Labor Market Implications of the COVID-19 Pandemic in the Philippines

Edited by
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Foreword

The COVID-19 pandemic is a public health crisis, but the large-scale community quarantines which started in the first quarter of 2020 to curb the spread of the virus had unprecedented effects on the global economy. The suspension of a broad range of economic activities due to mobility restrictions had adverse impacts on the labor market. World gross domestic product fell by 3.1 percent in 2020,[1] the sharpest drop since the years of the Great Depression. World unemployment accelerated to 6.6 percent.[2] In the Philippines, economic output fell by 9.5 percent in 2020, the first annual contraction since the 1998 Asian financial crisis. The country recorded its lowest labor force participation rate at 55.6 percent and highest unemployment rate at 17.6 percent in April 2020.[3] All these figures represent the complex combination of negative demand and supply shocks.

Now, nearly three years since the onset of the pandemic, economic and labor market indicators have seen significant improvements amid extraordinary government interventions. In 2022, the International Monetary Fund forecast the world and the Philippine economies to grow by 3.2 percent and 6.7 percent, respectively.[4] The global unemployment rate is expected to improve to 5.9 percent.[5] Meanwhile, in the Philippines, the labor force participation rate and unemployment rate improved to 64.8 percent and 6.0 percent, respectively, as of June 2022.[6] While several measures have been implemented to help mitigate the negative economic and social effects of the pandemic, a lot more could and should have been done. The COVID-19 pandemic revealed several opportunities for further improvement.

In April 2021, cognizant of the manifold implications of the pandemic on economic and labor market outcomes, former Governor Benjamin E. Diokno conceived of a labor market book project, the fulfillment of which is this book.

This book presents the different mechanisms by which the pandemic has affected employment and other elements of the labor market. It takes stock of what transpired in labor productivity, wages, human capital investment, consumption, and savings and sheds light on how the unanticipated health shock impacted not only people's daily activities but also the country's long-term economic growth prospects. It reveals the vulnerabilities of various aspects of the Philippine economy and recognizes the challenges that must be dealt with beyond the pandemic.

[1] International Monetary Fund (IMF) World Economic Outlook (WEO) Update, July 2022
[2] World Development Indicators (data retrieved on 23 August 2022)
[3] Philippine Statistics Authority (PSA) Labor Force Survey (LFS), April 2020
[4] IMF WEO Database, April 2022
[5] International Labour Organization ILOSTAT database (data retrieved on 23 August 2022)
[6] PSA LFS, June 2022

Documenting and estimating the full impact of the pandemic on people's lives and on the economy is a formidable task. The authors of this book take a significant step in venturing into the effects of the pandemic on the labor market.

Questions with important implications for policy are put forth and grappled with: How should policy deal with the "scarring effects" of the pandemic? Is public health spending sufficient? How should safety nets be designed? Should monetary and fiscal policy coordination be the new norm? When and how should support measures be withdrawn? How should the country and its population adapt to the new economy? What policies can be designed to ensure crisis preparedness and adaptability toward a more sustainable and inclusive growth path? These questions and other relevant issues were examined and synthesized by the authors of this book and will prove to be significant for post-pandemic policy development.

The findings summarized in the different chapters offer crucial lessons as the Philippines navigates the new economy:

First, the COVID-19 pandemic has emphasized the importance of a comprehensive health crisis response that addresses both health and socioeconomic impacts. While the World Health Organization has yet to declare the virus endemic, the prognosis appears less gloomy compared to when the health crisis began in 2020. Vaccines have been developed, the medical world has greater understanding of and tools for dealing with the virus, medicines against the virus are being developed, and the public has better awareness of and compliance with minimum health protocols. Nonetheless, the emergence of new COVID-19 variants could prolong the pandemic and result in new economic disruptions. Lessons learned reveal that strengthening health systems and social safety nets are essential.

This book presents the different mechanisms by which the pandemic has affected employment and other elements of the labor market. It takes stock of what transpired in labor productivity, wages, human capital investment, consumption, and savings and sheds light on how the unanticipated health shock impacted not only people's daily activities but also the country's long-term economic growth prospects.

The findings summarized in the different chapters offer crucial lessons as the Philippines navigates the new economy.

Second, the crisis has underscored that digital infrastructure must be recognized as a necessity and, as in other utility services, access to it must be equitably provided. Likewise, institutions and businesses that rely on brick-and-mortar models may need to be reinvented. Households, businesses, and academic institutions must consider greater investment in digital platforms.

Finally, the COVID-19 pandemic has affirmed the importance of policy coordination during crisis episodes. Monetary policy has increased liquidity and fiscal policy has allowed immediate spending and transfer of resources to the most vulnerable sectors. Together, these two policy realms have prevented a deeper economic contraction and laid the basis for recovery. Nonetheless, as we adapt to the new economy, authorities must be firm about reinstating the boundaries between the two types of policy. Failure to do so could imperil central bank independence and fiscal sustainability. The crisis has also underscored the need to have ample fiscal and monetary buffers during normal times to deal with shocks. Such was the case for the Philippines, as its buffers have been extensively and prudently used to aptly respond to the crisis.

The BSP hopes that this book will inform policy and stimulate further discussion and investigation on the implications of the COVID-19 pandemic, or other future crises of similar or greater magnitude, not just on the labor market but on other aspects of the economy.

We are grateful for the contributions of the chapter authors from the BSP Research Academy and Department of Economic Research, Philippine Institute of Development Studies, University of the Philippines School of Economics, and Ateneo de Manila University; and for the excellent guidance provided by Dr. Dante B. Canlas as consultant and editor-in-chief of this book.

The BSP is committed to support policy research that will help the economy build back better.

Felipe M. Medalla, Ph.D.
Governor
Bangko Sentral ng Pilipinas

1 | Introduction

Dante B. Canlas
UP School of Economics

1

1 | Introduction

Dante B. Canlas[1]

The labor market, together with commodity and financial markets, is central to the conduct of monetary policy. Following the restoration of democratic political institutions in 1986, the Philippine government began to institute several structural economic policy reforms. One of the most important ones was the establishment of the *Bangko Sentral ng Pilipinas* (BSP) in 1993 as a central monetary authority independent of the fiscal authority. In line with emerging trends in modern monetary theory, policy, and rules, the BSP Charter has been amended authorizing the BSP to set policy directions in money, credit, and banking conducive to "price stability, balanced and sustained economic growth, and employment."

Price stability is a primary objective of the BSP in recognition of the ability of a decentralized price system in a market-reliant economy to direct labor and capital to their most valued uses. Inflation is the antithesis of price stability; it creates noise that drowns out the signals from a price system. Granting the signaling functions of factor and commodity prices proceed smoothly, the efficiency in use of each factor of production rises, accompanied by sustained growth of total factor productivity (TFP) and real output per worker. In growth decomposition analysis, after accounting for the contributions to growth of real per capita income of increases in labor and capital, a residual remains. This is the TFP, often traced to technological progress. Given significant improvements in TFP, the country experiences a rise in real per capita income. As production proceeds, both labor and capital are each paid the value of their contributions to production, with sustained improvements in people's living standards. The upshot: the economy gets transformed and modernized.

In support of a sustained, stable, and broad-based growth, the BSP adopts monetary policy rules. There is a good deal of evidence globally that economies adopting such rules outperform economies that resort to discretionary actions. In this context, the BSP has embraced inflation targeting as a monetary policy rule. It must be noted, however, that there are other monetary rules, such as, monetary-aggregate targeting and exchange-rate targeting. The BSP is aware of the merits and demerits of the rules and, given the tools it could wield, it has mainly adopted inflation targeting over the others. The BSP may, however, use any of the other rules in combination with inflation targeting to advance the economy's efficiency and equity objectives.

There is, however, an empirical regularity worth noting: output growth tends to increase in the long run but not always smoothly. A market-oriented economy like the Philippines may experience some unanticipated shocks, ushering in unwanted business fluctuations from time to time such as rising unemployment rates and a decline in capacity utilization of capital. Policymakers in government are greatly concerned about unemployment, in view of its serious impacts on human welfare. Personal incomes decline, dragging consumption and savings

[1] *Professor Emeritus, UP School of Economics, and editor-in-chief of this book, authoring this first chapter as well as the last one.*

and, accordingly, household utility and welfare. As savings decline, investment suffers, with expected adverse effects on future economic growth.

The Monetary Board (MB), the BSP's highest policymaking body, is conscious of the adverse effects of unemployment on people's welfare and joins other government policymakers in extricating the economy out of high unemployment if it gets mired in such. And so the MB pays a good deal of attention to short-run developments, long-run trends, and outcomes—both actual and expected—in the labor market. A good understanding of the unemployment phenomenon is helpful in designing proper public policies as well as identifying the division of responsibility among various public institutions that have legitimate mandates over the unemployment problem. The BSP is most concerned about determining the appropriate monetary policy tools geared toward full employment.

Long-run economic growth as noted above is underpinned not only by increases in employment and capital but also by a rising TFP. Several decomposition analyses of output growth have shown that, after accounting for the contribution each to output growth of labor and capital, a big residual remains. The residual has been called by many growth scholars as the 'zone of ignorance' and have made the determination of the various factors behind it an essential part of their research agenda.

At the same time, shocks to employment, unemployment, and labor participation rates are widely recognized to be sources of sharp fluctuations seen in several economic indicators including earnings, consumption, savings, and investments. To prevent output declines and inflation outbreaks in the aggregate, the MB is careful and deliberate in using tools at its disposal, conscious that the goals of raising productivity and reducing unemployment and inflation rates may not be consistent with one another at all times. Balancing economic policies with a recognition of possible trade-offs is thus unavoidable.

The conduct of monetary policy and design of rules—whether inflation targeting, monetary-aggregate targeting, exchange-rate targeting, or something else—has long recognized the need to understand the behavior and response of people to any intervention. The MB, in assessing the efficacy of the tools at its disposal, continues to deepen its understanding of the operations of the labor market to maximize the likelihood of attaining BSP's primary objective of price stability, and providing a credit and financial environment conducive to real gross domestic product (GDP) and employment growth. In this context, the book at hand is intended to aid monetary policy by publishing scholarly labor-market studies in the Philippines, taking into account the economic impacts of the recent COVID-19 pandemic, possibly the most serious public-health shock in the country in recent years. The pandemic triggered a recession unprecedented in the post-World War II economic history of the Philippines.

The outbreak of COVID-19 in 2020 brought in its wake several formidable challenges in macroeconomic policy, both monetary and fiscal. The public-health shocks resulted early on in a deep output decline and severe unemployment. In 2020, real GDP

decreased by 9.5 percent—the sharpest drop in national output in a single year in the postwar era. The unemployment rate peaked at about 17.7 percent in the April 2020 round of the *Labor Force Surveys* (LFS) of the Philippine Statistics Authority (PSA), also without precedent. It has thus behooved policymakers in government to contain the coronavirus and restore the economy to its pre-pandemic growth path. In the long run, the pandemic set back the goal—articulated in the Philippine Development Plan (PDP) of 2016-2022—of achieving the status of a high middle-income economy in Southeast Asia by the end of the planning period.[2]

The pandemic threatens to persist following the emergence of easily transmissible variants of the coronavirus, although intensified mass vaccination in 2021 significantly slowed down COVID-19 infection rates. In the Philippines, public spending aimed at containing the coronavirus increased significantly in 2020-2021, resulting in outsized deficits in the national government budget. Recurrent borrowing to finance the budget deficits has caused the public debt to balloon, with concomitant challenges to the future conduct of monetary and fiscal policies.

The conduct of monetary policy, in particular, has been evolving and undergoing refinements including on the nature and extent of proper coordination and cooperation with fiscal policy. The latter, for instance, must determine the amount to allocate from the General Appropriations Act—or the budget of the national government—to ensure the growth of output per worker and of TFP. Many theoretical and empirical studies have endeavored to investigate the factors behind TFP. Expanding public-health spending in aid of containing the pandemic and restoring the economy to its growth path before the pandemic outbreak is widely accepted as a rational response. This is a task for the immediate period that forward-looking policymakers in government recognize as necessitating predictable multi-year allocations. A lot of coordination between the monetary and fiscal authorities is indicated.

To realize the social objective of containing the pandemic, a good understanding of the labor-market impacts of the public-health shocks across time is essential. A vital task is to shed light on the unwanted economic and social outcomes, as well as on the risk and uncertainty that the earlier containment approach has generated. Lessons learned from previous policies help guide the design of effective public-policy interventions in the foreseeable future. First and foremost, the MB seeks to raise the capacity of monetary tools

[2] Based on figures from the website of the International Monetary Fund (IMF), the Philippines has an annual nominal per capita GDP of USD 3,646 in 2020. It trails Indonesia, which has a per capita GDP of USD 4,256. Thailand, considered an upper middle-income economy, has a per capita GDP of USD 7,702. The Philippines at its current annual growth rate cannot match Thailand's 2020 per capita GDP in 2022. An annual average growth rate of 7.0 percent in the Philippines results in a doubling of per capita income, enabling the country to reach the lower bound, but not the upper bound, of a high middle-income economy, using World Bank definitions.

to smoothen tangled outcomes in labor markets from which many unwanted business fluctuations tend to emanate.

The chapters in this book have been prepared independently by their respective authors. There is, however, a unifying theme: the short- and long-run impact on the labor market of the COVID-19 pandemic that broke out in 2020. With this theme guiding the authors, a substantial amount of unity has been achieved even if each set of authors maintained full independence over content and organization of their respective chapters. The various authors have been selected taking into consideration their established expertise in macroeconomics, money and finance, and labor economics, with affiliation to well-known economics departments and public policy think tanks.

The book is organized as follows: After the **Introduction** (this chapter), **Chapter 2**—written by Emmanuel F. Esguerra and Karl L. Jandoc—describes episodes and trends in labor productivity, traditionally defined as the ratio of output to employment. It offers plausible explanations for episodes of productivity changes across time. The COVID-19 pandemic caused a severe decline in aggregate labor productivity in 2019 -2021. The authors trace this decline using a decomposition analysis into 'within-' and 'across-sectors' of productivity growth. Historically, improvements in labor productivity stem largely from within-sector rather than across-sector productivity growth; the latter is also referred to as structural change. The authors emphasize the importance of structural change and the need for economic policies that accelerate movement of labor from low-productivity occupations in traditional agriculture to high-productivity non-agriculture activities such as in industry and services. The pandemic revealed some unwanted movements of labor, i.e., a return to low-productivity pursuits in agriculture. Government must hasten to reverse these movements, perhaps through a new industrial policy.

Chapter 3 is written by Laura Britt-Fermo, Hazel Parcon-Santos, and Jose Eduardo Sto. Domingo. It opens an investigation of productivity and real wages in the country's information technology and business process management (IT-BPM), an important subsector in the service trades. The authors organized the objectives of the chapter by starting with the neoclassical marginal theory of the demand for labor and invoked the efficiency wage hypotheses to account for any divergence from the wage-marginal productivity equivalence. Amid the pandemic, the IT-BPM subsector has shown a capacity to be a leading growth area, outpacing even manufacturing, at a time when digitization is also fueling growth in retail, banking, and other financial services. This type of industrial transformation, however, has raised concerns on whether the envisioned economywide industrialization is achievable if the leading role for manufacturing is bypassed in the process. Alternatively, can services sustain industrialization? The authors underscore the positive spillover effects of IT-BPM on the other sectors of the economy through learning-by-doing, which is vital in realizing increasing returns and scale economies. It is noted, however, that while services may be able to sustain industrialization, the process requires building a scientific manpower base in view of the skill bias of technological upgrading in IT-BPM.

Chapter 4 by Geoffrey Ducanes investigates unemployment at the aggregate and disaggregate level. Movements of employment, unemployment, and labor force participation rates are tracked on a quarterly basis using concepts in PSA's LFS. The chapter reports details about the unemployed that rarely figure in popular discussions of unemployment before and after the outbreak of the COVID-19 pandemic. Profiles of the unemployed by age group, years of schooling, and regional location are well documented. In addition, search models of the labor market that explain job losses and findings yield key insights about the average length of unemployment spells by age and educational level. The author also adds a new dimension: the COVID-19 *unemployed*, or those who cited the legal and health measures that restricted their mobility, thereby providing a new reason for declaring themselves unavailable for work. This accounted for the unprecedented rise in the unemployment rate during the April 2020 quarterly round of the LFS. The high increase in unemployment among working-age individuals in the lowest income group exposed those most vulnerable—those most in need of social safety nets to be able to bounce back—to backsliding into poverty.

In **Chapter 5**, Faith Christian Cacnio, Marites Oliva, Neil Fidelle Lomibao, and Irene Rose Imson examine past and current states of youth unemployment in the Philippines and investigate the possible scarring effects and social disengagement brought about by the COVID-19 pandemic on young workers. Age groups 15–19 and 20–24 experienced surges in unemployment following the outbreak of the pandemic and consequent business lockdowns and social distancing aimed at containing the virus. Scarring effects, associated with foregone work experience and other aspects of on-the-job human capital accumulation, may impair the long-term employability of young workers. Earnings profiles of young workers across time tended to flatten. The authors also explore whether government employment and training programs can help mitigate the scarring and reduce the likelihood of creating a "lost generation" of young workers in the future. Limited data do not permit an analysis at this juncture of the overall impacts of these public programs.

In **Chapter 6**, Sarah Lynne S. Daway-Ducanes opens an inquiry into the macroeconomic and welfare effects of the pandemic in an overlapping generations (OLG) model with uncertain lifetime and social security. Recent surveys in a cross-section of countries, whether developed or developing, revealed a decline in the life expectancy of citizens. Survey findings are always helpful for theorizing. The author explores the expected impacts on labor supply, aggregate consumption, and savings of decline in survival probabilities in an OLG model with finite and uncertain lifetime; and adopts general-equilibrium calibrations to test hypotheses emerging from the model. In the short run, individual consumption path steepens, but in the long run, aggregate consumption, savings, work effort, and output decrease. The chapter illustrates well how building a comprehensive theoretical model of a public-health shock can lead to generalizable results.

Chapter 7, written by Michael Abrigo, Connie Dacuycuy, and Aniceto Orbeta, investigates the effects of the COVID-19 pandemic on lifetime labor productivity

and inequality. The organizing theoretical framework is a human capital model with uncertain lifetime that predicts declines in life expectancy. The time paths of health and education spending, two critical sources of human capital in the long run, were adversely affected by shocks from COVID-19, thereby impairing lifetime labor productivity. Inequality, measured by the Gini coefficient, worsens in due course. The authors used simulation exercises and found support for the predictions of the human capital model with survival probabilities, although the decline in life expectancy yielded by the simulation seems exceedingly large. The authors recognize the importance of using a dynamic model under uncertainty to examine the long-run economic implications of reduced life expectancy resulting from a public-health shock.

Chapter 8, written by Maria Margarita Debuque-Gonzales, Ma. Christina P. Epetia, and John Paul P. Corpus is a comprehensive empirical study of the effects of the COVID-19 pandemic on the probability of employment, hours of work, and real wages. The authors used figures from the PSA's LFS and employed both logit and multilogit regression methods, as well as ordinary least squares (OLS) to achieve the chapter's objectives. The probability of employment, hours of work, and real wages all declined at the height of the pandemic in 2020, but showed some improvements going into the year 2021. Even if wages are rigid, rationing of hours still led to a decrease in earnings, the product of hours of work and wage rates. Consequently, decreases in consumption, savings, and investments follow as a matter of course. Regression models by gender, class of worker, and location of work were also estimated and results showed the impacts of the coronavirus in varying degrees. Overall, the elaborate empirical models gathered in one place the most important labor-market variables that COVID-19 adversely affected, providing plausible explanations for the observed downswings in the business cycle in 2020-2021.

In **Chapter 9**, Charlotte Justine Diokno-Sicat, Valerie Gilbert T. Ulep, Robert Hector G. Palomar, Ricxie B. Maddawin, and Mark Gerald Ruiz empirically investigate the relationship between labor productivity and public health spending. The chapter offers another perspective on the effects of the COVID-19 pandemic on productivity. The results are qualitatively similar. In a regression analysis using cross-section data from ASEAN countries, the authors used GDP per worker as a measure of labor productivity and actual expenditures on public health, along with some health outcomes as proxy variables including life expectancy, mortality rates, and fertility rates. The regression estimates confirm the expected relationship between variables of interest, with labor productivity weakened by inadequate public-health spending. One policy suggestion is to keep on raising the share of public sector health spending in total health spending. The authors also made regression estimates using cross-section data of regions in the Philippines. Empirical results similar to the cross-ASEAN estimates were obtained, but were not as robust. Given the relative inadequacy of Philippine public-health spending by region, the inferior outcomes may well be expected.

Chapter 10, written by Renato Reside, examines an important dimension of forced savings, i.e., social security contributions financed by a payroll tax.

The effect of the COVID-19 pandemic on two legal systems—social security and retirement pay laws—are investigated quantitatively. Social security benefits consist mainly of retirement and disability payments. For private workers, the Social Security System (SSS) is the government institution in charge of the pension and retirement-benefit program. The SSS reserves the right to extend temporary relief measures, such as salary loans, when unanticipated shocks to personal income, say, natural disasters, intervene. This chapter is a case study of the social security benefits of SSS members. In the pre-pandemic era, the Social Security Commission envisioned increases in contributions commensurate to the rise in benefits of the members, but progress on these reforms was impeded by the COVID-19 pandemic. Contributions from members, regular or self-employed, both declined. Meanwhile, huge shares of the investible funds of SSS were diverted to members' social amelioration programs whose earnings and living standards were impaired by the pandemic. Laid-off workers, for example, were able to tap salary loans and other unemployment benefits. All of this reduced the returns from investments of the SSS. From a legal and institutional standpoint, the chapter recommends reforms in the two legal enactments. For example, the need to make SSS portable, instead of being dissipated if workers change employers, is crying out for an amendment of the SSS law, according to the author.

In **Chapter 11**, Maria Almasara Cyd N. Tuano-Amador, Veronica B. Bayangos, Marie Edelweiss G. Romarate, and Carl Francis C. Maliwat, dwell on another important feature of savings: remittances of both temporary overseas Filipino workers (OFWs) and permanent migrants. The authors review key factors driving remittance behavior, including altruism. The latter helps account for the stable growth of income-remittance flows despite the occurrence of geopolitical shocks and a public-health shock such as the COVID-19 pandemic, which ushered in unwanted business downturns in the host countries. The empirical findings show support for migrants motivated by altruism to assist relatives in the home country with additional cash transfers. Income remittances of temporary and permanent Filipino migrants are bound to affect the foreign-reserve position of the economy, resulting in significant movements in the exchange value of the peso against major currencies. Recent geopolitical shocks in the Middle East appear not to have dampened the altruism of OFWs. However, persistent geopolitical shocks outside the Middle East and the uncertainty they generate may test the motivation to remit, and eventually moderate, income remittances.

Chapter 12, authored by Zeno Ronald Abenoja, Jasmin E. Dacio, and Mark S. Romaraog focuses on the conduct of monetary policy based on inflation targeting (IT), the monetary policy rule the BSP has adopted since the enactment of a law in 1993 that transformed BSP into an independent monetary authority. Historically, IT has yielded salutary effects in the fight against inflation and in providing a monetary and financial environment that is pro-growth. The authors describe some adjustments in the IT rule following unanticipated shocks from the COVID-19 pandemic, which had sharp negative impacts on unemployment and the rest of the labor market. The BSP, ever watchful about providing the right

amount of liquidity to the economy, used other monetary tools such as the minimum reserve requirements on deposits of varying maturities which the BSP imposes on banks and non-bank intermediaries with banking functions. The BSP did so while at the same time designing exit strategies for extraordinary measures it had implemented. In the final analysis, IT has been made possible by establishing an independent BSP; it is ill-advised to create cracks in that independence on account of the COVID-19 pandemic.

In **Chapter 13**, Joselito Basilio, Faith Christian Cacnio, and Laura Britt-Fermo tackle coordination and cooperation with the fiscal authority in an economy reeling from the shocks of the pandemic triggered by COVID-19 and variants. A fiscal consensus developed globally early on among leading economists about overcoming the pandemic's unwanted economic and social impacts, resulting in some form of fiscal dominance. Central bankers also allowed, following the outbreak of the pandemic, some monetary accommodations of the unexpected budget deficits of governments, resorting to balance-sheet measures such as quantitative easing (QEs) and QE-like measures. The authors' regression evidence shows only a weak link between money and inflation, but with recent inflation outbreaks in some countries, central banks all over the world have started to retreat from QEs and QE-like tools while starting to hike interest rates in a bid, for one, to stem capital outflows. Scenarios have been depicted about high inflation, rising interest rates, burdensome public-debt servicing, and deep recessions in emerging economies like the Philippines. Such events are of grave concern to fiscal and monetary authorities. The authors recognize the fiscal drag rooted largely in declining tax revenues, and the likely crowding out of economic and social services in the national government budget with a rising debt-service burden.

Chapter 14 is the contribution of Zeno Ronald Abenoja, Cherrie Mapa, and Michael Lawrence G. Castanares, exploring the growing importance of big data and data science in the analytical and empirical analyses of labor markets. The authors use alternative data sources in their surveillance of the labor market. They employ a regression model augmented with a Google index and find significant improvements in predicting the unemployment rate. At the very least, the study suggests a reconsideration of the emphasis on stock variables and merely counting the numbers of the employed, unemployed, and the labor force. The chapter finds the ability of big data and data science to enhance the explanatory power of regression models traditionally reliant on small cross-section and time-series data. It invokes scholars to pursue the quantitative strategies opened up by big data and data science, made feasible, no doubt, by advances in information technology.

Chapter 15, which I wrote, concludes the volume. Instead of repeating the several important findings in the various chapters, it highlights lessons learned with clear policy implications toward employment growth—a goal BSP is committed to promote as stated in its amended charter. ■

2 | Labor Productivity, Structural Change, and COVID-19

Emmanuel F. Esguerra
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2

2 | Labor Productivity, Structural Change, and COVID-19

Emmanuel F. Esguerra[1], *and Karl Robert L. Jandoc*[2]

1. Introduction

Labor productivity, traditionally defined as the ratio of output to employment, is a critical determinant of a nation's economic performance. Its growth over time is essential to raising the surplus available for capital accumulation to enlarge the economic pie and sustain improvements in per capita income and living standards. Cross-country comparisons of per capita output growth and material wellbeing typically rely on differences in labor productivity.[3]

Labor productivity is determined by several factors apart from the worker's exertion of labor power. The deployment of labor to the most productive tasks and the provision of machines and other cooperating factors is a function of the organization and management of the enterprise, which is the capitalist owner's responsibility. Beyond the boundaries of the employment relationship, the available technology circumscribes the firm's choice of production technique given the pool of existing skills. Labor market institutions also impinge on productivity through their influence on firms' investment plans, employment prospects, human capital investment, and work incentives. At the macro level, the degree to which labor can be productive depends on the broader economic and policy environment that determines the pace and quality of economic growth. Market competition that spurs innovation conduces to raising productivity. Unstable growth that causes recurrent unemployment spells impedes labor productivity growth.

Despite picking up in the last two decades, labor productivity growth in the Philippines still lags behind what its regional peers have been able to achieve (World Bank, 2018). Underemployment remains stubbornly high, and poverty more closely correlates with the quality of employment rather than the lack of it. In March 2020, the COVID-19 pandemic forced a temporary suspension of most economic activities and restricted the movement of people and goods for the larger part of the year. As a result, the Philippine economy contracted by 9.5 percent in 2020, throwing five million people into open unemployment and causing about an equal number to stay out of the labor force in the second quarter (Ducanes, 2020). The unemployment rate reached a historic high of 17.6 percent in April 2020 while the underemployment rate climbed to 19 percent from 13 percent in the preceding year.[4]

While a sharp recovery in employment was seen by the second quarter of 2021, this recovery was characterized by a reallocation of employment into agriculture and wholesale and retail, where earnings have been comparatively low. The number of workers in agriculture and wholesale and retail increased by 12

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[2] Associate Professor, UP School of Economics

[3] Total factor productivity (TFP) is another measure commonly used. TFP accounts for growth in output beyond the growth of traditional inputs, capital, and labor. Calculated as a residual, it captures the efficiency with which inputs are employed to generate output. For a discussion of which statistic provides a "more appropriate" measure of productivity growth, see Sargent and Rodriguez (2000). This paper mainly looks at labor productivity.

[4] See Debuque-Gonzales, Epetia, and Corpus (2022, Chapter 8 in this volume) for a more extensive description of the labor market situation during the pandemic.

Despite picking up in the last two decades, labor productivity growth in the Philippines still lags behind what its regional peers have been able to achieve.

and 15 percent, respectively, possibly exacerbating the poverty situation as these two sectors already account for the largest shares of employment in the Philippines but exhibit the lowest earnings compared to the rest of the economy.

This chapter examines what happened to labor productivity during the pandemic-induced recession of 2020-2021. It picks up from the discussion in development literature on the drivers of labor productivity growth in developing countries, and from the observation that structural change has figured less prominently as a source of productivity growth in the Philippines (World Bank, 2018). Our approach follows the standard decomposition of labor productivity growth in the structural change and economic growth literature (McMillan & Rodrik, 2011) where the rate of growth of labor productivity is decomposed into its intrasectoral and intersectoral components. The first one results from changes within a sector, as when firms adopt new technology or improve production processes, or when exposure to international competition enforces greater efficiency among firms. The second component results from the movement of labor from low- to high-productivity sectors, also referred to as structural change.

Although we focus on the relatively short period 2020-2021, bringing the earlier years into the discussion is both important and unavoidable for context. In an earlier study covering the period 1998-2016, the World Bank (2018:12) observed that the "relatively small contribution of structural change to productivity growth in the Philippines makes it an outlier among its regional peers." Similarly, de Dios and Williamson (2015) noted the limited role played by structural change as a driver of labor productivity growth since the 1950s in terms of the inability of manufacturing—and industry in general—to absorb the excess labor from low-productivity agriculture. The result has been a shallow kind of industrial transformation, with industry currently accounting for no more than its share of GDP in the early 1950s and the services sector absorbing most of the labor released from agriculture (Clarete, Esguerra, & Hill 2018:24). This paper extends the analysis beyond 2016 with the main interest being in how the pandemic disturbed the status quo. Unlike the World Bank study which had the benefit of firm-level data, this study mainly uses aggregate and sectoral value added and employment data throughout the analysis.

Our examination of labor productivity shows that, since 2000, labor productivity continuously grew—except for the 2008-2009 period attributable to the Global Financial Crisis, and a deep decline from 2019 to 2021 due to the fallout from the pandemic-induced recession. Nearly 80 percent of productivity growth is captured by *within-sector* productivity growth. The most rapid rise in labor productivity occurred during the 2011-2015 period when the growth rate of labor productivity was more than twice that of the 20-year average. During the early COVID-19 period from 2019

to 2020, there was a reversal of the structural transformation pattern of the past 20 years when employment unprecedentedly shifted towards agriculture and away from the mobility-dependent services sector. There was a partial recovery of employment in the services sector in 2021, but not quite back to pre-pandemic levels.

The next section provides a selective review of what is known thus far about labor productivity in the Philippines based on previous studies. We focus on those that employ the decomposition method that we elaborate on below. The third section describes the methodology in detail and the data used for the subsequent analysis. The fourth section presents our results. The fifth section concludes with a discussion of outstanding issues concerning increasing labor productivity in the Philippines.

2. Antecedent work

That gaps in per capita incomes and material wellbeing across countries are traceable to differentials in productivity is a widely acknowledged fact in development economics. The rate of growth of productivity is thus an important variable for explaining a country's progress through time. As already mentioned above, the growth rate of labor productivity derives from intrasectoral (within sector) and intersectoral (between sectors) sources. McMillan, Rodrik, and Sepúlveda (2016:6–7) make the case that policies intended to push intrasectoral productivity growth, such as investing in human capital and improving governance, need not lead to structural transformation; similarly, policies to foster industrialization through subsidization of industries can succeed without substantially raising human capital and improving the quality of institutions. However, banking mainly on one set of policies can lead to growth that is either long drawn-out or episodic rather than rapid and sustained.

Structural change nevertheless looms large in the experience of countries that have achieved rapid rates of economic growth. As formalized by Arthur Lewis, the process involves shifting resources, chiefly labor, from low-productivity activities or sectors (e.g., traditional agriculture) to high-productivity ones (e.g., modern industry), leading to a rise in economy-wide productivity and an expansion of incomes. Monte, Kouame, and Mensah (2022) note the high labor productivity achieved by many Asian countries that underwent "deep structural change," in contrast to that experienced by most African and Latin American countries which relied principally on raising intrasectoral productivity.

Still, the process of structural change is by no means as neatly set out in stylized models but is contingent on the specific characteristics of individual countries and their circumstances at a point in historical time. Studies decomposing the overall growth in labor productivity into its intrasectoral and structural change components for several countries in Asia, sub-Saharan Africa, and Latin America reveal the variety of experiences and diversity of outcomes with respect to structural change (McMillan, Rodrik, & Sepúlveda, 2016). For example, while it catapulted Botswana and Brazil to middle-income status, structural change has not been much of a factor in these two countries' recent growth performance; in Vietnam and Ghana, structural change has been a major contributor to growth in the last twenty-plus years although Vietnam's pace of industrialization has proceeded more rapidly; while in India, Nigeria, and Zambia, the structural change that has supported growth is of a different kind, marked by a slow decline of agricultural employment and the absence of a robust labor-intensive manufacturing sector catering to the global market (ibid:4).

It is possible, as McMillan and Rodrik (2011:50) argue, for structural change "to reduce rather than increase economic growth." Citing country cases in Latin America and sub-Saharan Africa in the era of globalization, they note that "globalization appears not to have fostered the desirable kind of structural change. Labour has moved in the wrong direction, from more-productive to less-productive activities, including, most notably, informality." Here they are referring to workers in import-competing manufacturing industries who were displaced as a result of trade liberalization and who subsequently found themselves in lower-productivity jobs that abound in the services sector. McMillan and Rodrik also identify which factors likely determine the differences in the contribution of structural change to overall labor productivity among 38 countries exposed to globalization over the period 1990 to 2005. By regressing the share of structural change in overall labor productivity against selected correlates, they found that structural change tends to reduce growth in countries with a comparative advantage in natural resources, with overvalued currencies, and with overly rigid labor markets.

The World Bank (2018) reports significant growth in labor productivity in the Philippines since the late 1990s, which it attributes to the lagged effect of structural reforms introduced in the late 1980s and the 1990s. These were notably in the areas of trade, finance, and infrastructure development which sought to improve the country's external competitiveness. But as Monte, Kouame, and Mensah (2022) found for a larger set consisting of 36 developing countries, structural reforms have affected labor productivity growth via the intrasectoral, not the structural change, component. The World Bank's report on the Philippines does not contradict their findings:

> *This growth mainly reflects a rise in within-sector productivity growth in manufacturing and services and a small contribution of structural change. The contribution of structural change has remained small because most of the labor that moved out of agriculture went to low-end services—a sector with higher average productivity than agriculture but lower average productivity than manufacturing and formal services. The relatively small contribution of structural change to productivity growth in the Philippines makes the country an outlier among regional peers, as structural change played a central role in driving labor productivity growth in countries such as China, Indonesia, Malaysia, and Thailand.* (World Bank, 2018:12)

Indeed, the limited contribution of structural change to Philippine growth is apparent in the sectoral breakdown of GDP and employment. Industry currently accounts for 30 percent of GDP and 19 percent of employment while the corresponding shares for services are 62 percent and 58 percent, respectively. In particular, the manufacturing sector accounts for 19 percent of GDP and 8.5 percent of employment. Meanwhile, the contribution of agriculture to GDP is at 8.8 percent while providing jobs to 23 percent of the total employed.[5] Unlike several of its economically successful regional neighbors, the Philippines deviated from the archetypal development path from agriculture to industry. As industry's share of employment stagnated in the 1990s, services overtook agriculture as the employment share of the latter continued to decline.

[5] Preceding figures are all as of 2019, i.e., pre-pandemic.

In their inquiry into the reasons for the Philippines' failure to industrialize notwithstanding a period of import-substituting industrialization in the 1950s, de Dios and Williamson (2015) explore a number of possible explanations, which include: political instability in the 1980s until the early 1990s that resulted in a failure to attract manufacturing foreign direct investment; trade liberalization in the 1990s that constricted the domestic market for local manufacturers; industrial de-skilling on account of an exodus of labor for overseas jobs starting in the 1990s; and the penalty on manufactured exports rendered by a persistently appreciating peso. They show that despite progressively rising within-sector labor productivity in manufacturing in 1956-2009, productivity growth due to structural change was negative for the most part reflecting the sector's inability to grow and absorb more labor into productive employment.

Against this backdrop, we ask: how has labor productivity responded to past economic downturns as well as to the more recent pandemic-induced one? Theoretically, labor productivity could rise if firms decide to retain only their best workers, or if workers facing a higher probability of job loss are driven to exert greater effort (Biddle, 2014). On the other hand, productivity could fall if firms decide to maintain more workers than technically required to produce current output in the face of hiring, firing, training, and other costs not directly related to production.[6]

Lim and Bautista (2001) noted a procyclical trend in aggregate labor productivity, declining during recessions and rising during expansions. Sectoral labor productivities, of course, play a role. The procyclicality of overall labor productivity has been previously noted and attributed to the structure of the Philippine economy (Human Development Network 2002). Without income support during downturns, displaced workers find self-employment in low-productivity jobs in the agriculture or informal services sectors, causing overall labor productivity to decline. Alba and Dacuycuy (2009) find labor productivity in manufacturing, mining, construction, and in finance, insurance, real estate, and business services (FIREBS) to be countercyclical, while procyclical in the rest of the sectors.

However, the pandemic is known to have adversely affected employment almost across the board, including in those sectors associated with low productivity. In this case, aggregate labor productivity could have risen or fallen from its pre-pandemic level. For example, Bloom et al. (2022), using a unique firm-level survey and a methodology akin to McMillan and Rodrik (2016), decomposed labor productivity (as well as TFP) in the United Kingdom during the COVID-19 pandemic. They found an increase in labor productivity during the first year of the pandemic on account of the severe contraction of hours worked in low-productivity sectors and firms. This more than compensated for the decline in within-firm labor productivity.

[6] This is known as labor hoarding. Acknowledgement of this concept as a reason for the procyclicality of labor productivity was due to the formal models advanced in the 1960s by Holt et al. (1960, as cited in Biddle (2014)) and Oi (1962). Both models describe a firm's multi-period demand for labor, pointing out that the optimizing firm will not change its employment proportionately with a change in product demand.

Other factors also come into play. The increasing use of nonstandard employment contracts has brought down the cost of adjusting employment levels in response to business fluctuations, thus reducing the need to hoard labor. Similarly, the possibility of performing work offsite as a result of new technology may be expected to differently affect labor productivity between those sectors or firms where physical presence or face-to-face interaction with customers is not critical and those where in-person appearance is required by the nature of the job. As Bloom et al. (2022) found, COVID-19 raised productivity in firms of the former type and caused it to fall in the latter.

3. Methodology and data

Our methodology for decomposing the growth in labor productivity follows the one of McMillan and Rodrik (2011), thus:

$$\Delta Y_t = \sum_{i=1}^{n} \theta_{i,t-k} \Delta y_{i,t} + \sum_{i=1}^{n} y_{i,t} \Delta \theta_{i,t},$$

where Y_t and $y_{i,t}$ are respectively the economy-wide and sectoral labor productivity levels, $\theta_{i,t}$ is the employment share of sector i at time t, and n is the number of sectors. The operator Δ indicates the change in productivity or employment shares between time t-k and t.

The first term on the right-hand side is the intrasectoral component of productivity growth. It is the sum of productivity growth in the sectors at time t weighted by their respective shares in employment in some initial period, t-k. This term is also called the "within-sector" component of productivity growth, which summarizes efficiency improvements within sectors due to innovation, technology adoption, or the reorganization of the production process.

The second term is the intersectoral component or structural change. It is the weighted average of the change in employment shares across the sectors where the weights are the sectoral productivities at time t. Also referred to as the "across-sector" component, it accounts for the change in productivity arising from the reallocation of labor between or across sectors.

For the subsequent analysis, we use annual data on real gross value added (GVA) from the National Income Accounts and on employment from the Labor Force Surveys; both datasets are sourced from the Philippine Statistics Authority (PSA). These data are disaggregated by sector/industry through the years under consideration, 2001-2021, essentially following the Philippine Standard Industrial Classification (PSIC).

We consider the following nine broad sectors in our analysis: (A) agriculture, forestry, and fishing (AFF); (B) mining and quarrying; (C) manufacturing; (D) public utilities (electricity, gas, water, and waste management); (E) construction; (F) wholesale and retail trade, and hotels and restaurants (WRTHR); (G) transportation, storage, information, and communication (TSIC); (H) finance, insurance, real estate, and business services; administrative and support service activities; and professional, scientific, and technical activities (FIREBS+); and (I) community, social, personal, and government services (CSPGS).

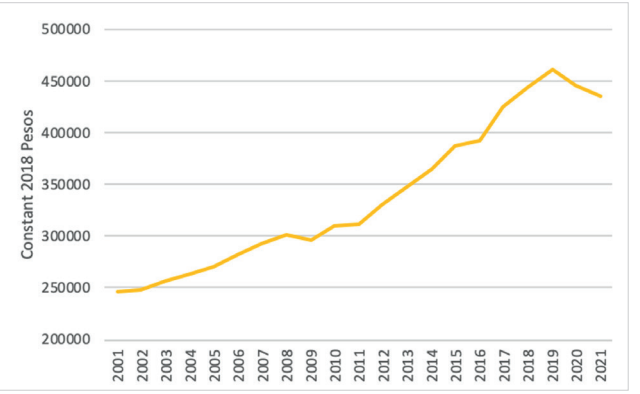
Disaggregated data on sectoral real value added and employment, however, do not necessarily conform to the nine-sector classification above. Real value added, for example, is broken down into 16 sectors while employment has 17 sectors for 2001 to 2011 and 21 sectors for 2012 to 2021. Thus, some sectors were grouped to generate the nine broad sectoral groupings we are working with, guided by the definitions provided by the various versions of PSIC and concordance tables.[7]

In many parts of the analysis, we focus on the last 20 years (2001-2021) to capture longer-horizon movements in labor productivity. This period encompasses episodes of slow (2001-2010) and rapid (2011-2015) economic growth for the country. From 2016 onwards, economic growth still continued its momentum but was disrupted unprecedentedly by the strongest post-war economic shock due to the COVID-19 pandemic. Hence, a part of the discussion is devoted to documenting productivity movements in this period.

4. Labor productivity in the Philippines

Over the 20-year period covered in this study, labor productivity (real value-added per worker) rose consistently (Fig. 1). From 2002 to 2021, productivity growth averaged 2.93 percent, with the steepest increase in labor productivity occurring in 2012 to 2015 at 5.5 percent. This period of strong labor productivity growth coincided with the period of rapid and uninterrupted GDP growth. Most industries followed a generally increasing trend in economywide labor productivity, with the exception of mining and quarrying which exhibited a more volatile pattern over this period (Fig. 2). The sharp dip in mining after 2009 can be attributed to the aftermath of the Global Financial Crisis which forced the shutdown of mines globally. The recovery from 2012 onwards was due to the opening of mineral rights for nickel exploration, jumpstarting mineral investments. This period also saw the increase of exports of non-ferrous metals which increased mining revenue (Clemente, Domingo, & Manejar, 2018).

Figure 1. Trends in labor productivity, 2001-2021 (value-added per worker).



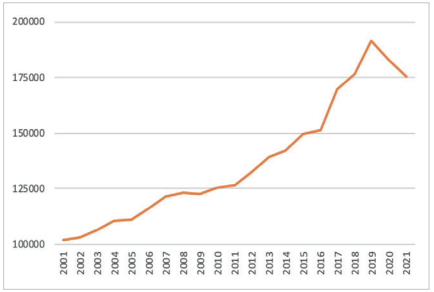
Source of basic data: Philippine Statistics Authority (PSA)

Construction and FIREBS+ saw a moderation in labor productivity growth from 2015 to 2019. For construction, the dip in 2015-2016 was due mainly to the strong surge in employment in the construction sector with GVA not keeping pace. This was probably caused by the initial inertia from the shift away from the public-private partnership (PPP) financing modality. Productivity recovered from 2017 onwards as several big-ticket infrastructure projects under the Build-Build-Build program commenced. In the same manner, robust employment growth in the FIREBS+ sector

[7] See Annex for the concordance used to generate these sectors.

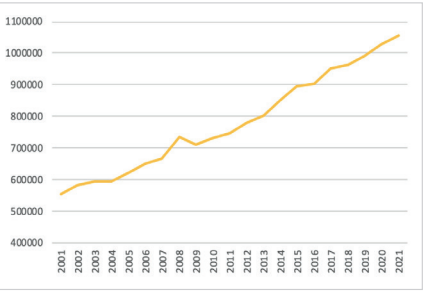
Figure 2. Trends in sectoral labor productivity, 2001-2021 (in 2018 constant PhP).

(A) AFF

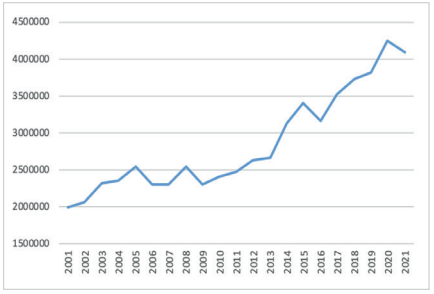


(B) Mining and quarrying

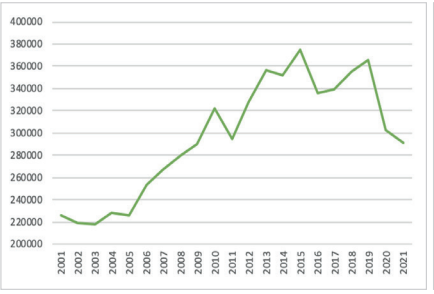
(C) Manufacturing



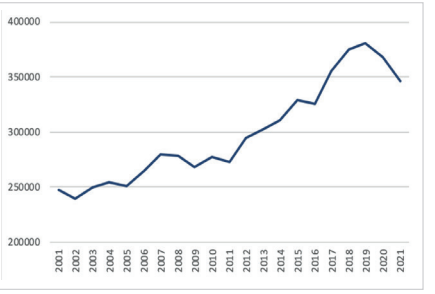
(D) Public utilities



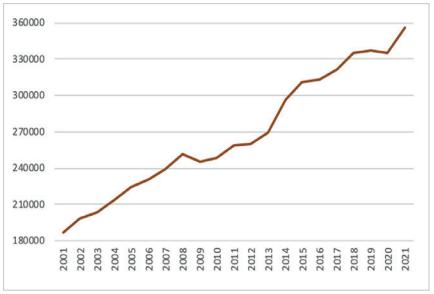
(E) Construction



(F) WRTHR

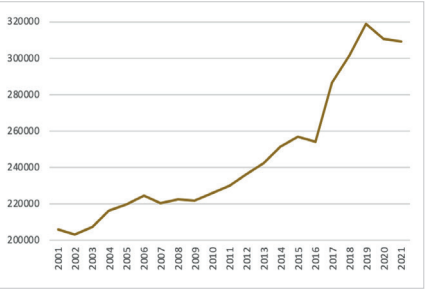


(G) TSIC



(H) FIREBS+

(I) CSPGS



post-2015 with slightly slower GVA growth shaped the moderately decreasing labor productivity trend over this period.

There were two noticeable slumps over the 20-year period—the first in 2008-2009 and the second in 2019-2021. The first dip in 2008 was caused by the Global Financial Crisis which precipitated a huge drop in labor productivity in public utilities, FIREBS+, WRTHR, and the manufacturing sector (Fig. 2). However, this dip was mild compared to the decline caused by the COVID-19 pandemic in 2020. From 2019 to 2021, aggregate labor productivity declined in absolute terms by 5.6 percent, with mining, construction, FIREBS+, and WRTHR being the hardest hit (Fig. 2).

The evolution of employment shares in the 2000s has continued the pattern documented since the 1990s (e.g., Hasan & Jandoc, 2010), showing a retreat in the share of agriculture and a surge in the share of service workers in total employment (Table 1).[8] The share of agriculture workers decreased from an average of 36.6 percent in 2001-2005 to 24.6 percent in 2016-2021. On the other hand, the service sectors (FIREBS+, WRTHR, TSIC, and CSPGS) all showed an increase in shares over the same period, with the largest gain in shares from FIREBS+ and WRTHR of more than 3 percentage points on average.[9] Over the same period, the movement in employment shares in industry was more varied: manufacturing decreased by slightly more than a percentage point, public utilities remained relatively constant, and construction increased by almost 4 percentage points, on average.

Table 2 shows relative labor productivity, which measures a sector's labor productivity against the labor productivity of the economy as a whole. Throughout the two decades, AFF productivity has been about 60 percent lower than the economywide labor productivity. Other sectors having lower than the economywide labor productivity—i.e., with ratios less than 1—are those with huge workforces such as construction, WRTHR, TSIC, and CSPGS. Manufacturing, public utilities, mining and quarrying, and FIREBS+, on the other hand, are the only major employment sectors with higher than economywide labor productivity. While the public utilities sector has the highest relative labor productivity, its share in employment is the lowest among all sectors.

Table 1. Sector composition, as percentages of total employment

	2001-2005	2006-2010	2011-2015	2016-2021	2019-2021
AFF	36.56	34.75	31.18	24.57	23.62
Mining and quarrying	0.36	0.47	0.62	0.48	0.44
Manufacturing	9.67	8.74	8.29	8.40	8.23
Public utilities	0.38	0.40	0.38	0.37	0.36
Construction	5.37	5.36	6.28	9.25	9.72
WRTHR	20.99	21.92	22.93	24.18	24.58
TSIC	7.43	7.63	7.88	8.53	8.46
FIREBS+	3.06	3.88	4.85	6.39	6.82
CSPGS	16.19	16.84	17.59	17.85	17.77

Source of basic data: PSA

[8] The cause and consequence of this premature industrialization or "development progeria" are discussed in Fabella (2013).

[9] The shift of employment toward the service sectors is fueled in part by the greater role of overseas employment in the national economy and the emergence of the business process outsourcing (BPO)/ information technology-business process management (IT-BPM) industry. The higher incomes made possible by these two developments have increased the demand for most other services, including real estate, wholesale and retail trade, food and hospitality, transport, and local travel (see de Dios, 2022).

Table 2. Relative labor productivity

	2001-2005	2006-2010	2011-2015	2016-2021	2019-2021
AFF	0.41	0.41	0.40	0.40	0.41
Mining and quarrying	2.86	2.36	1.69	1.84	1.85
Manufacturing	2.29	2.35	2.34	2.27	2.29
Public utilities	8.74	7.98	8.17	8.65	9.04
Construction	0.87	0.95	0.98	0.77	0.71
WRTHR	0.97	0.92	0.87	0.83	0.81
TSIC	0.80	0.82	0.80	0.77	0.77
FIREBS+	4.67	4.31	4.01	3.36	3.18
CSPGS	0.82	0.75	0.70	0.68	0.70

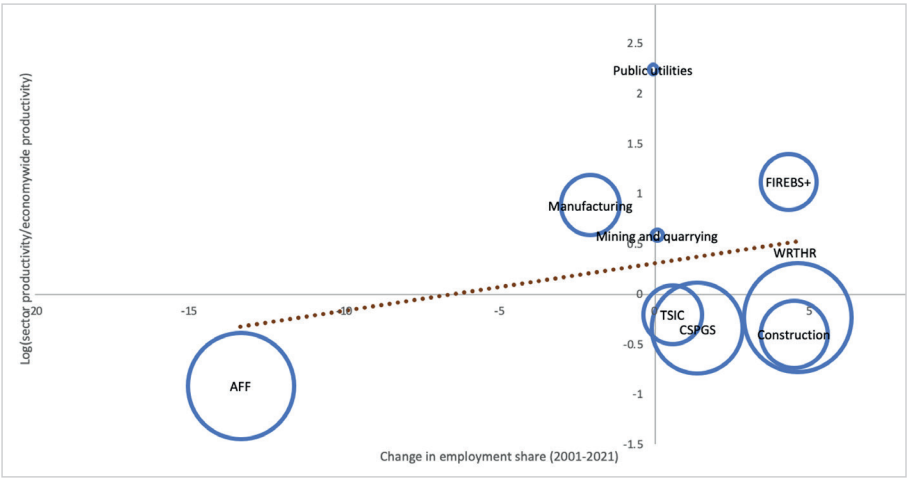
Source of basic data: PSA

To establish whether workers moved to relatively more productive sectors over the 20-year period, Fig. 3a plots the correlation of sectoral productivity and employment shares. The horizontal axis indicates the percentage point change in employment shares between two periods of consideration: in this case, 2001 and 2021. Note that a negative number implies that there is a lower proportion to total workers employed in that sector in 2021, even if the *absolute* number of workers has risen in that sector. The vertical axis indicates the logarithm of relative labor productivity (see Table 2) in 2021. A positive number means that a sector's labor productivity is higher than the economywide productivity. The size of the circles indicates employment share in 2021, where a larger circle means the sector has a larger share in total employment.

Figure 3a shows a positive correlation —the trendline is upward sloping— indicating that sectors with increased employment shares are the relatively more productive sectors. In particular, AFF, a low-productivity sector, lost 13.4 percentage points in terms of sectoral share while FIREBS+, WRTHR, and construction—sectors with relatively higher labor productivity than AFF— gained more than 4 percentage points. Except for FIREBS+, however, the other sectors which gained employment shares (i.e., circles that lie to the right of the vertical axis) all have lower than the economywide labor productivity (i.e., circles that lie below the horizontal axis). On the other hand, manufacturing, a major employer with relatively high labor productivity, has been losing employment share in the last two decades. Again, this illustrates the deviation of the country from the usual "East Asian growth pattern" of structural change away from agriculture toward industry.

Figure 3b repeats the same exercise over shorter time periods. From 2001-2005, WRTHR, FIREBS+, and TSIC were the main sectors absorbing workers. However, in the rapid growth period from 2011 to 2015, manufacturing witnessed a renaissance, marginally increasing its employment share while being relatively more productive. In 2016-2021, FIREBS+ increased its share by 1.5 percentage points, the highest it had increased in all the 5-year periods under consideration. As we shall see later, this has contributed to the largest across-sector component of productivity growth in the past twenty years. During the COVID-19 period (2019-2021), the pattern of structural change was completely reversed, as workers moved to low-productivity agriculture and away from mobility-dependent and high social interaction sectors such as TSIC and manufacturing (see panel (v); also Chapter 8 of this volume). The reduction in the employment shares of FIREBS+, WRTHR, and construction is also evident and more pronounced in the sub-period 2019-2020 (see panel (vi)). By 2020-2021,

Figure 3a. Correlation between sectoral productivity and change in employment shares, 2001-2021



Source of basic data: PSA

we observe the positive slope pattern again where relatively more productive sectors like FIREBS+ were increasing employment shares while low-productivity AFF was losing its share (panel (vii)). During this period, however, construction and WRTHR were the only other sectors that increased their employment shares. Thus, the recovery was not enough to offset the structural reversal that started in 2019 (see panel (v) in Fig. 3b).

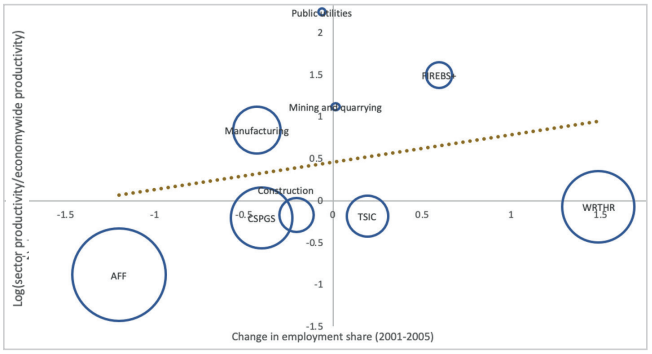
We saw in Fig. 1 that labor productivity had grown during the period 2001-2021; we now focus on the factors that contributed to this increase. As discussed in Section 2, labor productivity growth can be decomposed into intrasectoral and intersectoral changes. To reiterate, intrasectoral components have to do with those that improve efficiency *within* sectors such as technology adoption while intersectoral components capture productivity growth emanating from movement of workers *across* sectors, which is typically positive when the movement is from low-productivity to high-productivity sectors. Another aspect of the intersectoral component is rising productivity in sectors where employment is increasing.

Overall labor productivity growth in the past two decades averaged 2.93 percent per year (Table 3). Most of this was due to within-sector growth (2.12 percent) and only 0.81 percent was due to across-sector improvements. In general, the within-sector component dominated productivity growth, except for the period 2016-2021 when the across-sector component had a larger share in productivity growth. During this period, the within-sector component was much more volatile than the across-sector component, with very sharp dips in 2016 and 2020-2021 (Fig. 4). Zooming in on the 2019-2021 period in Table 3 shows that, had it not been for the positive contribution of the across-sector component, the decrease in labor productivity could have been deeper. Consistent with the story as shown in Fig. 3b panel (vii), this suggests that after the initial shock caused by COVID-19 in 2020, when workers reallocated to low-productivity agriculture and self-employment, there was a recovery in 2021 when mobility restrictions were relaxed and employment surged for sectors such as WRTHR and FIREBS+.

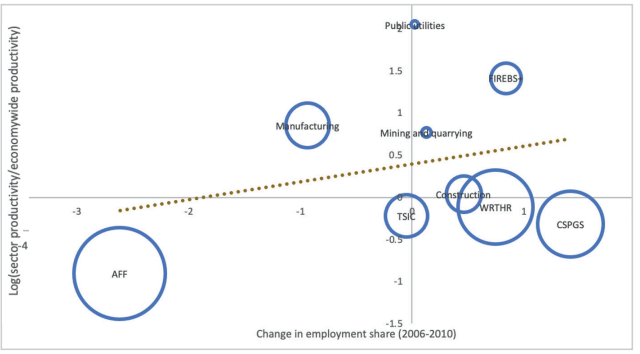
During the rapid and sustained growth phase of 2011-2015, we see from Fig. 4 that both within-sector and across-sector components were mostly positive, leading to the highest average growth of labor productivity of 4.53 percent within the 20-year period. The

Figure 3b. Correlation between sectoral productivity and change in employment shares, over various periods

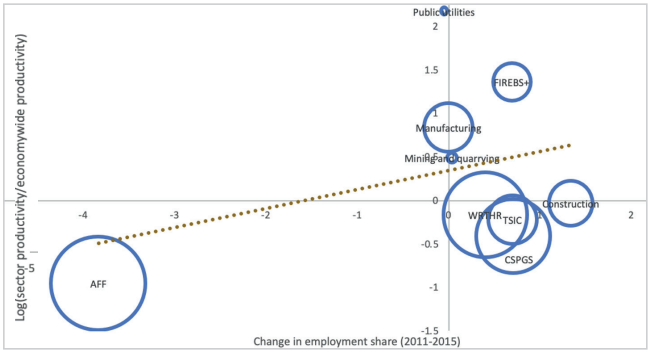
(i) 2001-2005



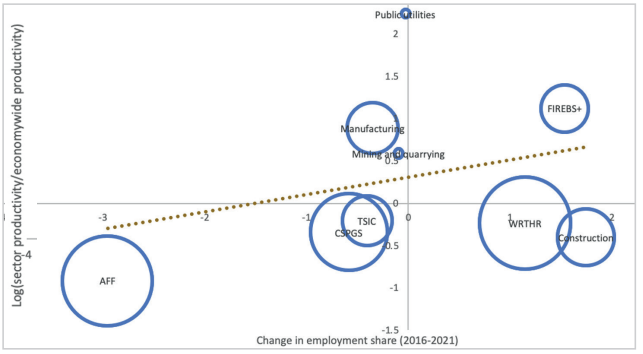
(ii) 2006-2010



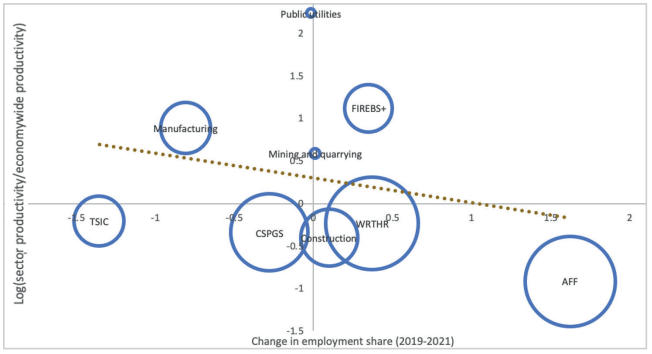
(iii) 2011-2015



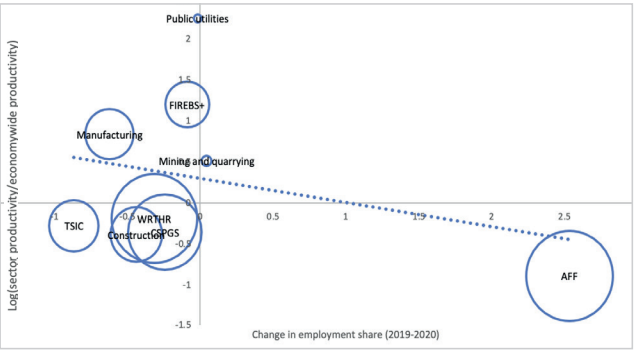
(iv) 2016-2021



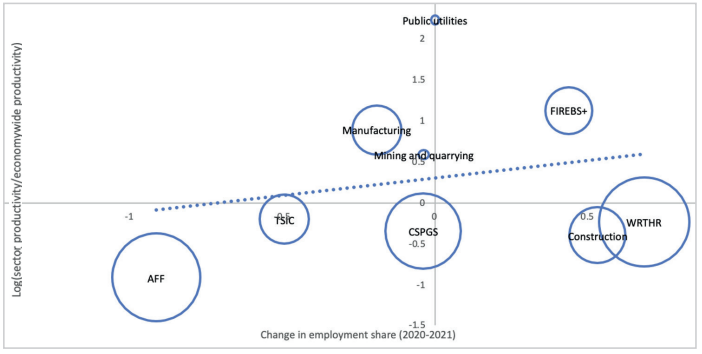
(v) 2019-2021



(vi) 2019-2020



(vii) 2020-2021



Source of basic data: PSA

within-sector took the lion's share of this growth, suggesting that productivity-enhancing activities within these sectors drove most of the improvements in labor productivity.

Which sectors were responsible for driving the patterns in the within- and across-sector components of labor productivity? Figure 5a shows that in all periods, manufacturing accounted for the bulk of within-sector productivity growth. In the robust growth years of 2011-2015, WRTHR and FIREBS+ also contributed substantially to within-sector productivity growth. This shows that strong economic growth can create a lot more elbow room in allowing adoption of productivity-enhancing technology or more efficient use of labor and non-labor resources. During the COVID-19 period, FIREBS+, WRTHR, and construction contributed negatively to within-sector productivity growth due to the steep drop in their sectoral labor productivity (see Fig. 2 earlier). Within these are subsectors (e.g., accommodation, restaurants, real estate) that experienced a disproportionate drop in GVA—at a rate faster than the drop in employment—due to severe lockdown restrictions.

On across-sector productivity, FIREBS+ and WRTHR had consistently large positive contributions while AFF and manufacturing had negative contributions all throughout the two decades.[10] As we saw earlier, the contribution of FIREBS+ is high because its productivity is higher than economywide productivity *and* it has continuously increased its share in employment (i.e., FIREBS+ always lies in the first quadrant in Fig. 3b). If FIREBS+ had not increased its employment share and absorbed workers from other sectors, overall labor productivity would have been substantially lower.

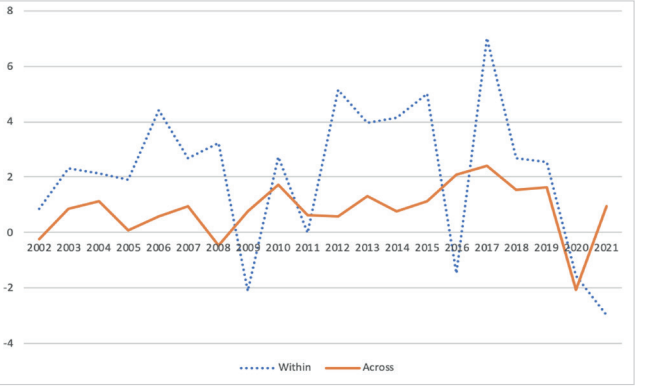
A possible explanation for the resilience of FIREBS+ in terms of employment and productivity amid the COVID-19 crisis is its high telework potential, or the degree to which jobs in these industries can be feasibly done at home or offsite

Table 3. Within-sector and across-sector components of productivity, by various periods (percent)

	Annual growth	Within-sector	Across-sector
2002-2005	2.24	1.79	0.44
2006-2010	2.87	2.18	0.70
2011-2015	4.53	3.65	0.88
2016-2021	2.11	1.02	1.09
2019-2021	-0.52	-0.68	0.16

Source of basic data: PSA

Figure 4. Trends of within-sector and across-sector productivity growth

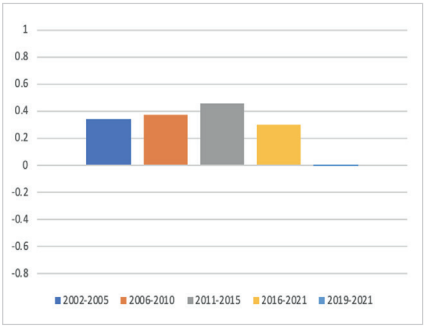


Source of basic data: PSA

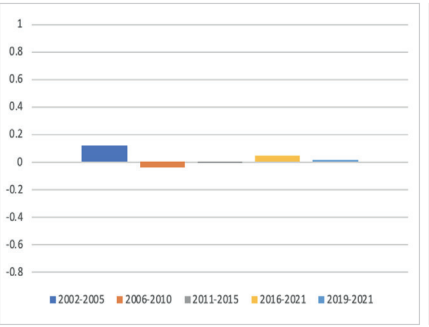
[10] Williamson and de Dios (2014) documented the negative contribution of manufacturing to across-sector productivity growth since the 1950s, except for positive contributions during the period 1965-1970 and 1985-1995. According to the authors, the 1965-1970 period witnessed a revival of manufacturing that resulted from the easing of quantitative restrictions in 1962, but the revival was short-lived. The growth periods of 1985-1995 were wiped out by, among others, the power crisis in the early 1990s.

Figure 5a. Sector contributions to overall within-sector productivity growth

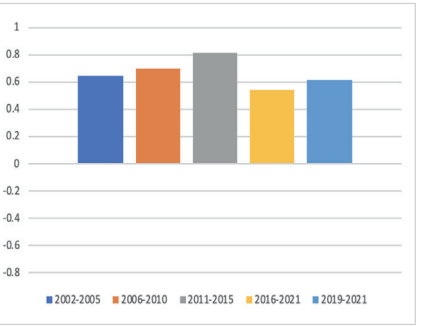
(a) AFF



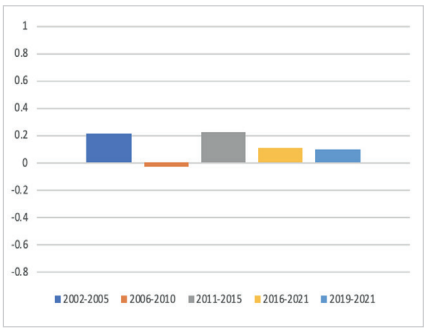
(b) Mining and quarrying



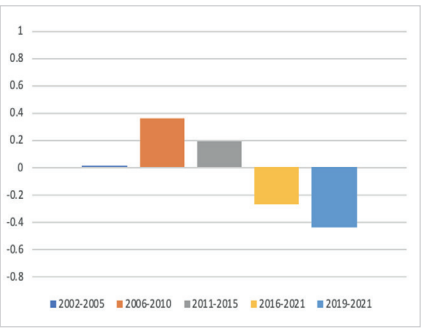
(c) Manufacturing



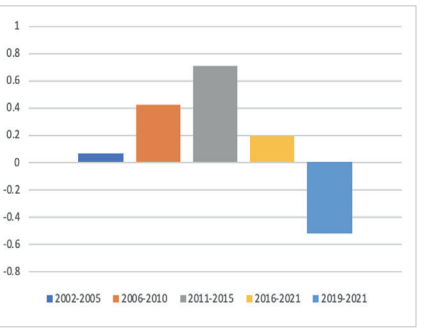
(d) Public utilities



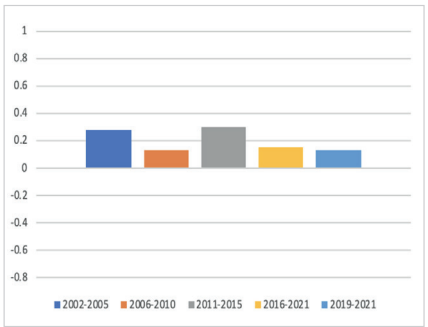
(e) Construction



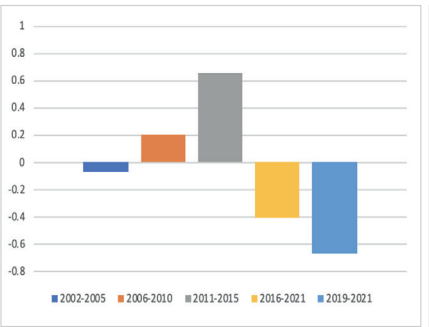
(f) WRTHR



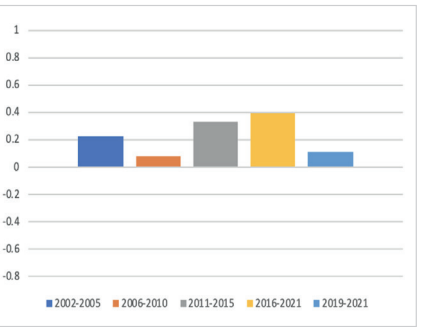
(g) TSIC



(h) FIREBS+



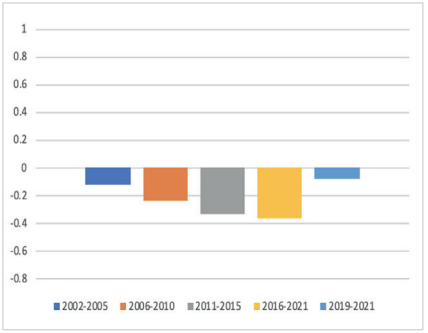
(i) CSPGS



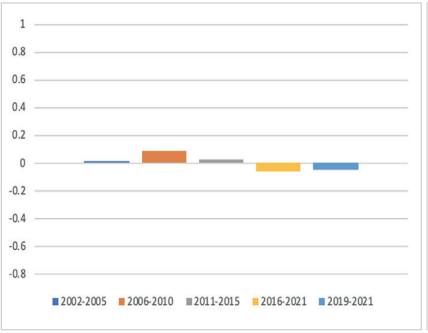
Source of basic data: PSA

Figure 5b. Sector contributions to overall across-sector productivity growth

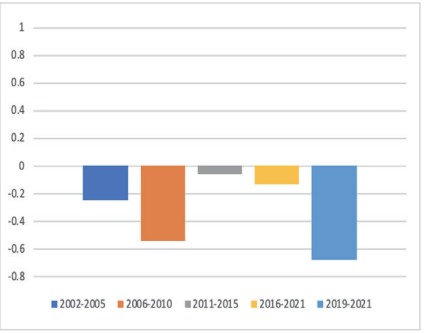
(a) AFF



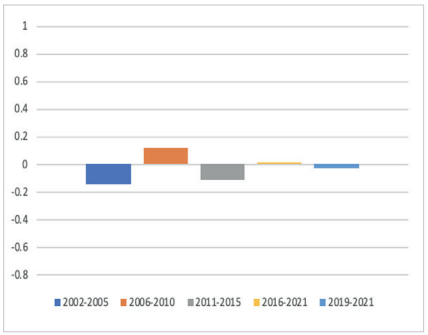
(b) Mining and quarrying



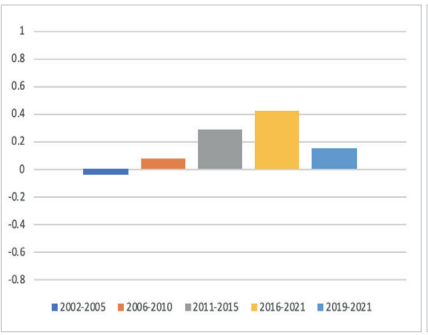
(c) Manufacturing



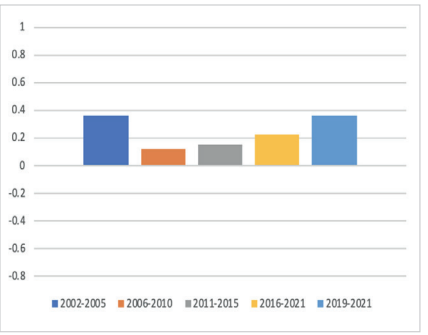
(d) Public utilities



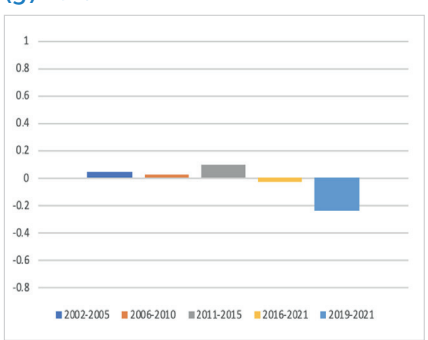
(e) Construction



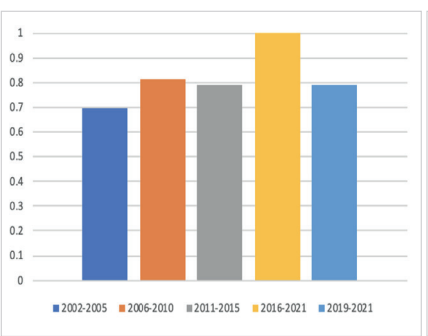
(f) WRTHR



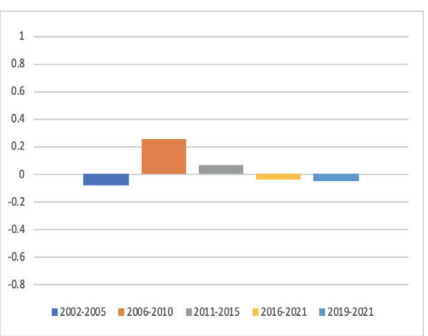
(g) TSIC



(h) FIREBS+



(i) CSPGS



Source of basic data: PSA

(Generalao, 2021). The strict containment measures to slow down COVID-19 transmission have disproportionately affected occupations that require physical contact and face-to-face interaction. Industries with a high proportion of highly "teleworkable" occupations, such as information and communication, financial and insurance activities, real estate and ownership of dwellings, and professional and business services, have been relatively less affected by COVID-19 in terms of working hours or job and income losses. These are the same industries which effectively harnessed technological advances, such as digitalization, and improved their production processes.

During the COVID-19 period, manufacturing registered a large negative contribution to across-sector productivity due to the huge drop in its employment share while being a high-productivity sector at the same time. Another sector that had a large negative contribution during the COVID-19 period was TSIC, in which employment decreased by 13.6 percent and its share in total employment by 1.4 percentage points. Apparently, the adverse impact of mobility restrictions on employment in the transportation sector more than offset the growth experienced in the information and communication industry.

5. Conclusions

Despite having increased over the last twenty years, labor productivity in the Philippines has not produced the corresponding expected rise in real wages. As the World Bank (2016:27) observed, "Economic growth created jobs, but failed to improve their average quality. Most workers have not benefited from growth in terms of higher real wages. This is in sharp contrast to developments in other Asian countries, which saw a considerable increase in real wages." Our exploration into the sources of labor productivity growth over time provides a clue to why this is the case: the scale of structural change that has taken place has not been as growth-enhancing as desired. For reasons research scholars have tried to explain, the country failed to sustain efforts to build its manufacturing capacity and missed out on the advantage of a strategy that could have provided high-productivity jobs to many semi-skilled and low-skilled workers. The result is the current employment structure with a still substantial share of employment in low-productivity agriculture (24 percent) and a disproportionately large and heterogeneous services sector (60 percent), with an informal segment playing the role of employer of last resort.

Be that as it may, COVID-19 caused a decline in overall productivity. It did so as within-sector labor productivity declined in most of the sectors adversely affected by the restrictions on mobility and in-person interaction. Data indicate that this drop could not be offset by the slight increase in across-sector productivity as labor displaced from other sectors due to the lockdown flowed mainly in 2019-2020 toward relatively low-productivity wage and non-wage employment in agriculture, reversing the trend of decreasing employment share it had registered since two decades ago (Fig 3b (vi)). With the easing of restrictions in 2020-2021, the decline in labor productivity was not as sharp as employment shares picked up in construction, wholesale and retail trade, and finance, real estate, and business services-plus away from agriculture, transportation, storage and information and communication, and manufacturing (Fig 3b (vii)). Still, with only the latter sector having a higher-than-average labor productivity, economywide labor productivity declined in 2019-2021.

A worrying upshot if the reversal in structural trend holds is the potential

deskilling and *scarring* of the labor force–especially among the youth. The shift of youth employment toward agriculture and away from more productive services and wage work can have adverse implications on skills and productivity. The disruption due to COVID-19 will impede the accumulation of skills in the crucial early years of a person's career, either due to unemployment or working in low-skill jobs (see Cacnio et al., 2022; Chapter 5 of this volume). This, in turn, will be detrimental to future labor productivity as this cohort matures to adulthood. If recovery is further delayed, problems in labor productivity will be compounded by issues associated with learning losses of children–again compromising the quality of the prospective labor force (Cho, Kataoka, & Piza, 2021).

The preceding considerations point to the importance of increasing investments in human capital to re-skill and train displaced workers whose old jobs may be gone for good as the economy transitions to a post-pandemic situation. Similarly, learning losses sustained by schoolchildren during the prolonged school closures will need to be reversed with urgency, not through a perfunctory re-opening of schools but through a revamp of curricula, if necessary, to improve educational quality given a changed labor market environment.

With the country's departure from the path of industrialization *a la* East Asia a long time ago, the prospects of a return to this route do not appear to be favorable in light of the more complex environment for global trade today. Even the possibility of building a robust manufacturing capability through participation in global value chains is highly circumscribed by how the parent company in the developed country chooses to relate with the developing country firm (Mendoza, 2018). In addition, recent evidence shows de-industrialization to be setting in at lower levels of income (McMillan, Rodrik, & Sepúlveda, 2016).

The Philippines may therefore need to increasingly rely on intrasectoral reallocation to accelerate labor productivity growth. It can capitalize on its success thus far in tradeable services to draw more of the labor now trapped in the informal sector toward higher productivity jobs in the formal services sector.[11] To succeed in this, it should be able to look beyond the existing contact centers and overseas employment in building capabilities for the high-productivity service industries. For one, the overly restrictive policy regime for services needs to be reassessed with a view to repeal the regulatory and non-regulatory measures that restrict competition and prevent the efficient conduct of certain activities (Serafica, 2014). It bears emphasizing, however, that unlike the manufacturing route that requires minimal skills, services-led "industrialization" (Nayyar, Driemeier, & Davies, 2021) is more skill-intensive. Education and skills training are essential for employment in high-end services (e.g., information technology and professional services). Investment in complementary inputs (e.g., school buildings; curriculum development particularly in the areas of science, technology, engineering, and mathematics or STEM; instructors; instructional materials; equipment) will be critical, too, as will the fiscal support that may be needed.

Scope similarly exists for raising productivity in low-end services–such as wholesale and retail trade, accommodation, and transportation–which generate substantial employment. Policies that expand "intangible capital," such as those related to business development, advertising, software, and the like (Nayyar, Driemeier, & Davies, 2021), can help widen the reach of low-skill services and generate more employment. In this context, encouraging the shift toward *digitalization* and fostering the skills needed to harness its

[11] Serafica (2014) provides an extensive discussion of the important role of services in the economy and how raising its productivity can contribute to making growth inclusive.

potential are essential. Leveraging digital technologies promotes the expansion of markets, efficiently facilitates interaction between customer and service provider, and encourages new labor modes such as telework. Underpinning the increase in labor productivity of both low- and high-end services is the continuous improvement in infrastructure, both physical (e.g., better roads for transportation) and virtual (e.g., stronger internet connectivity for trade).

Even though structural change implies workers moving away from agriculture, improving labor productivity in this sector still has the biggest potential impact in reducing poverty and inequality. Increasing labor productivity in agriculture through increased investment requires a rethinking of the types of government policies and interventions that have held back the sector from achieving its potential. First, the lack of scale economies resulting from highly fragmented landholdings must be addressed. Agriculture should move beyond the current land reform program and find alternative approaches for legal land consolidation either through lease or sale (Fabella, 2014; Jandoc & Roumasset, 2019), or through the development of cooperative arrangements to allow farmers to coordinate and latch on to inclusive value chains (Pelkmans-Balaoing, 2019). Second, public investments should focus more toward *public goods*—such as research and development, infrastructure to reduce transactions cost, innovation, market information, and biosecurity systems—and away from traditional interventions such as commodity price support and input subsidies (World Bank, 2020).

Finally, the role of labor market institutions in facilitating (or impeding) labor productivity growth through intrasectoral and intersectoral reallocation cannot be ignored. Labor market regulations, such as those prescribing minimum wages, conditions and hours of work, and restrictions on hiring and terminations, have been typically viewed as impediments to the movement of labor to more productive firms in the modern sector. Such regulations, it is argued, create rigidities in the labor market by increasing the cost of hiring workers in the formal sector or discouraging work effort, creating a drag on productivity. It would be useful to empirically validate these claims with Philippine data in light of evidence from cross-country studies which suggests that reductions in inequality are the only unambiguous outcome of labor regulations, and that these have no systematic effect on aggregate outcomes (Campos & Nugent, 2012; Freeman, 2005). In addition, if workers are risk-averse, the prospect of job loss in the formal sector absent the means for insuring against labor income risk easily makes job protection laws an attractive alternative, which could hinder labor reallocation (Ranjan, Hasan, & Eleazar, 2018). In their place, well-designed social protection programs, such as unemployment insurance, mandated severance payments, and similar others that mitigate against income loss and ensure consumption smoothing, are superior because these improve workers' welfare without preventing labor reallocation. Policymakers are well-advised to keep social protection schemes in their arsenal of policy instruments for promoting labor productivity growth.

The extent of policy coordination and the change in mindsets implied in all these can only mean that the way forward will be long and arduous. A careful rethinking of the development path for the country will ensure that more Filipinos take part in the rewards of economic growth.

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Annex

The industry classification used in this study follows the Philippine Standard Industrial Classification (PSIC). Patterned after the UN International Standard Industrial Classification (ISIC) but adapted to the national setting, the PSIC scheme classifies productive activities undertaken by establishments according to a hierarchy of industry categories.[1] The updated 2009 PSIC lists 21 sections, 88 divisions, 245 groups, 519 classes, and 1,360 subclasses.

Changing definitions of the sectors or industries between earlier and later editions of the PSIC as a result of changes in the economy over time (e.g., rise of new industries, technological developments impacting economic activity, or increasing importance of specific activities leading to changes in economic structure) necessitate mapping the classifications to ensure consistency in sectoral analysis. Specifically, for the period of interest in this study—from 2001 to 2021—sector or industry classifications based on PSIC 1994 for 2001-2011 (with 17 sectors) need to be matched with those based on PSIC 2009 for 2012-2021 (with 21 sectors).

PSIC 1994 is patterned after ISIC Rev 3.1, and PSIC 2009 after ISIC Rev 4. Table A1 shows how the industry classifications under ISIC Rev 3.1 and ISIC Rev 4 may be mapped.

Table A1. Broad structures of ISIC Rev 3.1 and ISIC Rev 4

ISIC Rev 3.1		ISIC Rev 4	
Section	**Description**	**Section**	**Description**
A	Agriculture, hunting, and forestry	A	Agriculture, forestry, and fishing
B	Fishing	B	Mining and quarrying
C	Mining and quarrying	C	Manufacturing
D	Manufacturing	D	Electricity, gas, steam, and air-conditioning supply
E	Electricity, gas, and water supply	E	Water supply; sewerage, waste management, and remediation activities
F	Construction	F	Construction
G	Wholesale and retail trade; repair of motor vehicles; motorcycles and personal and household goods	G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Hotels and restaurants	H	Transportation and storage
I	Transport, storage, and communications	I	Accommodation and food service activities
J	Financial intermediation	J	Information and communication

[1] Philippine Statistics Authority (PSA). https://psa.gov.ph/content/philippine-standard-industrial-classification-psic

K	Real estate, renting, and business activities	K	Financial and insurance activities
L	Public administration and defense; compulsory social security	L	Real estate activities
M	Education	M	Professional, scientific, and technical activities
N	Health and social work	N	Administrative and support service activities
O	Other community, social, and personal service activities	O	Public administration and defense; compulsory social security
P	Activities of private households as employers and undifferentiated production activities of private households	P	Education
Q	Extra-territorial organizations and bodies	Q	Human health and social work activities
		R	Arts, entertainment, and recreation
		S	Other service activities
		T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
		U	Activities of extraterritorial organizations and bodies

Sources: United Nations (2002). International Standard Industrial Classification (ISIC) of All Economic Activities, ISIC Rev. 3.1. Draft ESA/STAT/SER.M/4/Rev.3.1; United Nations. 2008. ISIC of All Economic Activities, Rev. 4. Statistical papers Series M No. 4/Rev.4

As the industry groups or sectors need to be subsequently linked to employment at the sectoral level, we take note as well of ILO's broad sector concordance across the two ISIC versions (Table A2).

Table A2. ILO's broad sector concordance with ISIC

Aggregate economic activity			Sections ISIC-Rev. 4	Sections ISIC-Rev. 3
Agriculture		Agriculture	A	A, B
Non-agriculture	**Industry**	Manufacturing	C	D
		Construction	F	F
		Mining and quarrying	B, D, E	C, E
		Electricity, gas, and water supply		
	Service	Market services (trade; transportation; accommodation and food; and business and administrative services)	G, H, I, J, K, L, K, M, N	G, H, I, J, K
		Non-market services (public administration; community, social, and other services; and activities not elsewhere classified)	O, P, Q, R, S, T, U	L, M, N, O, P, Q

Source: ILO. Concepts and definitions: International Standard Industrial Classification of All Economic Activities (ISIC); https://ilostat.ilo.org/resources/concepts-and-definitions/classification-economic-activities/

With the above information, the next step is to collapse the 16 industry groupings used for reporting the sectoral contributions to GDP in the National Accounts of the Philippines (NAP) and the 17 and 21 groupings for 2001-2011 and 2012-2021, respectively, for reporting sectoral employment into the nine broad sectoral groupings we are working with. These are: (A) agriculture, forestry, and fishing (AFF); (B) mining and quarrying; (C) manufacturing; (D) public utilities (electricity, gas, water, and waste management); (E) construction; (F) wholesale and retail trade; hotels and restaurants (WRTHR); (G) transportation, storage, and information and communication (TSIC); (H) finance, insurance, real estate, and business services; administrative and support service activities; professional, scientific, and technical activities (FIREBS+); and (I) community, social, personal, and government services (CSPGS).

Table A3 summarizes the final sector groupings and the mapping of sectors with available data. The columns ISIC Rev 3 and Rev 4 are from our own reclassifications based on ILO's correspondence of ISIC versions (broad sections) (Table A2) and a review of the corresponding definitions of each industry based on the two ISIC versions. The column "GDP by industry (2000-2021)" is based on the industry classification of the GDP by industry (2001-2021) from the NAP, published by the PSA. The last two columns are based on industry classification from the compilation of employment by major industry group from published tables and statistics, also of the PSA.

The last two columns highlight the issue of connecting the series for sectoral employment. The first time series refers to PSIC 1994, based on ISIC Rev 3, while the second one refers to PSIC 2009, based on ISIC Rev 4. According to UNSD's ISIC Rev 4 document, "At the highest level of ISIC, some sections can be easily compared to the previous version of the classification. Unfortunately, the introduction of a number of new concepts at the section level of ISIC (e.g., section N, "Administrative and support service activities") makes it impossible to achieve an easy overall comparison between ISIC Rev.4 and the previous version of the classification. Correspondence tables to assist in this process will be provided separately."

Using the correspondence tables of the UN Statistics Division (UNSD), we found the following:

- Administrative and support service activities
  - 62% of 4-digit ISIC Rev 4 are matched to the industry group of real estate, renting, and business activities (ISIC Rev 3)
- Professional, scientific, and technical activities
  - 83% of 4-digit ISIC Rev 4 are matched to the industry group of real estate, renting, and business activities (ISIC Rev 3)

Thus, we assign these industry groups under finance, insurance, real estate, and business services. On the other hand, the same exercise reveals that only 41% of information and communication (at the 4-digit ISIC level) are matched to real estate, renting, and business activities (ISIC Rev 3). Following McMillan and Rodrik (2011) who included communication under transportation and storage in ISIC Rev 3, we did likewise, creating "transportation, storage, information, and communication (TSIC)."

Table A3. Summary of industry matching based on data availability

Final sector grouping	McMillan and Rodrik (2011)	ISIC Rev. 3	ISIC Rev. 4	GDP by industry (2001-2021)	Employment	
					2001-2011 (ISIC Rev. 3 -> PSIC 1994)	2012-2020 (ISIC Rev. 4 -> PSIC 2009)
Agriculture, forestry, and fishing (AFF)	Agriculture, hunting, forestry, and fishing	A+B	A	Agriculture, forestry, and fishing	Agriculture, hunting, and forestry + fishing	Agriculture, hunting, and forestry + fishing and aquaculture
Mining and quarrying	Mining and quarrying	C	B	Mining and quarrying	Mining and quarrying	Mining and quarrying
Manufacturing	Manufacturing	D	C	Manufacturing	Manufacturing	Manufacturing
Public utilities (electricity, gas, and water)	Public utilities (electricity, gas, and water)	E	D+E	Electricity, steam, water, and waste management	Electricity, gas, and water	Electricity, gas, steam, and air conditioning supply + water supply; sewerage, waste management, and remediation activities
Construction	Construction	F	F	Construction	Construction	Construction
Wholesale and retail trade, hotels and restaurants (WRTHR)	Wholesale and retail trade, hotels and restaurants	G+H	G+I	Wholesale and retail trade; repair of motor vehicles and motorcycles + accommodation and food service activities	Wholesale and retail, repair of motor vehicles, motorcycles and personal household goods + hotel and restaurants	Wholesale and retail trade; repair of motor vehicles and motorcycles + accommodation and food service activities
Transportation and storage; information and communication (TSIC)	Transportation, storage, and communications	I	H+J	Transportation and storage + information and communication	Transport, storage, and communication	Transportation and storage + information and communication
Finance, insurance, real estate, and business services; administrative and support service activities; professional, scientific, and technical activities (FIREBS+)	Finance, insurance, real estate, and business services	J+K	K+L+ M+N	Financial and insurance activities + real estate and ownership of dwellings + professional and business services	Financial intermediation + real estate, renting, and business activities	Financial and insurance activities + real estate activities + professional, scientific, and technical activities + administrative and support service activities
Community, social, personal, and government services (CSPGS)	Community, social, personal, and government services	O+P+Q+L +M+ N	O+P+ Q+ R+S+ T+ U	Public administration and defense; compulsory social activities + education + human health and social work activities + other services	Public administration and defense; compulsory social activities + education + health and social work activities + other services	Public administration and defense; compulsory social activities + education + human health and social work activities + other service activities + activities of extraterritorial organizations and bodies

Source: Results of authors' industry mapping process

3 | The Implications of the IT-BPM Industry on Labor Market Outcomes

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3 | The Implications of the IT-BPM Industry on Labor Market Outcomes

Laura Britt-Fermo, Hazel Parcon-Santos, and Jose Eduardo P. Sto. Domingo† [1]

1. Introduction

The services sector has been a major source of economic growth for the Philippines, with the average share of the sector to gross domestic product (GDP) increasing from 46.5 percent in the 1980s to 58.5 percent in the 2010s.[2] Even during the pandemic years of 2020-2021, the share of the sector continued to grow and even increased to 60.6 percent.[3] The increasing contribution of services to the economy is likewise reflected in the expansion of services exports, which grew by 14.0 percent in the 2000s, although this slowed down to 9.1 percent in the 2010s but nonetheless outpaced manufacturing exports.[4, 5] The rapid growth in exports in information technology and business process management (IT-BPM)-related subsectors–telecommunications, computer, and information services; and business services–which grew strongly in the 2000s at 34.7 percent and 33.6 percent,[6] respectively, has helped propel services exports. Major drivers of this phenomenon are globalization of production and technological progress.

Globalization has led to the production of both goods and services being broken down into several tasks across countries. This "trade-in-tasks" is what is now denoted as global value chains (GVCs). With rapid advancements in communication and technology, multinational enterprises can outsource routine or non-core office functions to developing countries, thereby promoting the growth of business process outsourcing (BPO). Information and communication technology (ICT) innovation and increasingly fragmented production processes have encouraged the outsourcing of labor-intensive business services to developing countries such as the Philippines and India, which have become leaders for offshore business services worldwide because of unique comparative advantages.

The IT-BPM industry has been frequently described as one of the two "legs" of the Philippine economy, alongside overseas Filipino workers' remittances (Thomson, 2020). In 2019, the industry contributed USD 26.3 billion to the Philippine economy–representing about 9.0 percent of GDP–and employed 1.3 million people (IBPAP, 2020; OBG, 2020). In 2020, akin to other industries, it was disrupted by mobility restrictions implemented to contain coronavirus disease 2019 (COVID-19). Nonetheless, the industry was able to gain an early leverage when it was declared an essential service by the national government's Inter-Agency Task Force on Emerging Infectious Diseases very soon after the lockdown began in March 2020 (Department of Trade and Industry (DTI), 2020). The declaration and the agile response of the industry allowed it to continue its operations and even continue to hire during the pandemic. According to the IT and Business Process Association of the Philippines (IBPAP), industry employment increased by 1.8 percent and revenue increase by 1.4 percent in 2020 (Gutierrez, 2021).

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† Deceased, 7 July 2022

[1] The authors are Senior Researchers at the BSP Research Academy.

[2] Calculated using data from the Philippine Statistics Authority (PSA)

[3] *Ibid.*

[4] In the 2000s and 2010s, manufacturing exports registered an average growth of 0.4 percent and 6.8 percent, respectively.

[5] *Ibid.*

[6] *Ibid.*

BPO operations encompass call centers or voice services and higher-value non-voice BPO functions. Voice services cover most call center operations outsourced into the Philippines, which involve either calling the customer located abroad (outbound accounts) or receiving calls from the client (inbound accounts). These activities tend to focus on direct customer care (Fermo & Xing, forthcoming).

The Philippines has unique comparative advantages compared to other offshore service providers. The relatively low labor costs, the high level of English proficiency of its citizens, and their cultural adaptability have made the Philippines a favored destination for call center services, particularly for customer care. Government incentives and various initiatives from industry associations also help Philippine offshore service firms capitalize on these advantages.

Figure 1a illustrates the workforce composition across three different GVC categories. The first box, for low-technology manufacturing GVCs, involves a relatively large share of low-skilled, labor-intensive work requiring limited educational attainment. This is true for many apparels export GVCs. The second box represents medium- and high-technology manufacturing GVCs which involve a relatively large share of middle-skilled mixed production technologies and high-skilled technology-intensive work requiring specific technical competencies. The best example for this category is the segment for automotive manufacturing and electronic and electrical machineries, which is where Philippine semiconductor assembly and electronics and electrical machinery firms in many earlier export processing zones (EPZs) fall under. The third box represents knowledge-intensive GVCs that require specialized knowledge and skills and commonly a tertiary degree of education. This is where BPO firms, information technology outsourcing (ITO) firms, and knowledge process outsourcing (KPO) firms fall under. Figure 1b zooms in on the third category, highlighting the differences among BPO, ITO, and KPO firms.

Figure 1a. Workforce composition across global value chains

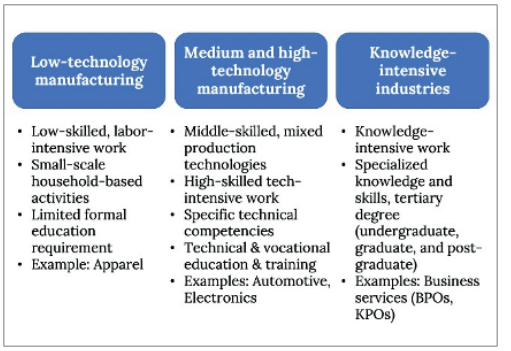
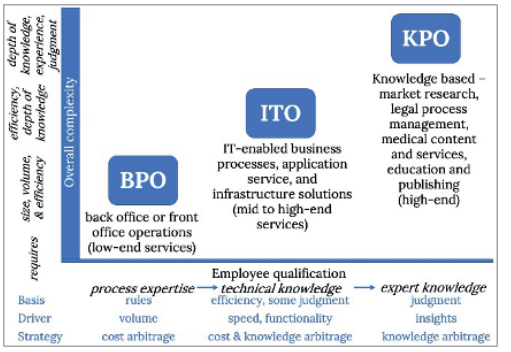


Figure 1b. Workforce requirement for knowledge-intensive industries



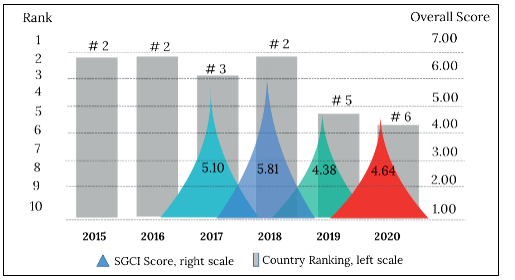
Sources: Figure 1a was adapted from Technical and Vocational Education and Training in the Philippines in the Age of Industry 4.0 (ADB, March 2021); Figure 1b was adapted from https://www.managedoutsource.com/services/what-is-kpo-how-is-it-different-from-bpo, as cited in Fermo and Xing (forthcoming)

The sector's competitiveness in BPO services is clearly manifested in how well the Philippines has been faring in global rankings. The Philippines was named the "Offshoring Destination of the Year" by the United Kingdom's National Outsourcing Association three times: in 2007, 2009, and 2010. By 2010, the Philippines was named the "call center capital of the world" by the IBM Global Location Trends Annual Report. It released this statement in October 2010, stating that the Philippines had become the leader in shared services for outsourcing in the world, outranking India.

In the 2015 Tholons Services Globalization Country Index (SGCI), the Philippines ranked second after India in the Top 50 Digital Nations in the World list and maintained about the same ranking for four consecutive years (Fig. 2). Based on A.T. Kearney's Global Services Location Index (GSLI),[7] the Philippines consistently ranked in the Top 7 among 50 countries from 2014 to 2017. The 2017 report named the country as an "industry leader" for its financial attractiveness, people skills and availability, and business environment. In 2019 and 2020, however, developed economies overtook developing countries in the Top 10 rankings.[8] The 2020 index included a much higher emphasis on digital innovation attributes. It also assessed how the various cities and countries have managed despite the global crisis during the pandemic.

In recent years, the Philippine IT-BPM industry has begun to move from BPOs to ITOs and into other higher value-added services coined as KPOs (Fig. 1b). In response to current global trends and the challenges brought by increased automation, the Philippine IT-BPM industry began to evolve and diversify and move into back-office or shared services functions, professional services (e.g., legal, architecture, and engineering consultancy), health and medical services, corporate functions (e.g., pricing and data analytics), and extensive social, digital, and creative functions (e.g., social moderation, website development, and animation).

Figure 2. Tholons Services Globalization Country Index scores and ranking for the Philippines (2015-2020)



Source: Tholons Service Globalization Country Reports, various years as cited in Fermo and Xing (forthcoming)

[7] The index evaluates services offshoring and location attractiveness of countries. It is based on 38 metrics across three main categories: financial attractiveness (40 percent), people skills and availability (30 percent), and business environment (30 percent). Financial attractiveness includes compensation costs, infrastructure costs, and tax and regulatory costs. People skills and availability comprise of ITO/BPO experience and skills, labor force availability, educational skills, and language skills. Business environment considers country environment, country infrastructure, cultural adaptability, and security of intellectual property (A. T. Kearney, 2017).

[8] The weights of the different components of GSLI were revised in 2019 to reflect the addition of the digital resonance component, as follows: financial attractiveness (35 percent), people skills and availability (25 percent), business environment (25 percent), and digital resonance (15 percent). From 38 metrics, the GSLI is now based on 47 metrics.

The 2013 Survey on BPOs conducted by the Bangko Sentral ng Pilipinas (BSP) registered a total of 1,098 respondent firms.[9] As of August 2021, the Philippine Economic Zone Authority (PEZA) reported a total of 1,258 IT-BPM firms located in its various EPZs. Historically, *contact centers* had the biggest share in terms of the number of companies in the IT-BPM industry. By 2013, the *other BPOs* subsector, which included KPO firms, increased its share further in the industry, followed by *call centers*. As of April 2022, *other BPOs* remained the subsector with the highest number of companies and with the biggest increase in number: from 417 companies in 2013 to 545 companies as of April 2022.

The industry's increasing level of maturity is manifested in the movement into higher value-added services (i.e., into ITO and KPO segments) in terms of employment share, number of new entrants, share in total revenues, and public-private efforts under the National Reskilling and Upskilling Program. These all indicate that the industry has begun to go up the value chain, managing entire business processes of clients and not merely tending to portions outsourced over cost considerations. The industry appears to have begun to mature and is understanding its clients' businesses better, doing more and more complex work including taking responsibility for the outcomes of the services provided.

The agility and resilience displayed by the industry during the COVID-19 pandemic highlight the importance of the IT-BPM industry to the Philippine economy. Given that the main comparative advantages of the IT-BPM industry in the country are in terms of human capital, this study examines the impact of developments in the industry on labor market outcomes, specifically on labor productivity and compensation in the IT-BPM sector. The contribution of the IT-BPM sector to the economy and its potential impact on labor market outcomes is a topic that has not been examined in depth in the case of the Philippines. This study fills that gap.

To establish the relationships between the IT-BPM industry and labor market outcomes, the Autoregressive Distributed Lag (ARDL)–Error Correction Model (ECM) is used, using annual data from 2007 to 2020. Findings reveal that exports, compensation, and value added in the IT-BPM industry can have important implications on labor market outcomes. Higher value added and exports of IT-BPM sectors, better compensation, and higher net foreign direct investment (FDI) in IT-BPM sectors—particularly for the science and technology subsector—combined with investments and improved innovations in science, could lead to higher productivity in IT-BPM. This, in turn, could potentially help move up the IT-BPM industry in the global value chain in business services. To tease out these relationships further—which may inform results from the ARDL-ECM approach—the Facebook Prophet tool is used. Results reveal that growth in value added for information and communication, as well as for professional and business services, contribute positively to forecasts of productivity in the IT-BPM industry. To ensure the industry's continued contribution to the Philippine economy, it must remain competitive amidst challenges and current developments. For policy, this implies that authorities must adopt appropriate strategies and pay particular attention to human capital investment.

The rest of this chapter is organized as follows: Section 2 covers a review of both theoretical and empirical literature on labor market outcomes and different

[9] This was the last survey on BPOs conducted by the BSP before it was turned over to the PSA.

aspects of globalization; Section 3 discusses stylized facts relevant to the IT-BPM sector; Section 4 defines the data used and sets out the empirical framework for the study; Section 5 discusses the empirical results; Section 6 briefly discusses emerging global issues and challenges faced by the IT-BPM industry; and Section 7 concludes.

2. Review of related literature

2.1 Theoretical studies

This section provides a review of the theoretical literature that explains the linkage between two labor market outcomes: compensation and labor productivity. It then presents how these labor market outcomes may be affected by different aspects of globalization including international trade, FDI, outsourcing, and global value chains.

2.1.1 *Compensation and labor productivity*

The theoretical literature shows a positive link between real wages and labor productivity. According to the basic neoclassical model, in an economy where there is perfect competition, no technological progress, and no uncertainty and risk, a profit-maximizing firm will equate the marginal productivity of labor with real wage (MPL=$\frac{w}{p}$). Thus, the firm would be willing to offer a wage up to what a worker would add to the firm's output, yielding the firm's demand for labor. Given the labor supply of a utility-maximizing worker and his labor-leisure choice, the equilibrium real wage and employment is thus determined.

The neoclassical model has been extended in various directions to account for departures from the condition of MPL=$\frac{w}{p}$. For instance, proponents of the efficiency wage theory argued that firms offer wages higher than the market clearing level to reduce employee shirking (Shapiro & Stiglitz, 1984) and turnover costs (Stiglitz, 1974; Salop & Salop, 1976; and Salop, 1979), induce self-selection to recruit the most productive workers (Stiglitz, 1976; Weiss, 1980; and Malcomson, 1981), and produce loyalty and favorable moral effects (Akerlof, 1982 & 1984).[10]

Meanwhile, the human capital theory, proposed by Mincer (1958), Schultz (1961), and Becker (1962), provided another framework for understanding the link between wages and labor productivity. This theory posits a joint relation between human capital, productivity, and income. The idea is that an individual has characteristics and skills that can be enhanced through education, training, and experience, which then increase his productivity and, in turn, his income.[11]

The foregoing studies do not account for the possible effect international activities of firms have on real wages and labor productivity. More recent literature probes this possibility.

2.1.2 *Globalization and labor market outcomes*

Export-led growth models contend that exposure to international markets through exports has important effects on labor market outcomes (Bhagwati, 1978; Kunst & Marin, 1989; Melitz, 2003). Several explanations have been put forth. First, trade liberalization or exposure to international markets induces a

[10] Acemoglu and Autor (2011) and Burki (1995) provide a good summary and review of efficiency wage models.

[11] Spence (1978) offered an alternative view to the human capital theory, arguing that observable measures of human capital such as education do not necessarily increase the productivity of workers but are rewarded in the market because they signal latent worker characteristics such as ability and motivation, which are desirable for employers.

reallocation of resources toward the export sector, which is more productive and employs more skilled labor than the non-export sector. The reallocation of resources contributes to growth in productivity, employment, and wages in the export sector and a decline in productivity, employment, and wages in non-export sectors. Second, higher export growth allows a country to gain from economies of scale, as the inclusion of the international market in addition to the domestic market permits larger scale. Third, stronger exposure to international competition is considered to increase the pressure on the export industries to keep costs low. This provides incentives for the introduction of technological change, which improves productivity. Fourth, the growth of exports is seen to have a stimulating influence on the productivity of the economy via externalities of exports on other sectors. These externalities could be in the form of knowledge spillovers, more efficient management styles, better forms of organization, labor training, or knowledge about technology and international markets.

Other theories suggest that more productive firms self-select into export markets (Wagner, 2005; Bernard & Jensen 1999; Hallward-Driemeier et al., 2002), there being additional costs of selling goods in foreign countries. The range of extra costs includes transportation costs for manufactured goods, distribution or marketing costs, and personnel with skills in managing foreign networks. These costs provide an entry barrier that less successful or less productive firms cannot overcome. The behavior of firms might be forward-looking in the sense that the desire to export tomorrow leads a firm to improve performance today to be competitive in the foreign market.

Meanwhile, outsourcing or participation in GVCs—in broad terms, international production sharing, where production of intermediates is split into different stages across different countries depending on skill intensity—has also been shown to affect labor market outcomes. Higher profit opportunities due to lower nominal wages or production costs in developing countries increase the incentive of developed countries to innovate and fragment production.

Feenstra and Hanson (1996, 1997) presented a model with a continuum of intermediate inputs produced with different skill intensities to explain specialization in production and its impact on relative wages. In their model, a movement of capital from North to South is interpreted as an increase in outsourcing by Northern firms to the South.[12] From the North's perspective, the activities or stages of production outsourced or transferred to the South through FDI are those that use relatively large amounts of less skilled labor; from the South's perspective, the reverse is true. This increases the relative demand for skilled labor in both countries, which, in turn, raises the relative wage of skilled labor in both countries. Thus, outsourcing or FDI acts as a type of endogenous technical change biased in favor of skilled labor. The model assumes that the supply of each type of labor is responsive to relative wages and labor is permitted to be mobile between skill categories, thus implying that less skilled workers have the incentive to become more skilled through education or training. Sayek and Sener (2006) similarly demonstrated that outsourcing unambiguously raises the relative wage of skilled labor in the North country. However, in the South, the relative wage of skilled labor increases only when the skill intensity of the outsourced task is higher than that of local Southern tasks.

Likewise taking off from Feenstra and Hanson (1996, 1997), Hale and Xu (2016)

[12] In the literature, advanced or developed countries are typically referred to as North countries, while developing or emerging countries are referred to as South countries.

demonstrated that FDI, which is likely to bring superior technology to the domestic economy, tends to shift demand away from less skilled to more skilled labor. If the supply of skilled labor is constrained,[13] equilibrium wages are likely to rise on average and the skill premium is likely to increase.

On the impact of FDI on labor productivity, Blomstrom and Kokko (1998), Fosfuri et al. (2001), and Mahmood and Chaudhary (2012) presented several channels. First, the presence of foreign firms can cause labor productivity in the domestic economy to increase primarily through direct technology transfers. Foreign firms typically have superior technology and efficient operational, marketing, and production techniques. Local labor employed in foreign firms or local subsidiaries increase their productivity through learning-by-watching or -doing. Second, the presence of foreign firms may have a positive externality on local firms via competitive effects. This may prompt domestic firms to use better technology to compete with foreign firms. Third, technology may also be transferred to local firms if foreign firms buy intermediate goods from local firms. Foreign investors may be willing to share some knowledge with local suppliers for the latter to meet their requirements. Fourth, positive externalities may also occur when domestic labor hired by foreign firms later transfer to local firms. Knowledge learned by local employees may then be transferred to the latter.

In the context of the IT-BPM industry, a transfer of specific tasks in emerging market economies, like the Philippines, through outsourcing or FDI, increases the demand for IT-BPM workers. This can be likened to an exogenous shock that increases labor demand, particularly for skilled labor. If skilled labor supply is fixed, at least in the short run, this will yield a new equilibrium with higher real wage and employment levels. In addition, assuming that foreign firms in the IT-BPM industry are technologically advanced and have efficient processes and techniques, their presence in the domestic economy is expected to have positive labor productivity effects. Higher relative wages in the IT-BPM industry may also prompt less skilled labor to acquire education and training in order to become employable in the industry. Nonetheless, this may occur over the long run as this process is costly, both in terms of time and money.

2.2 *Empirical studies*

The potential consequences of GVCs on labor market outcomes have been the subject of a rapidly increasing number of empirical studies (Farole et al., 2018). However, most of these studies focus on GVCs involving manufactured goods and on the impact on developed countries that offshore a production block. Empirical studies linking GVC in services and labor market outcomes in developing countries are scarce.

Using Indonesian manufacturing firm census data, Amiti and Davis (2011) showed that trade liberalization, as measured by average cuts in inputs tariffs, increases wages of workers in import-using firms compared to firms that only source locally. In the case of Peru, Casabianca et al. (2019) found a positive wage effect of import penetration for workers employed in highly cognitive or less manual-intensive jobs. In Thailand, Paweenawat (2019) showed that industries with higher GVC engagement offer higher wages and that skilled workers in GVC-oriented industries have higher wages. These provide evidence that GVC involvement increases wage inequality across and within industries.

[13] Hale and Xu (2016) pointed out that, in practice, labor movement from unskilled to skilled could be costly and time consuming.

Meanwhile, applying propensity score matching techniques to firm-level data for a sample of transition economies, Crino (2012) found that firms that import more inputs increase their relative demand for skilled labor. Similarly, Shepherd and Stone (2013) found that in developing and transition countries, manufacturing firms with the strongest international linkages (i.e., jointly engaged in exporting, importing intermediate goods, or being foreign owned) employ more skilled workers than firms that deal exclusively with the domestic market, but do not necessarily pay higher wages.

Cali and Hollweg (2017) used the World Bank's Labor Content of Exports (LACEX) database to examine the value-added linkages between different sectors for South Africa's exports, for both skilled and unskilled labor. They found that South Africa's enhanced GVC participation in automotive and apparel was associated with a decline in the relative demand of skilled labor directly employed in GVC sectors, and an increase in the relative demand of skilled labor indirectly employed in sectors that produce inputs for GVC sectors, in particular the services sectors. The greater GVC participation of South Africa increased the need for complementary services including financial services, transport and logistics, and other business services (Farole, 2015). The increase in demand for these services resulted in overall wage growth in South Africa. Likewise, using the LACEX and the Export Value Added (EVA) databases of the World Bank, and employing fixed effects estimations, Farole et al. (2018) examined the impact of GVC participation on different labor market variables in a sample of 118 countries. Results showed some evidence that greater GVC participation is positively correlated with total labor value added, labor share, and relative demand for skilled labor.

Meanwhile, using Inter-Country Input-Output tables with 54 countries, Kummritz (2016) showed that an increase in GVC participation leads to higher domestic value added and productivity for all countries independent of their income levels. Employing ordinary least squares and two-stage least squares on manufacturing sector data of 47 countries, Urata and Baek (2019) showed that GVC participation indeed improves total factor productivity growth for all countries, especially for developing ones. In the case of Vietnam, Asada (2020) showed that FDI, capital goods imports, and exports are positively related in the long run to labor productivity growth, by using ARDL bounds testing on data from 1990 to 2017. However, no conclusive relationship is found in the short run, implying that firms established through FDI need time to be fully set up before production can commence.

De Vries et al. (2016) looked at trends in skills upgrading in relation to GVCs across Asian economies. Using the Asian Development Bank (ADB) Multi-Regional Input-Output Tables (MRIOT) and occupational data on jobs by educational attainment and business activities, they showed an ongoing specialization process toward high-skilled, knowledge-intensive activities, particularly in China, resulting from technological change in GVCs. In Indonesia, Iberahim (2013) showed that the integration of Malaysian-based Japanese multinational companies into GVC spurs increasing needs for skill development, particularly in management and engineering services.

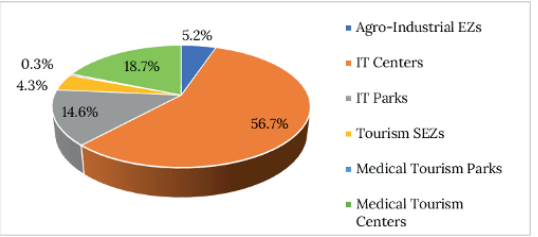
3. Stylized facts

3.1 Outsourcing is not a new concept for the Philippines.

EPZs have been in the country since the early 1970s, when the Philippines found its competitive edge in electronics and electrical machinery and semiconductor assembly (Fermo & Xing, forthcoming) (see Fig. 1a, second box). From only 16 public and private economic zones between 1969 to 1994, there are 416 operational, and 161 proclaimed, or a total of 577 EPZs in the country as of December 2021. Out of these 577, 327 (56.7 percent) are information technology (IT) centers and 84 (14.6 percent) are IT parks (Fig. 3). Apart from the opportunity to establish a business at one of the premier economic centers, PEZA-registered companies, including IT-BPM firms, are given several fiscal and non-fiscal incentives.

Meanwhile, in terms of wage indicators, a study conducted by the Ecumenical Institute for Labor Education and Research in 2009 revealed that 60 percent of BPO workers in Davao City's Damosa IT Park had an average monthly salary of PhP 10,000–PhP 15,000. At the UP Ayala Technohub in Quezon City, 39.0 percent were earning Php 10,000–Php 15,000 per month, and 26.0 percent were earning PhP 15,000–PhP 20,000. Using the average exchange rate of PhP 47.60/USD 1 in 2009, PhP 15,000 is equivalent to about USD 315 per month. As of 2018, the IBPAP reported that the average annual salary for IT and BPO workers in the Philippines is USD 17,270. By comparison, the average graduate starting annual salary in Australia and USA in 2018 was USD 64,455 and USD 46,800, respectively (as cited in Fermo & Xing, forthcoming).

Figure 3. Total operating and proclaimed economic zones (as of December 2021)



Source: Philippine Economic Zone Authority (PEZA)

3.2 A positive side effect of services trade engaged in GVCs (e.g., IT-BPMs) is that it raises the incentives for workers in developing countries to acquire more education.

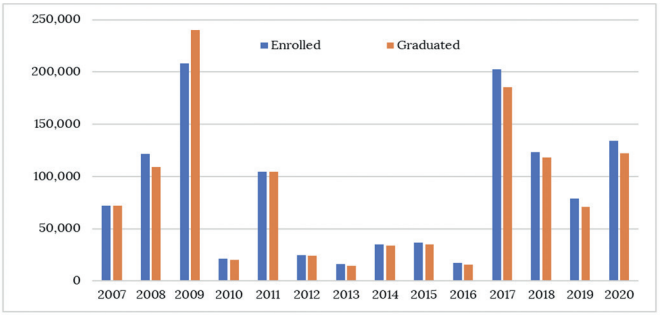
Evidence from India suggests that opening sectors like telecommunications, finance, and insurance, as well as services exports from the BPO sector, increased educational attainment in India.[14] In the Philippines, spurts in the number of technical and vocational education and training (TVET) enrollments and graduates, particularly in ICT and BPO fields, were seen in 2009, 2011, and 2017, but some waning again two years after (Fig. 4). In 2020, virtual modes or online training may have helped sustain enrollment and the number of graduates in ICT and BPO.

The latest offerings of free ICT-related courses in Technical Education and Skills Development Authority (TESDA) centers are reflective of the objective to move into more complex, higher-skilled segments of the IT-BPM industry. These are in addition to the regular offerings of English language proficiency classes, medical transcription, and contact center services courses, and others. There are also BPO companies, such as Sitel, that have either put up their own in-house training centers or partnered with academic institutions whereby senior high school students could take highly specialized and full courses that teach the skills required

[14] Nano *et al.* (2021), Jensen (2012), and Shastry (2012), as cited in Nano and Stolzenburg (2021).

for successful employment and smooth integration into call center services and BPO firms in general.

Figure 4. Number of TVET enrollees and graduates in ICT and BPO fields (2007-2020)



Sources: TVET statistics, TESDA

3.3 *IT-BPM industry sales revenues and employment have been growing steadily in the Philippines.*

Based on data from the BSP, IBPAP, and the Philippine Statistics Authority (PSA), the IT-BPM sector posted double-digit positive annual growth rates in sales revenues from 2004 to 2016. Growth was subdued in 2017 but showed some revival in 2018 and 2019. Sales revenues for 2018 and 2019 was about 7.0 percent of Philippine nominal GDP—not far from the annual share of overseas remittances in GDP for the same years which was about 10.0 percent. Forecasts from the Everest Group indicate that the IT-BPM's share in GDP could reach about 8.5 percent in 2022 (Fermo & Xing, forthcoming). Meanwhile, total IT-BPM employment grew from 94,000 in 2005 to 1.3 million in 2019 and is projected to reach 1.4 million in 2022 (IBPAP, 2020). This could be attributed to the significantly higher demand for employees from the additional EPZs in the regions and newly opened cyberparks and IT parks in central business districts (Fermo & Xing, forthcoming).

Based on the PSA's Annual Survey of Philippine Business and Industry (ASPBI),[15] for IT-BPM establishments with 20 or more employees, *customer relationship management* continues to account for the bulk of employment with a share of 68.3 percent, employing about 440,000 Filipinos in 2017, followed by *sales and marketing* and *computer programming and computer consultancy* (Fig. 5a). The income of the sector from outside the Philippines comes mainly from the United States, accounting for about 65.7 percent, followed by the UK (Fig. 5b). In terms of the number of establishments, *computer programming* dominates the sector, followed by *customer relationship management* and *sales and marketing*, which surged in 2015 and 2016 (Fig. 5c).

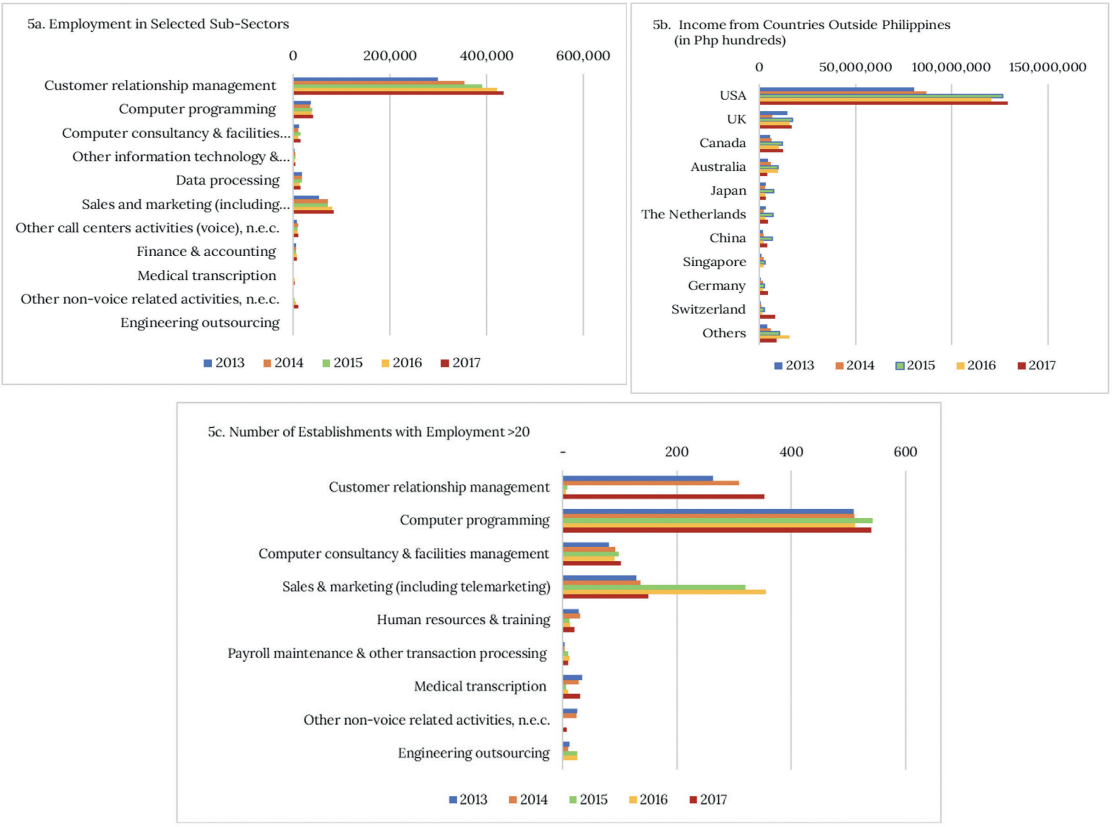
Meanwhile, annual average compensation was highest in *software publishing* at about PhP 1.1 million (equivalent to USD 21,637 using the average exchange rate of PhP 50.4/USD1 in 2017), followed by *finance and accounting*, *engineering outsourcing*, *payroll and maintenance*, and *computer programming* (Fig. 6b).

3.4 *Financial and insurance activities take the lion's share of net FDI, followed by information and communication activities.*

Based on the BSP's 2013 survey of IT-BPO services, the lion's share of FDI inflows in the IT-BPM sector went into *contact centers*, accounting for 60.1 percent on average from 2005 to 2013. This was followed by *software development* at 24.9 percent and *other* BPOs (where KPOs and higher value-added services are subsumed) at 20.0 percent. The top 3 sources of

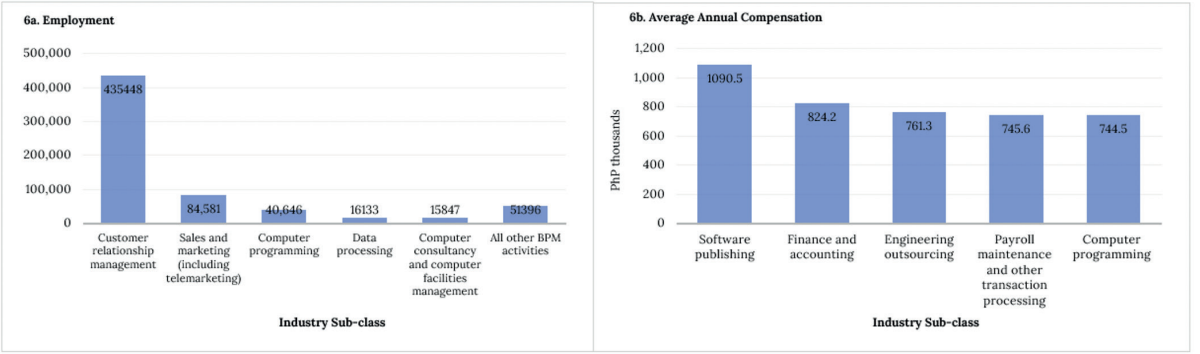
[15] The 2017 Annual Survey of Philippine Business and Industry (ASPBI) is the latest round of the survey and was released in January 2020.

Figure 5. Annual survey of Philippine business and industry: IT-BPMs (2013-2017)



Source: PSA's Annual Survey of Philippine Business and Industry (ASPBI)

Figure 6. Distribution of employment and per-worker compensation in IT-BPMs (2017)



Source: PSA's ASPBI

foreign equity for the same period are the USA, Europe, and Japan. More recently (2015-2021), net FDI in IT-BPM related industries[16] has been erratic on a year-on-year basis but generally went into *financial and insurance activities* based on balance of payments (BPM6) data.[17] In 2019, a surge was seen in *information and communication* (Fig. 7).

3.5 *IT-BPM-related activities have demonstrated increasing economic linkages.*

Based on data from the ADB MRIOT,[18] IT-BPM-related activities[19] have shown increasing backward and forward linkages from 2000 to 2020, demonstrating the increasing importance of IT-BPM to the economy. Figure 8a shows that the GDP attributable to IT-BPM-related sectors, arising from linkages in the economy, has increased in the past two decades—from about USD 24,380.4 million in 2000 to USD 92,472.3 million in 2020,[20] reflecting an increase of about 280.0 percent.

In terms of share in GDP,[21] forward linkages have slightly higher weight than backward linkages.[22] On the aggregate, the proportion of GDP attributable to IT-BPM-related sectors has increased from 17.1 percent in 2000 to 26.5 percent in 2020.

During the first year of the pandemic, the GDP attributable to IT-BPM-related sectors continued to register growth. From 2019 to 2020, the linkages of these sectors in the economy registered a growth of 12.5 percent—higher than the growth registered in years prior to the pandemic. This reflects the adaptability and resilience of the IT-BPM industry even during the pandemic.

Another way of measuring the importance of IT-BPM in the economy is by tracing the GDP that is lost when the industry is removed or extracted from the economy, which is referred to as the hypothetical extraction method (HEM).[23,24] The estimated loss from removing the IT-

[16] This includes information and communication; financial and insurance activities; professional, scientific, and technical activities; and administrative and support services.

[17] This is on account of Republic Act No. 10641 or the Foreign Bank Entry Liberalization Act of 2014 (see Parcon-Santos et al., 2021).

[18] ADB augmented the World Input-Output Tables (WIOTs) with 19 Asian economies for the years 2000 and 2007-2020. This has facilitated the production and analysis of global value chain-related statistics for a total of 25 Asian economies. GVC analysis addresses the case of double counting in traditionally reported export earnings which underestimated bilateral trade deficits, especially in the case of the Philippines where its top export industries are also its top importers.

[19] This is composed of telecommunications; financial intermediation; and real estate, renting, and business activities.

[20] Figures refer to the sum of forward and backward linkages, net of double counting.

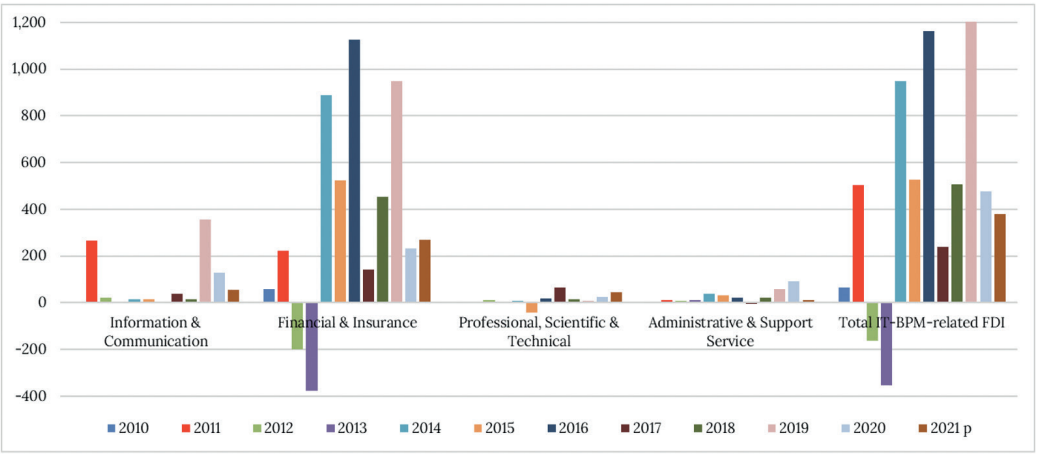
[21] This refers to pre-extraction GDP, defined as the GDP that would be lost if the IT-BPO sector is nullified or extracted from the economy (Consing, et al, 2021).

[22] For the period 2000-2020, forward and backward linkages of the IT-BPO sector have an average share in GDP of 22.8 percent and 19.8 percent, respectively.

[23] HEM assumes that once the inputs for business services in IT-BPOs are extracted, these resources do not shift to other activities and, therefore, remain unemployed. This assumption is valid in the short run (Consing et al., 2021).

[24] The estimated loss from sector extraction is the sum of losses coming directly from the extracted sector's contemporaneous linkages and from further interactions between the unextracted sectors (Consing, 2021). The counterfactuals created for measuring the impacts of a sector should be treated as an accounting exercise rather than an actual scenario (ADB, 2020).

Figure 7. Net foreign direct investments in IT-BPM-related industries (2015-2021)



Note: p-preliminary
Source: BSP's Balance of Payments Statistics (BPM6)

BPM-related sectors can be expressed as a percentage of GDP, decomposed into direct and indirect loss (Fig. 8b). The direct loss is the same as the sum of the forward and backward linkages, less the double-count, as shown in Fig. 8a. The indirect losses arise from the fact that extracting a sector from the economy does not only directly remove the contribution of that sector in the economy but also entails some decline in the output of other sectors. In 2020, if the IT-BPM industry were extracted from the economy, the estimated loss would have been 27.0 percent of pre-extraction GDP.

Among the sectors in the economy, IT-BPM-related activities induce production the most in *hotels and restaurants* (c22), followed by *pulp, paper, printing, and publishing* (c7), and *food beverages, and tobacco* (c3) (Fig. 9).

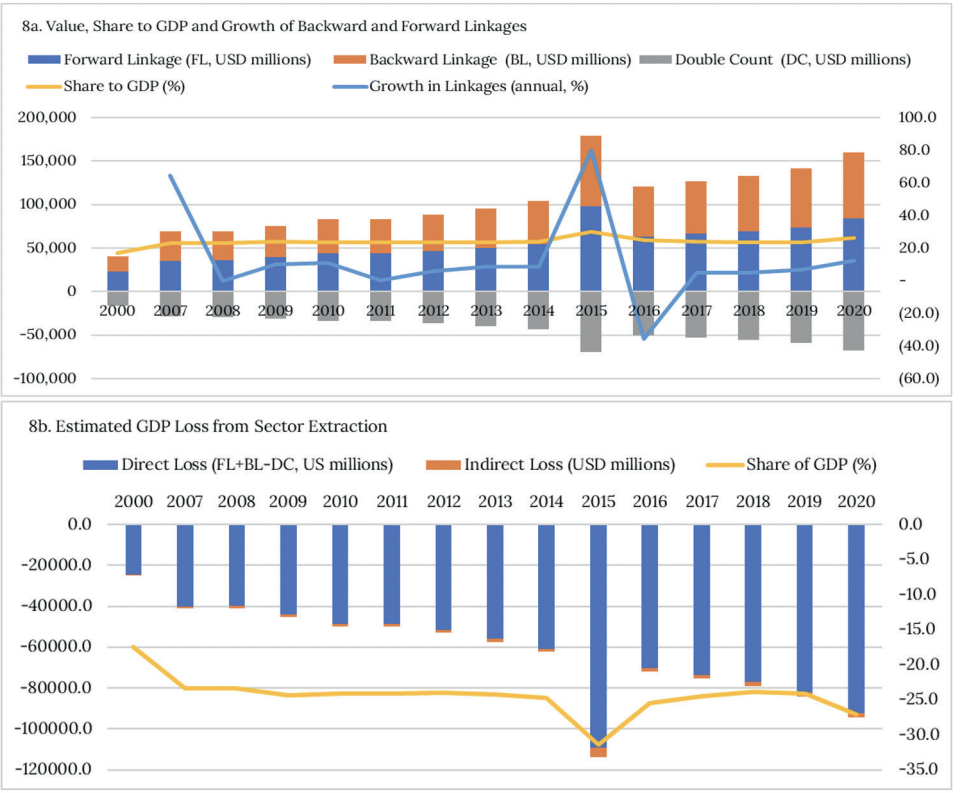
3.6 *Revealed comparative advantage (RCA) in the business services sector has been on the rise, whereas RCA in medium-to-high technology manufacturing has been declining.*

Following the increasing importance of the IT-BPM industry, the RCA of the business services sector, where IT-BPM belongs, has also notably been on an increasing trend (Fig. 10). This is almost a mirror-image of the declining trend in the RCA of the medium- to high-technology manufacturing sector, where the electronics export sector belongs.

4. Data and empirical methodology

Table 1 summarizes the data available for the IT-BPM sector. To examine the relationship between labor market outcomes and the IT-BPM sector, the last column shows the data used in the empirical estimation using the ARDL-ECM technique.

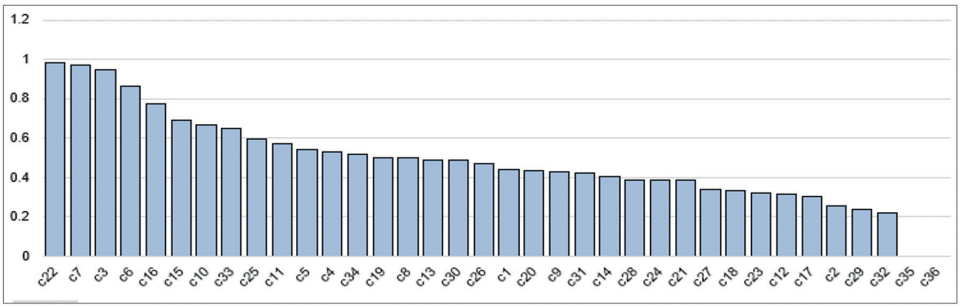
Figure 8. Estimated impact of IT-BPM on the economy



Note: Share in GDP and growth in linkages are calculated using the sum of forward and backward linkages, net of double counting. GDP refers to pre-extraction GDP.

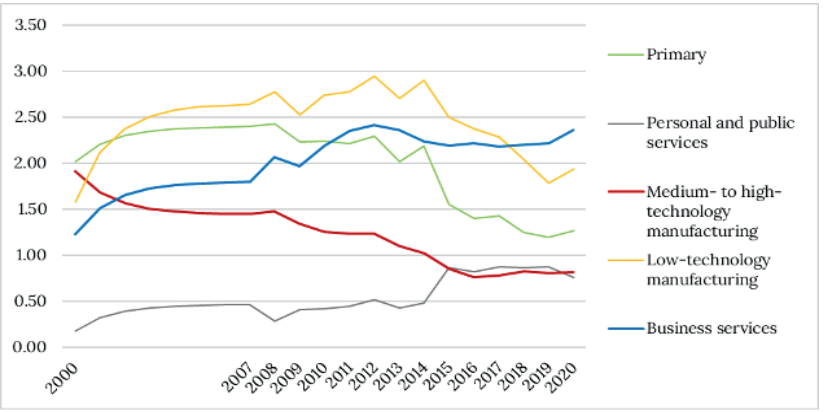
Source: ADB's MRIOT

Figure 9. Production-induced effect of IT-BPM (2020)



Notes: c36 refers to IT-BPM-related activities. Values show the multiplier of c36 relative to other sectors in the economy. See Annex for a complete list of sectors.
Source: ADB's MRIOT

Figure 10. Revealed comparative advantage, by sector



Note: New revealed comparative advantage based on Balassa (1965) and Wang et al. (2018).
Source: ADB's MRIOT

4.1 *The ARDL-ECM technique*

ARDLs are standard least squares regressions that contain the lagged values of the dependent variables as well as the current and lagged values of regressors as explanatory variables in a single-equation time series setup (Greene, 2008).[25] The ARDL thus uses a combination of both exogenous and endogenous variables, unlike a vector autoregressive (VAR) model that is strictly for endogenous variables. Given the data limitations of this study (i.e., annual data and a relatively short period coverage), the ARDL approach is deemed appropriate as it is considered robust in small samples, providing unbiased long-run estimates and valid results even when the explanatory variables are endogenous in the case of small and finite sample data sizes. It also has an advantage of application regardless of the order of the variables (i.e., either I(0) or I(1)). The generalized ARDL(p,q) model is represented as follows:

$$y_t = c_0 + c_1 t + \sum_{i=1}^{p} a_i y_{t-i} + \sum_{i=1}^{q} b'_i x_{t-i} + \varepsilon_t \quad (1)$$

where p and q are the optimal number of lags for the dependent variable, y, and exogenous regressors, x, respectively; c_0 is a constant; t is a time trend; a_i's are coefficients for the short-run and b_i's are coefficients for the long-run relationship; and ε_t is the disturbance term, which is a vector of the error terms comprised of the unobservable zero mean white noise vector process.

The ARDL model has gained popularity in applied time series econometrics because, for nonstationary variables, cointegration is equivalent to an error-correction (EC) mechanism. By differencing and forming a linear combination of the nonstationary data, all variables are transformed equivalently

[25] Although ARDL models have been used in econometrics for decades, they have gained popularity in recent years as a method of examining cointegrating relationships between variables through the work of Pesaran and Shin (1998) and Pesaran, Shin, and Smith (2001).

Table 1. Available data on the IT-BPM industry and variables used in the estimation

Data	Source/s	Frequency	Data Range	Variable/s used in the estimation
Revenues, Employment, FDI, Exports, Aggregate Compansation	BSP Survey of Information Technology-Business Process Outsourcing (IT-BPOs)	Annual	2004-2013	Compensation per Employee (Aggregate compensation / Employment)
Revenues, Employment	IBPAP at www.ibpap.org and The Everest Group for forecasts	Annual	2007-2022	Revenues
Value Added, Employment, Total Income	Annual Survey of Philippine Business and Industry (ASPBI) of the Philippine Statistics Authority (PSA)	Annual	2013 - 2017	Income
Sectoral Gross Value Added for what we define as IT-BPM sectors: Information and Communication, Financial and insurance activities, Real estate and ownership of dwellings and Professional and business services	National Income Accounts (NIA) by Industry; PSA	Annual	2004-2020	Labor Productivity = Gross Value Added (GVA) in Constant prices / Employment from PSA
Sectoral Employment, for IT-BPM Sectors as defined in NIA above	Employment by Industry, PSA	Annual	2004-2020	Labor Productivity based on GVA = Gross Value Added (GVA) in Constant prices / Employment from PSA
Value Added based on Global Value Chain analysis from the ADB's Multi-Regional Input-Output Tables (MRIOT)	ADB MRIO Tables[b]	Annual	2007-2020	Labor productivity based on GVC = Value Added based on GVC Analysis/Employment from PSA
Net FDI in IT-BPM Sectors	BSP Balance of Payments Statistics (BPM6)	Annual	2010-2020	Net FDI in IT-BPM related sectors
Innovation scores/ranking from the Global Competitiveness Index	Global Competitiveness Index Report 2019	Annual	2009-2018	Total Innovation Score and Innovation in Science for the Philippines
STEM Graduates in IT-Related Disciplines, from CHED	National Data on graduates in Undergraduate and Graduate IT Related Disciplines	Annual	2004-2018	Number of Graduates in STEM under IT-Related Disciplines
TESDA Enrollees and Graduates in IT-BPM Courses	TESDA	Annual	2007-2020	Number of Graduates and Enrollees in IT-BPM related TESDA courses

into an EC model with stationary variables only (Engle & Granger, 1987; Hassler & Wolters, 2006). The reparameterization of the ARDL model in ECM form is represented as follows:

$$\Delta y_t = c_0 + c_1 t - \alpha(y_{t-1} - \theta x_{t-1}) + \sum_{i=1}^{p-1} \varphi_{yi} \Delta y_{t-1} + \omega' \Delta x_t + \sum_{i=1}^{q-1} \varphi'_{xi} \Delta x_{t-1} + u_t \quad (2)$$

where α is the speed of adjustment, ideally with a negative sign to indicate a return to equilibrium; $(y_{t-1} - \theta x_{t-1})$ is the error-correction term; and θ are the long-run coefficients.

As the first step of the ARDL approach, the stationary property of the data is checked. The variables of interest must be integrated of either zero I(0) or one I(1). Then, an ARDL long-run bounds test is conducted to see if there is cointegration in at least one specification of the variables being estimated. If the variables are cointegrated, both the short-run (ARDL) and long-run (ECM) models are specified. However, if the variables in the specification are not cointegrated, then only the short-run ARDL model is specified.

Given the variables of interest in this study—i.e., labor productivity (*PRODYbpm*), log of the average compensation per employee (*lavecompbpm*), and the log of GVC-based[26] exports (*lgvcexportsbpm*) in the IT-BPM industry—the bounds test for cointegration of the conditional ARDL (p, q_1, q_2) basic model with three (or more, for alternative specifications using additional regressors x_t) variables is specified as:

Hypotheses:

$H_0 : b_{1i} = b_{2i} = b_{3i} = 0$ where i = 1,2,3

$H_1 : b_{1i} \neq b_{2i} \neq b_{3i} \neq 0$

$$PRODYbpm_t = a_{01} + b_{11}\, PRODYbpm_{t-i} + b_{21}\, lavecompbpm_{t-i} + b_{31}\, lgvcexportsbpm_{t-i} + \sum_{i=1}^{p} a_{1i}\, PRODYbpm_{t-i} + \sum_{i=1}^{p} a_{2i}\, lavecompbpm_{t-i} + \sum_{i=1}^{p} a_{3i}\, lgvcexportsbpm_{t-i} + u_{1t} \quad (3)$$

$$avecompbpm_t = a_{02} + b_{12} PRODYbpm_{t-i} + b_{22}\, lavecompbpm_{t-i} + b_{32}\, lgvcexportsbpm_{t-i} + \sum_{i=1}^{p} a_{1i}\, lavecompbpm_{t-i} + \sum_{i=1}^{p} a_{2i}\, PRODYbpm_{t-i} + \sum_{i=1}^{p} a_{3i}\, lgvcexportsbpm_{t-i} + u_{2t} \quad (4)$$

$$lgvcexportsbpm_t = a_{03} + b_{13} PRODYbpm_{t-i} + b_{23}\, lavecompbpm_{t-i} + b_{33}\, lgvcexportsbpm_{t-i} + \sum_{i=1}^{p} a_{1i}\, lgvcexportsbpm_{t-i} + \sum_{i=1}^{p} a_{2i}\, PRODYbpm_{t-i} + \sum_{i=1}^{p} a_{3i}\, lavecompbpm_{t-i} + u_{3t} \quad (5)$$

[26] GVC-based means the variable was obtained or calculated from ADB's MRIOT.

If the long-run bounds test shows that there is no cointegration, then the ARDL (p, q_1, q_2) model is specified as:

$$PRODYbpm_t = a_{01} + \sum_{i=1}^{p} a_{1i}\, PRODYbpm_{t-i} + \sum_{i=1}^{p} a_{2i}\, lavecompbpm_{t-i} + \sum_{i=1}^{p} a_{3i}\, lgvcexportsbpm_{t-i} + u_{1t} \quad (6)$$

If the long-run bounds test shows that there is cointegration, then the ECM representation would be:

$$\Delta PRODYbpm_t = a_0 + \sum_{i=1}^{p} a_{1i}\, \Delta PRODYbpm_{t-i} + \sum_{i=1}^{p} a_{2i}\, \Delta lavecompbpm_{t-i} + \sum_{i=1}^{p} a_{3i}\, \Delta lgvcexportsbpm_{t-i} + \alpha ECT_{t-1} + u_{1t} \quad (7)$$

where $\alpha = (1 - \sum_{i=1}^{p} a_{1i})$ is the speed of adjustment parameter, ideally with a negative sign to indicate a return to equilibrium; ECT $= (PRODYbpm_{t-i} - \theta Xt)$ is the error correction term, and $\theta = (\sum_{i=0}^{q} \beta i) / \alpha$, is the long-run parameter. a_{1i}, a_{2i}, and a_{3i} are the short-run dynamic coefficients of the model's adjustment to the long-run equilibrium.

4.2 *Prophet technique*

As a robustness check of the ARDL-ECM results, the Prophet framework—a machine learning tool developed by the Core Data Science team at Facebook[27] (Facebook Open Source, n.d.-a)—is also employed. According to Taylor and Letham (2017), Prophet derives its predictions through the use of components for trend, seasonality, and holidays, as in equation (8):

$$y(t) = g(t) + s(t) + h(t) + e_t \quad (8)$$

where $g(t)$ is a trend function which models non-periodic changes in the value of the time series, $s(t)$ represents periodic changes (e.g., weekly and yearly seasonality), and $h(t)$ accounts for holiday effects (Taylor & Letham, 2017). The error term e_t is assumed to be normally distributed (Taylor & Letham, 2017). Prophet also allows for the incorporation of additional regressors, which favors this study by allowing another vantage point from which to assess the influence of chosen predictors.

For this study, given that the data used is of annual frequency, seasonality and holiday effects may not be as important. As such, the trend function $g(t)$ will likely come into greater play. Unique to $g(t)$ is room for a non-constant growth rate, with changes allowed to occur at what are termed as changepoints (Taylor & Letham, 2017). More formally, Taylor and Letham (2017) provide the following specification in equation (9),[28] given S changepoints at times s_j, j=1, …, S:

$$g(t) = (k + a(t)^T d)t + (m + a(t)^T p) \quad (9)$$

where k is a growth rate, d is a vector of rate adjustments such that dj is the rate of change occurring at time s_j, and $a(t)$ is a vector of 1s and 0s that help activate

[27] Facebook has rebranded itself as Meta.

[28] This refers to the piecewise linear model; the package also offers a nonlinear, saturating growth option.

adjustments as necessary. Thus, a rate at time t is $k + a(t)^T d$ (Taylor & Letham, 2017). An offset parameter m is applied to connect segments, with p_j set to $-s_j d_j$ to make the function continuous (Taylor & Letham, 2017).

Changepoints s_j can be specified manually or, as followed in this study, be automatically selected by imposing a sparse prior on d (Taylor & Letham, 2017).

5. Presentation of results

All variables used in the estimation were tested for unit root to ascertain that all variables are either I(0) or I(1). Granger and Toda-Yamamoto causality tests were then conducted to establish the direction of causality among the variables.[29]

5.1 *Granger and Toda-Yamamoto causality tests*

Results of the Granger causality tests (See Table 2a) reveal that the productivity of the IT-BPM industry based on GVC analysis Granger causes both the level and growth of average annual compensation as well as of the real value added of the IT-BPM industry. In addition, both the productivity of the IT-BPM industry in gross value-added terms and its GVC-based value-added Granger causes the growth in GVC-based IT-BPM exports. Meanwhile, the GVC-based value added of the IT-BPM industry Granger causes the log of average compensation per employee.

Meanwhile, based on the Toda-Yamamoto causality test (See Table 2b), a more definitive test of causality,[30] it is GVC-based exports alone, and both the log of GVC-based exports and the log of annual average compensation per employee as a pairwise variable group that drives PRODYGVAbpm in a significant way (based on Wald Tests).

5.2 *Results from the ARDL-ECM estimation*

The ARDL long-run bounds tests indicate that the IT-BPM labor productivity variable and the log of average annual compensation per employee in IT-BPM have at least one long-run cointegrating relationship with the other variables of interest. Levels equations indicate that the ARDL Error Correction Term (ECT) for these relationships are statistically significant. In contrast, the log of GVC-based IT-BPM exports is not cointegrated and the ECT is not statistically significant. Based on the Toda-Yamamoto Causality Test, however, of the two variables which have cointegration, only the labor productivity variable indicated significant causal effects coming from the IT-BPM compensation and exports variables. These results are summarized in Table 3. Given the foregoing, the ARDL-ECM estimation is conducted for the PRODYGVAbpm variable as the dependent variable in order to look into the impact of the IT-BPM sector on labor market outcomes.

The detailed estimations are summarized in Table 4. In Model 1.1, results indicate that GVC-based exports of the IT-BPM sector (lagged 1 period) and average compensation per employee in IT-BPM (contemporaneous and lagged 1 period) are highly significant and are positive determinants of the labor productivity variable from the NIA of the PSA. In addition, net FDI enters as a positive and highly significant dynamic

[29] Granger causality is not causality in the deep sense of the word. Rather, Granger causality identifies whether changes in one variable precedes changes in another (Sorensen, 2005).

[30] Toda-Yamamoto is more reliable because it is robust whether the variables are cointegrated or not (Toda-Yamamoto, 1995).

Table 2a. Pairwise Granger causality tests

Sample: 2007 2021, Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Prob.
PRODYGVCbpm does not Granger Cause AVECOMPbpm	10	20.0	0.00
AVECOMPbpm does not Granger Cause PRODYGVCbpm		1.3	0.29
PRODYGVCbpm does not Granger Cause LAVECOMPbpm	10	20.6	0.00
LAVECOMPbpm does not Granger Cause PRODYGVCbpm		1.2	0.32
PRODYGVCbpm does not Granger Cause LREALGVCVALADD	13	5.3	0.04
LREALGVCVALADD does not Granger Cause PRODYGVCbpm		0.4	0.50
PRODYGVCbpm does not Granger Cause REALGVCVALADD	13	5.3	0.04
REALGVCVALADD does not Granger Cause PRODYGVCbpm		0.3	0.61
LREALGVCVALADD does not Granger Cause LAVECOMPbpm	10	3.6	0.10
LAVECOMPbpm does not Granger Cause LREALGVCVALADD		0.9	0.37
PRODYGVCbpm does not Granger Cause LGVCEXPORTSbpm	13	6.6	0.03
LGVCEXPORTSbpm does not Granger CausePRODYGVCbpm		1.3	0.28
LREALGVCVALADD does not Granger Cause LGVCEXPORTSbpm	13	13.7	0.00
LGVCEXPORTSbpm does not Granger Cause LREALGVCVALADD		2.62	0.14

Notes:
GVC in the variable name or GVC-based in the text means the variable was obtained or calculated from ADB MRIOT
PRODYGVCbpm=GVC-based real productivity of the IT-BPM industry
PRODYGVAbpm=real productivity of the IT-BPM industry in gross value-added terms, based on the National Income Accounts (NIA), PSA
AVECOMPbpm=average annual compensation per employee, in levels
LAVECOMPbpm=average annual compensation per employee, in log levels
LREALGVCVALADD=GVC-based real value added of the IT-BPM industry, in log levels
Source: Authors' estimates

regressor of productivity. These results are consistent with theory, as discussed in the literature review.

Meanwhile, contemporaneous GVC-based exports have a negative impact on productivity. This may indicate that the positive impact of exports in IT-BPM to productivity occurs with a lag.

In an alternative estimation (Model 2.2), the score of the Philippines in innovations in science is a positive and statistically significant determinant of productivity. This result is clear evidence that improvements in innovations in science in particular or STEM in general have a positive effect on IT-BPM labor productivity.

As robustness checks, estimations using the GVC-based labor productivity indicator was used. The GVC-based value added of the IT-BPM industry, as an indicator of output for the sector, as well as other fixed regressors were likewise considered. These include exchange rate (PHP/USD); net FDI specifically in the *professional, scientific, and technical activities* subsector (henceforth, science and technology); total innovations score (rather than on science alone); and the number of STEM graduates in IT-related TESDA courses.

Table 2b. Toda-Yamamoto causality test results

VAR Granger Causality/Block Exogeneity Wald Tests			
Dependent variable: PRODYGVCbpm			
Excluded	Chi-sq	df	Prob.
LAVECOMPbpm	1.4	2	0.51
LGVCEXPORTSbpm	5.5	2	0.06
All	10.6	4	0.03
Dependent variable: LAVECOMPbpm			
Excluded	Chi-sq	df	Prob.
PRODYGVAbpm	1.0	2	0.62
LGVCEXPORTSbpm	0.3	2	0.86
All	1.4	4	0.84
Dependent variable: LGVCEXPORTSbpm			
Excluded	Chi-sq	df	Prob.
PRODYGVAbpm	1.1	2	0.57
LAVECOMPbpm	2.6	2	0.28
All	3.0	4	0.55

Source: Authors' estimates

Results reveal that the GVC-based productivity variable is not cointegrated with compensation and exports in IT-BPM. Nevertheless, the ARDL estimation indicated significant short-run relationships. Compensation, GVC-based IT-BPM exports, and GVC-based value added of the IT-BPM sector are significant and positive determinants of GVC-based labor productivity in the short run. Among the fixed regressors considered, all indicated a positive relationship with productivity, but only FDI in science and technology has a statistically significant effect.

5.3 *Prophet results*

Internal estimates of productivity for the IT-BPM sector using Facebook Prophet were predicted following equation (9), together with additional regressors, for the period 2008 to 2020. Year-on-year growth in gross value added (GVA) for IT-BPM-related service subsectors—*information and communication*, *financial and insurance activities*, *real estate and ownership of dwellings*, *and professional and business services*—were considered. Table 3 presents the regression coefficients for these subsectors.[31]

[31] Twenty versions of the Prophet model were instantiated using several values for the changepoint_prior_scale setting ranging from 0.01 to 0.2. Then the resulting mean absolute percentage error (MAPE) on the training set was measured. Results showed that values 0.01 through 0.06 caused relatively higher MAPE values, indicating underfitting. Meanwhile, by 0.2, the model is too powerful and overfits, resulting in a near-zero value for MAPE. Given this, the hyperparameter was tuned to the middle of the options (i.e., 0.13), to give more reasonable error values. The changepoint_range was also changed to 1, so that the entire series is considered for purposes of selecting changepoints (Facebook Open Source, n.d.-b).

Table 3. Summary of the ECM, ARDL, and causality test

	ECM	ARDL	Causality Test
Dependent Variable	**Long-Run Regressors**	**ECT**	**Toda-Yamamoto**
PRODYGVAbpm	lavecompbpm and lgvcexportsbpm; significant	Significant/with cointegration	With causal effects from both variables
LAVECOMPbpm	lgvcexportsbpm and lrealgvcvaladd; significant	Significant/with cointegration	No causal effect
LGVCEXPORTSbpm	No cointegration	Not significant/No cointegration	No causal effect
Cointegrating Equation (CointEq):			
D(PRODYGVAbpm) = −407414.3 −1.4*(PRODYGVAbpm(−1) − (69.3*LAVECOMPbpm(−1) + 345474.6*LGVCEXPORTSbpm(−1)))			
		(0.01)*** (0.00)***	
ECM Specification:			
D(PRODYGVAbpm) = −7413025 + 784769*D(LAVECOMPbpm) −781434.3*D(LGVCEXPORTSbpm) + 46.9*FDITOTBPM + 1.399*CointEq(−1)			
	(0.00)***	(0.00)*** (0.00)*** (0.00)***	

*Note: ***, **, and * denote statistical significance of coefficients at 1 percent, 5 percent, and 10 percent levels of significance, respectively. Numbers in ( ) indicate p-values.*
Source: Authors' estimates

Table 4. ARDL-ECM coefficient estimation results

Dependent Variable	Dynamic Regressors	Dynamic Regressors' (long-run) coefficient signs	p-value	R-sq	Bounds Test: With Cointegration?	Fixed Regressors	Fixed Regressors' (short-run) coefficient signs	p-value	ECT Variables	p-value
PRODYGVAbpm	PRODYGVAbpm(-1)	Negative ***	0.00						LAVECOMPbpm	0.00 ***,
Model 1.1 (With Total FDI in IT-BPM as fixed regressor)	LAVECOMPbpm	Positive ***	0.00		YES				LGVCEXPORTSbpm	0.00 ***
	LAVECOMPbpm(-1)	Positive ***	0.01							
	LGVCEXPORTSbpm	Negative ***	0.00							
	LGVCEXPORTSbpm(-1)	Positive ***	0.00							
	C	Negative ***	0.00	0.99		Net FDI in IT-BPM	Positive ***	0.00		
Model 1.2 (With total innovation score and innovation in Science for PH)				0.98		PH score for innovations in Science	Positive *	0.09		
PRODYGVCbpm	PRODYGVCbpm (t-1)	Positive ***	0.04							
Model 2.1 (With ER as fixed regressor)	LAVECOMPbpm	Negative **	0.05		NONE					
	LAVECOMPbpm (-1)	Positive **	0.05							
	LGVCEXPORTSbpm	Positive *	0.07							
	LGVCVALADDREAL	Positive ***	0.01							
	LGVCVALADDREAL (-1)	Negative ***	0.03							
	C	Positive *	0.11	0.99	NONE	Exchange Rate (P/US$)	Positive	0.19		
Model 2.2 (with FDI in Professional, Scientific and Technical Activities as fixed regressor)				0.99	NONE	FDI in Science and Technology	Positive *	0.11		
Model 2.3 (with index of innovation as fixed regressor)				0.99	NONE	Index of innovations	Positive	0.19		
Model 2.4 (with STEM Graduates in IT Disciplines)				0.99	NONE	Number of STEM	Positive	0.22		

*Note: ***, **, and * denote statistical significance of coefficients at 1 percent, 5 percent, and 10 percent levels of significance, respectively.*
Source: Authors' estimates

As the above did not include full Bayesian sampling, the significance of the coefficients remains to be established, perhaps with a fuller set of data points. Still, as an indicative start, it is encouraging to see how growth in GVA for information and communication, as well as for professional and business services, contribute positively to forecasts of productivity in the IT-BPM sector. The negative values for financial and insurance activities as well as real estate, renting, and business activities (RERBA) would also be interesting to explore in future work, since reasons could vary from something as simple as a lack of significance to IT-BPM to outright counterproductivity. In the case of RERBA, for example, the near-zero value may be explained by the reclassification of certain related activities toward the middle part of the

data series used, resulting in a diluted result.[32]

In addition, Prophet allows visualization of the mathematically deduced changepoints, during which a time series undergoes a change in trajectories (Facebook Open Source, n.d.-b). Figure 11 shows that 2014 and 2016 were turning points, trend-wise. These results provide more solid affirmation as to what is visually apparent: improvements in estimated productivity for the IT-BPM sector plateaued sometime between 2014 and 2016.

Table 5. Regression coefficients

Regressor	Coefficient
GVA for information and communication	3.4
GVA for financial and insurance activities	-2.2
GVA for real estate, renting, and business activities	-0.2
GVA for professional and business services	0.4

Note: All variables are specified as year-on-year growth. In 2014, per 2009 Philippine Standard Industrial Classification, the single section real estate, renting, and business activities was split into (1) real estate activities and (2) professional, scientific, and technical activities; and administrative and support service activities.
Source: Authors' computations using Facebook Prophet package on Google Colab Pro+

Interestingly, the upward trend in productivity pre-2014 seems to have started around the same time that a large infusion of FDI in information and communication was made in 2011 (Fig. 7). It is possible that the relatively large FDI infusions in 2019 and 2020 may have started a similar take-off that will bear dividends for at least a few years, based on an uptick in productivity observed as of 2021 in Fig. 11.

6. Current global issues and challenges facing IT-BPMs

Rapid digital transformation. In Table 2, there appears to be a shift in global rankings for players in the GVCs for business services. The new entrants to the top 10 of Tholon's SGCI are developed countries who improved their scores in the index by double-digit terms. The USA, Canada, and the UK improved their rankings somewhere between 14 to 21 places in the past three years. In addition, Singapore—an industrialized Asian nation—also improved by a total of 12 places from 2017 to 2020, landing at Top 9 and 10 in 2019 and 2020, respectively. These four developed economies bumped off developing countries from the top 10 spots and pushed down countries like the Philippines in the ranking. Looking at the scores per category or factor,[33] the four developed countries achieved this almost solely via improvements in the digital and innovation component. In 2021, the Philippines dropped out of the top 10 list and ranked 18th.

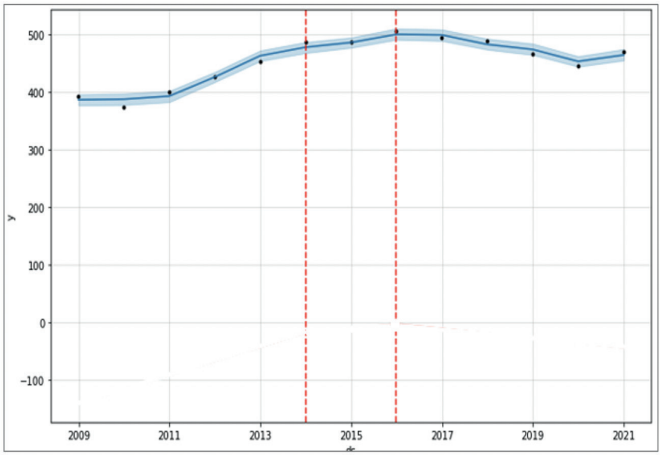
A.T. Kearney (2017, 2019)[34] reported that the information technology outsourcing

[32] Effective June 2014, per 2009 Philippine Standard Industrial Classification (PSIC), the single section real estate, renting and business activities (Section K) was split into three: real estate activities (Section L); professional, scientific, and technical activities (Section M); and administrative and support service activities (Section N).

[33] The index ranks the most attractive outsourcing destinations based on five factors: talent, skills, and quality; business catalyst; cost and infrastructure; risk and quality of life; and digital and innovation.

[34] A. T. Kearney is a global management consulting firm.

Figure 11. Prophet changepoints for internal estimates of productivity for the IT-BPM sector



Source: Authors' computations

(ITO) and business process outsourcing industry has faced significant disruption from digital transformation. The strongest impact is from two adjacent forces—automation and heightened cybersecurity. Anonymous data centers hosting cloud-based automation are bound to replace human labor in ITO and BPO and transform business models, thereby challenging traditional employment patterns. Nonetheless, while low-cost countries are losing jobs due to increased automation, more high skilled jobs are being created to manage the demands from automation.

At this point in its development, automation requires close monitoring, testing, and maintenance so that it creates new jobs that require more advanced skills to build, train, manage, troubleshoot, and enhance the technology. As they involve design, maintenance, testing, and calibration, most of these jobs are clearly of higher value added. A. T. Kearney (2017) estimated that, on average, one new automation management position is created for every four jobs that automation replaces. This means that some of the workers move into higher value positions instead of being laid off. But this also means that the resulting reshoring of offshore jobs only benefits more advanced economies like the USA and the UK. The net impact of automation on a country's IT-BPM employment therefore depends on the complex mix of the jobs eliminated versus those that are reshored.

For the Philippines, A.T. Kearney (2017) noted that employment in the IT-BPM industry is relatively more protected from losses compared to other countries, at least in the short term, due to the concentration of its customer service functions in the less easily automated activities. Despite the lower estimated probability of job losses compared to other major IT-BPM exporters such as India and Poland, A.T. Kearney nonetheless projected that the Philippine IT-BPM still stands to lose 110,000 jobs (or about 16.0 percent of current employment levels) to automation, and it has very little prospect for regaining the same jobs. In addition, with the current lack of home-grown companies and at its current level of skills and R&D, the Philippines is not going to benefit much from the high-skilled jobs newly created from automation, unless the country and the industry are able to either upskill and reskill the workforce *en masse* immediately, unravel brand new export opportunities for its current segments, or both.

A.T. Kearney (2019, 2021) also found that digital capabilities are increasingly becoming integral parts of business decisions on offshoring location strategies. This is why in 2019, A.T. Kearney included in its GSLI a digital resonance metric

that ranks countries based on the digital skills of the labor force, digital outputs,[35] the amount of corporate activity,[36] and legal adaptability[37]. This reflects the pivot of business decision-maker preferences toward digital resonance and away from traditional outsourcing parameters such as labor cost considerations. A. T. Kearney (2021) particularly notes that these trends should be a source of reflection for the Philippines, and that while the country has a fair level of start-up activity, this is not enough to remain competitive in a digital-first world. It noted that enhancements must be made in the country's legal system's adaptability to digital models and in the digital skills of the workforce.[38]

Meanwhile, as early as 2014, Deloitte's Global Outsourcing Survey[39] showed that new technologies and innovations, such as cloud computing, business process as a service (BPAS), data analytics, and data science are shaping opportunities and challenges in the outsourcing sphere and are starting to affect sourcing decisions and outcomes. In 2019, Deloitte's survey revealed that organizations are rapidly taking up disruptive outsourcing technologies such as cloud solutions and robotic process automation (RPA). In 2021, Deloitte's survey affirmed that RPA is considered the most desirable digital enabler for global business service (GBS) organizations and is expected to be the key focus area in the next one to three years. In addition, due to the impact of COVID-19, most organizations are focusing on expanding remote working capabilities to ensure business process continuity. Thus, organizations are keen on accelerating the digital agenda.

The foregoing highlight that the Philippines needs large and continuous improvements in digital innovation and transformation to stay competitive in the global digital outsourcing market.

While new outsourcing arrangements become more efficient, effective, and less costly, they expose companies to significantly more cyber risk. Hence, it can be expected that cyber risk profile of countries will become one of the leading concerns of global corporations. With this, countries should continue to work on fortifying their data security (A.T. Kearney, 2019). In the Philippines, greater cybersecurity investment is needed, as it only spent approximately 0.04 percent of its GDP on cybersecurity in 2017 (A.T. Kearney, 2018).[40] This is crucial, as the Philippines was identified by Kaspersky Security Network (KSN)[41] as the fourth most attacked country in the world, with over 50 million web threat attempts in 2021.[42]

[35] This includes creative, knowledge, and technology outputs.

[36] This is defined as the amount of capital invested in start-ups and the number of deals by venture capitalists.

[37] This refers to the extent to which the legal framework takes digital business models into account, including cybersecurity protections.

[38] A.T. Kearney (2021) made similar observations and recommendations for India, Malaysia, Indonesia, and Vietnam.

[39] The survey takes the pulse of global outsourcing and insourcing by polling executives from leading organizations about their observations, expectations, and experiences.

[40] This is below the ASEAN region average of 0.06 percent of GDP.

[41] KSN is a complex distributed infrastructure developed by Kaspersky Lab and dedicated to intelligently processing cybersecurity-related data streams from millions of voluntary participants around the world.

[42] From 2017 to 2021, in the malware-detection history of KSN, the cyber threats detected in the Philippines have gone up sharply by 433 percent.

There are real challenges with adopting disruptive solutions, especially for IT-BPM players in developing countries who wish to seize and exploit the new opportunities for higher value-added global services. Data migration, security requirements, and application optimization/change are just a few examples of challenges related to cloud adoption. Organizational resistance, highly fragmented processes, and regulatory restraints are common challenges related to RPA adoption.

To address these challenges, R&D, state-of-the-art IT resources, and a stronger internet infrastructure are among the ways identified in the literature to help ensure that competitiveness is maintained or even improved upon, via a move upwards in the global value chain for business services. One can appreciate this within the context of what is termed as the Smile Curve in GVCs. The Smile Curve, devised by Acer founder Stan Shih, shows the level of value added in different phases of an industry or service value chain. Higher value is focused both at the upstream end—via basic and applied research and development, commercialization, innovation, and design—as well as at the downstream end—which involves marketing, advertising, brand management, specialized logistics, after-sales, and distribution services. The middle part of the value chain, which consists mainly of basic manufacturing and standardized or repetitive services, represents the low value-added segments of a sector. When plotted, the three segments form a U-shape pattern similar to a smile. Traditionally, the higher value-added activities were dominated by advanced economies, while firms from developing and emerging economies tend to be assigned to the low value-added segment. However, rapid changes in digital technology and innovation and spillover effects from developed to emerging economies via FDI have opened the possibility for developing economies to move up or "leapfrog" toward higher value-added segments. The experience of the Philippines is instructive. Early on, call center services in the country involved repetitive tasks and are, therefore, at the bottom of the smile curve. As the industry progressed, services offered moved toward ITOs and KPOs, which is indicative of a move upwards in the smile curve.

Emergence of new markets for outsourcing opportunities. Asian economies including the Philippines continue to occupy top positions in the 2021 Global Services Location Index. Nonetheless, new markets for outsourcing opportunities are emerging. As stated by A.T. Kearney (2021) and Deloitte (2019), Latin America is becoming a strong regional contender in capturing outsourcing opportunities. Organizations involved in shared services centers (SSCs) are indicating a new focus on Costa Rica and Colombia (Deloitte, 2019). Meanwhile, Brazil (Sao Paolo) is rapidly becoming the digital hub of Latin America.

7. Conclusion

The Philippine IT-BPM industry faces a wealth of opportunities that can be taken advantage of. Nonetheless, serious challenges are at hand. Authorities from the public and private sectors must work together to equip the country's talent pool with the skills necessary for shifting to higher-value jobs and services. The IBPAP pointed out that policies need to be in place to turn technological disruptions and advancements into an advantage over competitors—something that will only be realized through the collective action of the various stakeholders from the industry, support sectors, the academe, and the government.

Although widespread digitalization had already been pushing the Philippines' upskilling and reskilling agenda forward, the health crisis of 2020 has become an additional impetus. It is in this vein that eleven national government agencies forged the Philippine Skills Framework in 2021 under the *Inclusive Innovation and Industrial Strategy* or i3S (DTI, 2021).[43] The collaboration seeks to enhance and equipping the Philippine workforce with new digital skills to prepare them for the future of work.

The empirical results in this study indicated positive impact of IT-BPM output, IT-BPM-related FDI, and the innovations in science on labor productivity. This means that the Philippines has the opportunity to improve labor productivity further, mainly via FDI and human capital investment. Despite the projected job losses due to automation based on A.T. Kearney's study, promoting STEM education and reskilling and upskilling in the next few years is a key policy prescription.

Further, the results of this study showed that, higher value added and exports of IT-BPM sectors, better compensation, and higher FDI in IT-BPM sectors—particularly for the science and technology subsector—combined with investments and improved innovations in science, could lead to higher productivity in the Philippine IT-BPM sector. This, in turn, could help move the sector up the global value chain for business services, and hence continually improve its revealed comparative advantage. Improved and broader provision of training activities on ICT and BPO skills and basic education geared toward innovation, as supported by the government through TESDA and as espoused by IBPAP, could further lead to higher labor productivity in this sector. All these efforts could help ensure and even improve the industry's competitiveness in the post-pandemic era.

This paper has offered various points for consideration by the private sector that can enrich their strategies,[44] as well as to inform policies pursued by the government. Given the right policies and strategies, the IT-BPM sector can transcend the challenges of the pandemic and beyond, and continue to be a force of growth for the Philippines.

[43] The i3S was designed to build an innovation and entrepreneurship ecosystem, remove obstacles to growth, and strengthen domestic supply chains and global/regional participation through its five major pillars: (A) new industry clusters; (B) human capital development; (C) innovation and entrepreneurship; (D) micro, small, and medium enterprise (MSME) start-up development; and (5) ease of doing business (DTI, 2021).

[44] IBPAP President Jack Madrid noted in his closing remarks at the 13*th International Innovation Summit* on 24 November 2021 that the BPO Roadmap to 2028 will be completed in mid-2022, and that it will prioritize strategies in digitization, talent, policy shaping, infrastructure, and country branding over the next six years.

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Annex

ADB-MRIOT 35-sector disaggregation

Sector			
c1	Agriculture, hunting, forestry and fishing	c19	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of fuel
c2	Mining and quarrying	c20	Wholesale trade and commission trade, except of motor vehicles and motorcycles
c3	Food, beverages and tobacco	c21	Retail trade, except of motor vehicles and motorcycles; repair of Household goods
c4	Textiles and textile products	c22	Hotels and restaurants
c5	Leather and footwear	c23	Inland transport
c6	Wood and products of wood and cork	c24	Water transport
c7	Pulp, paper, printing and publishing	c25	Air transport
c8	Coke, refines petroleum and nuclear fuel	c26	Other supporting and auxiliary transport activities; Activities of travel agencies
c9	Chemicals and chemical products	c27	Post and Telecommunications
c10	Rubber and plastics	c28	Financial Intermediation
c11	Other non-metallic mineral	c29	Real Estate Activities
c12	Basic metals and fabricated metal	c30	Renting of M&Eq and other business activities
c13	Machinery, Nec	c31	Public admin and defence; compulsory social security
c14	Electrical and optical equipment	c32	Education
c15	Transport equipment	c33	Health and social work
c16	Manufacturing, Nec; recycling	c34	Other community, social and personal services
c17	Electricity, gas, and water supply	c35	Private Households with employed persons
c18	Construction		

4 | Unemployment in the Philippines: Stylized Facts Before and During the COVID-19 Pandemic

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4

4 | Unemployment in the Philippines: Stylized Facts Before and During the COVID-19 Pandemic

Geoffrey Ducanes[1]

1. Introduction

Though it started as a public health concern, the COVID-19 crisis very quickly turned into an economic crisis, which spared no country in the world. Apart from the deaths and unprecedented spread of the disease that were the subject of daily news, the most salient impact of the pandemic was the job losses resulting from the slowdown in economic activity, primarily due to border closures and mobility restrictions imposed by countries. World GDP declined by 3.3 percent in 2020, according to the World Bank (2022). World merchandise trade fell by 7.4 percent and global service trades dropped by 20 percent in the same year, as a consequence of supply-chain disruptions and weaker aggregate demand (UNCTAD, 2021).

These had a tremendous impact on employment outcomes worldwide. According to the International Labour Organization (ILO) (2022), the global unemployment rate increased by 1.2 percentage points, from 5.4 percent in 2019 to 6.6 percent in 2020, equivalent to an additional 38 million unemployed people. Global labor force participation rate, meanwhile, dropped by 1.9 percentage points, equivalent to a decline of 66 million people in the labor force. Even among those who were employed, many worked much fewer hours. The same ILO report stated that the reduction in hours worked in 2020 was equivalent to 258 million jobs based on a 48-hour workweek.

The Philippine economy, its labor market in particular, was among the most heavily affected in the world by the COVID-19 crisis, in part due to the imposition of one of the most stringent and longest lockdowns in the world. Between 2019 and 2020, the country's gross domestic product (GDP) fell by 9.6 percent and the average annual unemployment rate more than doubled. In April 2020, as will be discussed in greater detail later in the chapter, the unemployment rate in the country reached a historic high of 17.7 percent and did not come close to its pre-pandemic level until two years later.

The impact of the pandemic on employment outcomes is certainly not just unemployment, but includes other dimensions of employment such as underemployment, labor force participation, and the quality of jobs. The underemployment rate increased and labor force participation fell at the height of the pandemic. This chapter, however, focuses solely on unemployment, before and after the pandemic. Low unemployment is one of the great trio of objectives sought by macroeconomic policy, the other two being high growth and low inflation. A better understanding of the impact of the pandemic on unemployment—the objective of this chapter—may help provide additional guidance for macroeconomic policy moving forward, especially if a similar crisis happens in the future.

[1] Associate Professor, Ateneo de Manila University

A better understanding of the impact of the pandemic on unemployment may help provide additional guidance for macroeconomic policy moving forward, especially if a similar crisis happens in the future.

To briefly summarize the main findings of this chapter: The pandemic radically reversed, even if temporarily, the trend of declining unemployment the country in the 15 years before COVID-19 came. The shock to employment in the Philippines was stronger than in any of its neighboring countries and resulted in millions of additional involuntary unemployment. At the beginning of the pandemic, it was the lower-skilled workers, likely also the low-income workers, who were most affected, resulting in poverty and hunger. Limited access to social and unemployment insurance, combined with the government's underdeveloped system for cash aid, exacerbated the impact of the crisis.

The pandemic experience underscores the importance of establishing more inclusive unemployment insurance in the country, one that covers extraordinary circumstances such as a global health crisis and hard lockdowns, and long enough to cover the typical length of unemployment spells as people look for employment (typically 3–4.5 weeks). As most of those who lost jobs were informal sector workers, it is important to design social insurance to be inclusive of them.

The rest of the chapter is organized as follows: Section 2 examines the patterns and trends of unemployment before the COVID-19 crisis. Section 3 discusses how unemployment evolved at the beginning of the pandemic, when a hard lockdown was imposed in Luzon and other parts of the country, and then in the aftermath, when mobility restrictions were eased even as the economic impact lingered. The final section presents the summary and conclusion.

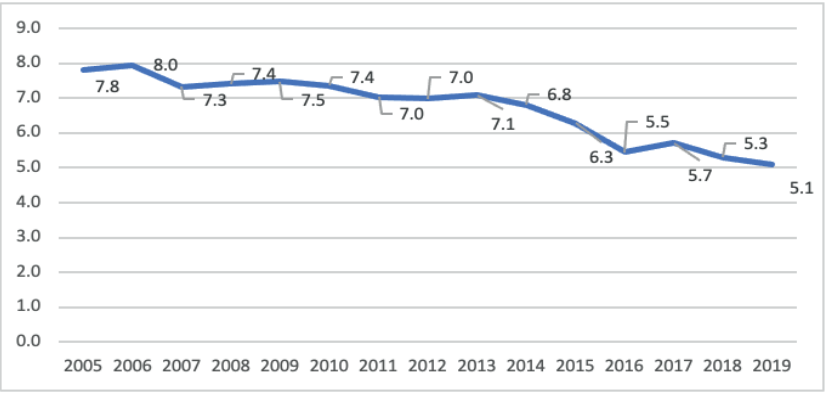
2. Philippine unemployment pre-pandemic

This section presents stylized facts about unemployment in the Philippines. It examines the pre-pandemic historical picture of unemployment in the country—how unemployment has changed over time, and how unemployment in the Philippines compares with its neighboring countries—and paints a profile of the country's unemployed. The link between output growth and unemployment rate in the country, which has long been characterized as weak, is also examined.

2.1 Declining unemployment rate but weak short-term correlation with GDP growth

From April 2005, after the National Statistics Office (now the Philippine Statistics Authority, or PSA) changed the official definition of unemployment in the Labor Force Survey (LFS), up to right before the beginning of the COVID-19 pandemic, Philippine unemployment rate slowly but steadily declined (Fig. 1)[2]. This long-term annual decline in unemployment rate of about one-fifth of a percentage-point in the 15-year period from 2005 to 2019,

Figure 1. Philippine unemployment rate pre-pandemic (2005-2019)



Note: Unemployment rate for the year is the average of the four quarters except for the 2005 one, which is the average for only three quarters.
Source: Labor Force Survey (LFS) of the Philippine Statistics Authority (PSA)

[2] The official definition of unemployment in the Philippines was changed in April 2005 to add the criterion of availability for work, to make it more consistent with the International Labour Organization's standard definition followed by most countries. The practical effect of this was it reduced the measured unemployment rate in the country immediately by three percentage points (comparing April 2005 to January 2005 unemployment rate) or by more than five percentage points (comparing April 2005 to April 2004).

happened at the same time the economy was growing at a robust 5.8 percent per year, on average.

A previous frequent characterization of Philippine economic growth was that it did not create enough jobs, or at least quality jobs, due to its pattern of growth which has favored sectors with low employment elasticities (Lim, 2007; Hanusch, 2013; Paqueo, et al., 2014; Felipe & Estrada, 2018). And yet, from 2005 to 2019, employment in the country still increased by about a quarter of a million people per year on average, while the ranks of the unemployed declined by about 50 thousand annually. In that 15-year period, as the country's labor force expanded from 35.3 million to 45.2 million, the number of unemployed went down from 2.7 million to about 2.1 million.

This indicates a relatively strong long-term link between output growth and unemployment rate in the country. What appears to be also true, however, is that Philippine unemployment rate is only weakly linked to overall GDP growth in the short term, despite their longer-term association observed in the past 15-year period. This is depicted in Table 1 which shows, using quarterly data from April 2005 to January 2020, the correlation coefficient between the year-on-year change in unemployment rate and the year-on-year growth in GDP using various lags. The expectation is that a higher expansion of economic output will result in lower unemployment, or a negative correlation. In the estimated correlations in the table, although the signs are negative as expected, there is no statistically significant relationship observed and the highest observed correlation is only -0.175, between the contemporaneous values of the two variables. This means that, at least in the short term, and using quarterly data, GDP growth is neither a leading indicator nor a lagging indicator of unemployment rate in the country.

Definition of the unemployed in the LFS

In the current official definition used by the PSA, the unemployed are those of working age (15 and older) who are without work but available for work, and are either (A) looking for work, or (B) not looking for work but only for the following reasons: tired; believe no work is available; awaiting results of previous job application; has temporary illness/disability; bad weather; or waiting for a rehire/job recall. If the reasons given by an individual for not looking for work is age-related (either too young or too old), retirement, permanent disability, schooling, or the need to perform household duties, then the individual is not classified as part of the labor force.

Source: Technical Notes on the Labor Force Survey (PSA) https://psa.gov.ph/article/technical-notes-labor-force-survey2012-08-16-1659

Table 1. Correlation of year-on-year change in unemployment rate with year-on-year GDP growth, different lags

	Year-on-year GDP growth	
	Lag	Forward
0	-0.176	-
1	-0.072	-0.065
2	-0.114	-0.023
3	-0.081	-0.088
4	-0.056	-0.031

Note: Based on quarterly data from April 2005 to January 2020. None of the correlations is statistically significant at the 5 percent level.

2.2 Relatively high unemployment rate compared to ASEAN neighbors and weaker relationship with GDP growth

The country's unemployment rate was high in comparison with its Association of Southeast Asian Nations (ASEAN) peers in the mid-2000s, when its definition of unemployment was revised to conform to international standards and remained high despite notable gains in the decade-and-a-half prior to the pandemic. Indonesia is the exception, which had about the same level of unemployment rate as the Philippines just prior to the pandemic, and which experienced the same long-term decline in unemployment rate (Fig. 2). Malaysia and Thailand, with a higher per capita GDP than the Philippines in 2019, and Vietnam with a lower per capita GDP, all had significantly lower reported unemployment rates compared to the Philippines.

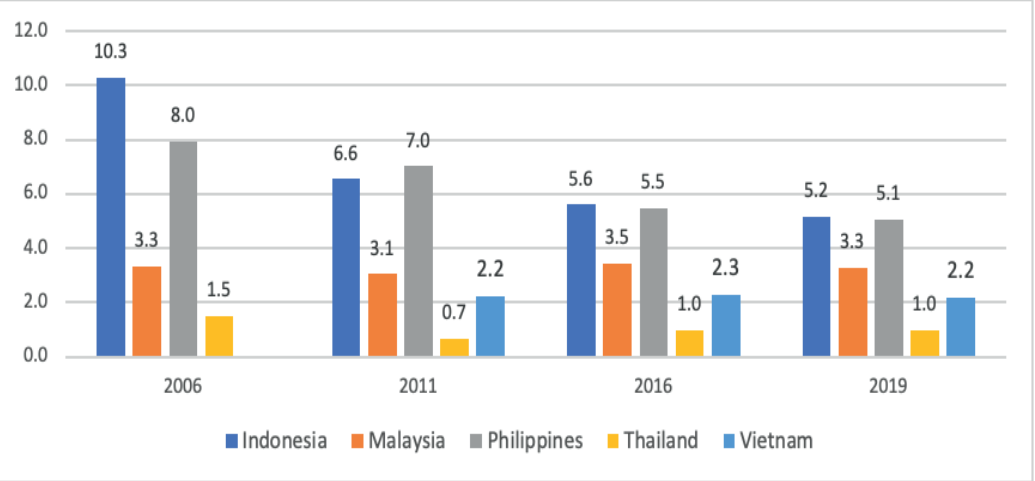
The relationship between overall economic growth and changes in unemployment rate is also relatively weak in the Philippines relative to Indonesia, Malaysia, and even Thailand. Using annual data, Table 2 shows the correlations between GDP growth and change in unemployment rate using three possible lags: contemporaneous (lag zero), lag one period, and forward one period, respectively indicating whether unemployment rate is a contemporaneous indicator, a lagging

Table 2. Correlation between GDP growth and change in unemployment rate (2006-2019)

	Lag period of change in unemployment rate					
Country	Contemporaneous		Lag 1		Forward 1	
Indonesia	-0.394		-0.142		**-0.573**	*
Malaysia	0.037		0.226		**-0.737**	*
Philippines	-0.084		0.243		**-0.259**	
Thailand	0.192		-0.131		**-0.366**	
Vietnam	0.171		0.221		0.112	

Notes: Used annual data from 2006 to 2019, except for Vietnam where available data starts from 2010 only. Figures in bold text represent highest observed correlation among the different lags.
** Significant at the 5 percent level.*

Figure 2. Unemployment rate in the Philippines compared with other countries in the ASEAN



Note: In Malaysia, the working age population is from 15 to 64 years of age; in the other countries, it is 15 and older.
Sources of data: CEIC, citing national statistics offices of the different countries

indicator, or a leading indicator of economic growth.

In bold text in Table 2 are the correlations with the highest absolute magnitude for each country. In both Indonesia and Malaysia, the change in unemployment rate forward one period has a high (in absolute value) and statistically significant relationship with GDP growth. For these countries, unemployment rate is a strong lagging indicator of GDP growth. For the Philippines and Thailand, no statistically significant relationship can be found, and the highest correlation is also with the forward-one-period change in unemployment rate. The magnitude of the coefficient for the Philippines is lower than Thailand's. In the case of Vietnam, the correlations are not statistically significant and have signs opposite to what is expected, although the available data for Vietnam is limited.

2.3 Growth of modern sectors has been driving changes in unemployment

If not overall GDP growth, what has been driving the changes in the country's rate of unemployment over time? As it turns out, the changes in the Philippine unemployment rate are more closely linked to gross value added growth in industry and services, rather than overall GDP growth, as shown in Table 3. The correlation of changes in unemployment rate to

Table 3. Correlation between Philippine sectoral growth and change in unemployment rate (2006-2019)

	Lag period of change in unemployment rate					
Sector	**Contemporaneous**		**Lag 1**		**Forward 1**	
Industry	**-0.869**	**	-0.089		-0.124	
Services	**-0.954**	**	-0.049		-0.185	
Agriculture	-0.286		**-0.332**		-0.022	

Notes: Used annual data from 2006 to 2019. Figures in bold text represent highest observed correlation, among the different lags.
*** Significant at the 1 percent level.*

services sector growth is -0.95, and with industry growth it is -0.87, both of which are statistically significant at the one-percent level. In other words, it is growth in the modern sectors that has been driving the declining unemployment rate observed from 2006 to 2019. Agriculture sector growth, on the other hand, is not significantly related with changes in unemployment rate. Such a finding is consistent with agriculture being the residual employment sector, admitting workers who have lost or are not able to find better-paying non-agricultural jobs.

2.4. *Profile of the unemployed*

Types of unemployed

The unemployed in the Philippines can be classified into three groups, according to the reasons for their unemployment. The first group consists of those who did not do any work in the reference week (not employed) and do not have a job or business but are looking for work. The members of this group can be termed *textbook unemployed*, as this is how the unemployed is defined in most textbooks. The second group consists of those who are available for work but are not employed, do not have a job or business, and are not looking for one because they believe there is no work available. The members of this group are typically called *discouraged workers*. The third group, consists of those who are available for work but are not employed, do not have a job, and are not looking for one for reasons not considered valid enough to classify them as not part of the labor force (see Box 1). They can be called the *other unemployed*.

Table 4 shows that in 2019, only slightly more than a third of the unemployed were *textbook unemployed* or actively looking for work, and the rest were those not actively looking for work. This was noticeably different from 2007 when the *textbook unemployed* comprised 45.2 percent of the total

unemployed. Both the share and the estimated absolute number of the *textbook unemployed* and *discouraged workers* declined substantially during the period, whereas the share and the absolute number of the *other unemployed* increased.

Information on the time spent looking for work is available only for the textbook unemployed. In 2007, the mean number of weeks they spent looking for work was 5.7 (median of 3) but in 2019, this declined to 4.5 (same median of 3). Apart from the decline in the overall unemployment rate, this change in the composition of the unemployed, and the lower amount of time spent looking for work among the *textbook unemployed* are likewise indicative of the improved employment situation in the country up to the period right before the pandemic.

Table 4. The unemployed, by type of unemployment

Type of unemployed	January 2007 (in thousands)	*Percent share*	January 2019 (in thousands)	*Percent share*	Change in no. of unemployed (2019-2007) (in thousands)	Change in share of unemployed (2019-2007) in percentage points
Textbook unemployed	1,219	*45.2%*	764	*35.2%*	-455	-10
Discouraged workers	480	*17.8%*	279	*12.9%*	-200	-5
Other unemployed	997	*37.0%*	1,129	*52.0%*	133	15
Total unemployed	2,696	*100%*	2,173	*100%*	-523	

Source of basic data: PSA's merged FIES-LFS data for 2006 and 2018. The 2006 merged data used the January 2007 LFS, while the 2018 merged data used the January 2019 LFS

Unemployment and household per capita income

The rate of unemployment in the Philippines has an inverted-U relationship with household per capita income, as shown in Fig. 3.[3] The unemployment rate is generally low in the poorest income decile, and then increases and peaks before declining in the higher income deciles.[4] This was true in both 2007 and 2019, and in-between although not shown in the figure. Some notable changes occurred between 2007 and 2019, however. The inverted-U relationship was much more peaked in the earlier period, indicating a higher variation in unemployment rate across income deciles. Stated differently, the rate of unemployment flattened across income deciles over time. The peak of the unemployment rate also changed: in 2019, the unemployment rate was highest in the third income decile (5.8 percent), whereas in 2007 it was highest in the seventh income decile. The lowest unemployment rate also shifted from the lowest income decile in 2007 to the highest income decile in 2019.

Type of unemployment is correlated with income decile. A smaller share of the unemployed in the lower income deciles are *textbook unemployed*, compared with the higher income deciles. This means a smaller share of the unemployed poor are actively looking for work. More strikingly, the share of *discouraged workers* is strongly negatively related with income. In both 2007 and 2019, about one-in-four of the unemployed in the lowest income decile were *discouraged workers*. Contrast this with the highest income decile, where only 6 percent in 2019 and 11 percent in 2007 were *discouraged workers*.

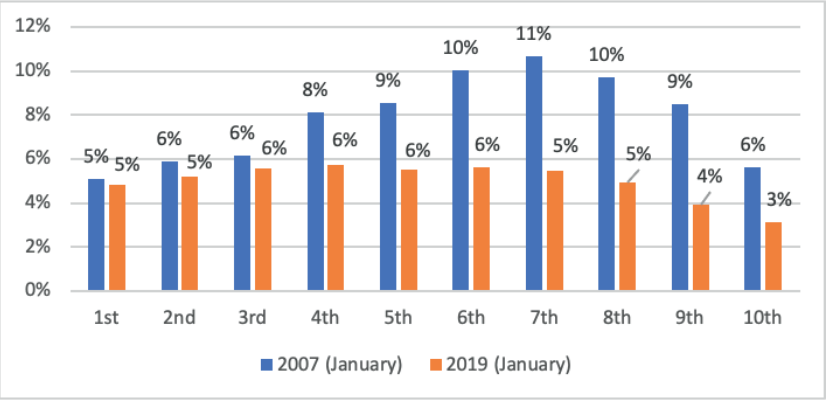
Discouraged workers are the least likely among the types of unemployed to find work because they have given up on finding work. As a consequence, they are also more likely to lose their job skills, or to have their skills become *passé*, further affecting their ability to find future employment. The high share of *discouraged workers* among the unemployed poor raises their likelihood of being trapped in poverty.

The amount of time spent looking for work among the textbook employed is positively correlated with income decile, especially in the 2019 data: those in the first income decile spent a mean average of 3.8 weeks (median of 2 weeks) compared to a mean average of 5.6 weeks (median of 3 weeks) in the tenth income decile. This suggests those in the higher income deciles are willing to wait longer for a more acceptable job offer.

[3] This contrasts with the labor force participation rate, which is strictly increasing with income.

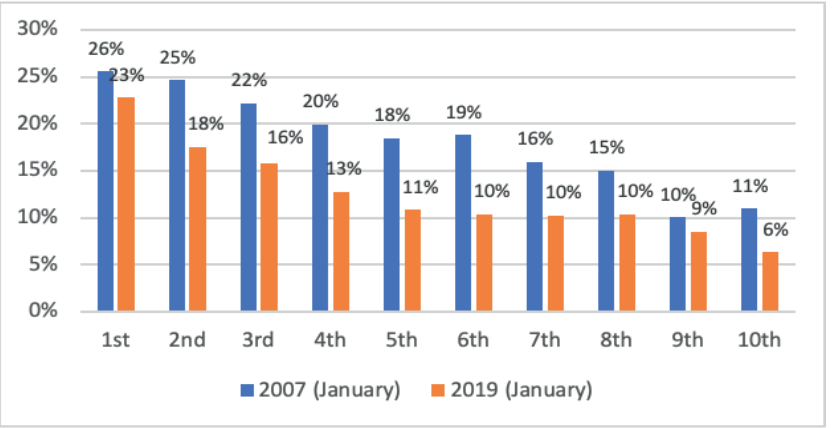
[4] Unemployment rate is low for those in the bottom income decile likely because of their need to find employment, regardless of the quality of employment. Most workers in the bottom income decile are employed in agriculture.

Figure 3. Unemployment rate, by per capita income decile



Source of basic data: PSA's merged FIES-LFS data for 2006 and 2018. The 2006 merged data used the January 2007 LFS, while the 2018 merged data used the January 2019 LFS

Figure 4. Share of discouraged workers among the unemployed, by per capita income decile



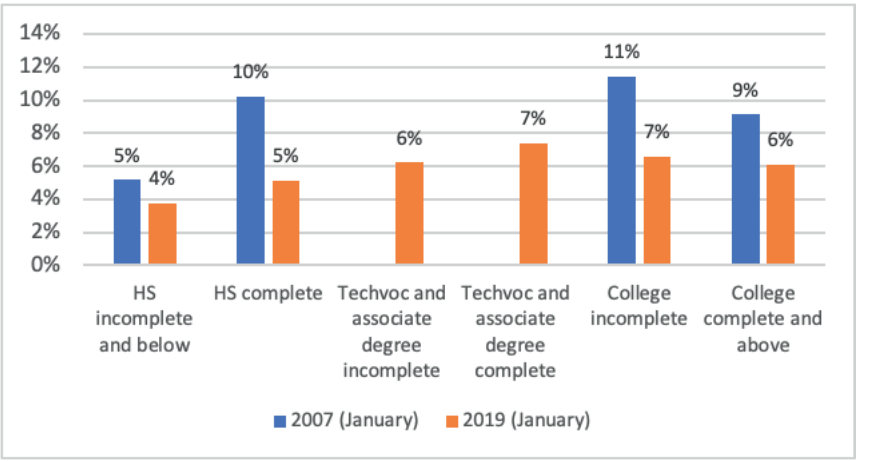
Source of basic data: PSA's merged FIES-LFS data for 2006 and 2018. The 2006 merged data used the January 2007 LFS, while the 2018 merged data used the January 2019 LFS

Unemployment and education

Unemployment rate also has an inverted-U relationship with level of education, similar to its relationship with income, with which education is strongly correlated (Fig. 5). Unemployment rate is lowest for those without a high school diploma and peaks at the level of incomplete college.[5] The smallest decline in unemployment rate during the period examined occurred for the least-educated workers.

As with income, the share of *discouraged workers* is significantly higher for those in the lowest education group. Almost half of all *discouraged workers* in 2019 were people who did not complete high school. Similarly, time spent looking for work is positively associated with education level among the *textbook unemployed*. Those with incomplete high school education spent a mean average of 3.8 weeks looking for work (median 2 weeks), while college graduates spent a mean average of 5.1 weeks (median 3 weeks) in 2019. Again,

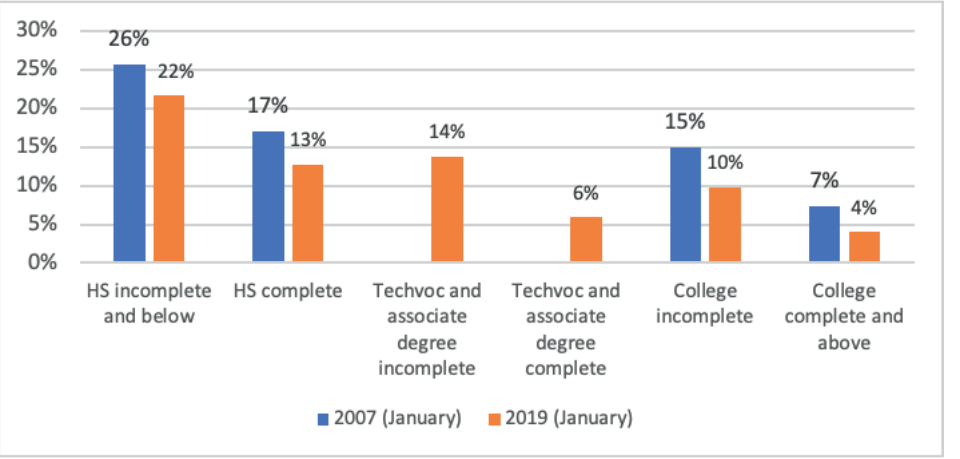
Figure 5. Unemployment rate, by education



Note: In the 2007 LFS, the categories incomplete and complete technical-vocational and associate degrees were not included. Presumably, people with those levels of educational attainment were classified as having either complete high school or possibly incomplete college education.
Source of basic data: PSA's merged FIES-LFS data for 2006 and 2018. The 2006 merged data used the January 2007 LFS, while the 2018 merged data used the January 2019 LFS

[5] In 2019, the unemployment rate was slightly higher among those with complete technical-vocational or associate degrees. An associate degree is a post-secondary degree not commensurate with a bachelor's degree, and which is awarded after 2–3 years of study.

Figure 6. Share of discouraged workers among the unemployed, by education



Source of basic data: PSA's merged FIES-LFS data for 2006 and 2018. The 2006 merged data used the January 2007 LFS, while the 2018 merged data used the January 2019 LFS

this likely indicates the capacity of the better-educated to be more selective in the jobs they accept. The amount of time looking for work declined across all education groups from 2007 to 2019.

Unemployment by age and sex

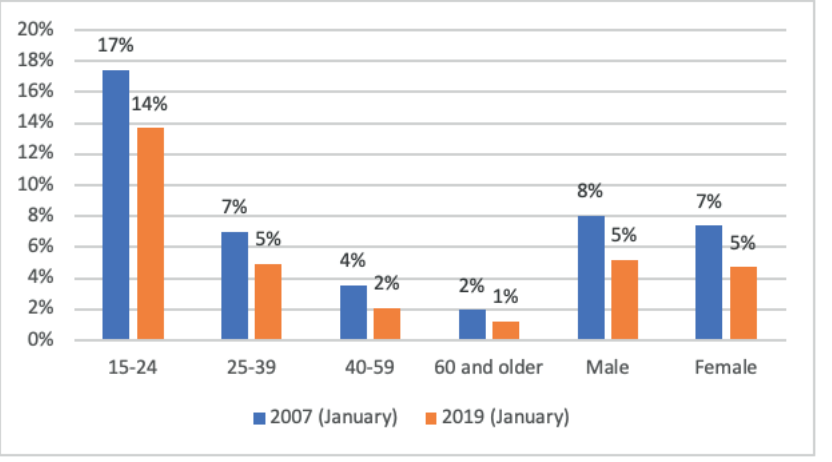
The unemployment rate in the Philippines is very high for the youth (15-24 years old) and steeply declines with age (Fig. 7). The youth made up 49 percent of the unemployed in 2007 and 46 percent of the unemployed in 2019, despite accounting for only 22 percent and 16 percent of the labor force in these two years, respectively. If the 25-39 age range were added to the youth, they would together make up 83 percent of the unemployed in both 2007 and 2019. In this sense, unemployment prior to the pandemic was mainly a problem affecting younger workers. People over 60 years of age have a low unemployment rate primarily because most who are not working would be classified as no longer part of the labor force.[6] The amount of time spent looking for work among the *textbook unemployed* was consistently lowest for those 60 years and older (mean of 3.9 weeks and median of 2 weeks in 2019).

On the other hand, the unemployment rate does not differ much by sex of worker (Fig. 7). Both males and females experienced a reduction in

[6] If the reason they gave for not working and not looking for work is that they are retired or too old.

unemployment rate between 2007 and 2019. However, because there were consistently more males than females in the labor force, the majority of the unemployed were males (63 percent in 2007 and 64 percent in 2019).[7] Interestingly enough, in both 2007 and 2019, unemployed males were more likely to be *discouraged workers* than unemployed females (higher share among males by 4 percentage points), while unemployed females were more likely to be *textbook unemployed* than unemployed males (higher share among females by 8–9 percentage points). The amount of time spent looking for work among the *textbook unemployed* was slightly higher among males compared to females in terms of the mean, but the same in terms of the median (3 weeks in both 2007 and 2019).

Figure 7. Unemployment rate, by age group



Source of basic data: PSA's merged FIES-LFS data for 2006 and 2018. The 2006 merged data used the January 2007 LFS, while the 2018 merged data used the January 2019 LFS

[7] Women are more likely to have no employment and to not be looking for work because of household duties, which would classify them as not part of the labor force.

Unemployment by region

There was a wide variation in unemployment rates across regions in 2007, which has significantly narrowed by 2019 (Table 5). In 2007, regional unemployment rates differed by as much as 9.6 percentage points: from 3.1 percent in Region 2 (Cagayan Valley) to 12.7 percent in the National Capital Region or NCR. In 2009, it only ranged from 3.3 percent in Region 2 to 5.7 percent in NCR. With some exceptions, the unemployment rates were typically higher in more urbanized regions. Three of the four highest regional unemployment rates in 2007, and the three highest regional unemployment rates in 2019 were in NCR, CALABARZON, and Region 3 (Central Luzon)—all in Luzon. In the Visayas, the unemployment rate was highest in Region 7, which has Cebu City.[8] The more urbanized and populous regions also contributed the most to total unemployment, as might be expected. NCR, CALABARZON, and Region 3 together already accounted for slightly more than half of total unemployment. And despite the NCR having the largest decline in unemployment rate between 2007 and 2019, it is also estimated to have had the biggest increase in the contribution to total unemployment, mainly due to its rapidly increasing labor force driven by internal migration.

Table 5. Unemployment rate before the pandemic, by region

Region	Unemployment rate			Contribution to total unemployment		
	2007 (January)	2019 (January)	Change (percentage points)	2006 (January)	2019 (January)	Change (percentage points)
NCR	12.7%	5.7%	-7.0	15.4%	21.6%	6.1
CAR	4.5%	4.5%	0.0	1.6%	1.1%	-0.5
Region 1	9.7%	4.8%	-4.9	4.8%	6.8%	2.0
Region 2	3.1%	3.3%	0.2	2.3%	1.6	-0.7
Region 3	9.5%	5.5%	-4.0	12.6%	12.8%	0.2
CALABARZON	10.3%	6.0%	-4.2	18.4%	16.3%	-2.1
MIMAROPA	3.7%	3.9%	0.3	2.2%	1.5%	-0.7
Region 5	6.2%	5.3%	-0.8	5.6%	4.6%	-1.0
Region 6	5.5%	4.7%	-0.9	6.9%	6.1%	-0.8
Region 7	7.5%	5.0%	-2.5	7.5%	7.2%	-0.3
Region 8	6.2%	4.4%	-1.7	3.7%	3.7%	0.0
Region 9	3.7%	5.1%	1.5	3.2%	1.7%	-1.5
Region 10	6.6%	4.1%	-2.5	3.8%	4.1%	0.3
Region 11	7.6%	3.7%	-3.9	3.6%	4.5%	0.9
Region 12	4.6%	3.9%	-0.6	3.5%	2.5%	-1.0
ARMM	3.8%	4.3%	0.4	2.3%	1.5%	-0.8
CARAGA	7.7%	5.3%	-2.4	2.6%	2.6%	0.0
Total	7.8%	5.0%	-2.8	100.0%	100.0%	0.0

Source of basic data: PSA's merged FIES-LFS data for 2006 and 2018. The 2006 merged data used the January 2007 LFS, while the 2018 merged data used the January 2019 LFS

[8] This pattern is not as clear in Mindanao.

3. Philippine unemployment during the pandemic

This section looks at how the COVID-19 pandemic affected unemployment in the country: by how much, for how long, and who were affected. The section also compares the unemployment impact of the pandemic on the Philippines against its neighboring countries.

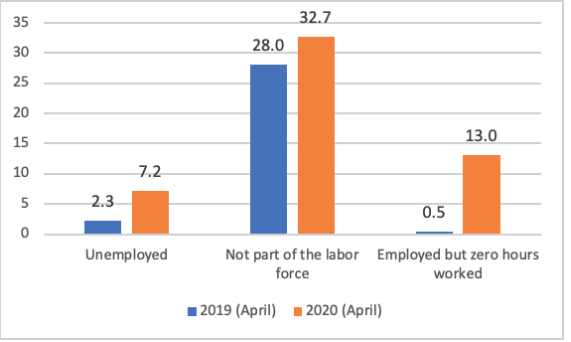
3.1 Hard lockdown period in April 2020

Philippine unemployment rate shot up from only 5.1 percent in April 2019 (and from 5.3 percent in January 2020) to 17.7 percent in April 2020, the highest ever unemployment rate recorded in the country, equivalent to an additional five million unemployed workers (Fig. 8). The increase in officially counted unemployment did not tell the complete story of the job loss that occurred during the quarter though. The decline in the number of employed from April 2019 to April 2020, in fact, had a total of close to eight million, which means that from the ranks of the previously employed, about three million were then classified as no longer part of the labor force. The new entrants to the working age population were also affected by the lack of employment opportunities. In total, those not in the labor force swelled by close to five million from April 2019 to April 2020.

In addition, there were 12.5 million more workers in April 2020 who reported having a job but having worked zero hours in the reference week; most of them could also be considered effectively unemployed, particularly those whose jobs are of a nature in which they only get paid when they do actual work. Ducanes and Daway-Ducanes (2021) estimated that there were 11 million households (46 percent of total households in the country) with no member in paid employment in April 2020, where paid employment excludes those who said they had a job but did not do any work. One could also include among the essentially unemployed, the farmers and fishermen who might have worked but were not able to sell their produce or catch because they could not transport them during the lockdown, as well as overseas Filipino workers (OFWs) who lost their jobs and returned to the country (Ducanes, 2020). By the end of the second quarter of 2020, the Philippine Overseas Employment Administration estimated the number of repatriated OFWs at close to 50,000; there were more who lost their jobs abroad, but travel restrictions kept them temporarily stranded in their places of work (Mangahas & Ducanes, 2020). By July 2022, according to the National Task Force against Coronavirus Disease-2019, more than 2.3 million OFWs have returned from abroad since the pandemic started–a number that almost equalled the total number of unemployed in the country right before the pandemic.[9]

[9] https://ndrrmc.gov.ph/attachments/article/4036/NTF_Situational_Report_No_839.pdf

Figure 8. Immediate impact of COVID-19 and the hard lockdown on unemployment and labor force participation (in millions of people)



Sources of basic data: PSA's LFS for April 2019 and April 2020

3.2 Comparison with neighboring countries

In almost all countries in the world, the pandemic affected employment through higher unemployment rates, lower labor force participation rates, and reduced working hours. But the impact on the Philippines was much more severe, especially on unemployment. This is shown in Fig. 9, which compares the Philippine unemployment rate against those of neighboring countries before and during the pandemic. The second quarter of 2020, in particular, stands out as the rise in Philippine unemployment rate can be seen dwarfing increases in other countries. From the first quarter to the second quarter of 2020, the unemployment rate increased by 1.6 percentage points in Malaysia, 0.4 percentage points in Thailand, and 0.9 percentage points in Vietnam; the Philippines' increased by 12.3 percentage points.[10]

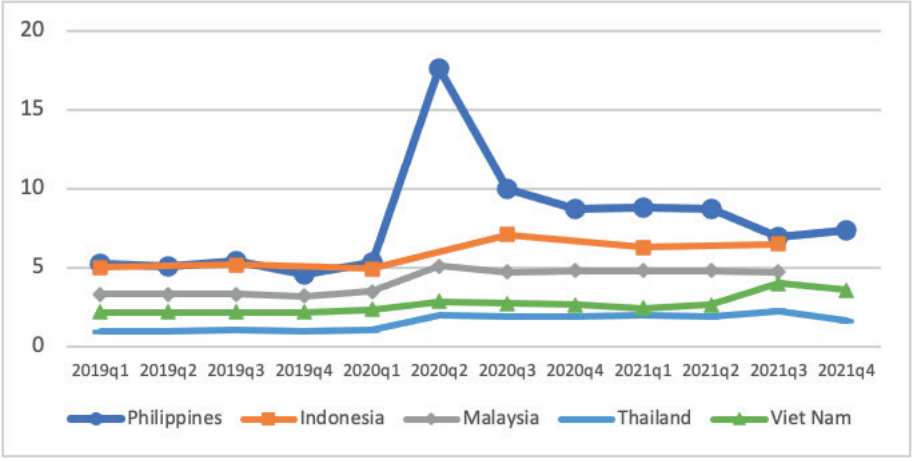
These differences in the impact on unemployment cannot be explained by output decline alone. Although Philippine GDP in the second quarter of 2020 fell by a historic 16.9 percent year-on-year, Malaysia's GDP fell by an even bigger 17.1 percent in the same period, and Thailand's GDP also fell by a substantial 12.3 percent.[11] Some of the differences can probably be accounted for by variation in the level of employment-retention support provided by the different countries. Malaysia, for instance, beginning in March 2020 implemented a wage subsidy program for employees insured under its Social Security Organization Employment Insurance Scheme, to help employers retain their workers (ADB, 2021). This program was estimated to have benefited about a quarter of Malaysia's labor force. In the Philippines, on the other hand, the main employment protection policy response of the government was (A) a direct cash aid program for affected workers of private sector establishments that temporarily suspended operations or implemented flexible working hours

[10] The unemployment figures in Indonesia are semestral rather than quarterly. From the first quarter of 2020 to the third quarter of 2020, the unemployment rate in Indonesia increased by 2.2 percentage points.

[11] VietNam managed a positive GDP growth of 0.5 percent, while Indonesia's GDP fell by 5.3 percent.

(COVID-19 Adjustment Measures Program), which benefited only 1.4 percent of the labor force, and (B) the Small Business Wage Subsidy Program, which benefited employees of eligible small businesses who did not work and did not get paid during the hard lockdown (ADB, 2021). The latter program was said to have benefited three million workers, or approximately just 6.7 percent of the labor force, as of June 2020 (Ignacio, 2021).

Figure 9. Unemployment rate in the Philippines and in other ASEAN countries during the pandemic



Sources: PSA (Philippines); Central Bureau of Statistics (Indonesia); Department of Statistics (Malaysia); National Statistics Office (Thailand); General Statistics Office (Vietnam)

Measured as a multiple of unemployment rate in April 2019, the most affected were those with less than complete high school education and those with complete high school education.

3.3 *The unemployed during the hard lockdown*

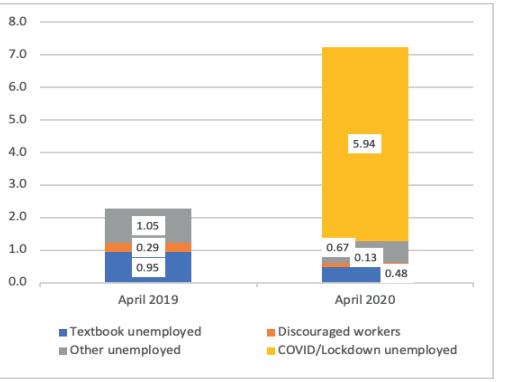
Types of unemployment

The PSA slightly modified the way it classified the employment status of the working age population in the April 2020 and succeeding LFS by adding one more reason respondents can give for not looking for work: the enhanced community quarantine or lockdown or the COVID-19 pandemic. A worker who is not employed and is not looking for work, but is available for work, would be classified as unemployed if he or she gave this reason for not looking for work. In the classification of the unemployed by type provided earlier, we could add this new group, to be called the COVID-19 *unemployed*. This type dominated unemployment in April 2020: of the 7.2 million unemployed, 82.2 percent or 5.9 million were among the COVID-19 *unemployed* (Fig. 10).

By education

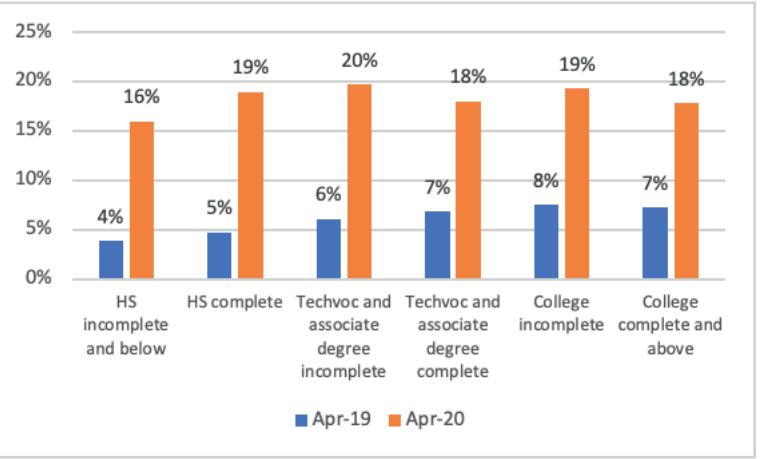
The unemployment rate rose substantially across all education levels in April 2020, though by varying degrees (Fig. 11). In terms of change in unemployment rate from April 2019, the most affected were those with complete high school education (increased by 14.2 percentage points) and those with incomplete technical-vocational (techvoc) or associate degrees (increased by 13.6 percentage points). In contrast, for the college-educated, the increase in unemployment rate was lower at 10.6 percentage points. But measured as a multiple of unemployment rate in April 2019, the most affected were those with less than complete high school education and, again, those with complete high school education, with at least a four-fold increase in unemployment rate for each group. About 72 percent of the increase in total unemployment between the two periods is accounted for by these two education groups. In contrast, the unemployment rate among college graduates in April 2020 was only 2.5 times what it was in April 2019. Those with less education were more likely to be in sectors more highly affected by the hard lockdown and in occupations which cannot be performed remotely such as construction workers, waiters in restaurants, salespersons in physical stores, tourist guides, barbers and spa workers. College graduates, on the other hand, were more likely to have jobs that can be done remotely (e.g., teaching and other professional jobs), which likely accounted for this pattern of unemployment growth during the hard lockdown.

Figure 10. The unemployed during the hard lockdown, by type (in millions of people)



Sources of basic data: PSA's LFS for April 2019 and April 2020

Figure 11. Unemployment rate during the hard lockdown period, by educational attainment



Sources of basic data: PSA's LFS for April 2019 and April 2020

By age group and by sex

Younger workers suffered higher increases in unemployment rate if measured by percentage-point increases. The unemployment rate for the 15-24 years of age increased 28 percentage points to 31 percent in April 2020 from April 2019. The percentage-point increases declined with age: 13 percentage points for the 25-39 age group, 11 percentage points for the 40-59 age group, and 8 percentage points for the 60-and-above age group.[12] In terms of the April 2020 unemployment rates as a multiple of the April 2019 unemployment rates, however, the opposite was found: older workers experienced steeper increases in unemployment rates compared to younger workers. For those aged 60 years and above, unemployment rate in April 2020 was 7.4 times that in April 2019. It was 5.2 times higher for the 40-59 age group, 3.7 times higher for the 25-39 age group, and 2.4 times higher for the 15-24 age group. Because mobility restrictions were strictest for those 60 and older during the hard lockdown, they were also the most likely to be COVID-19 *unemployed*: 93.5 percent of the unemployed 60 and older gave the ECQ or the hard lockdown or COVID-19 as the reason why they were not looking, although available, for work. Males experienced a higher increase in unemployment rates compared to females in April 2020.

[12] Epetia (2021), using probit analysis on the same LFS data, found that the workers more heavily affected during the ECQ period were males and younger workers.

By region

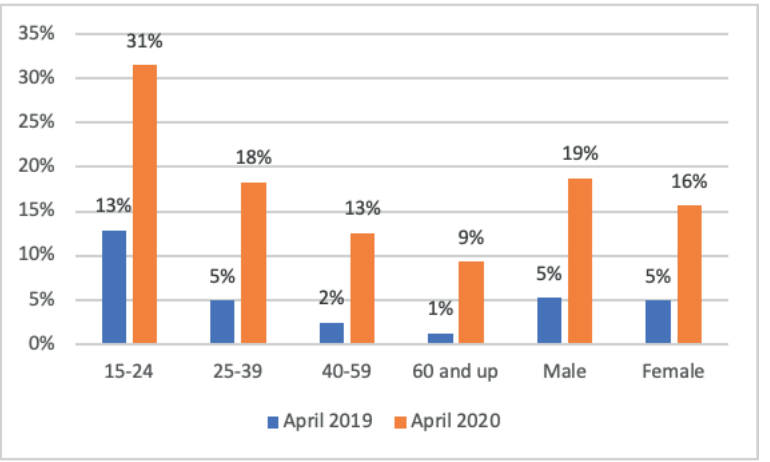
Wide regional variation was observed in the increase in unemployment rate during the hard lockdown period: from 6.1 percentage points in the NCR (comparing April 2019 to April 2020) to 22.5 percentage points in CAR (Table 6). Besides CAR, the regions which posted the highest percentage-point increases in unemployment rate were Regions 1, 3, and 12, and the ARMM. Surprisingly, NCR had the lowest increase in unemployment rate even if it was subject to the strictest implementation of the hard lockdown along with CALABARZON and Region 3.

Ducanes and Daway-Ducanes (2021), however, showed that the impact of the hard lockdown in April 2020 was mainly on working hours rather than on unemployment *per se*. Using difference-in-difference analysis on LFS data, with regions entirely covered by the hard lockdown during the survey period as the treatment group and regions not subject to a hard lockdown as control group, they found that the hard lockdown in April 2020 reduced weekly hours worked by 19 hours but had no additional effect on the probability of employment.

3.4 Post-hard lockdown in April 2020 up to April 2021

As movement restrictions slowly eased after the second quarter of 2020, quarterly GDP continued to contract, year-on-year, though at a slower rate, up to the first quarter of 2021.[13] It was not until the second quarter of 2021

Figure 12. Unemployment rate during the hard lockdown period, by age group and by sex



Sources of basic data: PSA's LFS for April 2019 April 2020

[13] GDP growth was -11.6 percent in 2020Q3, -8.2 percent in 2020Q4, -3.8 percent in 2021Q1, and 12.1 percent in 2021Q2.

that the economy managed positive and even double-digit growth, though this is mainly accounted for by the low base it was coming from. But the unemployment rate eased to 10 percent in July 2020, and further to between 8.7–8.8 percent from October 2020 to April 2021, or one year after the historic high in April 2020. By April 2022, or two years later, the unemployment rate had already gone down to 5.7 percent, which is still higher than the unemployment rate immediately preceding the pandemic, but already equal to the unemployment rate in April 2017. In the discussions below, we focus only on the period up to April 2021, as this is the period for which microdata was available for analysis at the time of this writing.

By type of unemployed

The COVID-19 *unemployed*, as defined earlier, still comprised the majority of the unemployed in July 2020. Meanwhile, the *textbook unemployed* had already exceeded their pre-pandemic numbers (Fig. 13). Financial hardship during the hard lockdown appeared to have encouraged some previously *discouraged workers* to look for employment, as the number of *textbook unemployed* increased by

Table 6. Unemployment rate before and during the hard lockdown period, by region

Region	Unemployment rate			Contribution to total unemployment		
	2019 (April)	2020 (April)	Change (percentage points)	2006 (January)	2019 (January)	Change (percentage points)
NCR	6.3%	12.3%	6.1	15.5%	9.2%	-6.3
CAR	2.9%	25.3%	22.5	1.0%	2.4%	1.4
Region 1	5.9%	22.3%	16.4	5.5%	6.7%	1.1
Region 2	3.0%	15.6%	12.6	2.0%	3.1%	1.1
Region 3	5.2%	27.3%	22.2	10.9%	16.9%	6.0
CALABARZON	5.3%	16.7%	11.4	14.9%	14.9%	-0.1
MIMAROPA	4.7%	12.5%	7.7	2.7%	1.9%	-0.8
Region 5	5.8%	15.7%	9.9	6.5%	4.8%	-1.7
Region 6	4.8%	13.7%	8.8	6.7%	5.8%	-0.9
Region 7	5.5%	16.7%	11.2	8.1%	7.2%	-1.0
Region 8	4.1%	14.3%	10.1	3.5%	3.5%	-0.1
Region 9	4.3%	23.9%	19.6	2.8%	4.3%	1.5
Region 10	5.0%	11.1%	6.2	5.4%	3.3%	-2.1
Region 11	3.1%	17.9%	14.7	2.8%	4.9%	2.0
Region 12	4.4%	21.2%	16.8	4.0%	5.4%	1.4
ARMM	9.0%	29.8%	20.8	5.3%	4.1%	-1.1
CARAGA	4.0%	12.3%	8.3	2.2%	1.8%	-0.5
Total	5.1%	17.6%	12.5	100.0%	100.0%	-

Sources of basic data: PSA's LFS for April 2019 and April 2020

the same amount as the reduction in *discouraged workers*. In October 2020, the number of COVID-19 *unemployed* went down and no longer comprised the majority although they still made up the largest group of unemployed. In January 2021, the COVID-19 *unemployed* fell further in number and was exceeded by the *textbook unemployed*. In April 2021, however, following another hard lockdown in Metro Manila and nearby provinces, the COVID-19 *unemployed* again exceeded the *textbook unemployed*.[14] By then, there were still 1.7 million COVID-19 *unemployed*, and 1.5 million *textbook unemployed*.

By income

The LFS does not include information on household income and thus does not provide information on which income groups were most affected by unemployment during the pandemic. For certain quarters, however, the LFS can be matched with either the Annual Poverty Indicators Survey or the Family Income and Expenditures Survey conducted in the same period, as these share a (mostly) common household sample and the two data sets contain household income information. The July 2020 LFS and the July 2017 LFS matched with the 2020 APIS and the 2017 APIS, respectively, and were used to compare the unemployment rates across income quintiles before and during the pandemic (Table 7).[15]

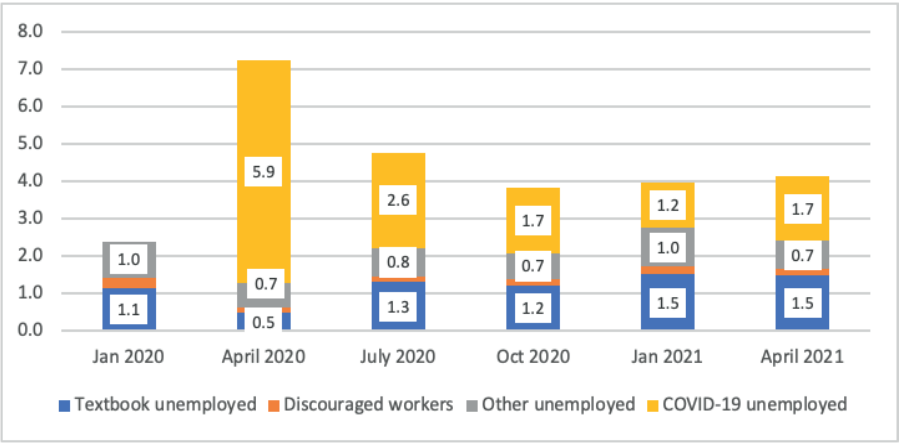
No clear pattern can be seen on increase in unemployment rate by household per capita income quintile from July 2017 to July 2020. The largest percentage-point increase in unemployment rate was seen in workers in the third income decile (6.6 percentage points) and the lowest for those in the second income quintile (3.4 percentage points). Unemployment rates in both the lowest and highest income quintiles more than doubled but, by July 2020, the share of the lowest income quintile in total unemployment has increased by 2.9 percentage points. The substantial increase in unemployment in the lowest income quintile is of great concern, because most households in this quintile would already be counted among the poor even before the pandemic. Increase in unemployment in the second and third quintiles, the households belonging to which could be easily tipped into poverty by sudden job losses among members, is also concerning.[16]

[14] A hard lockdown was imposed again in Metro Manila and nearby provinces from 29 March 2021 to 30 April 2021.

[15] Unfortunately, the matched APIS-LFS for 2019 could not be obtained. For the 2017 data, household income for the period January to June was used to construct the quintiles; for the 2020 data, only household income for the period January to March was used to construct the quintiles, in order to remove most of the effects of the pandemic on income.

[16] According to the PSA, household poverty incidence was 12.1 percent in 2018, the latest year for which poverty statistics was available prior to the pandemic. This roughly corresponds to the 12.1 percent of all households in the country with the lowest household *real* per capita income, where *real* means adjusted for differences in poverty lines.

Figure 13. The unemployed post-April 2020 hard lockdown, by type of unemployment (in millions of people)



Sources of basic data: PSA's LFS for January 2020, April 2020, July 2020, October 2020, January 2021, and April 2021

By education

Those with incomplete high school education or lower posted the sharpest drop in unemployment rate immediately after April 2020—by 10 percentage points in July 2020 from the previous quarter (Fig. 14). Unemployment went down at a slower rate among college graduates and those with complete techvoc or associate degrees, declining by only four percentage points and two percentage points, respectively, in July 2020.

By April 2021, unemployment rates among those with incomplete college education and those with complete techvoc and associate degrees were still six percentage points higher compared to their immediate pre-pandemic (January 2020) level. For the rest, it was five percentage points higher for those with incomplete techvoc and associate degrees, four percentage points higher for college graduates and those who completed high school, and only two percentage points higher for those with incom-plete high school education or lower.

By age group and by sex

What appears notable by age group is the more gradual, but ultimately larger decline, in unemployment rate among the youth after April 2020 (Fig. 15). After reaching a high of 31.5 percent in April 2020, youth unemployment rate first fell to 23.1 percent in July 2020, then to 19.4–19.8 percent in October 2020 and January 2021, before going down to 15.8 percent in April 2021. In contrast, for the other age groups, unemployment rates fell to a level in July 2020 that they more or less stayed at up to April 2021. The youth were more likely to take up employment in sectors or occupations that were slower to open up during the pandemic, such as jobs in malls and restaurants.

By sex, although males experienced a higher increase in unemployment rate in April 2020, their unemployment rate also declined faster. By April 2021, male unemployment rate was only two percentage points higher compared to its immediate pre-pandemic level, while female unemployment rate was still four percentage points higher. This is likely due to the delayed opening up of sectors typically dominated by women workers, such as tourism and personal services (e.g., spas and beauty salons).

By region

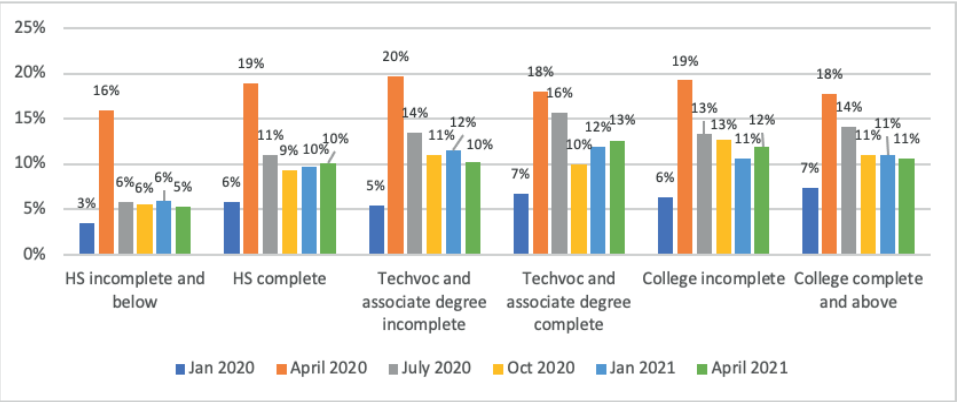
In most regions, the unemployment rate dropped precipitously since April 2020. In some cases, the unemployment rate in April 2021 was even lower than its pre-pandemic level, e.g., for Regions 1, 9, and 11). Three of the most urbanized regions in the country—NCR, CALABARZON, and Region 7— posted a slower decline in unemployment rate up to April 2021. In the NCR, unemployment rate in April 2021 was higher than in April 2020.

Table 7. Unemployment rate before and during pandemic, by per capita income quintile

Household per capita income quintile	Unemployment rate			Contribution to total unemployment		
	July 2017	July 2020	Change (percentage points)	July 2017	July 2020	Change (percentage points)
1st	4.4%	9.5%	5.1	17.1%	20.0%	2.9
2nd	6.2%	9.5%	3.4	24.5%	20.0%	-4.5
3rd	4.9%	11.5%	6.6	20.1%	21.4%	1.3
4th	5.9%	11.4%	5.5	23.5%	23.7%	0.2
5th	4.1%	8.4%	4.3	14.9%	14.9%	0.0
Philippines	5.1%	10.1%	5.0	100.0%	100.0%	-

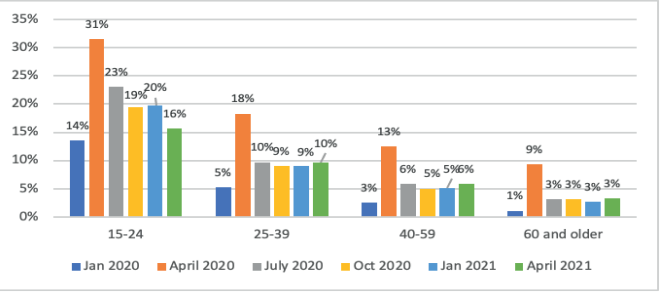
Source: PSA's merged APIS-LFS for 2017 and 2020

Figure 14. Unemployment rate post-April 2020 hard lockdown, by education



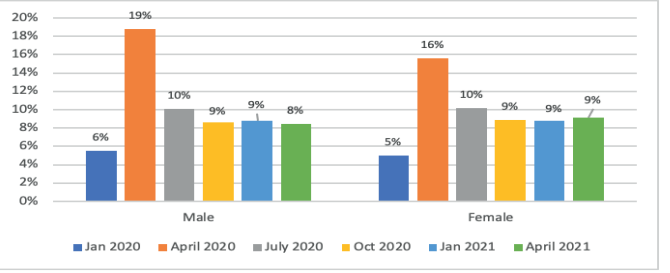
Sources of basic data: PSA's LFS for January 2020, April 2020, July 2020, October 2020, January 2021, and April 2021

Figure 15. Unemployment rate post-April 2020 hard lockdown, by age group



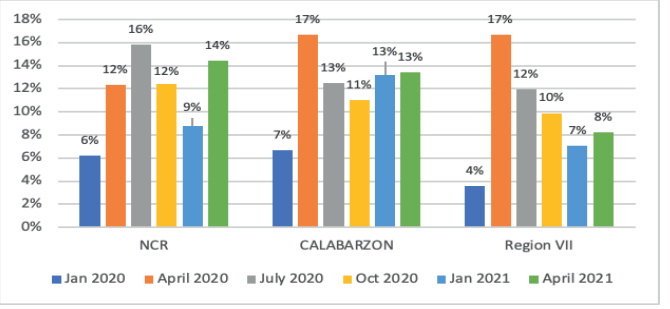
Sources of basic data: PSA's LFS for January 2020, April 2020, July 2020, October 2020, January 2021, and April 2021

Figure 16. Unemployment rate post-April 2020 hard lockdown, by sex



Sources of basic data: PSA's LFS for January 2020, April 2020, July 2020, October 2020, January 2021, and April 2021

Figure 17. Unemployment rate post-April 2020 hard lockdown, by region.



Sources of basic data: PSA's LFS for January 2020, April 2020, July 2020, October 2020, January 2021, and April 2021

4. Summary and conclusions

In the 15 years before the pandemic, unemployment rate in the Philippines was declining, coinciding with a period of relatively rapid economic growth. The link between unemployment and overall GDP growth, however, was weak in the short-term. Unemployment rate was more closely correlated with growth in the industrial and services sectors as a contemporaneous indicator. Unemployment in the country is higher compared to most of its ASEAN peers, with the exception of Indonesia. Of the total unemployed in the Philippines right before the pandemic, just over a third were actively looking for work. The rest were either *discouraged workers* or those not actively looking for work for a reason not strong enough to categorize them as not part of the labor force. The unemployment rate initially increases and then decreases with both income level and education level. By age group, the youth had the highest unemployment rate, by a wide margin. By sex, on the other hand, very little separated the unemployment rates of men and women. The more urbanized regions, on average, typically had higher unemployment rates.

The onset of the pandemic and the hard lockdown that was selectively imposed on Luzon and some provinces in Visayas and Mindanao toward the end of the first quarter up to a portion of the second quarter of 2020 caused unemployment to reach a historic high in April 2020. The increase in unemployment rate in the Philippines over the second quarter of 2020 widely surpassed similar increases in its neighboring countries during the same period. The COVID-19 crisis brought on a new type of unemployed—the COVID-19 *unemployed*—who reported themselves available for work but were not looking for work because of COVID-19 or the lockdown. This group dominated unemployment in April 2020 and in the next few quarters. Those with lower education levels were most affected by the initial increase in unemployment due to the pandemic. Unemployment increased across all age groups and, depending on how one measures the increase, either the youngest or the oldest age groups were most affected. Some regions experienced higher increases in unemployment rates than others, although no clear pattern emerged.

There is some evidence the pandemic increased the share of the poorest 20 percent of households in the total unemployed, at least early in the pandemic. Looking at the period from July 2020 to April 2021, college graduates and those with complete techvoc and associate degrees were slower to recover to pre-pandemic levels of unemployment. The youth, compared to other age groups, made a slower return to their pre-pandemic unemployment rate. A faster decline in unemployment rate was observed in men compared to women, post-April 2020. Among the regions, the decline in unemployment rate was slower in the NCR, CALABARZON, and Region 7 during the same period.

Price stability was the predominant goal of central banks around the world before the pandemic (Dikau & Robins, 2020); it is viewed as conducive to sustainable growth in output and employment. The sheer scale of the impact of the pandemic on output and employment, however, combined

with the inherent power of central banks to influence them more directly, forced central banks to go beyond their usual tools of policy rate adjustments and open market operations, to rely on a more multidimensional set of tools to deal with the crisis such as asset purchases, liquidity and credit support, and regulatory easing (English, Forbes, & Ubide, 2021). Many central banks worldwide undertook responses that directly supported employment retention and creation, including extending supportive lending facilities to small and medium enterprises and using moral suasion to get commercial banks to offer loan payment moratoriums to customers whose jobs or businesses were affected by the pandemic (Dikau & Robins, 2020).

The *Bangko Sentral ng Pilipinas* (BSP) itself, though initially precluded from using these other tools by legal limits and BSP rules, eventually implemented such measures: reducing the reserve requirement and designating lending to micro- and small and medium enterprises (MSMEs) as an alternative compliance to the reserve requirement; increasing the single borrower limit; and raising the ceiling of real-estate loans.[17] The BSP went further by providing provisional advances to the National Government (NG) to support it in its efforts at fiscal expansion to raise output and employment.[18]

Whether the BSP could have done more to mitigate the impact of the crisis on output and employment is an empirical question without an easy answer. Without the additional and extraordinary BSP measures, though, the human impact of the pandemic would have been likely worse. As the earlier analysis showed, the impact of the COVID-19 crisis, especially initially, was not only severe but also uneven. While the effects of the pandemic linger, some of the interventions should continue, especially the support provided to micro, small, and medium enterprises (MSMEs). Moving forward, the question remains as to how much more actively the BSP should be engaged and use the tools developed during the crisis to influence output, job creation, and even poverty and inequality, even outside of crisis situations. This is a question that merits further examination.

On the fiscal side, the findings of this chapter underscore the importance of establishing a more inclusive unemployment insurance in the country. The scale of the crisis, the limited access to social and unemployment insurance, and the government's underdeveloped delivery system for cash aid caused a lot of avoidable suffering among affected households. The above findings suggest some possible features of an expanded unemployment insurance system in the country. In case of a similar crisis in the

[17] Keynote speech by then BSP Governor Ben Diokno at the BSP Research Fair, "Central Banking in the Time of Pandemic," held online on 12 July 2021. https://www.bis.org/review/r210722e.pdf

[18] *Ibid.*

future necessitating a similar type of hard lockdown and forcing many people into involuntarily unemployment, the unemployment insurance should cover the period for which the hard lockdown is in place. Outside of crisis situations such as the pandemic, the unemployment insurance could cover a period of between three and 4.5 weeks, equivalent, respectively, to the median and mean amount of time the *textbook unemployed* spend looking for work. Many of those who lost employment have jobs in the informal sector and were thus unlikely to be members of the social security system. The government should look at successful models of social insurance coverage expansion for informal sector workers that can be applied in the country, such as simplifying and incentivizing government registration for unregistered MSMEs and subsidizing contributions for informal sector workers with earnings below a certain threshold.

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5 | Filipino Youth Workers and the Scarring Effects of the COVID-19 Pandemic

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Neil Fidelle G. Lomibao
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5

5 | Filipino Youth Workers and the Scarring Effects of the COVID-19 Pandemic

Faith Christian Q. Cacnio, Marites B. Oliva, Neil Fidelle G. Lomibao, and Irene Rose Imson[1]

1. Introduction

The COVID-19 pandemic has led to considerable shocks to labor markets. These shocks have disproportionately affected young workers (i.e., those aged 15–24 years) more than older workers. The pandemic caused the job market to slacken for young workers, with sectors such as retail, travel, food, and accommodations being heavily affected by the economic downturn. These industries traditionally employ many young workers, who are most likely the first to be laid off given their relatively short period of employment. Because of the lower demand for labor, the youth may experience delayed school-to-work transitions and longer unemployment spells. The learning and skills development of young workers have also been hampered by the suspension of face-to-face classes and training activities during the pandemic. Such disruptions adversely affect the productivity of young workers and, in turn, their ability to increase their earning potential. These conditions have raised concerns over the emergence of a "lockdown generation" of young people who may experience longer unemployment periods and have difficulty finding decent and sustainable jobs in the post-pandemic economy.

Youth unemployment is a key challenge to global economic growth and development (UN, 2020; World Bank, 2012). Young people are vulnerable to higher-than-average rates of unemployment compared to other workers. This is often attributed to their disadvantaged position in the labor market. Youth workers have less job experience and their work skills may be perceived as limited. These make them less likely to be hired, particularly when labor markets are slack. The structural changes that have occurred in labor markets, including sectoral shifts and technological innovations, also favor better educated and highly skilled workers and thus dampen the job prospects of young people. The COVID-19 pandemic, with its adverse effects on labor markets, poses further difficulties for young workers.

Empirical evidence on youth unemployment indicates that not only does it have negative short-term effects, but it can also lead to detrimental long-term consequences. These long-term effects are referred to as "scarring effects," which can significantly bear down on future employment and wages of individuals. Factors such as forgone work experience, missed training and learning opportunities, and skills deterioration underpin this scarring. Potential employers also contribute to perpetuating these 'scars' when they become biased against hiring young workers who have been out of work for some time or have little experience, presuming they would be less productive workers. The longer a youth worker remains unemployed, the larger and longer lasting the scarring effects will be. Aside from its economic costs, early unemployment has also been shown to cause social problems among the youth, including disengagement, feeling of exclusion, and juvenile delinquencies. Youth unemployment can also result in low levels of job satisfaction, happiness, and physical and mental wellbeing.

Using an instrumental variable (IV) model, we find that an increase in past youth unemployment in the Philippines contributes to higher youth unemployment in the current period. Moreover, our impulse response functions

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(IRFs) signify that shocks to previous youth unemployment rates linger over time and affect future youth unemployment. This indicates the persistence of youth unemployment in the country and its scarring effects.

This chapter looks at the state of young workers in the Philippines and how the COVID-19 pandemic could potentially lead to scarring effects for them. Section 2 of this chapter presents the macro and sectoral trends in the country's youth labor market. Section 3 examines the potential scarring effects of the COVID-19 pandemic on youth workers. Section 4 looks at the policies and initiatives the government has implemented to help improve the welfare of youth workers. The last section concludes.

2. The labor market for young Filipino workers: trends and dynamics

In the decade prior to the pandemic, the Philippine labor market for young workers generally improved. Youth unemployment rate was on a downtrend from 17.6 percent in 2009 to 13.6 percent in 2019. Nonetheless, the 2019 youth unemployment rate was almost three times that of the national unemployment rate of 5.1 percent; remaining above the government's target (Fig. 1). Likewise, youth underemployment rate went down from 17.6 percent in 2009 to its lowest point at 12.4 percent in 2019, reflecting an improvement in the quality of employment among the youth.

The three economic subsectors where most young workers were employed had slightly changed in a span of 10 years. In 2009, more than 30 percent of youth were employed in agriculture, hunting, and forestry; almost 20 percent in wholesale and retail trade; and less than 10 percent in manufacturing. In 2019, more than 20 percent of young workers remained in wholesale and retail trade, but the share of agriculture declined to less than 18 percent; construction came in third, accounting for more than 10 percent (Fig. 2).

Figure 1. Youth unemployment rate and target in %, 2009-2020

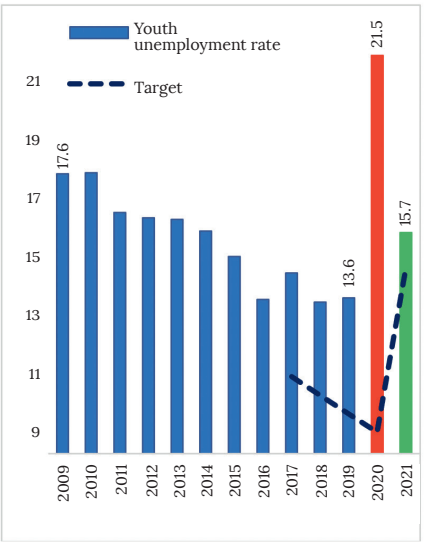
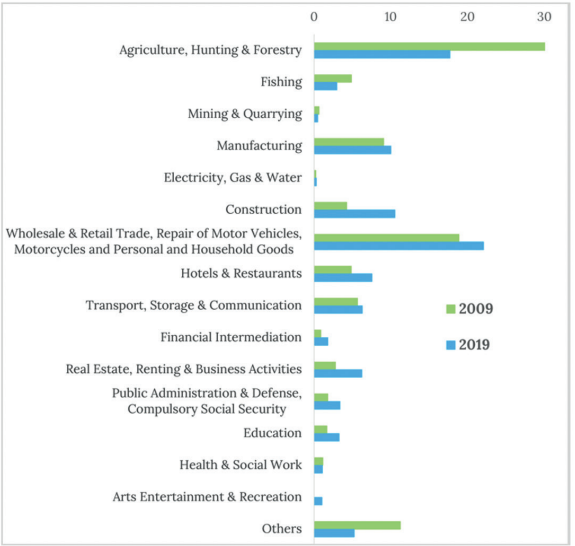


Figure 2. Youth employment by sector (% share), 2009-2019

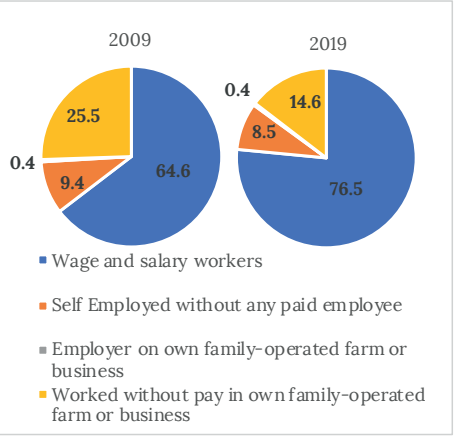


Sources: Philippine Statistics Authority (PSA) and the Philippine Development Plan 2017-2022 Mid-term Update

Young workers were also increasingly employed in a more remunerative class of work. In 2009, more than half of employed youth were working in private establishments, more than a quarter worked without pay in an own family-operated farm or business (unpaid family workers), and less than a tenth worked for private households. After a decade, more than two-thirds of the employed youth were working in private establishments, with only less than 15 percent serving as unpaid family workers. Many young workers also appear to have become individual entrepreneurs (as self-employed without any paid employee) accounting for around 9 percent (Fig. 3). There was also an improvement in the highest educational level completed among young workers. From mostly junior high school (JHS) graduates, JHS undergraduates, and college undergraduates in 2009, they became mostly JHS graduates, JHS undergraduates and college graduates in 2019 (Fig. 4). While most young employees continued to work in elementary occupations[2] and as service and sales workers, there was an uptick in the share of young professionals, technicians, and associate professionals after 10 years, indicating greater skills among young workers (Fig. 5).

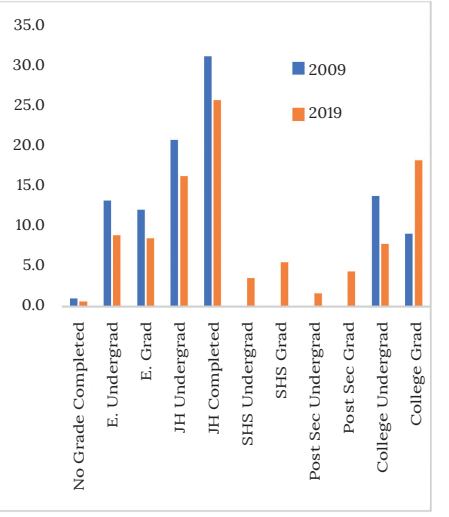
From 2009 to 2019, the distribution of young workers remained the same across the different regions of the country. Regions IV-A and III and the National Capital Region (NCR) employed most of country's young workers. Composition by sex stayed the same as youth workers remained dominated by males (63 percent). Worth noting, however, is the decline in employment as a ratio of the working age population among the youth, from 37.6 percent in 2009 to 32.4 percent in 2019

Figure 3. Youth employment by class of work (% share), 2009-2019



Source: PSA

Figure 4. Youth employment by highest grade completed (% share), 2009-2019



Source: PSA

[2] Elementary occupations involve the performance of simple and routine tasks which may require the use of hand-held tools and considerable physical effort. Most occupations in this major group require skills at the first International Standard Classification of Occupations (ISCO) skill level. (Source: PSA)

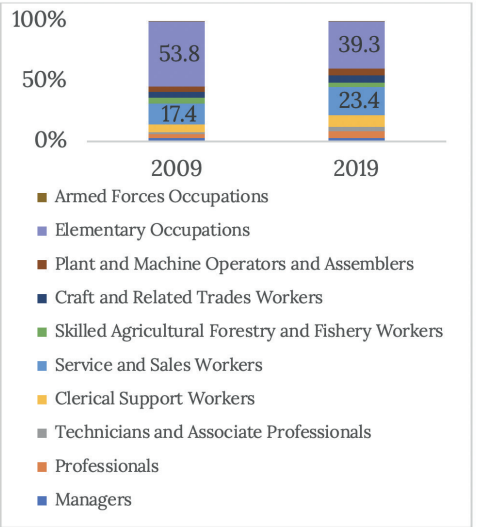
(Fig. 6). This could reflect the increasing number of young people who are outside of the labor force (Parker, 2010).

The labor force participation rate (LFPR) of youth went down from 45.6 percent to 37.5 percent within the decade. This could be traced to five consecutive years of contractions in the youth labor force that started in 2014 and deepened in 2017, particularly among those who are single. Possible reasons for the declining labor force were (a) the implementation of the K-to-12 program since 2017 and (b) increasing interest to pursue further study among young people. This is reflected in the rising share of schooling as a reason for not participating in the labor force. For 15-19 year olds, the share of schooling as a reason rose from 84 percent in 2016[3] to almost 90 percent in 2019. For 20-24 year olds, the primary reason for not taking part in the labor force shifted from household or family duties in 2016 and 2017 to schooling from 2018 onwards.

Filipino youth workers and the COVID-19 pandemic

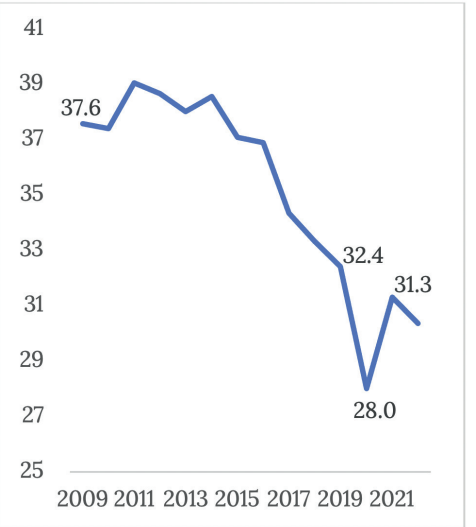
The implementation of strict quarantine and mobility restrictions to help reduce the spread of COVID-19 in the country adversely affected young workers. Among the age groups, youth employment contracted the most, with a double-digit decline of 13.3 percent in 2020 (Fig. 7). The youth unemployment rate rose to as high as 21.5 percent, more than double the 10.3 percent national unemployment rate and way above the youth unemployment target of only 9.2 percent for the year (Fig. 1). The youth underemployment rate also increased, but at a relatively lower rate than previous years' and not as much as other age groups.

Figure 5. Youth employment by occupation (% share), 2009-2019



Source: PSA

Figure 6. Ratio of employment to working age population (in %), 2009-Q1 2022



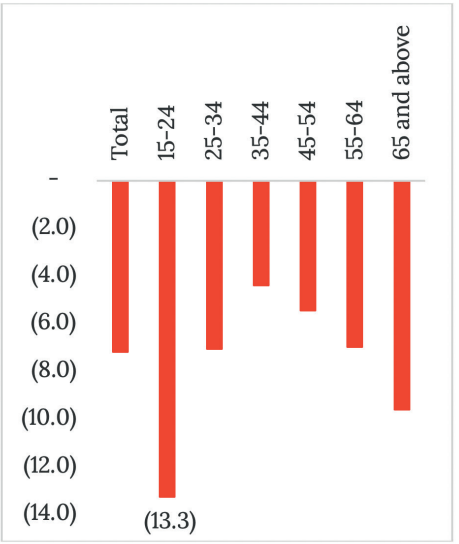
Source: PSA

[3] Data starts only from April 2016.

The pandemic resulted in contractions in youth employment in almost all subsectors, except for agriculture as demand for food continued. The deepest declines were in subsectors that required close physical contact, particularly in accommodation and food service businesses, manufacturing, and wholesale and retail trade (Fig. 8). Only wage and salary workers among the young posted a contraction in numbers, and mainly among workers in private establishments. Amid the pandemic, more young workers found employment by serving as unpaid family workers, by being self-employed without any paid employee, or as employers in own family-operated farm or business (Fig. 9). Most of the country's youth were still working in private establishments, albeit their share declined in 2020.

Employment of young workers posted some growth for those who were college undergraduates, senior high school (SHS) graduates, and SHS undergraduates during the pandemic.

Figure 7. Impact of COVID-19 on employment by age group (% growth rate), 2020

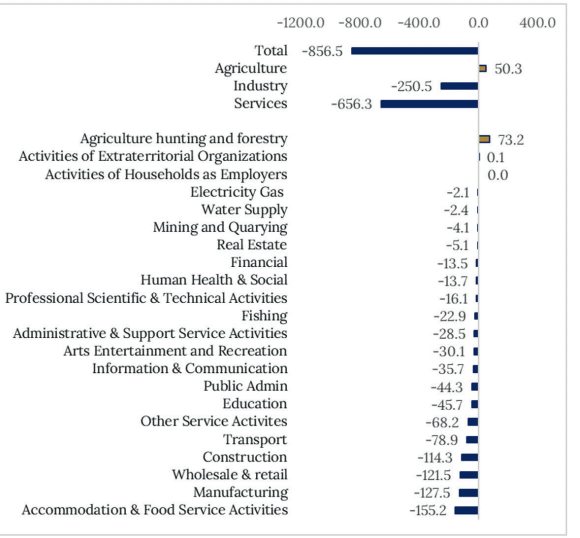


Source: PSA

However, the COVID-19 crisis adversely affected the less educated youth as employment losses were recorded mainly among young workers who only finished JHS, post-secondary education, and elementary education (Fig. 10). Consistent with sector employment data, most youth found more employment as skilled agricultural, forestry, and fishery workers. The strict quarantine and mobility restrictions led to significant employment losses for youth who worked in service and sales and elementary occupations, and as workers in craft and related trades (Fig. 11).

Youth employment dropped in all regions in the country except in ARMM, a predominantly agricultural area. The agriculture sector continued to post positive growth during the pandemic, which allowed it to retain and hire young workers. Young workers suffered the deepest employment losses in Regions III, VII, and V (Fig. 12) as wholesale and retail trade as well as manufacturing play

Figure 8. Sources of decline in youth employment by sector ('000), 2020 vs. 2019

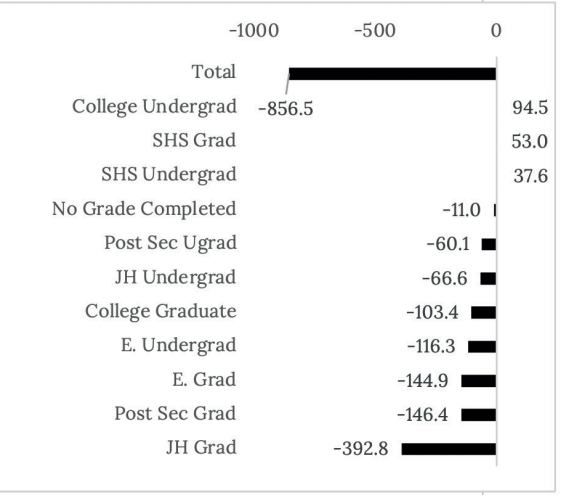


Source: PSA

Figure 9. Sources of decline in youth employment by class of worker ('000), 2020 vs. 2019

Source: PSA

Figure 10. Sources of decline in youth employment by highest grade completed ('000), 2020 vs. 2019



Source: PSA

major roles in these regions' economies. Males continued to be a majority among youth workers, but the slight increase in the share of female workers during the pandemic is worth noting.

The ratio of employment to youth population dipped to 28.0 percent in 2020 (Fig. 6). Aside from an increase in the number of unemployed, many young people—mostly among the 20-24 age group—were not part of the labor force during the pandemic. For 15-19-year-olds, schooling remained the top reason for not being part of the labor force; other reasons were pandemic-related, being too young, or permanent disability. For 20-24 age group, the share of schooling as a reason for being out of the work force increased from 48 percent in 2019 to 52 percent in 2022, while 'pandemic-related' accounted for around 9 percent. Youth LFPR was at its lowest at 35.7 percent as the labor force declined, mostly among the single and those who married young.

In the first quarter of 2022—two years since the pandemic started in the country[4]—youth employment has not yet returned to pre-pandemic level (i.e., January 2020). This shows that the pandemic affected youth employment more adversely than the global financial crisis (GFC) did. During the GFC, youth employment only went below the pre-crisis level in the first quarters of 2008 and 2009. Youth underemployment rate also remained higher than pre-pandemic levels.

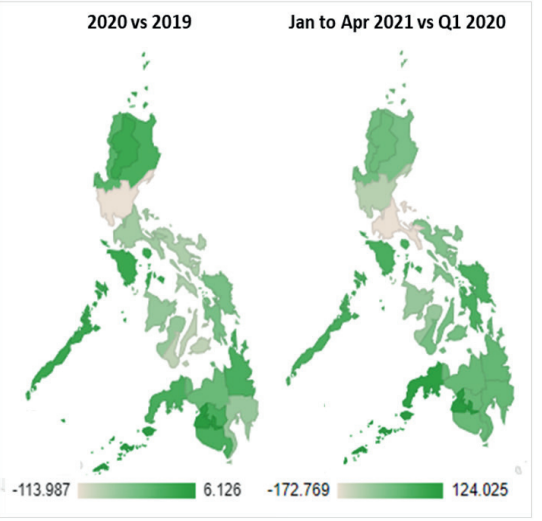
In contrast, youth unemployment rate significantly improved as it fell to 13.1 percent in Q1 2022, already below the

[4] The data used for the analysis is the average of monthly data.

Figure 11. Sources of decline in youth employment by occupation ('000), 2020 vs. 2019

Source: PSA

Figure 12. Youth employment reduction per region (deeper green means less employment loss)



Source: PSA

pre-pandemic rate. The 15.7 percent youth unemployment rate in 2021 also surpassed the revised target of the government for the year (i.e., 20.5-22.5 percent). However, this figure is more than double the country's average unemployment rate of 7.8 percent.

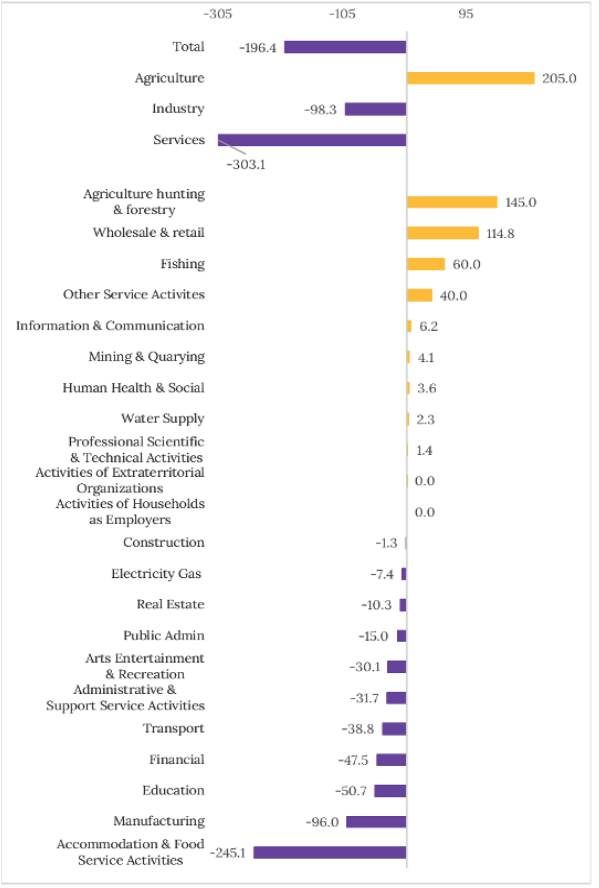
Meanwhile, latest readily available data indicate that in the first four months of 2021, youth employment was still below pre-pandemic levels mainly for accommodation and food service activities, manufacturing, and education. After a year, youth employment appears to have recovered for wholesale and retail trade and remained resilient for agriculture (Fig. 13). The number of young wage and salary workers was still below the pre-pandemic level, mainly due to workers being in private establishments. The youth continued to gain more employment as unpaid family workers and as self-employed workers (Fig. 14).

As the pandemic continued, employment gains were experienced more by young workers who were SHS graduates, SHS undergraduates, and junior high school undergraduates. Employment among youth who graduated from college, JHS, and elementary school were still lower than the pre-pandemic level (Fig. 15). In addition to skilled agricultural forestry and fishery workers, elementary occupations had started posting higher-than-pre-pandemic employment in the first four months of 2021 (Fig. 16). Lower-than-pre-pandemic employment levels were recorded mainly for service and sales workers, clerical support workers, and professionals.

The number of regions that had started to employ higher than pre-pandemic levels increased, the main players being Regions IX and VI and ARMM. Again, agriculture plays a significant role in these regions, accounting for 20 to 36 percent of these regions' economies. Ten of the 17 regions recorded lower than pre-pandemic employment in the first

four months of 2021, led by Region IV-A, NCR, and Region III (Fig. 12). The share of female workers and single young workers in total employment continued to increase during the period. The employment-to-youth-population ratio improved to 31.3 percent in 2021, reflecting the decline in the number of young people not in the labor force. The LFPR improved to 37.2 percent in 2021 but still lower than the pre-pandemic level. In Q1 2022, the employment-to-youth-population ratio slightly declined to 30 percent.

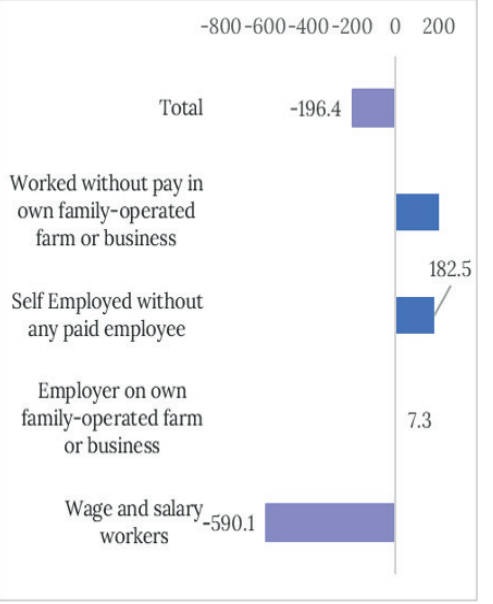
Figure 13. Sources of decline in youth employment ('000), January-April 2021 vs. January 2020



Source: PSA

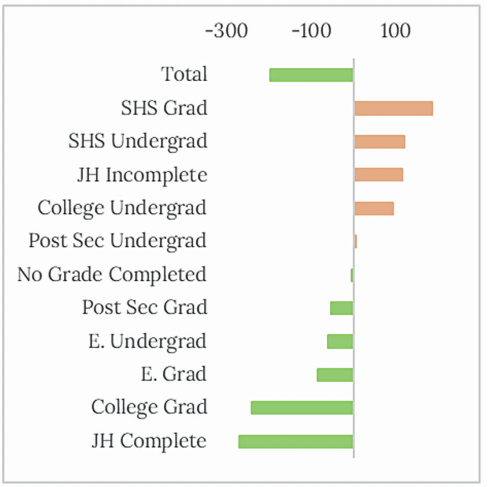
Two years since the start of the pandemic, youth employment has not yet fully recovered. This is particularly true for the higher educated, higher skilled, and those that work for a higher remuneration. While the youth unemployment rate has improved, it remains twice the country's average unemployment rate. These developments have raised concerns about the possibility of scarring effects from the COVID-19 pandemic on Filipino youth workers.

Figure 14. Sources of decline in youth employment by class of worker ('000), January-April 2021 vs. January 2020



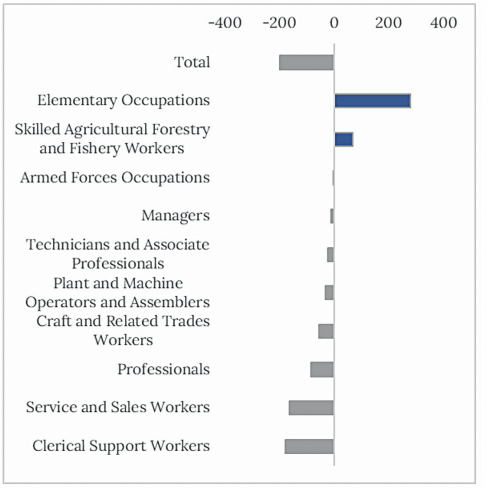
Concerns have been raised about the possibility of scarring effects from the COVID-19 pandemic on Filipino youth workers.

Figure 15. Sources of decline in youth employment by highest grade completed ('000), January-April 2021 vs. January 2020



Source: PSA

Figure 16. Sources of decline in youth employment by occupation ('000), January-April 2021 vs. January 2020



Source: PSA

3. Youth unemployment in the Philippines: determinants and scarring effects

Empirical evidence indicates that youth unemployment generates significant adverse effects. Unemployment translates to forgone income and work experience for young workers. It also leads to lower human capital investment for young people in the short run (Mroz & Savage, 2003). Youth unemployment could also cause feelings of social exclusion and disengagement, and trigger juvenile delinquency. In addition to short-term problems, the effects of youth unemployment have been found to persist over the lifetimes of workers. Studies observed that early spells of unemployment lead to "permanent scars" that affects workers over their lifetimes.[5] The scarring effects of youth unemployment emanate from two factors: 1) early unemployment increases the likelihood of being unemployed in later years; and 2) unemployment permanently shifts down the lifetime earnings profiles of young people.

[5] Ellwood (1979) made a distinction between "voluntary" and "involuntary" nature of early unemployment (i.e., due to job shortages or slack labor markets). He observed that most studies that predict long-term effects of youth unemployment are predicated on the assumption of the "involuntary" nature of early unemployment (i.e., due to job shortages or slack labor markets). Nonetheless, he argued that even when unemployment is "voluntary" (e.g., young people choose to work only when they think the job suits them), it still has long-term consequences, including foregone skills development and weaker labor force attachment.

Some early studies (e.g., Becker & Hills, 1980; Stevenson, 1978) observed that youth unemployment increases the probability of being unemployed again in later years. This indicates that unemployment at an early age has large and persistent long-term effects on the employment potential of individuals over their lifetimes. However, later studies noted that individuals differ in certain unobserved characteristics. The failure to control for this heterogeneity could result in a spurious causal persistence (Heckman & Borjas, 1980; Flinn & Heckman, 1982).[6] Taking heterogeneity into account, lower future employment as an effect of early unemployment was found to be nonpersistent and tapered off rather quickly (Corcoran, 1982; Ellwood, 1982).

While evidence shows that early unemployment does not engender a vicious cycle of recurring unemployment, its effects on wages and income appears to be more permanent and persistent. Human capital models (e.g., Ben-Porath, 1967; Blinder & Weiss, 1976) suggest that unemployment in the early years deprive young workers of work experience at a time when this yields the highest return over their life cycle. Thus, young people who went through periods of unemployment, and thus lost work experience, will most likely find their earning streams over their lifetimes to be lower than their contemporaries who found jobs easily (de Fraja, 2019; Kahn, 2010).[7] The potential loss in lifetime earnings due to youth unemployment can be substantial. Morsy (2012) estimated that the earnings loss of young people who had unemployment spells can be of as high as 20 percent compared to their peers who were employed early. The earnings deficit likewise persists for as long as 20 years. De Fraja et al. (2019) found that the scarring effect of unemployment on income is more pronounced if unemployment occurred in the first few years after entry into the labor market. They estimate that each month of unemployment between the ages of 18 and 20 result in a permanent income loss of 1.2 percent. The long-term effects become substantially lower if unemployment happens between ages 21 and 23 and it becomes imperceptible if it is between the ages of 24 and 26. Moreover, the scarring effect is most dire for individuals with the least skills.

The timing of the entry of young people into the labor market also affects their potential lifetime earnings. Kahn (2010) concluded that graduating from college during a recession can have large, negative, and persistent implications for potential wages. The lifetime earnings of graduates who entered the labor market when the economy is bad are substantially lower than those who did during better times. In addition, graduates during economic downturns tend to end up in lower-level jobs.

Aside from its economic costs, unemployment during the early working years can result to less job satisfaction, increased anxiety over job security, and lower levels of job happiness and life satisfaction (Bell & Blanchflower, 2011, Knabe & Ratzel, 2011). Youth unemployment has also been found to have lasting effects on the mental

[6] For example, young people with weak preferences for work will tend to work less over time, other things being equal. Thus, variables such as previous employment are endogenous in the regression analyses. The unbiased measure of the effects of these variables on future unemployment cannot be obtained (Mroz & Savage, 2003).

[7] Some papers have extensively documented the long-term effects of past unemployment on the wages and income of workers over their lifetimes (e.g., Couch & Placzeck (2010) for the US, Arulampalam et al. (2001) for the UK, Genda et al. (2010) for Japan, and Eliason & Storrie (2006) for Sweden).

health of individuals (Strandh et al., 2014; Mossakowski, 2009; Wadsworth et al., 1999).

Determinants and scarring effects of youth unemployment in the Philippines

We explore the determinants of youth unemployment in the Philippines and assess the potential scarring effects of the COVID-19 pandemic on Filipino youth workers. To do these, we use the following specification:

$$YUR_t = \alpha_0 + \beta_1 YUR_{t-1} + \beta_2 lnGDP_{t-2} + \beta_3 \pi_{t-2} + \beta_4 AdUR_t + \beta_5 LABORF_t + DUMMY_t + \varepsilon_t \quad (1)$$

where YUR_t is the youth unemployment rate, $AdUR_t$ is the adult unemployment rate, $InGDP_t$ is the log of seasonally-adjusted real gross domestic product (GDP), $LABORF_t$ is the growth in total labor force, $DUMMY_t$ is the variable for quarters when real GDP contracted, and $\mathcal{E}_t$ is a random residual. These are the variables that are commonly associated with youth unemployment in the literature.[8] Lagged youth unemployment rate is included among the independent variables to gain insights on the persistence of youth unemployment and its scarring effects. We also use lagged values of log real GDP and inflation rate to indicate the non-contemporaneous effect of these variables on youth unemployment. To account for the possibility of the YUR_{t-1} variable being correlated with the error term (i.e., given that it is directly related to the dependent variable YUR_t), we use instrumental variables to estimate equation 1. Our sample period is between Q1 2006 and Q4 2021.

Regression results show that real GDP has a negative statistically significant relationship with youth unemployment rate, indicating that economic growth (or contraction) leads to lower (or higher) youth unemployment (Table 1). This finding conforms to the established link between economic growth and unemployment (i.e., for both youth and adults).

Inflation and youth unemployment are positively related in that higher (or lower) inflation results in higher (or lower) youth unemployment. High inflation dampens demand which, in turn, reduces output and demand for labor.

Meanwhile, we find a positive statistically significant association between youth unemployment and adult unemployment, implying that youth and adult unemployment rates tend to have similar trends. Theoretically, this could be expected given that youth and adult unemployment rates are most likely affected by similar factors (e.g., macroeconomic conditions). Using a CES production function that differentiates between youth and adult labor, we found that these two types of labor are complements.[9] Thus, they move in the same patterns.

Growth in the labor force appears to have a negative relationship with youth unemployment. This may be reflective of the effect of similar factors on labor force growth and youth unemployment. For example, better economic conditions can encourage individuals to enter the labor market as more jobs are being created. With more job opportunities, young workers may also find themselves getting employed. The negative sign of the dummy variable for episodes of economic contractions point to two possible reasons:

[8] We tried to include minimum wage in an earlier version of the model. However, it was not statistically significant and showed a negative sign.

[9] Our estimates indicate an elasticity of substitution between youth and adult labor equivalent to -0.003.

- First, during crisis periods, young people may opt to stay or return to school or remain without work. Card and Lemieux (2000) found that slack labor market conditions and lower wages increase the possibility of young men staying at home with their families and remaining in school. During the COVID-19 pandemic in the Philippines, it was observed that many young people chose to study (e.g., through online modules and web-based training programs) given the difficulties of finding a job. Bell and Blanchflower (2011) observed that changes in educational participation influence the size of the youth labor market and, thus, youth unemployment rates.

- Second, economic downturns often result in high unemployment rates and very loose labor markets. The challenges of finding employment during crisis periods can lead to discouragement and disengagement among young workers. They would then prefer to stay out of the labor force.

Table 1. Regression results

Dependent variable: YUR_t		
	Coefficient	Standard error
Constant	15.738**	5.889
YUR_{t-1}	0.296***	0.084
$lnGDP_{t-2}$	-0.978**	0.372
π_{t-2}	0.055**	0.023
$AdUR_t$	0.327***	0.041
$LABORF_t$	-0.027***	0.008
$DUMMY_t$	-0.747**	0.295
N	60	
Adjusted R-squared	0.796	

*Notes: ***, **, and * indicate significance at 0.001, 0.05, and 0.10 percent levels.*
Estimated using 2SLS with Newey-West standard errors, using 4 lags. Instruments used include lags of youth unemployment rate, adult unemployment rate, inflation, output gap, and minimum wage.

An important conclusion from the regression results is the positive and statistically significant estimated coefficient of lagged youth unemployment rate. This implies that an increase in past youth unemployment contributes to a higher current youth unemployment. Such a finding signifies the persistence of youth unemployment and its scarring effects.

We performed a robustness check on our results using a vector autoregressive (VAR) model. The use of a VAR model also allowed us to further assess the potential scarring effects of unemployment when shocks, such as those from the COVID-19 pandemic, affect youth workers. Annex 1 presents the impulse response functions (IRFs) of youth unemployment rate to shocks in real GDP growth, inflation, and adult unemployment rate.

Based on the IRFs, a positive shock to real GDP growth leads to a generally lower youth unemployment rate, particularly in the first six to seven quarters after the shock. Meanwhile, shocks that result in a higher inflation rate and adult unemployment rate bring about an increase in the youth unemployment rate. To determine the scarring effects, we looked at the response of the lagged youth unemployment rate. Shocks to previous youth unemployment rates are shown to persist over time and thus affect future youth unemployment.

Our results show that youth unemployment in the Philippines could lead to scarring effects—a finding that aligns with evidence from other countries. Increased youth unemployment due to the COVID-19 pandemic could give rise to challenges going forward. Mroz and Savage (2003) observed that, while the scarring effects of early unemployment can fade over time, it is persistent in the short-term. There are various factors that could cause the persistence, including

labor market dynamics and employers' behavior. Potential employers can contribute to prolonging the scarring effects when they exhibit bias against hiring young workers who have been out of work for some time. In Japan, youth unemployment persisted even with economic recovery after the so-called lost decade in the 1990s. This is because Japanese employers preferred to hire recent graduates rather than those who graduated during the economic downturn and suffered long periods of unemployment or inactivity (Morsy, 2012).

4. Policies and initiatives to improve the welfare of Filipino youth workers

Recognizing the needs and potential contribution of youth workers to the economy and to society in general, several policy initiatives aimed at reducing youth unemployment and expanding job opportunities for young people have been implemented. In the Philippines, these initiatives took the form of employment and training programs (Annex 2). The country's educational system was also reformed to include an additional two years of schooling, intended to better prepare students for the job market. Given the impact of the COVID-19 pandemic to labor markets, these training and learning programs will help equip young workers with the skills necessary to become more competitive and to find gainful employment. Mroz and Savage (2003) noted a "catch-up" response to being out of work in that recent unemployment has a significant and positive effect on the decision of young workers to undertake training. This upgrading of skills and retooling, in turn, lessen the scarring effects of unemployment spells to future employment.

Training for Work Scholarship Program (TWSP) and Special Program for the Employment of Students (SPES)

Since 2012, the Technical Education and Skills Development Authority (TESDA) and the Department of Labor and Employment (DOLE), through their converged Training for Work Scholarship Program (TWSP) and Special Program for the Employment of Students (SPES), respectively, have been targeting youth workers—particularly out-of-school-youth (OSY)—to provide more job opportunities for them.[10] Under the joint program, young people are selected from 300 to 400 municipalities identified by the Human Development and Poverty Reduction Cluster as the poorest in the country. These young people undergo training for a minimum of 20 days (160 hours) and a maximum of 52 days (416 hours), upon completion of which TESDA and DOLE help them find jobs or start a business (TESDA, 2012).

The TWSP and SPES have been the main programs of the DOLE and TESDA implemented to help soften the impact of COVID-19, particularly for youth who are not in school or in training. The USAID provided support to enable distance learning with TESDA's TWSP and other techvoc programs and make these more accessible to young people. This enabled TESDA to provide training continuously despite the lockdowns and other health-related restrictions. On

[10] The out-of-school youth (OSY) is one sector of the young Filipino population severely affected by the COVID-19 pandemic. Based on a US Agency for International Development (USAID) report (2021), the number of OSYs in the country rose during the first few months of the pandemic from 16.9 percent in January 2020 to 25.2 percent in April 2020. In August 2020, the Department of Education noted that almost 4 million additional students were unable to enroll in either a public or private school due to the pandemic.

the other hand, DOLE's SPES modified its deployment of student beneficiaries during the pandemic to continuously provide employment to young people.[11]

Despite adjustments in the training, education, and employment programs, the numbers of young people who enrolled and graduated in 2020 were significantly lower than in previous years. This was due primarily to the suspension of face-to-face classes and assessments (TVET Statistics Annual Report, 2020; Philippine News Agency, 2021). In 2019, the youth accounted for 110,505 enrollees and 94,190 graduates; these numbers declined to 39,715 enrollees and 36,297 graduates in 2020. While 2021 saw a substantial increase in enrollees, it was still at almost 50 percent lower than pre-pandemic figures.

The youth represented one of the highest percentages of TESDA beneficiaries during the pandemic but had the lowest employment rate among Technical-Vocational Education and Training (TVET) graduates, with just 26.42 percent (Study on the Employment of Graduates, 2020). This has been continuing concern of TESDA that started even before the pandemic. The agency noted in the same study that educational attainment is still one of the most significant factors, second to age, for employability across different years. It also found that a student who took the TVET program for a job promotion or salary increase had a better chance of getting employed than a person whose primary reason for taking the TVET program was employment. These are some of the factors that might explain why the youth are still at a disadvantage when pursuing employment even after undergoing the TVET.

Employment program for the youth

With the difficulty of bridging youth TVET graduates with employment, the partnership with SPES was of great support. SPES partners with public and private institutions to deploy students, providing temporary jobs to poor but deserving students, other young people, and dependents of displaced or would-be-displaced workers so they could reinforce their respective family incomes and pursue education at a later time. Most SPES beneficiaries have been hired as service crews or clerical and administrative staff in various institutions. DOLE subsidizes 40 percent of the salary of the youth beneficiary while the partner institution pays for the remaining 60 percent. SPES was first implemented in 1993 and since then, DOLE has recorded at least 3.1 million young Filipino beneficiaries under the program. In 2020, 40,204 youth, including 5,277 out-of-school youth were provided temporary employment under the SPES (DOLE, 2020).

The assessment of Beam et al. (2017) of the impact of SPES noted that, in the medium run, the SPES did not have an impact on education outcomes, including school enrollment, graduation, and grades. Enrollment in males increased, however, which is important given that males have been known to have a higher risk of dropping out of school. In terms of employability, the SPES increased the likelihood of being currently employed by 70 percent, compared to the control group. It also improved beneficiaries' confidence about their work prospects after graduation, although it did not affect their wage perceptions. The program was also found to not have an impact on life skills, self-esteem, and office skills. The

[11] Deployed students were only allowed to do desk work and tasks that will not require them to travel or stay outside; this enabled them to start working despite the pandemic and work-related protocols (SPES Advisory No. 2-2021).

cost of SPES to DOLE is also high, with PhP 90,000 spent per job found. Given these findings, Beam et al. (2017) recommended the review of employment effectiveness as part of program objectives and to (a) ensure that the work experience translated into meaningful skills, (b) improve targeting to enhance effectiveness, (c) add training on life skills, (d) resolve payment delays, and (e) strengthen program monitoring and communication between regional and local Public Employment Service Offices.

While the SPES has been generally effective in providing jobs for its beneficiaries, the COVID-19 pandemic essentially prevented public and private companies partnering with DOLE and absorbing SPES beneficiaries. Health protocols in the workplace and lower revenues generated during the pandemic limited these institutions' ability to participate in the program. Some of DOLE's partner institutions also reallocated their remaining funds to their COVID-19 responses. The resulting shortage of partners and the eventual lack of a funding source for the remaining 60 percent of the salary of SPES beneficiaries became two of the major roadblocks that hindered DOLE's deployment of students for employment since the onset of the pandemic (Medenilla, 2021).

Youth unemployment has long been a problem of the country and a whole-of-government approach will be needed to effectively address the needs and concerns of young workers in the Philippines (Angara, 2021). Legislations such as Republic Act (RA) 10917 expanding the SPES enabled the government to address some of the shortcomings of previous laws to address youth unemployment. Some of the provisions of the law include expanding the coverage to Filipinos up to 30 years of age, adjusting the 40 percent wage subsidy of the DOLE to be paid in cash rather than educational subsidy; provisions for the DOLE to pay a larger subsidy share to poorer municipalities who cannot afford the 60 percent share of partner institutions; and inclusion of SPES beneficiaries in social protection programs under the Government Service Insurance System (GSIS) for one year. Other policies need to be put in place to address new challenges faced by young workers that started during the pandemic. These should include greater focus on improving the digital skills of TVET and SPES beneficiaries to help them adapt to the demands of a more digitized environment. The government must continuously improve programs and services that can help address current and future youth unemployment.

K to 12: Did it achieve its goal of developing skilled graduates?

In 2013, RA 10533, or the Enhanced Basic Education Act, was enacted. It added two more years to basic education, thereby forming the kindergarten to Grade 12—or K to 12—curriculum. Reforming the longstanding 10-year basic education in the Philippines had as one of its aims better-skilled and employment-ready SHS (Grade 12) graduates. It also sought to align the Philippine Education System with international standards. The Philippines is the only country in Asia and one of only three remaining countries in the world, with Djibouti and Angola, that retained a 10-year pre-university education system (Senate of the Philippines, 2011).

Under the K to 12 program, students have the option to specialize in one of eight strands during the two years of SHS: (1) accountancy, business, and management (ABM); (2) humanities and social sciences (HUMMS); (3) science, technology, engineering, and mathematics (STEM); (4) general academic (GAS); (5) technical-vocational-livelihood (TVL); (6) arts and

design (ARTS); (7) sports; and (8) maritime. Graduates can then use this additional training to their advantage should they decide to join the labor force right after, or pursue a college degree. The first cohort of K to 12 graduates started to join the labor force in 2018. The Philippine Institute for Development Studies (PIDS) (2018, 2020) noted in its analysis of the K to 12 program that only around 20 percent of SHS graduates enter the labor force and more than 70 percent intended to continue further studies. Orbeta, et al. (2019) highlighted that the labor market is not a popular destination for SHS graduates. At the same time, graduating from the K to 12 program has not shown a clear advantage nor disadvantage in the labor market. Whether a person finished Grade 10, SHS, or second-year college, estimation results do not clearly indicate which among the three is superior in terms of labor market outcomes.

Employers have a wait-and-see attitude toward hiring SHS graduates (PIDS, 2020). Orbeta, et al. (2018) noted that many firms deem SHS graduates as not work-ready yet. Industry groups have noted that while there have been efforts to revise job descriptions to accommodate SHS graduates, the uptake is still slow because many SHS graduates remain unqualified, based on the experiences of some companies (Valencia, 2019). There are concerns on the inadequacy of the SHS graduates' technical and behavioral skills, lack of length and quality of work immersions, and lack of maturity and perseverance in performing work. Interviews conducted by PIDS also revealed that SHS graduates do not believe they are prepared for work and have no confidence when it comes to competing with college graduates. Valencia (2019) also noted that SHS graduates competent enough to join the labor force had received proper training from schools with more resources and higher tuition costs. Most of them, however, go straight to college rather than seek employment after SHS. Those left behind looking for jobs after graduating from SHS came from less endowed schools and were not planning on going to college because of financial and other problems.

On the other hand, firms who indicated that SHS graduates are work-ready banked on the fast technological adoption of millennial SHS graduates. They also noted that SHS graduates were ready for jobs that required simple routine skills like cleaning, waiting, clerical, and working the production line. Most SHS graduates hired in 2018 were put into elementary occupation positions that only required primary education and below middle-level skills (Orbeta et al., 2018).

To increase the likelihood of getting employed, the SHS program includes work immersion of at least 80 hours embedded in the curriculum (Department of Education (DepEd), 2018). This enables students to do practical application of theories they learned in school as well as develop skills and competencies to become "work-ready" after graduating. However, industries eyeing to hire SHS graduates have a competing view with the DepEd (Orbeta et al., 2018). Companies prefer graduates who have longer hours of practical work experience, as they have observed that the current SHS program does not provide enough training to make SHS graduates eligible for middle-level roles. On the other side, the DepEd argues that longer work immersion is not an ideal scenario, as work training and in-school classes must be balanced. As a result, only entry-level and non-technical positions are offered to most SHS graduates.

The study conducted by PIDS in 2018 also cited other reasons companies are not hiring SHS graduates: (a) the need to revise hiring policies to accommodate SHS

graduates, (b) internal policy does not permit hiring of SHS graduates, and (c) the need for other certifications such as that of the Philippine Maritime Industry Authority or the Civil Service Exam of the Civil Service Commission. The mismatch of policies and the still early stages of implementation of the K to 12 program hinders some SHS graduates from immediately looking for jobs.

An evaluation of the academic performance of K to 12 students (Almerino et al., 2020) revealed possible adjustments that can be made to improve the K to 12 program. The study noted that among the five strands (i.e., STEM, ABM, HUMSS, TVL, and GAS), only STEM and ABM students obtained at least an average score in all subsets of the Scholastic Abilities Test for Adults, a standardized instrument that measures the cognitive and psychological factors thought to underlie academic competence and the skills closely associated with academic accomplishment. Students of the other three strands obtained scores below average. The study concluded that despite reforms made in the K to 12 curriculum, many students are still unprepared for higher education or obtaining jobs.

The COVID-19 pandemic also affected the K to 12 program. The sudden shift to online learning raised concerns from various analysts about its impact on education. The Social Weather Stations (2021) found through a survey that 42 percent of enrolled school-age Filipinos do not use electronic devices for distance learning. The survey also noted that the use of devices for distance learning rises with the household head's educational level. De Guzman (2021) observed that, even though DepEd reported that 99 percent of public-school students got passing marks for the first academic quarter of 2020, several studies says otherwise. Students polled by the Movement for Safe, Equitable, and Relevant Education said they learned less through the take-home modules (>86 percent), online learning (66 percent), and blended learning (74 percent). Unequal access to education, particularly due to school closures, stoked fears of a 'lost generation' because of associated consequences such as losses in school learning and training, mental distress, heightened risk of dropping out, child labor, and child marriage (UNICEF, 2021).

Overall, it may be critical to consider concerns from various studies and industry groups when assessing whether the K to 12 program achieved its goal of producing skilled graduates ready to augment the labor force. K to 12 is a young program, having graduated just four batches since 2018, and it may still be too early to conduct a full assessment of its success. Evaluating the full impact of the pandemic to education and the workplace has yet to be undertaken as COVID-19 is still an ongoing concern. Nonetheless, there is an immediate need to improve the K to 12 program as it affects the quality of education received by Filipino children and young people and will have a bearing on their future employment prospects and career paths.

5. Conclusion

Over the past decade (i.e., 2009 to 2019), the labor and employment conditions of young workers improved gradually. However, these were interrupted by the COVID-19 pandemic. Youth workers were among the hardest hit by the pandemic in the Philippines. The strict implementation of community quarantines and mobility restriction measures heavily affected industries such as tourism, transport, and

accommodation and food services—the traditional employers of young workers. Two years since the pandemic started, youth employment has not yet fully recovered. This is particularly true for the higher educated, higher skilled, and those that work for jobs with more remuneration. In addition, while youth unemployment rate has improved, it remains twice the country's average unemployment rate.

Our regression results indicate that an increase in past youth unemployment contributes to higher current youth unemployment, implying the persistence of youth unemployment and its scarring effects. With increased unemployment due to the COVID-19 pandemic, the potential scarring effects could pose challenges for young workers going forward.

Several policy initiatives aimed at reducing youth unemployment and expanding job opportunities for young people have been implemented in the Philippines. These initiatives include employment and training programs. The country's educational system was also reformed to include an additional two years of schooling, intended to better prepare students for the job market. In the post-COVID-19 period, these training and learning programs are important in equipping young workers with the skills necessary to become more competitive in the labor market and to mitigate the scarring effects.

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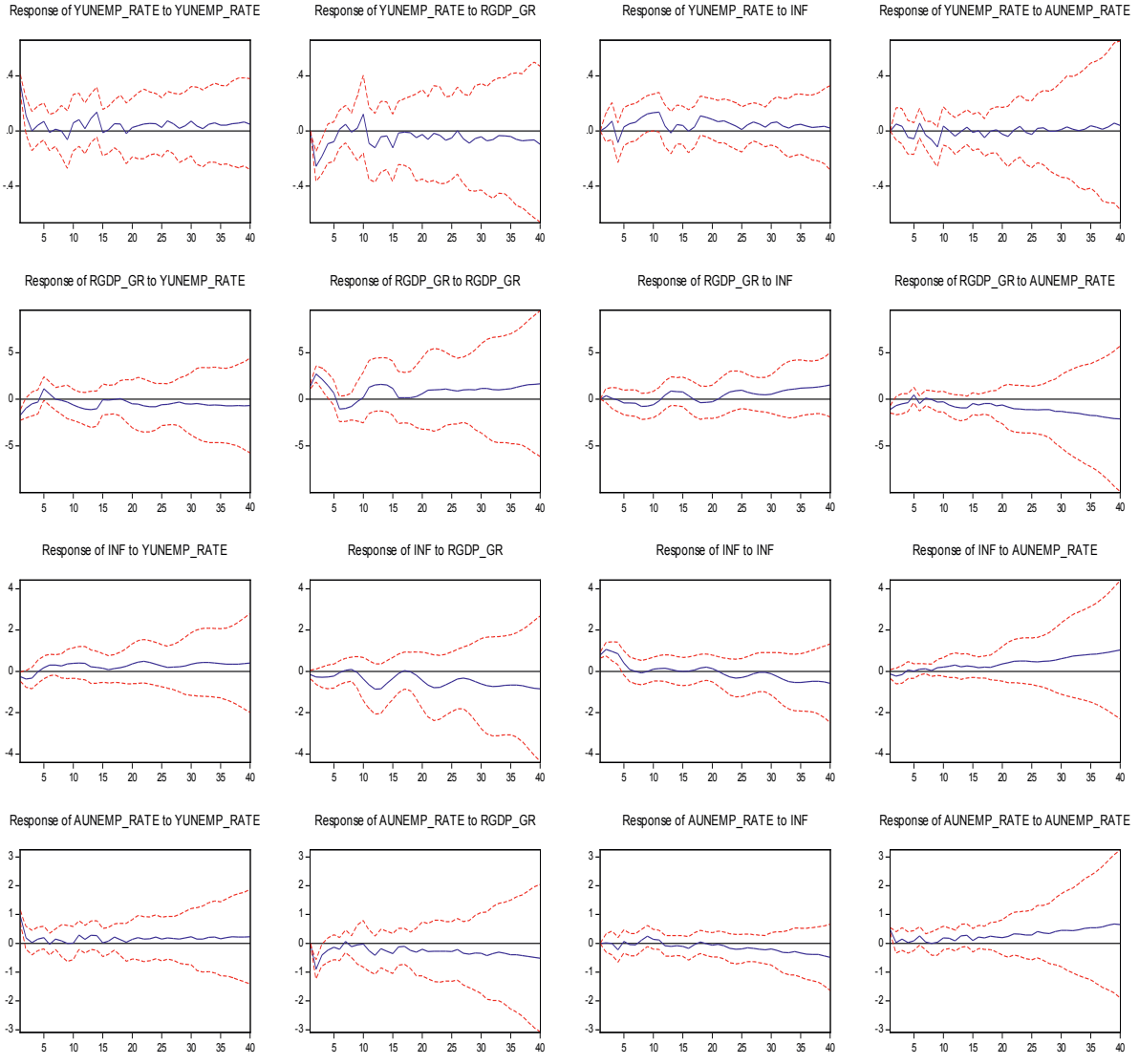
Annex 1

Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.



Annex 2

Program	Implementing agency	Description
Facilitating Youth School-to-Work Transition Program, Subprogram 3	Asian Development Bank (ADB)	A USD 400 million policy-based loan, following the previous approved loans in 2017 and 2019, to support the Philippine government's efforts to expand youth employment and skills program (i.e., PESO, Tulong Trabaho Fund, unemployment insurance scheme, and the First Time Jobseekers Act) to help young Filipinos find quality jobs.
JobStart Philippines (JSP)	Department of Labor and Employment (DOLE)	DOLE's program to enhance the employability of youth by reducing their job-search period and increasing their employability through training (life skills and technical skills required by industries), paid internship, and full-cycle employment facilitation services.
Public Employment Services Office (PESO)		PESO is a non-fee charging multi-dimensional employment service facility or entity established in all local government units in coordination with DOLE.
Special Program for the Employment of Students (SPES)		DOLE's youth employment-bridging program that aims to provide temporary employment to poor but deserving students, out-of-school youth (OSY), and dependents of displaced or would-be displaced workers 15–30 years of age.
Tulong Panghanapbuhay sa ating Disadvantaged/ Displaced Workers (TUPAD)		Emergency employment program that provides short-term (minimum of 10 days, maximum of 30 days) jobs to displaced, underemployed, and seasonal workers.
Youth Education – Youth Employability (YE-YE) Project		A partner corporation/company will provide young people aged 15–24 to pursue a post-secondary course through tuition fee advances, at the least, while being afforded formal workplace experience using DOLE-prescribed proper work attitudes and ethics (e.g., hard work, patience, honesty, saving money, self-reliance, and self-discipline).
TESDA Online Program (TOP)	Technical Education and Skills Development Authority (TESDA)	TOP is an online and free-to-use skills training program of TESDA intended for people who wants to enhance their skills but cannot go to training centers to attend classes.
Training for Work Scholarship Program (TWSP)		TWSP is a special program that intends to fill the skills gap and job requirements of priority industries and sectors with high employment demand.
TVET Programs		One of the main programs of TESDA to directly provide skills training for clients with four modalities: school-based, center-based, enterprise-based, and community-based.
Special Training for Employment Program (STEP)		STEP is a program for Filipinos who want to gain skills to build their own business or livelihood.
Opportunity 2.0	United States Agency for International Development (USAID)	Assistance for the Alternative Learning System and technical-vocational education to enable distance learning and make these more accessible to OSYs.

Sources: ADB, DOLE, TESDA, and USAID websites

6 | On the Labor, Macroeconomic, and Welfare Effects of Reduced Survival Probabilities in the Time of COVID-19

Sarah Lynne Salvador Daway-Ducanes
UP School of Economics

6

6 | On the Labor, Macroeconomic, and Welfare Effects of Reduced Survival Probabilities in the Time of COVID-19

Sarah Lynne Salvador Daway-Ducanes[1]

1. Introduction

The COVID-19 pandemic has reduced life expectancies at birth in many countries across the world, resulting in lower survival probabilities and higher mortality risk across different age groups (The Economist, 2021). These, in turn, are expected to affect individual decision-making behavior—both inter- and intratemporal—and welfare, as well as macroeoconomic allocations across time periods.

This paper thus tries to tease out the macroeconomic and welfare impacts of reduced survival probabilities in the context of an 85-period overlapping generations (OLG) model with social security, wherein individuals have uncertain lifetimes and labor-leisure choice. In particular, the model aims to determine the transitional and steady-state impacts of reduced survival probabilities on (1) prices, i.e., wages and interest rates; (2) consumption-savings/asset allocation; (3) labor-leisure choice; (4) social security contributions and benefits; (5) the aggregate values of labor, capital, government spending, and output; and (6) welfare.

As a preview of the results, the calibrated model shows that, while reduced survival probabilities steepens the agent's consumption path due to higher accidental bequests and prospective social security benefits upon retirement, the economy as a whole shrinks: the aggregate levels of labor, capital, output, consumption, and government spending decline. Social security contributions also decrease, but the ensuing increase in mortality rates enable pension benefits per retiree to rise. While there is gain for newborn cohorts along the transition path and in the new equilibrium, existing cohorts during the "impact year" may lose, suggesting a role for a transfer mechanism to compensate these agents.

The rest of the paper is organized as follows: Section 2 is the "economic environment," describing both the empirical and theoretical motivations for this paper. Section 3 presents the model, Section 4 explains the calibration method, Section 5 discusses the results, and Section 6 concludes.

2. Economic environment

In this section, we lay out the empirical motivation for the calibrated model in Section 3. We also survey the theoretical literature featuring decreased life expectancies or survival probabilities to ground the results and the discussion in Sections 4 and 5.

2.1 Empirical evidence

Cross-country studies show that the COVID-19 pandemic has resulted in reduced life expectancies and survival probabilities.[2]

Using data on 29 countries, including the U.S., Chile, and European economies for the period 2015-2020, Aburto et al. (2022) reported that: (1) life expectancy (at birth) declined in 27 countries; (2) the largest life expectancy losses were among males, particularly in the U.S. and Lithuania; and (3) these losses are mostly due to the increase in mortality rates for those above 60 years of age.

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[2] See, for instance, Islam et al. (2021), Pifarré i Arolas et al. (2021), Aburto et al. (2022), Mazzuco and Campostrini (2022), The Economist (2021), Williams et al. (2022), Woolf et al. (2022), and Zatz et al. (2022).

* *The author thanks Dr. Dante B. Canlas for his helpful comments and suggestions, and Mr. Vincent Jerald R. Ramos for his able research assistantship. Any remaining errors are the author's alone.*

Woolf et al. (2022) confirmed these results, using more recent data up to January 2022. Simulating life tables based on death and population counts in the U.S. and in 21 other high-income economies, they found that, while the average life expectancy at birth declined by 0.58 years, that in the U.S. declined by 1.87 years. The decrease in life expectancy at birth was disproportionately higher among Latinos (3.7 years) and Blacks (3.2 years) than among Whites (1.38 years).

Pifarré i Arolas et al. (2021) further confirmed these results using a wider dataset, which includes 81 countries as of January 2021. They reported that years of life lost (YLL) due to premature death in countries heavily hit by COVID-19 are two to nine times that due to the average seasonal flu. Furthermore, 75 percent of the YLL in these countries are due to deaths among those aged below 75 and almost a third from deaths below age 55. Finally, there is also a gendered difference: YLL among men declined by 45 percent more than it did for women. As of this writing, the authors estimate 20.5 million YLL all over the world due to COVID-19.

Employing U.S. data, Andrasfay and Goldman (2021) found that life expectancy at birth declined by 1.13 years, setting back projected life expectancy at birth to 2003 figures. In terms of racial differences, life expectancy at birth declined more by 2.1 and 3.05 years among the Black and Latino populations, respectively, while it only declined by 0.7 years among Whites, corroborating the findings of Woolf et al. (2022). By age group, Chan et al. (2021) reported that the young working-age group (aged 44 and below) are the most affected by COVID-19, in terms of YLL; but in terms of excess mortality due to COVID-19, older and retired agents (aged 65 and up) are more affected.

Departing from the majority of the literature, which evaluates life expectancy losses in advanced economies, Vasishtha et al. (2021) focused on Maharashtra, one of the most adversely affected states in India by COVID-19. They found that life expectancy at birth declined by 0.8 year by the end of 2020, shortening life expectancy at birth from 73.2 years pre-COVID-19 to 72.4 years by the end of 2020. This estimated decline is expected to have almost doubled to 1.4 years, with more COVID-related deaths occurring in the succeeding months. They estimated the YLL to be at 1.06 million across all age groups.

2.2 *Theoretical effects*

Sánchez-Romero (2022) developed an OLG model with national transfer accounts, incorporating the effects of the COVID-19 pandemic as: (A) a temporary shock to labor income, and (B) a shock that increases the mortality hazard rates of the infected. The model is calibrated to 12 countries.[3]

The effects of a percentage loss in labor income results in decreases in lifetime consumption across all ages, but the working-age population (i.e., ages 25–64 years) bears the brunt of the decline with 0.94 percent; followed by the young (ages 0–24), with 0.73 percent; and then the old (aged 65+), with 0.32 percent. The reductions in lifetime consumption of the working-age population are mainly due to the decline in labor income and the negative impact of the pandemic on survival probabilities. For the young, the decline in lifetime consumption is primarily due to a decrease in parental transfers and the increase in future taxes due to the increase in government debt incurred during the crisis. For the old, the decline in lifetime consumption is due to the loss of pension benefits and the increase

[3] The 12 countries are Australia, Austria, Brazil, Colombia, Costa Rica, Finland, Hungary, Italy, Japan, Slovenia, Sweden, and the U.S.

in the mortality rate. However, fiscal policies, which focus on compensating workers for lost incomes, distributes and smoothens the pandemic's adverse impact across cohorts.

Calibrating their model to match the data for five developed economies (U.S., Canada, UK, Germany, France, and Italy), Eichenbaum et al. (2022a) developed a New Keynesian model that captures the salient features of an epidemic-induced recession. The paper then analyzed the effects of an epidemic on key macro variables, treating these as: (A) a shock on consumption demand, (B) a shock on labor supply, and (C) a shock on both consumption demand and labor supply. Modeling the epidemic as simultaneously affecting both consumption demand and labor supply negatively, the model suggests large drops in output, consumption, investment, and hours worked, with peak-to-trough declines ranging from eight to 12 percent.

Using data on the 1918–1919 influenza pandemic from Sweden, Karlsson et al. (2022) employed an OLG model to analyze the effects of the influenza pandemic on key macroeconomic aggregates. The model shows that younger cohorts benefited from the increase in per capita consumption (of about 0.45 percent) because of the increase in accidental bequests brought about by the sharp and unanticipated rise in mortality. Aggregate output, aggregate consumption, and the real wage rate are shown to decrease, and decrease persistently, even a decade after the pandemic.

This paper differs from the aforementioned primarily in that the current model directly analyzes the effects of an unexpected and permanent decrease in survival probabilities.

3. The model

We now present the OLG model with lifetime uncertainty, which follows the baseline model (and notations) of Daway-Ducanes (2021).[4]

3.1 *Production sector*

The typical firm's production function is:

$$F(K_t, L_t) = BK_t^{\alpha} L_t^{1-\alpha}, \alpha \in (0,1),$$

where K_t and L_t denote aggregate capital and labor at time t, respectively; and $d_K \in$ is the constant total factor productivity. Capital depreciates at a constant rate denoted by $d_K \in (0,1)$ Accordingly, the firm's profit maximization problem yields the usual first-order conditions:

$$r_t = \alpha B K_t^{\alpha-1} L_t^{1-\alpha} - d_K \qquad (1)$$

$$w_t = (1-\alpha) B K_t^{\alpha} L_t^{-\alpha} \qquad (2)$$

where r_t and w_t denote the real interest rate and the real wage rate, respectively.

3.2 *Demographics*

A cohort of new agents is born in every period t. The size of the cohort at time t is $N_t = (1+n)^t$, for $t \geq 0$ and $n > 0$.

Each agent can live for at most $J+1$ periods. Conditional on being alive at age j, the time-invariant probability of being alive in the next period is $\psi_{j+1} \in (0,1)$. Death is certain at the terminal age: hence, $\psi_{j+1} = 0$. The unconditional probability of surviving up to age j is given by

$$s_j \equiv \left(\Pi_{m=0}^{j} \psi_m\right), \text{ for } j \in \{0,1,\ldots,J\},$$

[4] The model in Daway-Ducanes (2021) assumes the existence of both time-inconsistent and time-consistent discounting agents. In this paper, we use a simpler version, where all agents are time-consistent or exponential discounters.

where $\psi_j + 1 \in (0,1)$ denotes the probability of being alive in the next period conditional on being alive at age j. We further assume that $s_0 = \psi_0 = 1$ and $\psi_j + 1 = 0$.

Accordingly, the share of age-j agents at time t is given by

$$\mu_j \equiv \frac{\Theta_{j,t}}{\sum_{l=0}^{J} \Theta_{l,t}} = \frac{s_j(1+n)^{-j}}{\sum_{l=0}^{J} s_l(1+n)^{-l}}, \quad (3)$$

which is constant over time and where $\sum_{j=0}^{J} \mu_j = 1$ and where $\Theta_{j,t} = s_j N_{t-j}$ is the number of age-j agents at time t. The demographic-age structure of this economy is thus constant, and characterized by

$$\mu_{j+1} \equiv \frac{\psi_{j+1}\mu_j}{1+n}, \quad (4)$$

where

$$\mu_0 \equiv \left[\sum_{l=0}^{J} s_l(1+n)^{-l}\right]^{-1}.$$

3.3 Preferences

Each agent derives utility from consumption and disutility from working in every t.[5] Given the Greenwood-Hercowicz-Huffman (GHH) preferences, the agent's lifetime utility, from an age-0 at time t, is represented by

$$U_{0,t}^{i} \equiv \frac{\left(c_{0,t} - A\frac{h_{0,t}^{1+\theta}}{1+\theta}\right)^{1-\sigma}}{1-\sigma} + \beta\left[\sum_{j=1}^{J} \beta^{j-1}\psi_j \frac{\left(c_{j,t+j} - A\frac{h_{j,t+j}^{1+\theta}}{1+\theta}\right)^{1-\sigma}}{1-\sigma}\right], \sigma, \theta, A > 0, \quad (5)$$

where $c_{j,t}$ and $h_{j,t}$ denote consumption and working hours of the age-j agent at t, respectively; $\beta \in (0,1)$ is the constant discount factor; σ is the coefficient of relative risk aversion; and θ is the inverse of the Frisch elasticity of labor supply.

3.4 Budget constraint

In every period, each age-j agent is endowed with the same labor productivity, $\varepsilon_j > 0$. The sequence $\{\varepsilon_j\}_{j=0}^{J_R-1}$ is intended to capture the observed life-cycle earnings profile. For the sake of convenience, we take $\varepsilon_j = 0$ for $j \geqslant J_R$.

All agents face four tax rates: a consumption tax rate, $\tau_c \in (0,1)$; a labor income tax rate, $\tau_h \in (0,1)$; a capital income tax rate, $\tau_k \in (0,1)$; and a social security tax rate (imposed on labor income), $\tau_{ss} \in (0,1)$.

Retirement is mandatory at age $J_R < J$. Each retired agent receives the same amount of social security benefits, x. While working, each agent contributes $\tau_{ss} w_t \varepsilon_j h_{j,t}$, where $\varepsilon_j > 0$ is the constant age-specific labor productivity and the sequence $\{\varepsilon_j\}_{j=0}^{J_R-1}$ is meant to capture the observed life-cycle earnings profile.

In the absence of a private annuity market in this economy,[6] agents who die unexpectedly at time t leave behind accidental or unintended bequests, denoted by $b_t > 0$. These unintended bequests are allocated equally among all surviving agents.

For $j \in \{0,1,\ldots,J\}$, we define $y_{j,t}$ as follows:

$$y_{j,t} = (1-\tau_h-\tau_{ss})w_t\varepsilon_j\chi_j h_{j,t} + (1-\chi_j)x_t + b_t,$$

where $w_t > 0$ is the real wage rate at time t, and χ_j is an indicator function, which equals 1 if $j < J_R$ and 0 otherwise. The agent's budget constraint is thus

$$(1+\tau_c)c_{j,t} + a_{j+1,t+1} = [1 + (1-\tau_k)r_t]a_{j,t} + y_{j,t}. \quad (6)$$

[5] The utility of being deceased is normalized to zero.

[6] This is a common assumption in literature and can be rationalized by Friedman and Warshawsky's (1990) observation that the private annuity market is small due to adverse selection problems. Moreover, the presence of a bequest motive or even a self-insurance motive against health-risk and/or old-age expenses may justify agents for opting out of this market (Imorohoroglu et al., 2003).

In every period t, the age-j agent apportions his disposable income between consumption and savings in an interest-bearing asset, $a_{j+1,t+1}$. We assume that $a^i_{0,t} \geq 0$ and $a^i_{J+1,t} = 0$, which guarantee that the agent can neither be born nor die in debt, as is typical in available literature.

To preserve the availability of a closed-form solution for the consumption-Euler equation, we assume away income uncertainty and borrowing constraints and only allow for mortality risk.

3.5 Consumer's problem

The dynamic programming problem of the agent, may be defined recursively as:

$$V_{j,t}(a_{j,t}) \equiv \max_{c_{j,t},h_{j,t}} \{u(c_{j,t}, h_{j,t}) + \beta\psi_{j+1}E_t[V_{j+1,t+1}(a_{j+1,t+1})]\}, \quad (7)$$

subject to the budget constraint.

3.6 Life-cycle profiles

Denoting the after-tax interest rate at time t by $r_t \equiv (1-\tau_k)r_t$ and letting $q_t \equiv (1+r_t)^{-1}$ the present value of all future incomes starting from age j at time t, denoted by $\Omega^i_{j,t}$ is

$$\Omega^i_{j,t} \equiv \sum_{l=j}^{J} q^{l-j}_{t+l-j} y^i_{l,t+l-j}, \text{ for } i = 1, \dots, I$$

The proposition that follows presents the closed-form solution to the consumer's problem.

Proposition. Given the tax rates $\{\tau_c, \tau_h, \tau_k, \tau_{ss}\}$, the transfers $\{x_t, b_t\}$ and the prices $\{w_t, r_t\}$, the life-cycle profile $\{c_{j,t}, h_{j,t}, a_{j+1,t+1}\}$ for an age-j agent at time t satisfies

$$h_{j,t} = \begin{cases} \left(\frac{\widetilde{w}_t \varepsilon_j}{A}\right)^{\frac{1}{\theta}}, & \text{for } j = 0,1,\dots,J_R-1, \\ 0, & \text{otherwise} \end{cases} \quad (8)$$

$$c_{j,t} = \frac{1}{\Lambda^i_{j,t}}\left[\frac{(1+\tilde{r}_t)a^i_{j,t} + \Omega^i_{j,t}}{1+\tau_c} - \Psi^i_{j,t}\right] \quad (9)$$

$$c_{j+1,t+1} = \Phi_{j+1,t+1}c_{j,t} + \Delta_{j+1,t+1} \quad (10)$$

for $j \in \{0,1,\dots,J\}, t \in \{0,1,\dots,T\}$, where

$$\Phi_{j+1,t+1} \equiv \left[\psi_{j+1}\beta(1+\tilde{r}_{t+1})\right]^{\frac{1}{\sigma}} \quad (11)$$

$$\Lambda_{j,t} \equiv 1 + q_{t+1}\Phi_{j+1,t+1}\Lambda_{j+1,t+1} \quad (12)$$

$$\Delta_{j+1,t+1} = \begin{cases} \frac{A}{1+\theta}\left(h^{1+\theta}_{j+1,t+1} - \Phi^i_{j+1,t+1}h^{1+\theta}_{j,t}\right), & \text{for } j = 0,\dots,J_R-1 \\ -\frac{\Phi^i_{j+1,t+1}Ah^{1+\theta}_{j,t}}{1+\theta}, & \text{for } j = J_R \\ 0, & \text{for } j = J_R+1,\dots,J \end{cases}, \quad (13)$$

$$\Psi_{j,t} \equiv \begin{cases} q_{t+1}\left(\left(\Lambda_{j+1,t+1}\Delta_{j+1,t+1} + \Psi_{j+1,t+1}\right)\right), & \text{for } j = 0,\dots,J_R-1 \\ 0, & \text{for } j = J_R,\dots,J \end{cases} \quad (14)$$

where $\widetilde{w}_t \equiv w_t(1-\tau_h-\tau_{ss})$, $\Phi_{J,t} = \left[\beta\psi_J(1+\tilde{r}_t)\right]^{\frac{1}{\sigma}}$, $\Gamma_{J,t} = 1$ and $\Lambda_{J,t} = 1$ for all $t = 0,\dots,T$. See the appendix in Daway-Ducanes (2021) for the derivations when the agent is an exponential-discounting (ED) agent.

3.7 Welfare measure

To evaluate welfare changes from the decrease in survival probabilities, we first compare all existing cohorts in the year when the change occurs (i.e., $t = 1$) with the respective cohorts in the initial equilibrium (at $t = 0$). The welfare measure, $\phi_{j,1}$ denotes the amount of resources in the initial equilibrium required for the age-j agent at time t to achieve his long-run utility at $t = 1$. Thus, age-j agent's welfare change at $t = 1$ is given by:

$$\phi_{j,1}^{i} = \left\{ \left[\frac{E\left[V\left(a_{j+1,1}\right)\right]}{E\left[V\left(a_{j+1,0}\right)\right]} \right]^{\frac{1}{1-\sigma}} - 1 \right\} \times 100, j = 0, \ldots, J, \tag{15}$$

where $V\left(a_{j+1,0}^{i}\right)$ and $V\left(a_{j+1,1}^{i}\right)$ correspond to the age-j, type-i agent's long-run utilities at $t = 0$ and $t = 1$, respectively. A $\phi_{j,1} = 1$ means that the age-j agent requires 1.0 percent more resources at $t = 0$ in order to attain his long-run utility at $t = 1$. Accordingly, a positive $\phi_{j,1}^{i}$ implies that the decline in survival probabilities yields greater welfare, while a negative $\phi_{j,1}$ indicates otherwise.

For new generations born during the transition (i.e., $t \geq 1$), the long-run welfare changes are given by:

$$\phi_{0,t} = \left\{ \left[\frac{E\left[V\left(a_{1,t}\right)\right]}{E\left[V\left(a_{1,0}\right)\right]} \right]^{\frac{1}{1-\sigma}} - 1 \right\} \times 100.$$

3.8 Government and social security

Government expenditures are denoted by G_t, which is financed by taxes on consumption, capital, and labor. Thus, the government's budget constraint satisfies

$$G_t = \sum_{j=1}^{J} \mu_j \left[\tau_c c_j + \tau_h w_t \varepsilon_j h_{j,t} + \tau_k r_t a_{j+1,t+1} \right] N_t. \tag{16}$$

The unfunded social security system is assumed to maintain a balanced budget for every t, i.e.,

$$x_t \sum_{j=J_R}^{J} s_j (1+n)^{-j} N_t = \tau_{ss} \sum_{j=0}^{J_R-1} s_j (1+n)^{-j} w_t \varepsilon_j h_{j,t} N_t, \tag{17}$$

where the left-hand side is the total social security benefits given to all retirees at time t, while the right-hand side is the total mandatory contributions made by all workers at time t.[7]

3.9 Competitive equilibrium

Definition of equilibrium transition path. Given the tax rates $\{\tau_c, \tau_h, \tau_k, \tau_{ss}\}$, a competitive equilibrium is an allocation sequence $\{(c_{j,t}, h_{j,t}, a_{j+1,t+1})\}_{j=0,\ldots,J}$ unintended bequests bt, and prices $\{r_t, w_t\}_{t=0}^{\infty}$ and $\{K_t, L_t\}_{t=0}^{\infty}$, such that $\forall t$:

1. The allocation sequence solves the consumer's problem defined in (7).
2. Firms maximize profits by satisfying equations (1) and (2) .
3. The labor and capital markets, that is,

$$N_t \sum_{j=0}^{J_R-1} s_j (1+n)^{-j} \varepsilon_j h_{j,t} = L_t, \tag{18}$$

$$N_t \sum_{j=0}^{J} s_j (1+n)^{-j} a_{j+1,t+1} = K_{t+1}. \tag{19}$$

[7] In a no-growth economy, neither the government nor the social security system can be allowed to accumulate debt. Otherwise, per capita debt will explode as t approaches infinity.

4. The budget constraints of the government and the unfunded social security system are balanced in every t, as given by (16) and (17), respectively.
5. The amount of per capita unintended bequests satisfies

$$b_{t+1} = \frac{1}{1+n}\sum_{j=0}^{J-1}(1+\tilde{r}_{t+1})(1-\psi_{j+1})\mu_j a_{j+1,t+1}. \quad (20)$$

4. Calibration

4.1 Equilibrium transition path

At $t = 0$, the economy is in a steady state. At the beginning of $t = 1$, survival probabilities over the life cycle decline. To solve for the equilibrium transition path from the initial to the new steady state, we employ time path iteration. Initially assuming that it takes $T = 250$ periods for the economy to reach its new steady state, we then guess the initial time paths for capital per worker, $\{k_t^0\}_{t=1}^T$, and unintended bequests. With these initial guesses, we compute for the initial time paths of the real interest rate and the wage rate, and then the individual and aggregate variables. The initial guess for $\{k_t\}_{t=1}^T$ is subsequently updated until convergence is achieved.

4.2 Initial steady state

Table 1 summarizes the parameter values employed in the baseline model. See Daway-Ducanes (2021) for a thorough discussion.

5. Results

Figure 1 shows the baseline conditional survival probabilities over the life cycle, and the four cases in which survival probabilities are reduced: (A) *for all ages*, survival probabilities are reduced by a percentage across all ages; (B) *for ages* 20-44, survival probabilities are reduced more for agents aged 20-44; (C) *for ages* 45-64, survival probabilities are reduced more for ages 45-64; and (D) *for ages* 65-85, survival probabilities are reduced more for agents aged 65-85.

Figure 1. Conditional survival probabilities

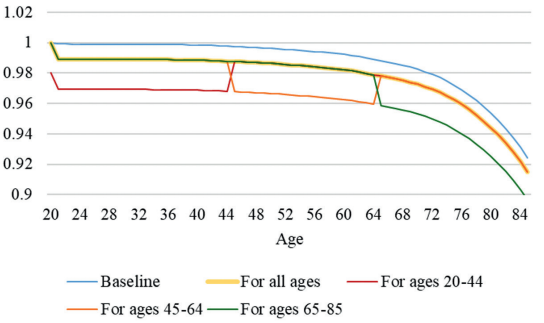

Table 1. Parameterization of the initial equilibrium

Demographics	Preferences	Technology	Government	Targets
$J = 66$ (age 85)	$\sigma = 1.5$	$\alpha = 0.36$	$\tau_c = 0.08$	$r = 0.06$
$J_R = 46$ (age 65)	$\theta = 3.5$	$d_k = 0.08$	$\tau_k = 0.20$	$\frac{K}{Y} = 2.52$
$n = 0.012$	$\beta = 0.98$		$\tau_h = 0.20$	$\frac{G}{Y} = 0.22$
ψ_j: US Life Tables			$\tau_{ss} = 0.12$	$\frac{\#Retired}{Population} = 0.18$
ε_j: Bureau of Labor Statistics				

Table 2 below shows the fraction of retired agents for each case. Reduced survival probabilities decrease the retired fraction of the population from the 18.2 percent baseline. It decreases the most when survival probabilities decline more for ages 45-64, implying that the working-age population increases the most in this case.

Table 2. Retired fraction of the population

	Retired fraction of the population (percent)
For all ages	13.6
For ages 20-44	11.4
For ages 45-64	10.0
For ages 65-85	11.6

5.1 *Aggregate effects*

Figure 2 presents the transitional and equilibrium effects of reduced survival probabilities on the aggregate levels of capital, labor, output, and consumption, as well as the real interest rate, the real wage rate, social security contributions per worker and pension benefits per retiree, and the government spending-output ratio. As in the case for the allocation effects, we show the results for (1) a percentage-decrease in the agent's survival probabilities throughout the life cycle; (2) greater decreases in the survival probabilities for agents aged 20-44 years; (3) greater decreases in the survival probabilities for agents aged 45-64 years; and (4) greater decreases in survival probabilities for agents aged 65-85 years.

For all ages. Suppose that the survival probabilities, $\psi_{j+1}, j = 1,2,\ldots,J$ decline by 1.0 percent over the entire life cycle. The red solid lines in Fig. 2 show that reduced survival probabilities across the life cycle results in a decline in aggregate savings and, thus, aggregate capital declines over time. The decline in the supply of aggregate savings is accompanied by an increase in the equilibrium real interest rate. While aggregate labor supply also declines, the decline in aggregate labor demand is greater due to the decrease in aggregate capital, resulting in lower real wage rates over time. The reductions in both aggregate labor and aggregate capital reduce aggregate output and aggregate consumption. Government spending and even its ratio to aggregate output also decline due to decreases in all three sources of tax revenues—consumption, labor income, and interest income from savings. The reduction in survival probabilities and the attendant increase in mortality rates increase the amount of accidental bequests. While social security benefits per retiree increase, the contributions per worker can decrease to satisfy the social security's budget constraint.

Aggregate capital, labor, consumption, and output drop the most, and social security benefits per retiree increase the least, when survival probabilities decline relatively more for ages 20-44 (the young). This is expected, as the bigger decline in survival probabilities when young has early effects on labor hours and asset accumulation, which are carried over the rest of the life cycle. This can be further verified by the observation that the decline in the aggregate variables is the least, or closest to the "for all ages" case, when survival probabilities decline more during retirement (i.e., ages 65-85).

Accidental bequests increase the most when survival probabilities for ages 45-64 decline relatively more. This is because, as is usually the case, productivity and asset accumulation peak within this age range. Thus, when

the survival probabilities among agents of this age are lower, there would be more wealth accidentally left behind for splitting (equally) among the surviving part of the population.

Social security contributions decline the most when survival probabilities for ages 45-64 decline relatively more, as labor productivity and, thus, lost labor income that would have been available for social security taxation are also the highest for this age range. This is closely followed by the case when the survival probabilities for ages 20-44 decline more. As expected, social security benefits per retiree increase more when the survival probabilities of the pension drawers (retirees, aged 65-85) decline more.

5.2 *Allocation effects*

Figure 3 shows the effects on the agent's allocations for consumption, asset holdings, and labor hours over the life cycle of reduced survival probabilities.

Baseline. Consumption over the life cycle follows an upward-sloping trajectory until age 65, when the sudden decline in productivity upon retirement results in a precipitous drop in labor income and, thus, consumption, but then starts increasing again until around age 74, when it starts decreasing (blue solid line, upper left panel in Fig. 3). Following the typical life-cycle pattern of asset holdings, assets increase until retirement at age 64, after which assets start declining to zero upon death. Following the life-cycle pattern of the productivity parameters, labor hours increase until age 55 (at the peak of the agent's productivity), when they slightly decrease until retirement, after which they drop to zero during retirement.

For all ages. The figure shows the effects during the transition phase and in the ensuing equilibrium at T=250 of reduced survival probabilities for all ages or at all stages of the life cycle.

- **Transition period.** With the decline in survival probabilities, the agent's labor hours decline throughout his life cycle. However, his consumption profile steepens (over the life cycle) due to the increase in the real interest rate, inducing him to consume less when young to consume more beginning middle age at 44 years old. Thus, asset holdings increase from ages 20 to around 60, but then decline during the earlier years of retirement due to the abrupt drop in labor income, and then recover—increasing slightly from the baseline scenario—from around ages 71 to 85.
- **Ensuing long-run equilibrium.** In the long run (i.e., T=250), labor hours and consumption closely follow their respective transitional paths. Asset holdings decline throughout the life cycle but decline the most in the years close to retirement.

For ages 20-44 years. When survival probabilities decline more for agents aged 20-44 years, labor hours also decline more during these ages. Accordingly, asset holdings also decline until age 64. Upon retirement, higher retirement benefits enable these agents to raise their asset holdings for the remainder of their lives. While the consumption path still steepens, it declines longer (compared to the baseline) until around age 54, when it starts increasing relative to baseline consumption.

For ages 45-64 years. When survival probabilities decline more for ages 45-64, labor hours still decline over the life cycle. The consumption path is also still steeper than the baseline. Consumption

is lower until around age 34, and then becomes higher until age 85. In the transition phase, except for about two to three years around retirement, asset holdings increase significantly. In the ensuing equilibrium, asset holdings slightly increase until age 44, and then decrease significantly until age 79, when asset holdings again slightly increase.

For ages 65-85 years. When survival probabilities decline more during retirement, labor hours decline, but not as much as when survival probabilities decline more during the earlier stages of the life cycle. The consumption path is still steeper than the baseline: consumption is lower than the baseline until age 40, when it increases significantly, only to decrease relative to the baseline in the agent's last five years. In the transition period, asset holdings increase significantly until just before retirement at around age 62, when they start declining until age 85. In the ensuing equilibrium, asset holdings only slightly increase until around age 50, and then decrease relative to the baseline until the end of the life cycle.

5.3 *Welfare effects*

Table 3 presents the welfare effects of a decrease in survival probabilities over the life cycle. The welfare changes are reported in these terms: (A) for newborn cohorts during the transition to and in the new long-run equilibrium, and (B) for existing cohorts during the "impact year," when survival probabilities unexpectedly decline.

Along the transition path and in the ensuing long-run equilibrium, all newborn cohorts gain. Their welfare gains are due to a beneficial combination of higher lifetime per capita consumption and lower labor hours, as shown in the previous subsection. Higher per capita lifetime consumption, in turn, is possible due to a combination of higher real interest rates, which help raise interest income from savings (despite the decline in asset holdings in some instances), resulting in higher accidental bequests, lower social security contributions, and higher prospective social security benefits during retirement. Cohorts aged 45-64 years gain the most, both during the transition to and in the new long-run equilibrium, when their survival probabilities decline more than those of the other cohorts, since the increase in accidental bequests are considerably the highest in this case.

Existing cohorts. Younger cohorts gain more than older ones, as the former experience the highest increases in expected remaining lifetime per capita consumption and social security benefits upon retirement.

Still among existing cohorts in the "impact year," welfare gains are lower or may even be negative for those whose survival probabilities declined more compared to other cohorts, as mortality rates increase more for these agents, thereby reducing further their expected remaining lifetime discounted utilities . Cohorts aged 20-44 years even experience welfare losses of around 0.62 percent when the decline in their survival probabilities is greater than those for other cohorts. The same occurs for cohorts aged 65-85 years—their welfare losses become the highest at around 6.3 percent, as per capita consumption declines below the baseline in the last years of the old agent (refer to Fig. 3).

Figure 2. Aggregate effects of reduced survival probabilities

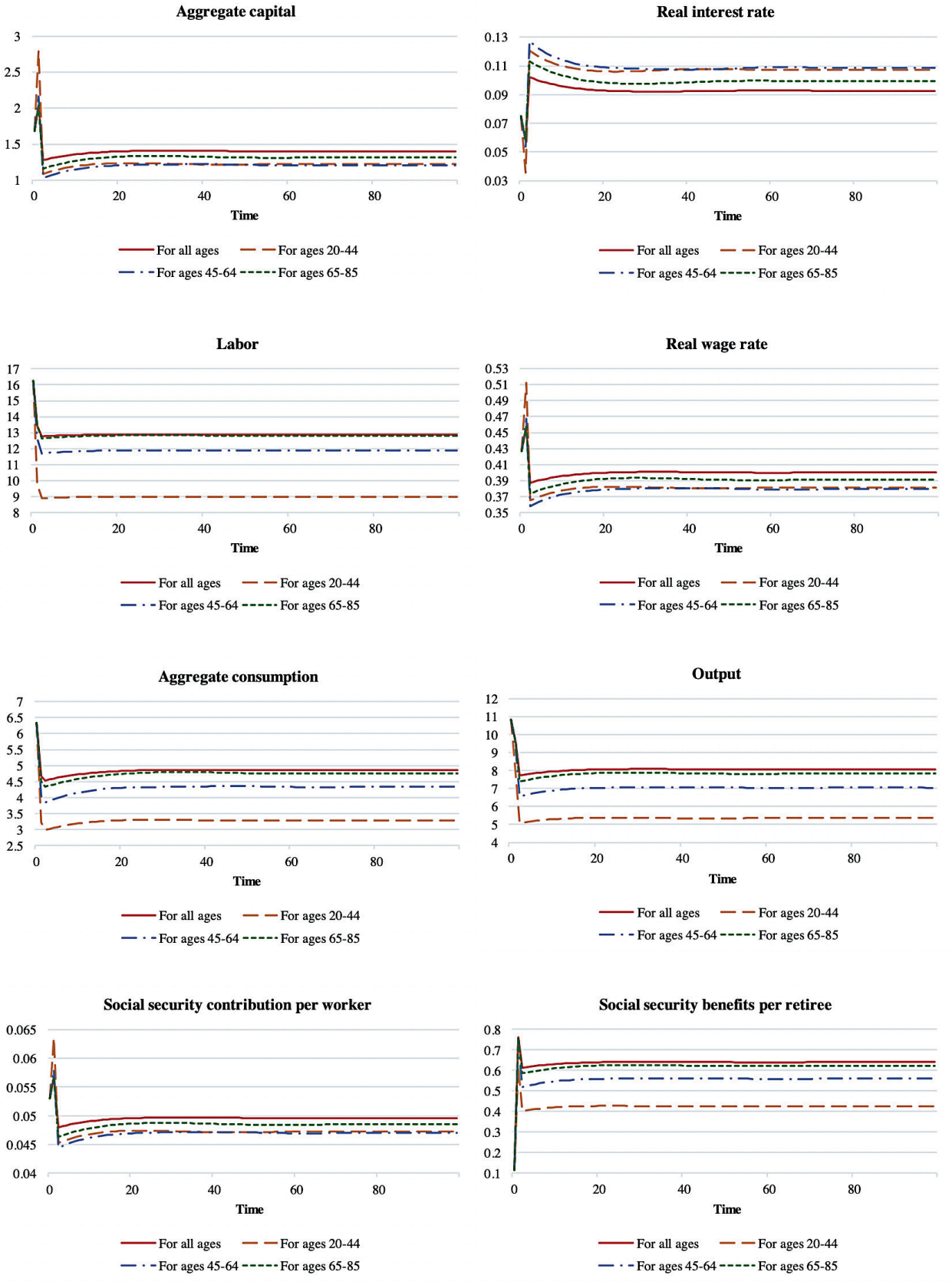

Figure 3. Allocation effects of reduced survival probabilities

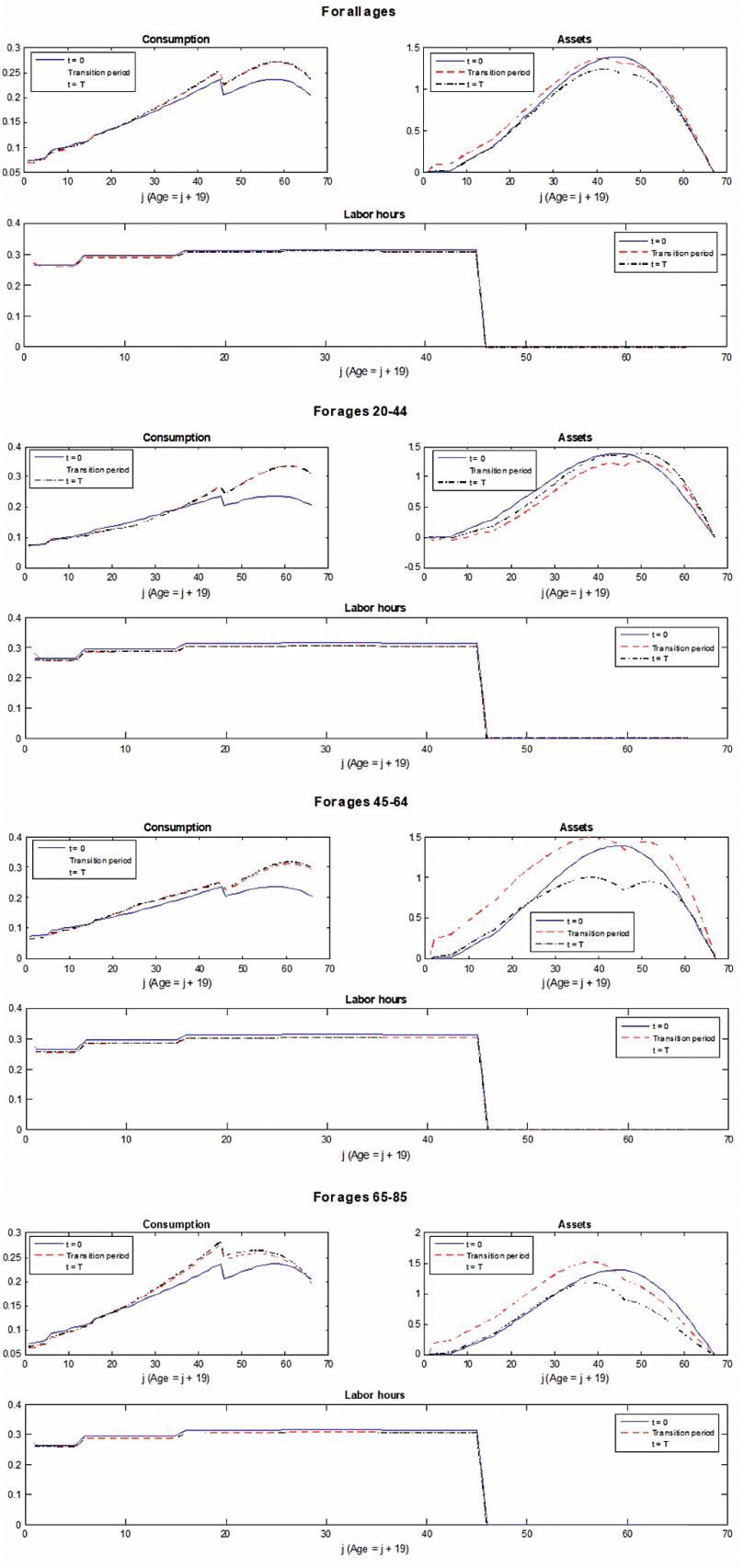

Table 3. Welfare effects of reduced survival probabilities

	Lower for all ages	Lower for ages 20-44	Lower for ages 45-64	Lower for ages 65-85
Existing cohorts in the reform year				
Age in the reform year				
20-24	7.143	–0.622	22.535	14.371
25-34	7.643	3.116	20.219	15.141
35-44	6.709	13.303	8.460	11.187
45-54	5.661	19.618	2.546	5.954
55-64	4.429	14.596	9.518	–2.084
65-85	1.900	6.436	9.879	–6.303
Newborn cohorts along the transition				
Period				
10	3.062	2.314	6.054	2.940
30	3.775	3.102	7.972	4.663
50	3.676	2.781	7.744	4.335
100	3.671	2.880	7.676	4.353
200	3.672	2.887	7.678	4.360
Long run	3.672	2.887	7.678	4.360

The results of our calibrated model are largely in line with the results of other theoretical models. The unanticipated and permanent reduction in survival probabilities shrink the economy as the aggregate levels of labor, capital, output, consumption, and government spending all decline.

6. Concluding remarks

The results of our calibrated model are largely in line with the results of other theoretical models discussed in Section 2. The unanticipated and permanent reduction in survival probabilities shrink the economy as the aggregate levels of labor, capital, output, consumption, and government spending all decline. While the decline in aggregate capital is accompanied by higher real interest rates over time due to a supply-side decline from lower savings, the decline in aggregate labor is accompanied by a decline in real wages, indicating the predominance of a demand-side effect due to the decrease in aggregate capital. Consequently, the aggregate levels of output, consumption, and government spending also decline.

While the decrease in labor incomes available for social security taxation reduces contributions per worker, the decline in survival probabilities and, thus, the increase in mortality rates enable pension benefits per retiree to increase. The same increase in mortality rates also enable significant increases in accidental bequests.

In terms of welfare effects, all newborn cohorts gain during the transition to and in the new long-run equilibrium due to a combination of higher lifetime per capita consumption and lower labor hours, which reduce the disutility of labor. Higher lifetime per capita consumption is primarily made possible by higher accidental bequests and higher prospective retirement benefits.

However, existing cohorts at the time when survival probabilities decline may even lose due to increased mortality rates, which, in turn, reduce the expected remaining lifetime discounted utilities. This suggests the need for transfer programs á la Sánchez-Romero (2022) that would compensate agents for lost labor incomes and reduced expected pension benefits due to higher mortality rates, or a mechanism that would enable accidental bequests to disproportionately benefit existing cohorts that are at a greater disadvantage from reduced survival probabilities.

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7 | COVID-19-Induced Human Capital Shocks, Lifetime Labor Productivity, and Inequality

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7 | COVID-19-Induced Human Capital Shocks, Lifetime Labor Productivity, and Inequality

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1. Introduction

The 2019 coronavirus disease (COVID-19) pandemic unmasked many weaknesses and introduced new challenges in the Philippine education and health systems. Enduring issues on resource availability—including on manpower, facilities, technologies, and supplies—in both education and health sectors have been made more prominent and stretched further with government-imposed mobility restrictions to control the spread of COVID-19. This has affected household access to critical human capital investments, among others, with large potential long-run implications.

By and large, early pieces of evidence on the impact of the COVID-19 pandemic show that households had cut back on human capital spending on children, at least in the early phase of the pandemic. For example, school attendance among five-year-old children had decreased from 92.2% in 2019 to 78.2% in 2020 (Philippine Statistics Authority [PSA], 2020 and 2021), thereby reversing the rising enrollment trend from earlier years. This also suggests that the affected cohorts of children will attend the schooling cycle later compared with those before. Several studies (e.g., Ulep, et al., 2021; Ulep, 2022) documented consistent declines in help-seeking behavior for health, such as patient consultation and hospitalization, especially among children and the elderly, across disease groups because of the pandemic, which may be indicative of broader impacts of COVID-19 on population health.

Less discussed in the literature is the distributional impact of COVID-19 on human capital investments. While school attendance among primary and secondary school-aged children appeared to be similarly affected across income classes, students from more affluent households were better equipped to study under alternative schooling modes (PSA, 2020, 2021; Orbeta, 2022). Such early-life differential in household access to computers and the internet, housing square footage per person, and the availability of better-educated home caregivers are expected to affect the distribution of human capital. It, therefore, has important implications for future survival, productivity, and income inequality.

Assessing the impact of the COVID-19 pandemic shocks on long-term economic outcomes, however, poses several challenges. On the one hand, the global pandemic has affected whole populations and economic systems, making the identification of natural experiments to exploit in impact studies somewhat difficult. On the other hand, the long-term nature of these outcomes requires a substantial period for these effects to be actually measured. When these effects are manifested, it may be too late to implement corrective policy actions if needed, or for these policies to make a difference.

To assess how the COVID-19 pandemic may impact yet-to-be-observed long-term outcomes, this study employs a human capital model with uncertain lifetimes useful in highlighting the

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potential adverse effects of a pandemic on the time paths of health and education spending. It allows us to trace how education and health spending shocks induced by the global pandemic may propagate separately through the economic life cycle. It also provides a mechanism to calculate a first-order approximation of the potential magnitude of these impacts on life expectancy, productivity, and income inequality. We show that the COVID-19 pandemic is likely to negatively affect health and labor productivity, and increase inequality in the long run.

Our study highlights the scale and scope of COVID-19 pandemic impacts based on two complementary sets of simulations. The first set of scenarios assumed a lifetime exposure of agents to COVID-19 human capital spending levels, while the second assumed only a two-year exposure. Expectedly, the former yielded a very large decline in life expectancy. The latter resulted in estimates more consistent with international evidence. Interestingly, there appears to be some heterogeneity in impacts across age groups. We showcase how seemingly disparate shocks emanating from addressing a particular issue in one sector may spread to other parts of the economy and through time. We also document the importance of government policies in shaping household behavior during crises.

The rest of the chapter is organized as follows: the next section reviews recent successes and challenges in the Philippine education and health systems. We also summarize government responses to the COVID-19 pandemic in these sectors and how household behavior had changed relative to previous periods, partly in response to these government policies. In Section 3, we then present a human capital model that distinguishes how health and education spending may separately affect productivity. We discuss how we parameterize this model using available data in Section 4. The results of the model calibration are also presented. Next, we used the model to simulate and assess the likely impacts of the COVID-19 human capital spending on survival, lifetime income, and inequality. We summarize the results of these simulation exercises in Section 5. Finally, Section 6 concludes with policy implications drawn from our results.

2. Human capital spending during the early COVID-19 pandemic

Over the last decade, the Philippines has made several important strides in expanding human capital investments through new education and health entitlements. In education, for example, the government adopted the K-to-12 program in 2012, emphasizing the value of kindergarten education while catching up with global standards on the length of the whole basic education cycle, among others. In addition, in 2017, the government introduced universal free public post-secondary and tertiary education. On the health front, the country's social health insurance program has expanded considerably, with free coverage provided to vulnerable sectors including the poor, persons with disabilities, and the elderly. On top of this is the country's flagship anti-poverty conditional cash transfer program, which provides cash grants

Aggregate education and health expenditures have increased during the COVID-19 pandemic. This expansion includes direct expenditures for COVID-19 prevention and control.

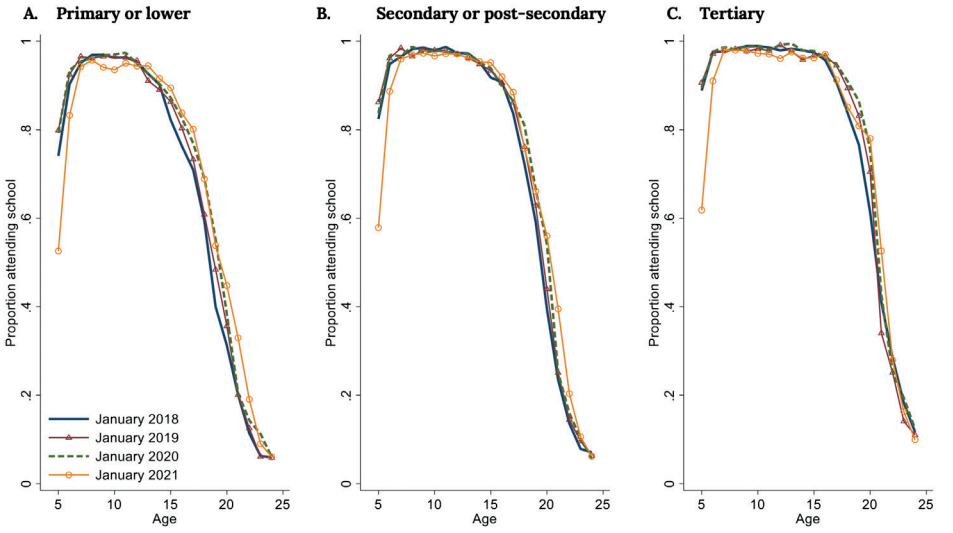
to poor households in exchange for meeting certain education and health requirements. Indeed, over the last decade, access to education and health services has dramatically increased, especially among the poor, although critical issues remain.

While the Philippines has recorded notable gains in school participation over the past decades, particularly in basic education, the country's quality of education lags behind its regional and aspirational peers based on internationally comparable student assessments. Among 79 high- and middle-income countries in the 2018 Programme for International Student Assessment (PISA) conducted by the Organisation for Economic Co-operation and Development, for instance, the Philippines ranked last in Reading and second to last in Mathematics and Science. This may be related to education spending differences across countries (Abrigo, 2021a) and other environmental factors. Further analysis of PISA test scores in the Philippines underscores the importance of household and community support, in addition to school endowments, in explaining variations in student outcomes (Orbeta et al., 2020).

Similarly, in health, although spending per capita has more than doubled over the last two decades, the Philippines continues to fall behind other Southeast Asian countries in per capita health spending and in health outcomes including infant-, child-, and maternal-mortality rates. In addition, large spatial and socioeconomic disparities in the access and distribution of endowments continue to exist. In 2015, for example, per capita health spending among households in the Bangsamoro Region was about half of those in the National Capital Region (Abrigo, 2021b). In the same year, three of every four cities and municipalities in the country had health personnel-to-population ratios below the 45 physicians, nurses, and midwives per 10,000 population recommended by the World Health Organization (Abrigo & Ortiz, 2019).

Notwithstanding these extant issues, the COVID-19 pandemic threatens whatever gains the Philippines has painstakingly amassed over the years.

Figure 1. School attendance by age and highest educational attainment of household head, Philippines (2018-2021)



Source: Authors' calculations based on January rounds of the PSA's quarterly Labor Force Surveys

In the early phase of the pandemic, the government cut short the closing education cycle in the summer of 2020 and delayed the start of the succeeding cycle to October instead of the usual June for basic education. The education system shifted to remote learning, with face-to-face classes pilot-tested only in November 2021 and progressively expanded beginning in February 2022. Over this period, the K-to-12 curricula were streamlined from the original 14,171 competencies down to 5,689—called the Most Essential Learning Competencies—to lighten the load of both teachers and students. An additional PhP 4.4 billion was earmarked for basic education to support the government's Basic Education Learning and Continuity Plan (Orbeta, 2022).

Despite these important public sector interventions, school participation rates among basic education learners dropped in the first year of the COVID-19 pandemic (see Fig. 1). The decline had been steepest among the youngest age groups as households delayed children's entry into school or even pulled them out of school. Those from lower socioeconomic backgrounds appear to have been affected more severely. By January 2021, only half of all five-year-old children from households with heads having primary education or less were enrolled in school, compared with three in every five children from households with college-educated heads. Interestingly, school participation among the college-aged population continued to expand in the early phase

of the pandemic, sustaining previous growth from the introduction of the free tertiary education program.

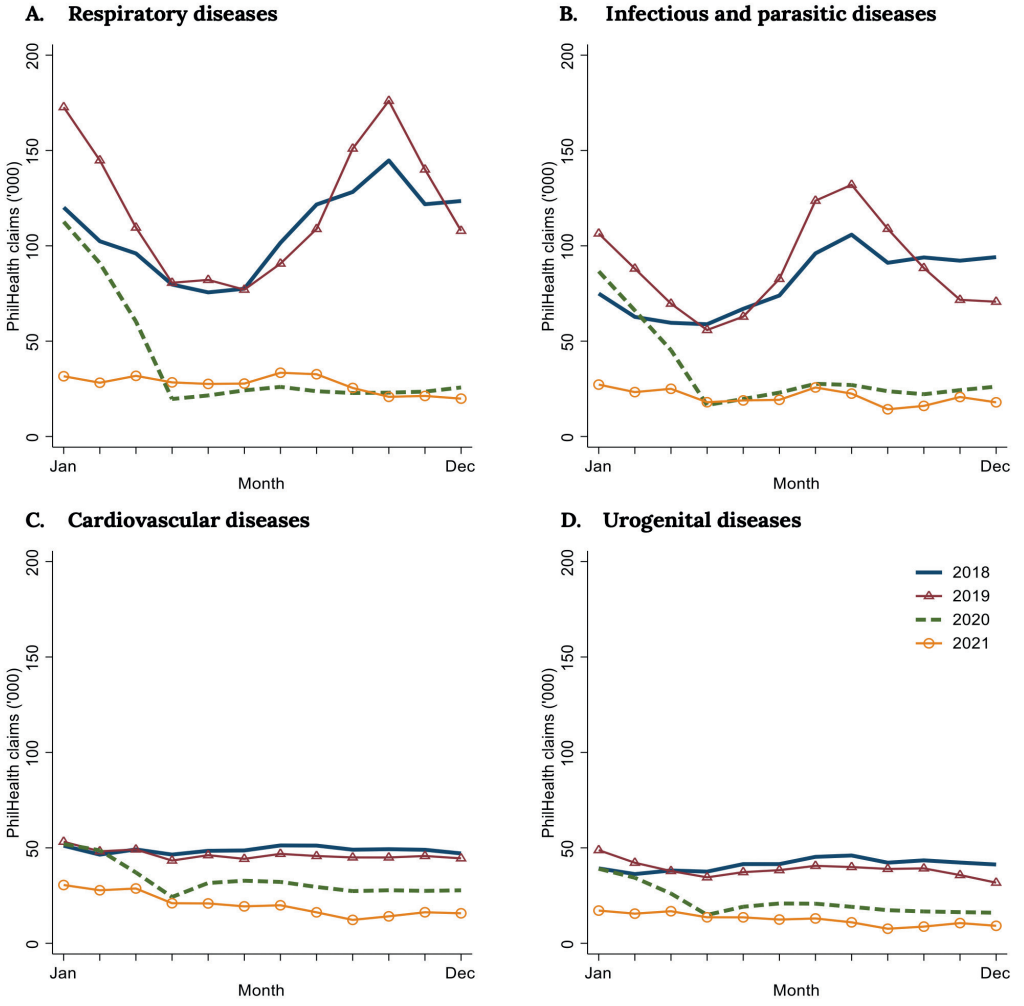
Among those enrolled in school, remote learning is expected to result in learning disparity across socioeconomic classes (Orbeta, 2022). While more than 40 percent of private-school students used a more interactive online mode, more than 80 percent of public-school students used less interactive printed modules. In addition, there appeared to be marked differences in available home support for learning. Orbeta (2022), for example, found that only three percent of household heads in the poorest household income quintile have a secondary education or better, compared with 28 percent in the richest household income quintile. This is particularly critical when teachers are not available to guide students, such as in remote learning. Even in pre-pandemic face-to-face classes, the quality of home support has been documented to be predictive of test scores (Orbeta et al., 2020). Household access to broadband internet and ownership of a computer, television, and cellular phone, which may aid in remote learning, also vary across socioeconomic classes, with home conditions of more impoverished families being less conducive to learning.

Access to health care services was also significantly affected by the COVID-19 pandemic. Consultations in primary health care units and hospitalizations declined with the onset of the pandemic (Ulep, 2022) and have not returned to their pre-pandemic level since, at least for inpatient care, as shown in Fig. 2. The figure presents the trend in the number of hospitalized patients by top major disease groups between 2018 and 2021 based on social health insurance claims (Philippine Health Insurance Corporation, 2022). Children and the elderly appear to be the most affected (see Fig. 3), highlighting how the global pandemic has affected the most vulnerable populations.

Strict stay-at-home directives, particularly for children and the elderly, and the reallocation of health resources to the COVID-19 response in the early months of the pandemic may have contributed to the observed drop in patient consultations and hospitalizations (Ulep, 2022). However, it remains a conundrum why it has not been reversed with more relaxed community quarantine rules or with fewer COVID-19 cases.

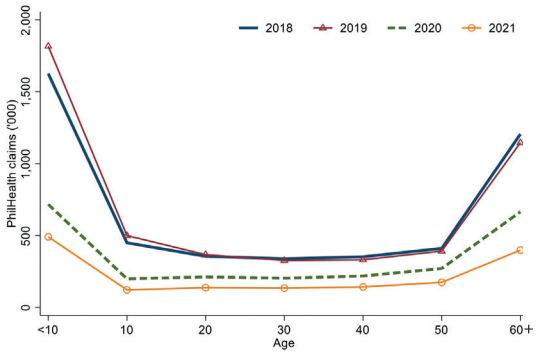
Aggregate education and health expenditures have increased during the COVID-19 pandemic. Compared with 2018 levels, total education spending increased by 1.2 percent and that for health by 10.7 percent. This increase, however, masks the true level of human capital spending as COVID-19-related expenditures have artificially ramped up expenditures on health and education.

Figure 2. Social health insurance claims, by major diseases, Philippines (2018-2021)



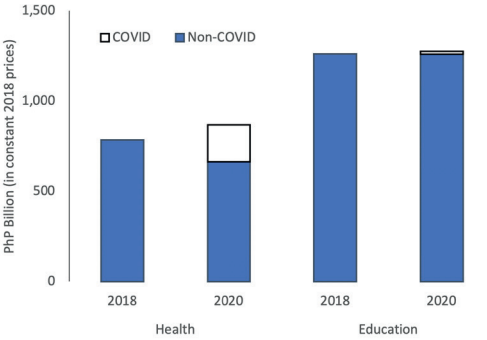
Source: Authors' calculations based on PHIC data

Figure 3. Social health insurance claims by age group, Philippines (2018-2021)



Source: Authors' calculations based on PHIC data

Figure 4. Aggregate human capital spending (in billion PhP), Philippines (2018 and 2020)



Source: Authors' calculations based on PHIC, DBM, and PSA data

Excluding expenditures related to the COVID-19 response[5] reveals some deterioration in aggregate non-COVID-19 human capital spending by at least PhP 118 million (see Fig. 4). The decline was higher for health (15.2 percent) compared with education (0.1 percent), which are both primarily due to falling household spending. Between 2018 and 2020, total household consumption of education and health declined by 7.8 percent and 18.2 percent, respectively, if we exclude COVID-19-related expenses. Government spending, on the other hand, increased by 9.4 percent for education, offsetting the fall in household education spending, but decreased by 9.2 percent for health over the same period.

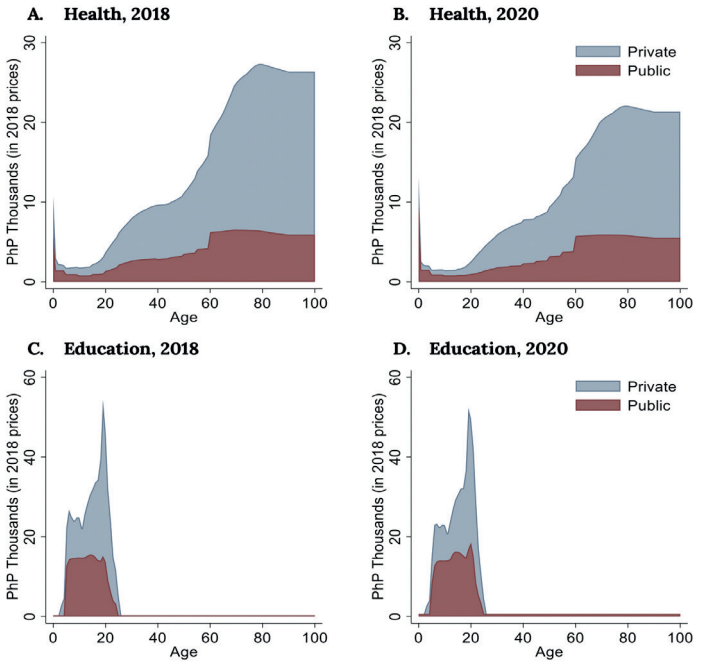
Figure 5 shows non-COVID-19 education and health consumption per capita by age between 2018 and 2020. These estimates capture differences in utilization patterns and relevant costs, as well as the many factors that affect these, across age groups between these two periods. The figure highlights the importance of the public sector in smoothing consumption during crises. While non-COVID-19 health spending has declined across age groups, expansion of government health spending, particularly of social health insurance for infants, had more than offset the decline in household health spending for this age group over this period. Similarly, while household education spending by age had declined between 2018 and 2020, increased government spending, especially for secondary, post-secondary, and tertiary education, narrowed overall spending cuts across age groups and even expanded those for the population in their early twenties.

[5] COVID-19-related expenditures were based on government disbursements as recorded by the Department of Budget and Management (2022), and social health insurance records by the Philippine Health Insurance Corporation (2022).

3. A simple model of human capital, survival, and productivity

The documented changes in age patterns of human capital spending are expected to have important implications on future economic outcomes. However, assessing the long-term impacts of the COVID-19 pandemic poses several important challenges. First, COVID-19 has affected large swathes of populations within and across economies, with degrees of severity likely affected by both observable and latent factors. This makes identifying natural experiments to exploit for impact assessments particularly difficult. Second, we are interested in long-term outcomes, which are yet to be observed in the real world. While the COVID-19 pandemic affected virtually the whole world and is expected to have important implications on individuals and the aggregate economy alike, measurement of long-term outcomes, by its nature, requires a significant time period to pass.

Figure 5. Human capital spending per capita, by age, Philippines (2018 and 2020)



Source: Authors' calculations

In this section, we discuss a simple economic model based on the current understanding of processes surrounding human capital acquisition to assess the potential long-term impacts of the COVID-19 pandemic on survival and labor productivity. As a heuristic device, the human capital model we present below lacks many intricacies of the real world. However, it allows us to clarify the potential pathways through which human capital shocks affect the entire economic life cycle and to estimate the first-order approximation of its magnitude through simulation exercises.

Consider an economy lived in by individuals, indexed by $i = 1,2 \ldots N$. Given some initial endowment and schedule of prices, each individual chooses a lifetime age-specific bundle of goods and services based on some well-behaved utility function that each individual maximizes. Without loss of generality, we group goods and services under three main headings: health, education, and others. We are agnostic about the form of the utility function, how agents interact with one other, or the process through which utility-maximizing bundles of goods and services are derived. We are interested, however, in how their health and education consumption relates to their survival and lifetime labor income.

Following Grossman (1972), we distinguish between health and education as inputs to human capital, which, in turn, affects individual productivity. In particular, we assume that health spending affects productivity only by influencing individual age-specific survival probabilities, while education spending improves efficiency in producing goods and services. That is, health consumption allows individuals to become productive, while education makes them productive per se.

Current consumption of health and education goods and services are transformed into health and knowledge stocks, respectively, through distinct production functions. These stocks accumulate across the years, although a portion of these depreciates through time at some exogenous age-specific rate. These stocks then determine whether an individual survives or the level of his/her productivity at each age. We discuss these mechanisms in more detail below.

We specify age-specific health stock $H_{(i,h)}(a)$, as

$$H_{i,h}(a) = \alpha_h \cdot c_{i,h}(a)^{\phi_h} + [1 - \rho_h(a)] \cdot H_{i,h}(a-1);$$
$$0 \le \rho_h(a) \le 1;\ \alpha_h, \phi_h, c_{i,h}(a) \ge 0, \quad (1)$$

where $c_{i,h}$ is individual health consumption at age a=1,2, ..., T, and α_h and ϕ_h are total factor productivity and production elasticity, respectively, which governs how $c_{i,h}(a)$ is converted into units of health stocks. We do not impose any functional form assumption on the age-specific depreciation rate $\rho_h(a)$ other than that these should be bounded between 0 and 1. We assume that the initial health stock, i.e., the birth stock, $\lambda_h \ge 0$, and health stock depreciation rates are common among individuals and are set by nature.

An individual's survival depends on his/her health stock at any period being above some threshold, $\underline{h} \ge 0$, named the death stock. For a progressively rising $\rho_h(a)$, especially at old age, replenishing the health stock becomes increasingly expensive. When incomes do not grow at least as fast, then death is inevitable.

The proportion of the population surviving up to some age t, given by $\pi(t)$, may be defined based on observed age-specific hazard rates $\theta(a)$ up to age t as follows:

$$\pi(t) = \prod_{a=0}^{t} [1 - \theta(a)]; \quad (2)$$
$$\theta(a) = P\left[H_h(a) < \underline{h} \,|H_h(0), H_h(1), \dots, H_h(a-1) \ge \underline{h}\right].$$

The individual evolution of the knowledge stock, $H_{i,k}(a)$, is similarly defined as that of health stock with some slight modification. Unlike in health stock production, we introduce a stochastic component to the total factor productivity of knowledge stock production, which captures individual differences in how agents transform education consumption into productive knowledge stock units:

$$H_{i,k}(a) = [\alpha_k \cdot \psi_i] \cdot c_{i,k}(a)^{\phi_k} + [1 - k(a)] \cdot H_{i,k}(a-1);$$
$$0 \le \rho_k(a) \le 1;\ \alpha_k, \phi_k, c_{i,k}(a) \ge 0; \quad (3)$$
$$\psi_i = \frac{\exp(z_i)}{E[\exp(z_i)]},$$

where $c_{i,k}(a)$ is age-specific education consumption, and the rest of the parameters are similarly defined as in (1) but with subscript k, representing knowledge. The individual-specific age-invariant stochastic component of total factor productivity, ψ_i, is strictly non-negative and has population mean equal to unity. Without loss of generality, we assume the birth knowledge stock, λ_k, to be zero.

The knowledge stock represents some productivity potential that is actualized only when an individual is employed in the economy. Let $L_i(a)$ be an indicator function equal to one when individual

i is employed at age a, with $E[L_i(a)] = p(a)$ being exogenously set. Normalizing wages at 1 per unit of knowledge stock, the age-specific annual labor income of an individual, $l_i(a)$, is given by:

$$l_i(a) = \begin{cases} H_{i,k}(a) \cdot L_i(a) & , H_{i,h}(t) \geq \underline{h} \; for \; all \; t \leq a \\ 0 & , H_{i,h}(t) < \underline{h} \; for \; some \; t \leq a \end{cases} \quad (4)$$

It must be recognized that the above model is rather simplistic and devoid of many important real-life nuances. For example, we assume that survival depends only on health consumption. In reality, however, individual health status depends on many other factors including consumption of non-health goods and services, genetics, and living conditions (Marmot & Smith, 1997; Fuchs, 2004). Further, we assume that knowledge stock depends only on education consumption. However, productivity-enhancing knowledge may also be derived from experiences, particularly while working (Mincer, 1974; Lemieux, 2006). Finally, there may be alternative motivations to consume health or education goods other than investments to improve the chances of survival or to raise future labor income, such as for leisure. These are beyond the scope of our model.

These having been said, the above specifications provide a first-order approximation of the mechanisms surrounding survival and productivity that is in line with mainstream human capital theory. This allows us to disentangle and trace the potential pathways through which human capital shocks induced by the COVID-19 pandemic may affect long-term outcomes.

4. Calibration of human capital model to baseline outcomes

We estimate the parameters in the health and knowledge stock laws of motion, expressed as equations (1) and (3) in the previous sub-section, using a series of simulated method of moments (c.f. McFadden, 1989) based on moment conditions that may be derived from equations (2) and (4). We sequentially estimate the model parameters starting with the health stock law of motion, which feeds into the parameter estimation for the knowledge stock law of motion.

Let π^M and π^D be the vector of survival rates from data and calculated from the model, respectively. We exogenously set α_h, ϕ_h and $\underline{h}$ equal to one, which, together with information on $c_{i,h}(a)$, allows us to pin down the vector $\{\rho_h(a)\}$. Conditional on the observed $c_{i,h}(a)$ and parameters $\{\alpha_h, \phi_h, \underline{h}\}$, we performed a standard numerical search for $\{\rho_h(a)\} \in [0,1]$ to match the model moments π^M with the observed moments π^D as closely as possible by minimizing

The COVID-19 pandemic is likely to negatively impact health and productivity and raise inequality in the long term.

$$Q_h = (\pi^D - \pi^M)' W_h (\pi^D - \pi^M), \quad (5)$$

where W_h is a conformable weight matrix, which we set as an identity matrix following Meghir and Pistaferri (2004). This allows hypothesis testing that is robust to within-individual correlations and across time. Calculation of the covariance matrix of the estimated parameters is similar in form to the classical generalized method of moments (McFadden, 1989).

Given $c_{i,h}(a)$, the estimates for $\{\rho_h(a)\}$, our maintained assumption on $\{\alpha_h, \phi_h, \underline{h}\}$, and the derived $H_{i,h}(a)$, we can then estimate the parameter vector $\{\alpha_k, \phi_k, \rho_k(a)\}$ conditional on $c_{i,k}(a)$. Similar to the estimation procedure above, let l^D and l^M be the vector of observed and simulated per capita labor income stacked over age. Performing a similar minimization procedure as above allows us to match the schedule of lifetime per capita labor income in the model with that observed from the data. In addition, however, we also want to mimic the observed income inequality in our simple model of the economy. In order to do this, we introduce another parameter η, such that $z_i = \eta \cdot v_i$ where $v_i \sim N(0,1)$.

Let G^D and G^M be the observed Gini coefficient from official national estimates and the calculated Gini coefficient based on lifetime labor income of individuals in the model, respectively. Numerical search for $\{\alpha_k, \phi_k, \rho_k(a), \eta\}$ is then performed to match the stacked vectors $\omega^D = \{ l^D, G^D \}$ and $\omega^M = \{ l^M, G^M \}$ by minimizing

$$Q_k = (\omega^D - \omega^M)' W_k (\omega^D - \omega^M), \quad (6)$$

with the weight matrix W_k also set as a conformable identity matrix.

We calibrate the model to new estimates of National Transfer Accounts (NTA) for 2018 Philippines. NTA is a system of accounts that measure how different generations in an economy produce, consume, and share resources in a manner consistent with the United Nations (UN) System of National Accounts. NTA provides estimates of age-specific per capita education consumption, health consumption, and labor income, among others, that are required in our model. Details of NTA estimation are provided in the UN (2013) manual, with recent historical estimates for the Philippines presented in Abrigo, et al. (2020). In addition to Philippine NTA data, we also used 2015-2020 life table estimates by the United Nations (2019) and the 2018 Gini coefficient estimated by PSA (2019a).

We adopt a synthetic cohort approach in our estimation. We assume that the age-specific consumption and income observed in the Philippine NTA represent the value of consumption and income an individual expects if he/she is to live a whole lifetime in 2018. We simulated 10,000 individuals with maximum lifespans of 100 years, representing more than one million agent-year observations. We randomly assign to each individual a lifetime schedule of human capital consumption based on the joint distribution of age-specific health and education consumption derived from the NTA-adjusted 2018 Philippine Family Income and Expenditure Survey (PSA, 2019b). Employment status is also assigned randomly based on age-specific employment-to-population ratios calculated from the October 2018 Labor

Force Survey (PSA, 2019c). Using these simulated observations, we minimize the objective functions in (5) and (6) to identify baseline parameter values of our human capital model.

Table 1 presents parameter estimates of our human capital model. For the health law of motion, we constrained the parameters of the health stock production function to allow the identification of lifetime depreciation rates. It is straightforward to show that any affine transformation of health consumption does not change the statistical ordering of individual mortality. We did not impose any parameter constraints on the education law of motion other than that the birth knowledge stock is nil for everyone.

The estimates in Table 1 capture some key features of human capital dynamics. First, health stock depreciates faster with age, which is in line with previous estimates (e.g., Grossman, 1972; Halliday, et al., 2019). Before age 30, health stock depreciates at less than one percent

Table 1. Simulated method of moments model estimates

Parameter		Health			Education		
		Est.	S.E.		Est.	S.E	
Total factor productivity	α	1.000	0.000	e	0.408	0.010	***
Production elasticity	φ	1.000	0.000	e	0.955	0.035	***
Birth (initial) stock	λ	1.000	0.000	e	0.000	0.000	e
Death stock	$\underline{h}$	1.000	0.000	e	...	...	na
Productivity shock SD	η	...	...	na	0.570	0.009	***
Depreciation rate	ρ_{10}	0.008	<0.001	***	0.086	0.170	
	ρ_{20}	0.006	<0.001	***	<0.001	0.004	
	ρ_{30}	0.010	<0.001	***	<0.001	0.001	
	ρ_{40}	0.028	<0.001	***	<0.001	0.001	
	ρ_{50}	0.025	<0.001	***	<0.001	0.001	
	ρ_{60}	0.043	<0.001	***	0.014	<0.001	***
	ρ_{70}	0.061	<0.001	***	0.026	0.001	***
	ρ_{80}	0.082	<0.001	***	<0.001	0.001	
	ρ_{90}	0.122	<0.001	***	<0.001	0.017	
Q		0.014			0.070		
pseudo-R^2		0.999			0.993		
N		10,000			10,000		

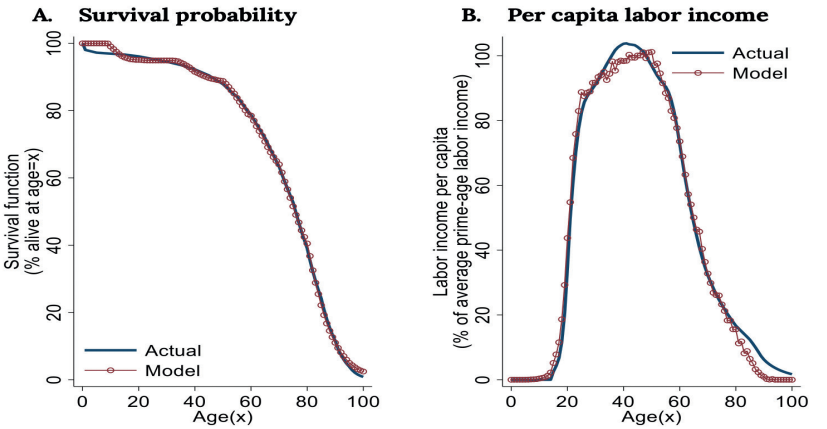
*Notes: N – number of observations; e – exogenous; na – not applicable; *** indicate statistical significance at the 1% alpha level. The pseudo-R^2 measure is calculated as the squared Pearson correlation between the model estimate and the data.*
Source: Authors' calculations

per year. However, this progressively rises. By age 90, the annual rate of health stock depreciation is above 10 percent. Second, knowledge stock depreciation is relatively small in magnitude and remains flat throughout the lifetime, unlike that for health. Consequently, knowledge stock may steadily accumulate throughout an agent's lifetime with minimal loss from depreciation. Third, the output elasticity of knowledge production cannot be statistically distinguished from unity. This suggests that knowledge stock increases at about the same rate as individual education investments.

Figure 6 compares the data and model estimates of the age schedules of survival probabilities (Panel A) and per capita labor income (Panel B). The figures show substantial overlap between the data and the model estimates, although some important deviations exist. In Panel A, for example, model estimates of survival probabilities below age 10 overstate actual propensities relative to those observed in the data. In Panel B, the model understates per capita labor income among middle-age and elderly populations. While the differences could be somewhat trivial, these suggest that the model potentially excludes some important real-life human capital dynamics across the economic lifecycle.

Using parameter estimates in Table 1, calibrated based on age-specific target moments shown in Fig. 6, we then calculated the following indicators: (A) life expectancy at birth, le_0, (B) average undiscounted lifetime labor income, $\bar{l}$, and (C) Gini coefficient, $G(li)$. We then compared these with baseline data (Table 2). Except for the Gini coefficient, we did not specifically target these moments; thus, these can be used to benchmark the performance of our model. The difference between model estimates and the data is within one percent, despite deviations in estimates of lifecycle profiles in Fig. 6.

Figure 6. Baseline survival probability and per capita labor income, by age



Source: Authors' calculations. Survival probability is calculated from UN (2019) World Population Prospects Philippine life table.

Table 2. Baseline outcomes: Data v. model estimates

	Actual	Model		
		Est.	90% confidence band	
Life expectancy at birth (in years)	71.4	71.5	71.5	71.6
Lifetime labor income (in PALY years)	45.9	46.3	45.5	48.7
Gini coefficient	0.43	0.43	0.42	0.43

Note: PALY – average labor income of prime-age adults, aged 30-49 years.
Source: Authors' calculations

5. Impact of COVID-19 human capital shocks on survival, productivity, and inequality

Based on the estimated baseline parameters, we then performed policy simulations to assess how the COVID-19 pandemic shocks on human capital spending are likely to affect important long-term economic outcomes. More specifically, we look at how age-specific survival rates, average lifetime labor income, and inequality are likely to be affected by changes in the average levels and covariation in health and education consumption over the economic life cycle.

We provide three alternative scenarios in our policy simulations. In addition to using the observed distribution of per capita human capital spending in 2020, we separately assess the potential impact of changes in education and health spending on our selected outcomes. This allows us to identify the relative importance of shocks on each of these human capital pathways.

In these alternative scenarios, we use the human capital spending patterns in the first year of the COVID-19 pandemic netted out for health and education spending related to COVID-19 prevention and treatment. This is done to make the spending comparable to 2018 expenditures. We assumed that COVID-19-related spending has no spillover effects on non-COVID-19 outcomes, since these expenditures are used specifically for direct COVID-19 pandemic response. The only way COVID-19 spending may affect non-COVID-19 outcomes in our model is when these expenditures crowd-out other human capital spending unrelated to COVID-19 prevention and treatment. These early pandemic distributions of human capital spending are based on new Philippine NTA estimates for 2020.

We focus on the impact of the above alternative scenarios on life expectancy at birth, and on the distribution of lifetime labor income. We compare the values of le_0, l, and $G(li)$ at baseline and in the alternative scenarios to assess the

impact of the distributional change in human capital spending during the early COVID-19 pandemic on these long-term outcomes.

5.1 Lifetime exposure to COVID-19 human capital spending

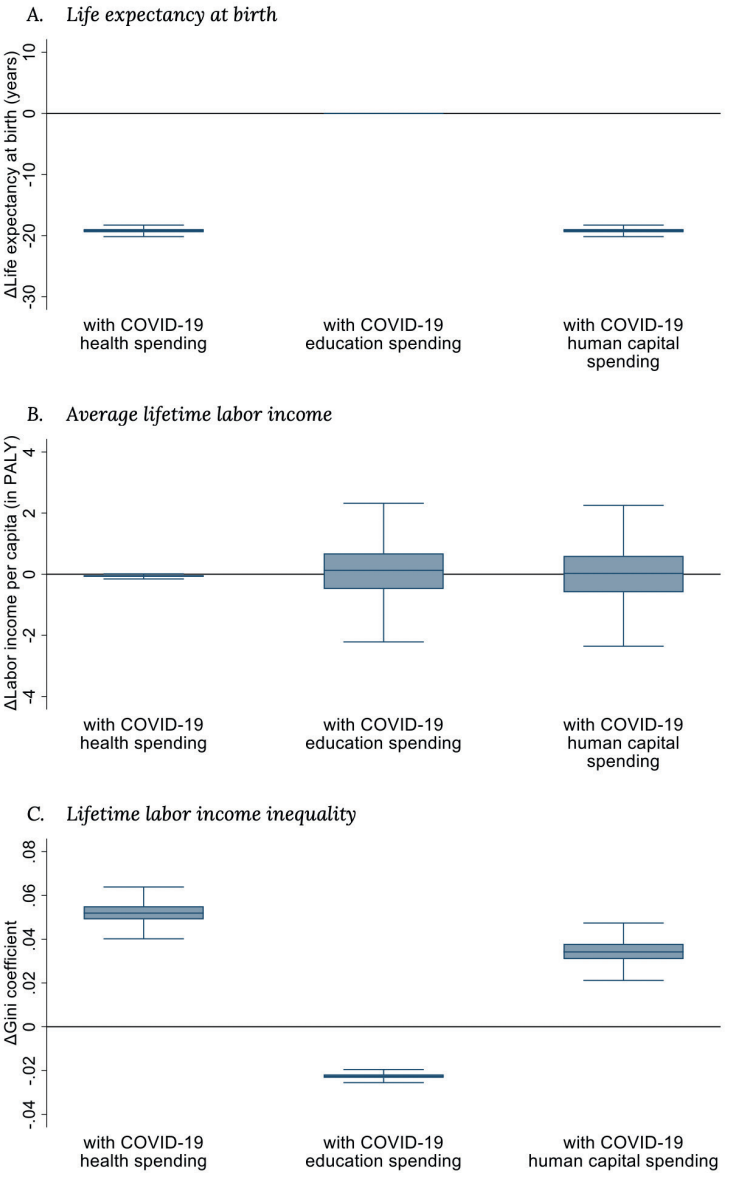
In Fig. 7, we present estimates of life expectancy at birth, average lifetime labor income, and Gini coefficient for three alternative scenarios vis-à-vis baseline estimates. The distribution of the simulated outcomes is based on 1,000 Monte Carlo draws from the parameter distribution in Table 1. The alternative scenarios are based on NTA estimates of health and education expenditures, excluding those related to the COVID-19 response, by age in 2020. Simulations in this exercise are done assuming that agents starting at age zero have a lifetime exposure to COVID-19. The results may be interpreted as the expected impact if the simulated population is to consume health and education goods based on the alternative lifetime spending schedules, and thus may be treated as upper limits of the potential impact of COVID-19 human capital spending exposure.

The results of the policy experiment show that the simultaneous changes in health and education expenditure age profiles will lead to: a deterioration in life expectancy (Panel A), no impact on average lifetime labor income (Panel B), and an increase in income inequality (Panel C), relative to the 2018 baseline. The effect on survival is substantial, with life expectancy at birth calculated to decline by as much as 19.2 years. The simulated impact on average lifetime labor income relative to baseline is both economically and statistically not significant. On the other hand, lifetime labor income inequality is estimated to increase by about 7 percent, to 0.46 Gini coefficient compared with the baseline 0.43.

These indicate that a continuous lifetime exposure to human capital spending at the level seen during the early part of the COVID-19 pandemic is likely to lead to a deterioration in life expectancy and in income inequality. This has serious implications for the country's attainment of several national and international goals. At the international level, the country's progress toward attaining the Sustainable Development Goals (SDGs) of ensuring healthy lives and promoting wellbeing for all ages (SDG 3) and reducing inequality (SDG 10) may be stalled or reversed.

At the national level, issues on inclusive growth had hounded the country even when the economy had experienced substantial economic growth. COVID-19 has ushered more considerable setbacks to attaining inclusive growth due to the heterogeneous endowments of people to address the challenges in human capital accumulation during sustained shocks. Plausibly, those with inferior endowments will miss opportunities to invest in health and in education. Missing these opportunities may have adverse ripple effects on time-dependent human capital and development outcomes. For example, it takes a school year to attain specific education milestones. Those who were unable to attend school or were able to participate but did not receive ideal instructions and guidance will lag relative to their cohorts. A similar situation is expected in health outcomes, with more adverse implications for the sick who failed to secure medical and professional help.

Figure 7. COVID-19 human capital spending and simulated impact on long-term outcomes



Note: Estimates are based on 10,000 simulated lifetimes subjected to 1,000 random draws from the parameter distribution in Table 1. Following standard box and whiskers plot convention, the lines on the box represent the 25th, 50th, and 75th percentiles of simulated outcomes. The whiskers represent the upper and lower adjacent values of the distribution.
Source: Authors' calculations

Increasing inequality also has implications for the attainment of the Filipinos' aspirations articulated in the *Ambisyon Natin* 2040, at the heart of which is social mobility. As summarized by Krueger's (2012) "Great Gatsby Curve" and supported by succeeding influential studies (e.g., Chetty et al., 2014), inequality is inversely related to social mobility. While the evidence is highly concentrated in industrialized Western economies, the inequality-mobility paradigm arguably also holds in developing societies like the Philippines. Children from well-endowed households are expected to fare better later in life due to the abundant resources, tools, and social connections available to them.

The reduction in life expectancy needs a more nuanced interpretation. A decline in life expectancy may have an ambiguous effect on income per capita through a positive accounting effect with population decline and a negative effect through foregone human capital potentials. However, which effect dominates depends on the phase an economy is in, in its demographic transition (Cervellati & Sunde, 2011).

In the case of the Philippines, where early-life mortality rate has declined and fertility rate has been declining, a reduction in life expectancy, particularly as a result of increased adult mortality rates, is likely to depress income per capita for at least two reasons. First, the early death of prime-age adults will slow down the growth of the relatively more productive working-age population relative to the growth of the populations of the elderly and children. Second, these early deaths are setbacks to productive human capital investments, since returns to these investments will not be maximized. These compounding effects suggest that the country may fail to fully realize economic potentials brought about by demographic change, i.e., the so-called demographic dividends.

Separating the effects of changes in health and in education expenditures provides some insights into the drivers of the overall impact of the COVID-19 human capital expenditure shocks.

The drop in per capita health expenditures in the early COVID-19 pandemic relative to the 2018 baseline is expected to lead to a decline in life expectancy at birth, no change in average lifetime labor income, and a rise in income inequality. The impact on life expectancy may not be unexpected, given the significant drop in health expenditures in 2020. Inspection of the simulated observations shows that those who die earlier relative to their baseline outcomes not only had lower health expenditures by age, but also had lower education expenditures due to the positive covariation between health and education spending. Consequently, these less-endowed simulated observations have lower lifetime labor income prospects . Their dying earlier leads to an increase in lifetime labor income inequality, but not enough to change the overall average for the simulated population.

The shock on per capita education expenditure by age, on the other hand, appears to have no effect on life expectancy and average lifetime labor income and a slightly negative effect on income inequality. Again, this may not be unexpected given that the change in education expenditures by age is not as drastic as those for health expenditures,

including among young learners. As shown in Fig. 5, per capita education spending increased slightly for those in their early twenties.

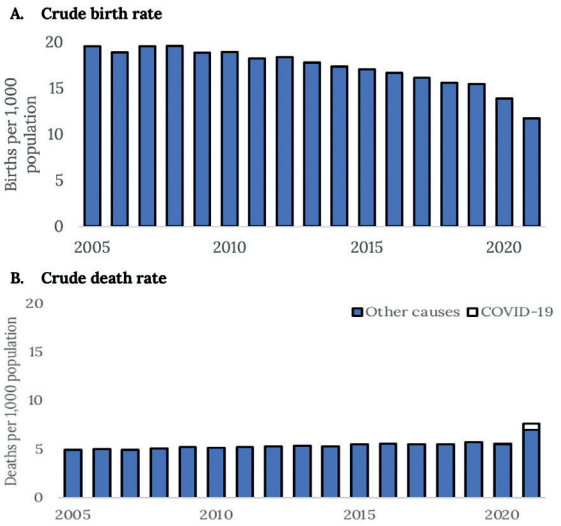
5.2 *Some qualifications*

The human capital model we employed in our simulation exercise allows us to conceptually disentangle the different pathways of how human capital shocks induced by the COVID-19 pandemic may propagate through the economic life cycle. However, it cannot be overemphasized that the simple model we used lacks many of the real world's intricacies and refinement. That being said, we believe that the simulated impacts we present in the previous subsection may be grossly incorrect for several reasons.

A decline by almost 20 years, or more than a quarter of the baseline life expectancy of 71.5 years, spells a major catastrophe that should have decimated a large portion of the population, which we did not observe in the real world. While there has been an increase in excess deaths due to COVID-19 (Ulep, 2022), this is nowhere near what our model predicted. There could be a number of reasons for this departure:

First, we only modeled survival and not fertility. As shown in other studies (e.g., Dehejia & Lleras-Muney, 2004; Sobotka, et al., 2011), fertility is countercyclical with economic activity as a result of changing opportunity costs of childbearing and of fertility behavior during uncertain times, such as in pandemics or economic downturns. That is, we have not considered averted deaths from infants not being born in the first place. This has some empirical support in the Philippines, as we have seen a non-trivial decline in the absolute number of reported live births in 2020 that cannot be accounted for by the long-run declining trend in crude birth rates (Fig. 8, Panel A).

Figure 8. Vital rates, Philippines (2005-2021)



Source: PSA, various years

Second, real people may be more resilient than agents in our model. Relatedly, third, health in general, and survival in particular, do not only depend on the consumption of health goods and services. While medical care-seeking practices may be constrained in the early COVID-19 pandemic, people may substitute health consultations, for example, with more careful health-related choices in the short term. We could expect a delay in health effects, especially with mortality, with impacts more likely observable with prolonged exposure to the global economic and

health shock. Indeed, in the second year of the pandemic, the Philippines recorded its highest crude death rate (CDR) since World War II (Fig. 8, Panel B) that, again, cannot be explained by the long-run trend in its CDR.

Fourth, our simulation is based on a rather extreme case of lifetime exposure to the human capital expenditure shock in 2020. It has only been two years since the start of the COVID-19 pandemic, and the global economy, including the Philippines, has been showing some signs of recovery from the 2020 economic slump (World Bank, 2022; International Monetary Fund, 2022; Asian Development Bank, 2022). The shock on human capital spending is also likely to be transitory. While there may still be risks of COVID-19 breakouts from the ever-evolving coronavirus, large-scale inoculation of early generation vaccines and consistent public health guidance provide some protection for the population and the economy (e.g., Dorn, et al., 2022; Deb, et al., 2022).

We also believe that the impacts we estimated from the changes in education expenditures during the early COVID-19 pandemic may be incorrect for similar reasons as the last two above. In particular, we explicitly assumed that productivity-enhancing knowledge only comes from the consumption of education goods when it has been well documented in the literature (e.g., Mincer, 1974; Lemieux, 2006) that experience plays an important role in human capital development. In addition, we did not consider qualitative variations in the effectiveness of different education expenditures, such as those for paper-based modules and those for online learning (e.g., Bird et al., 2022; Angrist et al., 2021). A dollar (or peso) is equivalent to any other in our simple model. We also did not factor in the potential long-term scarring effects from schooling delays or gaps (e.g., Samaniego et al., 2022). Finally, we have included in our policy experiments a pre-existing trend in higher education expansion. While we did not have a readily acceptable mechanism to isolate this particular extraneous shock, it nonetheless impacts our analyses by artificially assigning this expansion as due to the COVID-19 pandemic.

With these limitations at hand, we believe our estimated impact on life expectancy may be grossly overstated, although it provides us an upper limit to the potential impact of the COVID-19 shock for a particularly extreme case. Similarly, the estimated distribution of lifetime labor income may also have been overstated for the reasons stated above and therefore provides a reasonable bound to our simulation-based estimates. That is, we believe that the true impact of the COVID-19 pandemic on average lifetime labor income may be at best zero, while that for income inequality is non-negative.

5.3 *Limited two-year exposure to COVID-19 human capital spending*

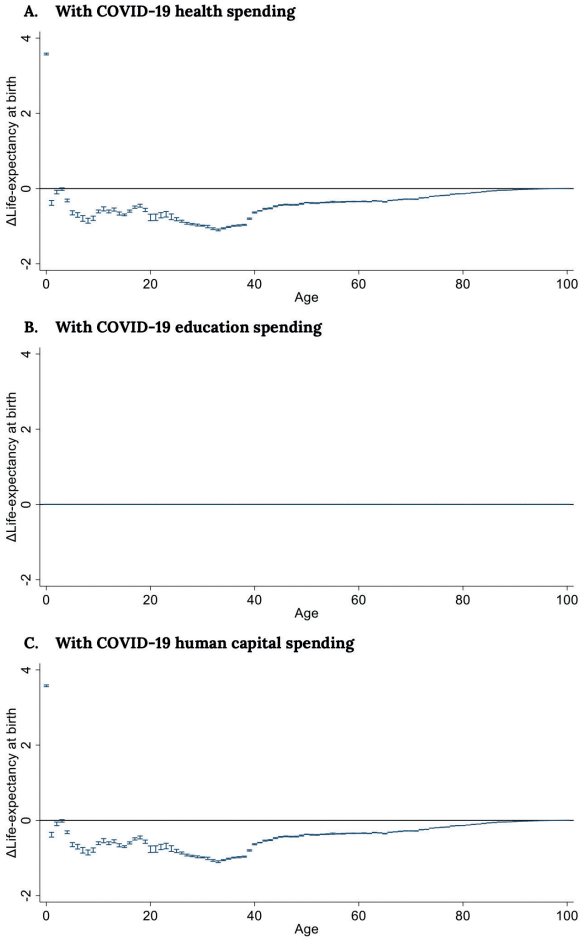
Given the issues enumerated above, we performed another set of simulation exercises based on a more realistic assumption of agents being exposed to only two years of COVID-19 human capital spending. In these simulations, we provided estimates by cohort at their specific ages in 2020 to highlight the likely heterogeneous lifetime impact of limited exposure to the pandemic across age groups. We note the following key takeaways:

First, life expectancy is expected to decline across almost all cohorts (Fig. 9), although the drop from the pre-COVID-19 level is substantially lower compared with lifetime exposure to COVID-19 human capital spending levels. Among the cohorts, younger cohorts appear to be more adversely affected with up to a year of life expectancy lost, consistent with results from other studies (e.g., Heuveline, 2022; Andrastay & Goldman, 2020). Interestingly, infants born during the early phase of the pandemic are expected to have a longer life expectancy as a result of increased health spending per capita during their early developmental years.

Second, lifetime labor income is expected to decline among the young aged below 20, and to increase among younger prime-age cohorts (Fig. 10). This appears to be driven mainly by changes in education spending. Third, the change in education and health spending have diverging effects on income inequality (Fig. 11). Inspection of the data indicates that education spending per capita was sustained, and even increased for older cohorts, during the pandemic; this is expected to have negative to no impact on inequality across population cohorts. The decline in health spending per capita, on the other hand, is expected to increase income inequality among the young and younger prime-age adults.

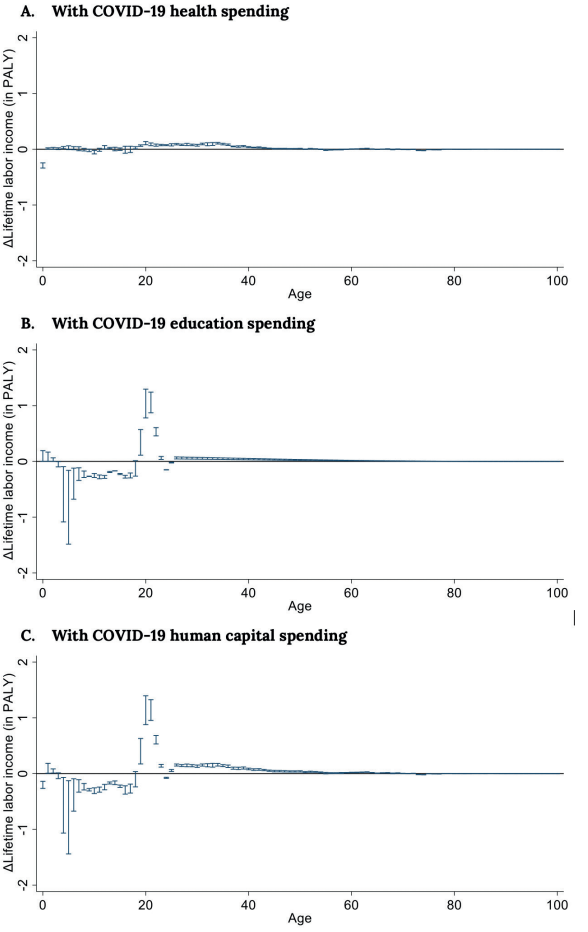
These results highlight the interplay between education and health spending as distinct human capital investments. While education may be the vehicle that can lead to favorable economic outcomes, health is the fuel for attaining these results. During a pandemic, health spending is critical in maintaining favorable outcomes in life expectancy and lifetime income inequality. Unfortunately, the decline in health spending during the early phase of the COVID-19 pandemic is likely to result in adverse long-term outcomes. This highlights the need to assess the health programs and other initiatives implemented for the young population during the pandemic. Understanding what responses worked or could have worked better is crucial in designing responses to future global health crises. While the sustained education spending during the early pandemic phase is expected to yield favorable future economic outcomes, strategic education investments are still needed to improve the productivity of younger cohorts.

Figure 9. COVID-19 spending and simulated impact on life expectancy at birth, by cohort



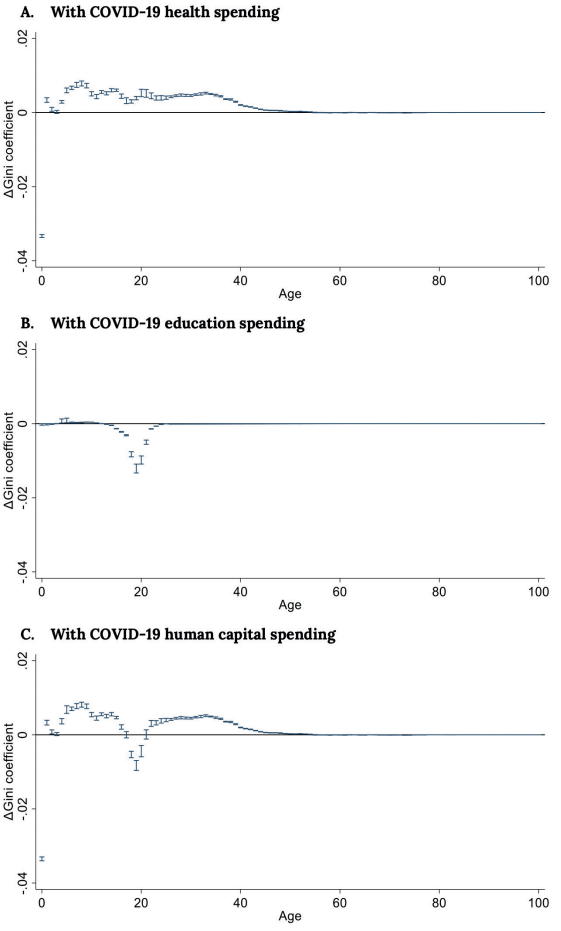
Note: Ninety percent confidence interval shown are based on 10,000 simulated lifetimes subjected to 1,000 random draws from the parameter distribution in Table 1.
Source: Authors' calculations

Figure 10. COVID-19 spending and simulated impact on average lifetime labor income, by cohort



Note: Ninety percent confidence interval shown are based on 10,000 simulated lifetimes subjected to 1,000 random draws from the parameter distribution in Table 1.
Source: Authors' calculations

Figure 11. COVID-19 spending and simulated impact on lifetime labor income inequality, by cohort



Note: Ninety percent confidence interval shown are based on 10,000 simulated lifetimes subjected to 1,000 random draws from the parameter distribution in Table 1.
Source: Authors' calculations

6. Conclusion

The COVID-19 pandemic highlighted existing weaknesses and introduced new challenges to the Philippines' education and health systems. These threaten the country's recent successes in expanding human capital spending to enhance development outcomes. Worries about long-term economic scarring from delays in schooling and in help-seeking induced by the COVID-19 pandemic are of particular importance due to its persistence and likely severity. An equally important but less discussed issue is how the pandemic may exacerbate existing inequalities and how this may endure through generations.

In this study, we parameterized a simple human capital model to disentangle how the COVID-19 pandemic may propagate through the economic life cycle via human capital spending shocks. This allowed us to provide a first-order approximation of the likely impact of the COVID-19 pandemic on several long-term outcomes. The qualitative results are neither unexpected nor controversial. While we believe that the estimates we presented are overstated compared to actual outcomes, these nonetheless provide us reasonable bounds to the true impacts of the global economic and health shock. To wit, the COVID-19 pandemic is likely to negatively impact health and productivity and raise inequality in the long term.

The study highlights the multifaceted and broad reach of the COVID-19 pandemic. We documented sharp declines in school attendance and in help-seeking during the early phase of the pandemic, which have also been documented elsewhere (e.g., Ulep, 2022; Orbeta, 2022). We also showed that while increased government education spending was able to partially offset declines in household spending, diversion of public funds to the COVID-19 response had significantly reduced spending in other health programs. Children, the elderly, and the poor appear to be affected more severely.

The study opens opportunities to introduce or strengthen policies and programs to alleviate, if not fully address the potentially detrimental effects of COVID-19 on health, productivity, and inequality. The literature is replete with policy advice (e.g., Reyes, 2022) that is not repeated here, for brevity. It must be underscored, however, that government and public policies play many important roles in shaping household behavior and, thereby, their experience of the pandemic and the ensuing recovery period.

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8 | Effects of the COVID-19 Pandemic on Employment and Wages in the Philippines

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8 | Effects of the COVID-19 Pandemic on Employment and Wages in the Philippines

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1. Introduction

As it did in many parts of the world, the emergence of the COVID-19 virus presented large negative shocks to the Philippine economy. Social distancing and stringent mobility restrictions designed to prevent the spread of the virus were adopted, and the country experienced its deepest postwar recession. The country also saw its highest rate of unemployment during the initial phase of the pandemic in 2020, with nearly a fifth of the labor force temporarily without jobs after the lockdowns.

The pandemic evidently had a radical impact on the labor market. With the labor market often identified as the major source of influence in recent crises in the Philippines, especially on poverty and distribution (e.g., Habib, 2010), its role in transmitting the effects of a pandemic crisis through employment and labor earnings may be even greater. Past crises primarily affected production sectors vulnerable to a collapse in external demand such as manufacturing, with exports being the primary channel of transmission, while the more current COVID-19 crisis had effects that were of wider scope, involving business shutdowns even in the historically resilient services sector, which accounts for the largest portion of the economy (about three-fifths of GDP and employment).

This offers enough motivation to investigate developments in the labor market during the COVID-19 crisis and to look at both employment and wages, as the available studies have so far mostly focused on job patterns and their determinants during the pandemic (e.g., Epetia, 2021). The impact on wages had been less studied and quite difficult to anticipate, as the pandemic involved constraints to both labor supply, because of the quarantines and social distancing, and labor demand, due to an overall slowdown in economic activity. Effects on sectors may also vary, depending on the nature of output produced (i.e., whether complements or substitutes). Analyses of both job and real wage outcomes can therefore add much to the understanding of how the pandemic crisis has affected the economy, particularly its workforce.

Given the nature of the COVID-19 crisis, this research estimates the impact of the pandemic and related public health measures on the labor market based on industry sector, in addition to measuring variations across individual characteristics of workers. However, following the literature (e.g., Lim, 2000; Rodgers & Menon, 2012) our research continues to provide a gender-based perspective, on account of distinct differences observed between the sexes and the greater clarity provided by such an approach to the empirical analysis.

In this study, we analyze the effects on employment in terms of working status and daily working hours. We apply a set of logit and multinomial logit regressions to estimate the probability of employment and determine how much this probability has changed annually at various stages of the pandemic. For a more nuanced analysis, employment data is disaggregated by sector, skill level, and class of work in the estimations. We also use ordinary least squares (OLS) regression to explore whether the duration of working time had changed over the pandemic across urbanization type, age, education, sector, skill level, and class of work. To measure

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the effects on wages, we similarly use OLS regressions on subsamples of wage and salary workers disaggregated by individual characteristics as well as industry sector. While our main regressions are based on subsamples, we additionally run full-sample regressions with interaction terms as a robustness check, to confirm our findings.

Our results show a deeper impact of the pandemic crisis on employment rather than on real daily wages, in contrast to earlier research which revealed a sharper effect on wages. The immediate outcome had been a huge decline in the probability of employment on aggregate (by 11.2 percentage points) and across industry sectors, occupational skill level, and class of work. This was found to be most prominent in high-contact sectors, in medium-skill occupations, and in wage jobs, with men, urban residents, and middle-aged individuals observed to be more vulnerable at the onset of the pandemic. The decline in the probability of employment was accompanied by a decline in daily working hours. Employment conditions improved a year into the pandemic, but the recovery had been uneven.

Movement in real daily wages, meanwhile, had not been as severe, with a moderate decline seen on aggregate at the start of the pandemic (by 3.3 percent), and cuts in real daily pay observed for only a certain number of sectors. These include contact-intensive services such as accommodation and food; services hinged on mobility such as domestic (wholesale and retail) trade, and transport and storage; and high-contact jobs in industry such as construction. With many of the affected sectors being male-dominated fields, outcomes for men drove the overall results, with older and less educated males in middle-skill occupations bearing the brunt of the pandemic crisis in its initial phase.

Wage impacts fell mostly on women a year later, however. Real daily wages declined sharply for younger females and those in medium- and high-skill jobs. They particularly worsened for females in education, manufacturing, public administration, and domestic trade. In contrast, real wages for males in rural areas and in agriculture recovered in the later phase of the crisis. Agriculture had been the only sector where both employment and wages were able to rise eventually, controlling for relevant factors, indicating robust demand during the COVID-19 pandemic. Such resilience likely owes to (A) agriculture's dual nature, being both a low-contact and essential sector; (B) possible substitution effects from non-food to food consumption of households; and (C) the hefty support it received from both government and private business.

To cushion the harsh effects of the pandemic on Filipino workers, the government introduced social protection programs that provided cash aid to low-income households. It tried to curb the rapid rise in unemployment through labor-related adjustment measures, wage subsidies, and even credit guarantees and support to agriculture under the *Bayanihan I* Law, signed a few weeks after the first set of lockdowns in March 2020. It also offered cash-for-work and repatriation programs under the *Bayanihan II* Law, enacted in September of the same year, and launched a national strategy for employment recovery by June 2021. In light of our findings, a comprehensive master plan for labor market revival may be crucial, given the large heterogeneous effects of the COVID-19 pandemic on the country's work force.

The main contribution of this study to the literature is the complete view it provides regarding the impact of the COVID-19 crisis, analyzing the effects on employment as well as on real daily pay of

Filipino workers during the initial phase of the pandemic and at a later stage, when recovery started. Few researchers, if any, have empirically documented what occurred in the Philippine labor market from this wider angle and during this rare period, when many sectors were closed and domestic workers unable to leave their homes. This study also offers a better understanding of the nature of a pandemic crisis while helping identify those most vulnerable to such a crisis—certainly valuable information for policymakers in designing labor market policies.

The rest of the chapter is organized as follows: Section 2 discusses the changes in macroeconomic conditions as a result of the COVID-19 pandemic and presents models that help form reasonable hypotheses to improve analysis of the empirical results. Section 3 describes the data and method used in the study, and Sections 4 and 5 discuss the results of the employment and wage regressions, respectively. Section 6 provides concluding remarks.

2. Macroeconomic conditions and conjectures[1]

The COVID-19 pandemic and local mobility restrictions designed to contain the spread of the virus led to the Philippines' deepest recession since the 1950s, with output shrinking by nearly a tenth in 2020 (by 9.5 percent annually). GDP had already begun to fall by the first quarter of 2020 as investment declined (Fig. 1), with COVID-induced border closures and travel bans across countries slowing the world economy, preceded by a volcanic eruption in January, damaging the CALABARZON region, a key production area. A virtual lockdown—an enhanced community quarantine or ECQ—was imposed in the National Capital Region and nearby regions in mid-March, and this lasted for a period of over two months.[2] ECQs restricted the movement of people and required temporary closure of nonessential businesses.

With stringent public health measures in the country's key economic regions, GDP fell by 16.9 percent during the second quarter of 2020 and continued to decline year-on-year for the next three quarters (until the first quarter of 2021) as the country's capital and other areas remained in general community quarantine (GCQ), which has fewer restrictions than the ECQ.[3] The peak of the pandemic crisis saw a sharp decline in investment, coupled with a rare collapse in household spending on the demand side and an unprecedented fall in services on the supply side. Hardest hit were contact-intensive sectors such as entertainment and recreation and accommodation and food services, and sectors hinged on mobility such as transport and storage and domestic (wholesale and retail) trade. Industrial activity also faltered, particularly in construction and manufacturing. International trade, however, contributed positively to growth as imports fell faster than exports at the peak of the COVID-19 crisis.[4]

[1] This section draws from Debuque-Gonzales (2022).

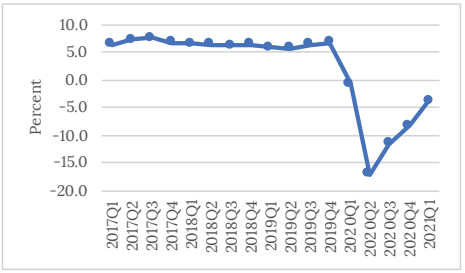
[2] Apart from the National Capital Region, ECQs were imposed on Region III (Central Luzon comprising Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac, and Zambales provinces) and Region IV-A (CALABARZON comprising Cavite, Laguna, Batangas, Rizal and Quezon provinces). These three regions together accounted for about three-fifths of GDP.

[3] Stringent public health measures were intermittently reimposed in August 2020 and in mid-April to mid-May 2021. GDP started to recover by 12.1 percent in the second quarter of 2021 and around 7.0 to 8.2 percent until the first quarter of 2022. We do not include this latter period in the current study, however, given the unavailability of detailed labor market data for our regressions as of the time of writing.

[4] The current account surplus during the time traced to a drop in oil imports (as economic activity waned due to mobility restrictions and business closures, and oil prices fell due to weak global demand) and to a decline in purchases of machinery and equipment as investment decisions were postponed or cancelled.

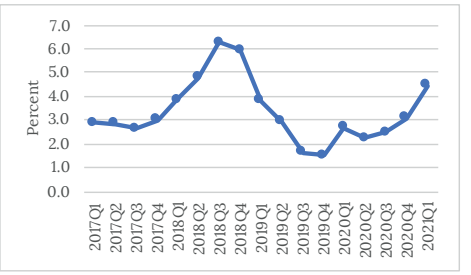
In its simplest depiction, a pandemic crisis features a combination of negative supply and demand shocks as businesses cease to operate and consumers, who may also face job and income loss, socially distance, whether voluntarily or because of public health restrictions (Mankiw, 2020). These disturbances also tend to have mixed effects on prices. In the Philippines, inflation during the COVID-19 crisis fell in sectors facing diminished demand (such as those involving restaurants and hotels, recreation and culture, clothing and footwear, and education), but rose for transport services where public health rules continued to limit operations and constrict supply. Overall, depressed demand in certain sectors at home and abroad—with world oil prices freefalling until April—helped limit the country's headline inflation in 2020, keeping it within the target range of the central bank (3 percent +/- 1 percentage point) (Fig. 2). Unrelated supply-side factors including the African Swine Fever and typhoons that damaged agricultural areas started to push prices upward by the end of the year, with inflation breaching the official target band by 2021Q1.[5]

Figure 1. Real GDP growth rate



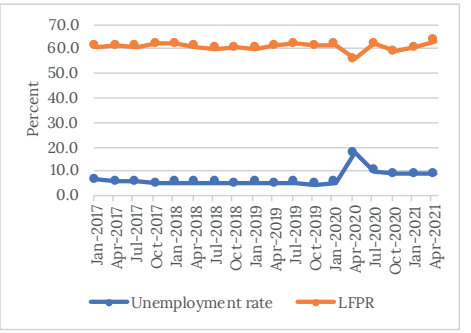
Source: Philippine Statistics Authority (PSA)

Figure 2. Inflation rate



Source: PSA

Figure 3. Unemployment and labor force participation



Source: PSA

2.1 Labor market conditions during the pandemic

The COVID-19 crisis had severe repercussions on the labor market, with the unemployment rate rising to 17.6 percent—its highest point historically—by April 2020, about a month after the ECQs were imposed (Fig. 3). The increase was partly due to labor force participation dipping during the period. The uncertain path of the COVID-19 virus and delays in meeting vaccination targets continued

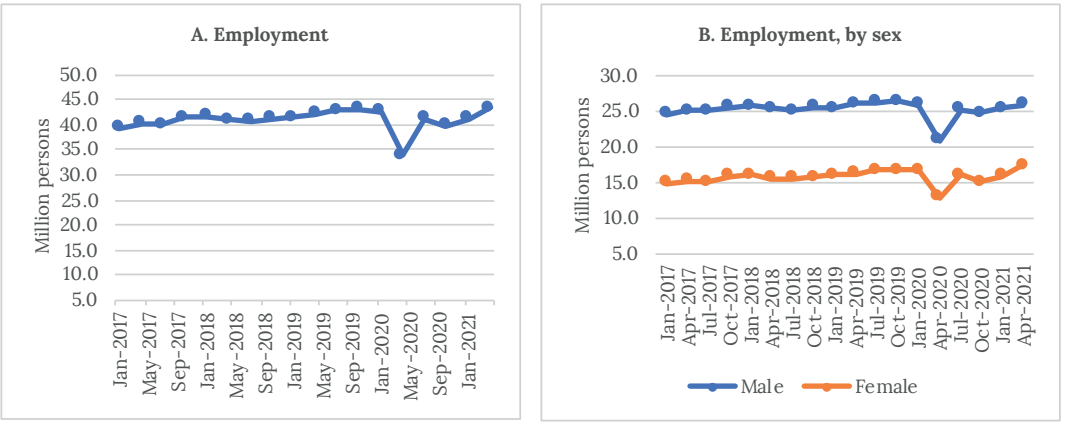
[5] Price pressures in food and transport grew during the latter period due to a sharp reversal of global commodity prices tracing to a recovery in economies able to control the virus and/or launch a strong stimulus response (e.g., China and the US, respectively).

to fuel job and income insecurity, as the domestic economy remained closed under prolonged community quarantines and with social distancing becoming prevalent. The unemployment rate remained elevated even a year after the lockdowns, despite labor force participation rebounding.

One can find the corresponding dent in the raw employment figures, with the number of employed persons falling by nearly 9 million between January and April of 2020 (Fig. 4, Panel A). The drop appears to be deeper and the recovery slower for men compared to women, though male employment continued to exceed female employment (Fig. 4, Panel B).

Viewing the data across industrial sectors, one can anticipate large employment declines in areas requiring high social contact, especially in services and industry. There is a sharp drop in the number of employed men in both services and industry but not in agriculture, where the number rises to above pre-pandemic levels (Fig. 5, Panel A). A drop in the number of employed women can be observed only for services, with minimal fluctuations in other industries (Fig. 5, Panel B). Female employment in services rebounded more strongly than corresponding male employment, with numbers of the latter only barely returning to levels seen prior to the COVID-19 crisis.

Figure 4. Employment



Source: PSA's Labor Force Survey (LFS)

Figure 5. Employment, by industrial sector and sex

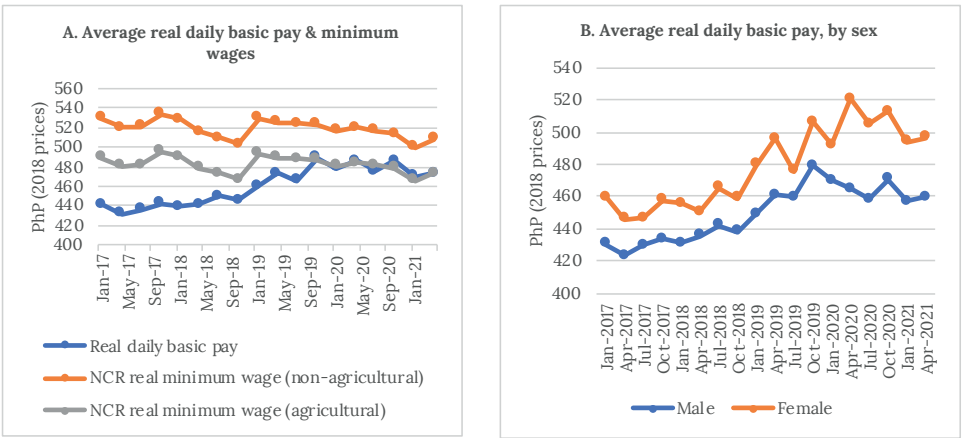
Source: PSA's LFS

The pandemic had a less evident impact on real daily wages, with nominal minimum wages kept fixed during the period under study and real minimum wages moving in line with inflation (Fig. 6, Panel A). Yet, the overall figure reflects different trends for men and women. Real daily pay of men dipped from October 2019 to July 2020, rising only briefly in October 2020 (Fig. 6, Panel B). Real daily pay of women, generally higher than that of men and which had been fluctuating but trending upward in the year prior to the COVID-19 crisis, trended downward only after April 2020, a few months after the ECQs.

The decline in the real daily pay of males largely reflects their real wages in the services sector, while the brief uptick during the pandemic reflects real wage movement in industry (Fig. 7, Panel A). Fluctuations in the real daily pay of females reflect real wage volatility in both services and industry, while the post-lockdown decline largely reflects real wage development in services (Fig. 7, Panel B). Real daily wages in agriculture remained relatively stable for both men and women, although there was a noticeable decline in daily pay for women in the latter months of the pandemic after momentarily rising in October 2020.

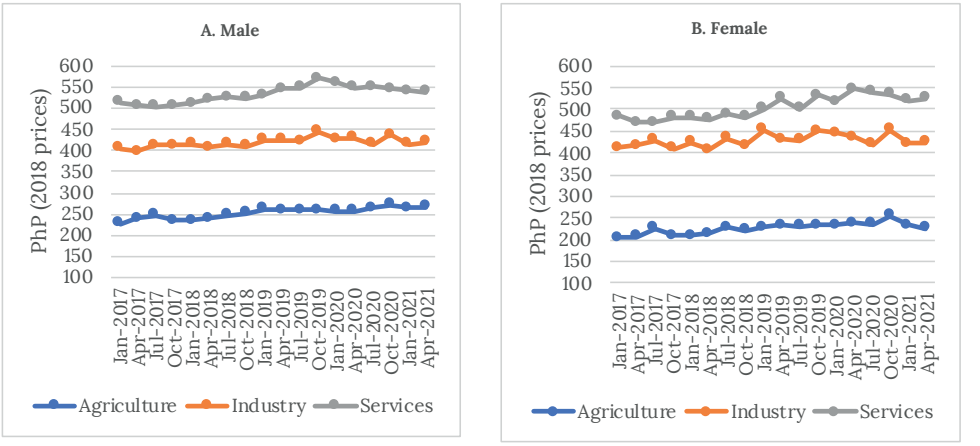
So far, the evidence seems to differ widely from observations made of the food and fuel crisis and the global financial crisis (GFC) that occurred between 2008 and 2009, where the effects of the economic turmoil on wages were more obvious than the effects on employment (Rodgers & Menon, 2012). Based on this crisis episode, previous research concluded that downturns in countries such as the Philippines were more likely to result in lower earnings rather than open unemployment (Habib et al., 2020).

Figure 6. Real daily wages



Source: PSA's LFS

Figure 7. Average real daily wages, by industrial sector and sex



Source: PSA's LFS

2.2 *Crisis transmission through the labor market*

The trends in employment and real wages indicate even greater importance of the labor market in a crisis. Using a micro-simulation approach to study the impact of the GFC of 2008-2009 on poverty and income distribution in the Philippines, Habib et al. (2010) noted the critical role of the labor market, as the effects of the GFC largely transmitted through employment loss in particular sectors, mainly manufacturing, and lower labor earnings in an output slowdown. Predominant channels in the past traced back to external demand shocks, such as through exports and remittances, and commodity price spikes (Rodgers & Menon, 2012).

While these channels also play a role in the COVID-19 crisis, they seem to be of lesser importance.[6] Rather, the effects of the pandemic in the country emerge from severe weakening of contact-intensive and related sectors and business closures and downsizing. These tend to lower employment, but hypothetically, the impact on wages may go either way.

In the theoretical literature, Guerrieri et al. (2020) presented a model of Keynesian supply shocks, which can trigger aggregate demand changes larger than the initial disturbances, in the context of the COVID-19 pandemic where sector shutdowns, firm exits, and worker layoffs are distinct features. Briefly stated, negative supply shocks can have negative demand spillovers in an economy where goods are mostly complements, ultimately resulting in a demand-deficient recession, where employment and wages are pushed downward. However, in an economy where goods have substitutes, a recession in one sector generates a boom in another, raising employment and wages in such sectors.

[6] Overseas workers' remittances declined in 2020 by only less than a percentage point, and quickly rebounded the following year. While exports sharply declined at the peak of the pandemic, they appeared to be on a recovery path by 2021Q1. Inflation remained moderate during the coverage of this study.

In another multi-sector model that looks at aggregate supply and demand in the COVID-19 crisis, Baqaee and Farhi (2020) highlighted the coexistence of tight and slack labor markets during a pandemic, as some sectors may be supply-constrained, and some may be demand-constrained. Lockdowns and social distancing, for example, serve to limit capacity and create upward wage pressure. Meanwhile, household demand declines may directly and indirectly (i.e., through the supply chain) lead to reductions in nominal spending, pulling down employment and labor pay. In short, negative sectoral supply shocks tend to be stagflationary, leading to job loss and price acceleration, while negative sectoral demand shocks tend to be deflationary, leading to job loss and price deceleration.

In the Philippines, we also see a sector-based story, though slightly different given a developing country setting, where there is a relatively larger pool of unemployed labor to begin with and smaller fiscal stimulus packages to stoke demand. With the pandemic leading to sector shutdowns and public health measures severely constraining or weakening firms, one can reasonably expect the general direction of employment and wages in the country to be downward. A strategy for local firms to survive may be to cut wages to retain workers and preserve jobs. Unavoidable business closures could create a surplus of workers, especially in contact-intensive sectors, and they may need to find alternative work in open sectors, which also puts downward pressure on wages. It would be rare to find labor demand curves shifting to the right and bolstering wages in this setting, except for specialized sectors that allow for substitution across goods and services.

Clearly, the impact of the COVID-19 pandemic crisis on the labor market, notably the effect on employment and wages in various sectors of the economy, needs to be empirically investigated. At the minimum, the above models and conjectures on the Philippines can help inform this study's econometric analysis, which also presents a gender angle on account of its importance in the literature (Lim, 2000; Rodgers & Menon, 2012).

3. Data and methods

This study uses the April quarterly round of the Philippine Labor Force Surveys (LFS) in 2019, 2020, and 2021 to analyze the impact of the pandemic on employment and wages. Conducted by the Philippine Statistics Authority, the LFS is a household-based survey used to produce nationally representative labor market data and generate the country's official labor statistics.

For employment regressions, the base sample used consists of the working-age population, i.e., aged 15 years old and above, excluding the armed forces. The impact on employment is investigated using two measures of labor supply: employment status and daily working hours. To estimate the probability of employment, the following labor supply equation is specified:

$$y_{it} = \alpha + \gamma P_t + \beta X_{it} + e_{it} \qquad (1)$$

where y_{it} is the dependent variable, which indicates the employment status of individual i at quarter t. We look at four distinct aspects of employment status. The first is reflected by a simple indicator stating whether an individual is employed or not. The other three further identify the labor market to which an individual belongs if employed, with aggregate employment broken down as

follows: (A) by sector[7], (B) by skill level[8], and (C) by class of work.[9] Examining the probability of employment in specific labor markets enables us to gain insight on the heterogeneous impact of the COVID-19 pandemic. To tie the employment findings with the effect of the pandemic on wages, we also estimate the probability of wage employment in given sectors using the subsample of wage workers and the non-employed.

On the right-hand side of the equation, the variable of interest is P_t, a period dummy variable which equals 1 if t refers to the quarter in the current year and 0 for the same quarter in the previous year. Thus, the marginal effect of P_t is interpreted as the year-on-year change in the probability of employment. Two sets of estimates of the marginal effect of P_t are obtained: (A) the difference between April 2019 and April 2020 and (B) the difference between April 2020 and April 2021. The first set provides the estimates of the immediate impact of the pandemic, while the second set shows whether there has been an improvement in or worsening of employment prospects since the onset of the pandemic.

The vector X_{it} denotes the set of controls that can influence labor supply decisions including sex, age, educational attainment, urbanization, region of residence, and household head indicator, while e_{it} represents the error term. We apply logit regression and multinomial logit regression to estimate the labor supply equation with the binary dependent variable and multi-categorical dependent variable, respectively.

To see if there is a statistically significant change in daily working hours among the employed, the notations for y_{it} and X_{it} in Equation (1) are modified. The dependent variable y_{it} becomes the normal working hours per day as reported by individual i at quarter t. The set of controls denoted by X_{it} includes the same set of controls except for the household head indicator. The variable of interest is expressed similarly as in the previous employment equation, but the coefficient of P_t in this case signifies the year-on-year change in daily working hours. The employed sample is further split by the variables in X_{it}, as well as by sector, class of work, and skill level, to determine which groups show a statistically significant change in daily working hours during the pandemic. We use OLS to estimate this equation.

For both employment status and working hours equations, we generate separate estimates for men and women. This allows us to explore whether there were gender differences in employment outcomes during the pandemic.

Meanwhile, to measure the pandemic's impact on wages, we perform wage regressions on a subsample comprising only wage earners and similarly produce two sets of estimates comparing observations for April 2019 and April 2020, and for April 2020 and April 2021. Using OLS, we estimate the following wage

[7] The sectors are defined according to the 2009 Philippine Standard Industrial Classification (PSIC 2009).

[8] Occupational skill levels are distinguished according to the International Standard Classification of Occupations 2008 (ISCO-08).

[9] The classes of work are wage employment, self-employment, and unpaid family work. Wage employment refers to employment in a private household, the private sector, government or government-controlled corporations, or paid family work. Self-employment includes the self-employed and the employers.

equation:

$$w_{it} = \alpha + \beta X_{it} + \delta P_t + e_{it} \qquad (2)$$

where w_{it} denotes the natural logarithm of real daily basic pay, derived by deflating the nominal amount by the consumer price index (CPI); X_{it} represents a set of controls similar to that used in the above working hours regression; P_t represents the dummy variable indicating the pandemic period of interest, as defined above; and e_{it} denotes the error term.

The parameter of interest, δ, captures the average year-on-year percentage change in real daily wages among the wage-employed, after controlling for other factors that influence a person's wage level. To uncover the pandemic's impact on wages for different subgroups of wage earners, we run regressions on subsamples defined by sex and by categories of age group, education, urbanization, skill, and industry.[10] We check the robustness of our results on differences in impact based on individual characteristics through regressions that use the complete sample and captures the interactions between period changes and the various characteristics.

4. Employment

4.1 Probability of employment

Table 1 reports the estimates of the marginal effects of the explanatory variables on the probability of employment. We find that the immediate impact of the COVID-19 crisis was a huge decline in the likelihood of employment, by 11.2 percentage points, in April 2020. We also see that men, rural residents, older people (except those at the expected retired age group), and the more educated people were more likely to be employed than women, urban residents, younger people, and those who did not have education, respectively.

The negative effect of the pandemic on employment appears to be more severe among men than among women. The probability of employment among males was lower by 13.5 percentage points in April 2020 compared to that in April 2019, while that among females was lower by 8.9 percentage points. Thus, we can infer that although men were still more likely to be employed than women (by 17.3 percentage points), the difference in their employment rates could have narrowed during the onset of the pandemic.

The likelihood of employment improved after a year, with people more likely to be employed by 11.8 percentage points in April 2021 than in April 2020. This also suggests that the employment losses in April 2020 had been offset by the gains seen in April 2021.

The gains, however, appear uneven if we examine the probability of employment by sex. Men's likelihood of employment was higher by 12.5 percentage points in April 2021 compared to that in April 2020, but this did not seem sufficient to completely counter the fall during the previous year. In contrast, women's likelihood of employment increased by 11.2 percentage points in April 2021, which was larger than the decline in April 2020. These results are consistent with the estimated marginal effect of sex on employment wherein men were more likely to be employed than women by a smaller degree (by 15.6 percentage points). This finding implies that men still had the employment

[10] The specification is similar to that of Rodgers and Menon (2012), but also measures the effects of skill and industry and controls for regional differences.

advantage, but this advantage contracted a year into the pandemic.

4.1.1 Probability of employment by sector

Table 2 reports the marginal effect of the period dummy variable on the probability of employment in given sectors, which indicates how much the probability of employment in each sector changed from the previous year to the current year of observation. The probability of employment in nearly all sectors fell from April 2019 to April 2020, showing that the initial impact of the pandemic had been widespread.

The adverse effect on employment can be traced back to the stringent lockdown measures that practically closed the economy to curb the surge of COVID-19 cases. Some sectors, however, were affected more severely than others. At the aggregate, employment loss largely came from the wholesale and retail trade and repair sector where people were less likely to be employed (by 2.8 percentage points). The other gravely affected sectors were construction, transportation and storage, and manufacturing. There are two major reasons for the vulnerability of these sectors to the pandemic and lockdown measures: (A) these can be considered high-contact sectors; thus, social distancing guidelines can affect their operations more negatively; and (B) their business operations mostly require onsite reporting of workers. As such, the physical closure of establishments during the first few months of the pandemic could generate income losses for firms and lead to worker layoffs. The latter explanation is aligned with the findings of Epetia (2021), which showed that people working in sectors that were either operating at limited capacity or fully closed were more susceptible to job loss.

Among men, the probability of employment fell the most in construction (by 4.3 percentage points), followed by transportation and storage, wholesale and retail trade and repair, and manufacturing. Among women, the gravely affected sectors include services, where largest declines in probability were found in wholesale and retail trade and repair (by 3.8 percentage points), followed by accommodation and food and other services. No statistically significant decline

Table 1. Marginal effects of the explanatory variables on the probability of employment

	All sexes		**Male**		**Female**	
Explanatory variable	**April 2019 and April 2020**	**April 2020 and April 2021**	**April 2019 and April 2020**	**April 2020 and April 2021**	**April 2019 and April 2020**	**April 2020 and April 2021**
Current quarter (base: previous quarter)	-0.112*** (0.002)	0.118*** (0.002)	-0.135*** (0.002)	0.125*** (0.002)	-0.089*** (0.003)	0.112*** (0.002)
Male (base: female)	0.173*** (0.002)	0.156*** (0.002)	-	-	-	-
Urban (base: rural)	-0.041*** (0.002)	-0.052*** (0.002)	-0.058*** (0.003)	-0.069*** (0.003)	-0.021*** (0.003)	-0.033*** (0.003)
Age group (base: 15–24)						
25–44	0.321*** (0.003)	0.331*** (0.002)	0.343*** (0.004)	0.339*** (0.004)	0.281*** (0.003)	0.301*** (0.003)

45–64	0.282*** (0.003)	0.297*** (0.003)	0.245*** (0.005)	0.242*** (0.005)	0.304*** (0.004)	0.329*** (0.004)
65 and above	-0.084*** (0.004)	-0.069*** (0.004)	-0.159*** (0.006)	-0.148*** (0.006)	-0.018*** (0.005)	-0.005 (0.004)
Education (base: no grade)						
Elementary level	0.083*** (0.007)	0.087*** (0.007)	0.102*** (0.009)	0.105*** (0.009)	0.052*** (0.010)	0.059*** (0.010)
High school level	0.021*** (0.007)	0.025*** (0.007)	0.019** (0.009)	0.020** (0.009)	0.023** (0.009)	0.033*** (0.010)
Post-secondary level	0.064*** (0.008)	0.069*** (0.008)	0.017 (0.011)	0.039*** (0.011)	0.109*** (0.012)	0.100*** (0.012)
College level or higher	0.096*** (0.007)	0.088*** (0.007)	0.013 (0.010)	0.012 (0.009)	0.169*** (0.010)	0.159*** (0.010)
Number of observations	**239,784**	**255,559**	**120,065**	**127,929**	**119,719**	**127,630**

*Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a dummy variable which indicates whether an individual is employed or not. Each entry on the table reports the marginal effect for the respective group relative to the base group. Other controls are region and household head indicator. Standard errors are in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

was seen in the probability of employment in the industry sector among women, unlike in the case of men, except in manufacturing.

The probability of employment in many sectors exhibited a statistically significant increase from April 2020 to April 2021. The prominent increase can be observed in the wholesale and retail trade and repair sector, where people were more likely to be employed (by 4.2 percentage points) in April 2021. This gain was more than enough to offset the decline estimated in April 2020, and this observation can be inferred not just for aggregate employment but for both male and female employment in the wholesale and retail trade and repair sector. Among men, the probability of employment in construction and manufacturing also appeared to be promising, with males more likely to be employed in these sectors (by 3.8 and 1.2 percentage points, respectively). Among women, the probability of employment in other services was also relatively higher by nearly a percentage point.

Although stringent community quarantine measures were reimposed in some parts of the country in April 2021 because of another surge in COVID-19 cases, the results suggest that the labor market somehow adjusted progressively to the restrictions because of the pandemic. An example of such adjustment is the increased use of digital platforms in performing transactions that had been otherwise done through face-to-face means. It could have also helped that the community quarantine guidelines by that time allowed some partial physical operations even in some high-contact and non-essential sectors. It should be noted, however, that the rise in the probability of employment in a few sectors, particularly in accommodation and food and administration and support, albeit significant, remained muted in April 2021 compared to the corresponding decline in April 2020.

Table 2. Marginal effect of the period dummy on the probability of employment, by sector

Sector	All sexes		Male		Female	
	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021
Agriculture	0.003** (0.001)	0.025*** (0.001)	0.005** (0.002)	0.026*** (0.002)	0.001 (0.001)	0.025*** (0.001)
Mining and quarrying	-0.001*** (0.0002)	0.001*** (0.0002)	-0.001*** (0.0004)	0.002*** (0.0004)	-0.00004 (0.0001)	0.0003** (0.0001)
Manufacturing	-0.012*** (0.001)	0.008*** (0.001)	-0.016*** (0.001)	0.012*** (0.001)	-0.008*** (0.001)	0.004*** (0.001)
Electricity, gas, steam, and AC supply	-0.0004*** (0.0001)	0.0001 (0.0001)	-0.001*** (0.0003)	0.00004 (0.0002)	0.000007 (0.0001)	0.0001 (0.0001)
Water supply, sewerage, and waste management	-0.0002* (0.0001)	0.0001 (0.0001)	-0.0003 (0.0002)	0.0001 (0.0002)	-0.0001 (0.0001)	0.0001 (0.0001)
Construction	-0.022*** (0.001)	0.019*** (0.001)	-0.043*** (0.002)	0.038*** (0.001)	-0.0002 (0.0002)	0.0002 (0.0002)
Wholesale and retail trade and repair	-0.028*** (0.001)	0.042*** (0.001)	-0.018*** (0.001)	0.027*** (0.001)	-0.038*** (0.002)	0.057*** (0.002)
Transportation and storage	-0.013*** (0.001)	0.005*** (0.001)	-0.026*** (0.001)	0.009*** (0.001)	-0.0004 (0.0003)	0.0004 (0.0003)
Accommodation and food	-0.009*** (0.001)	0.001*** (0.0005)	-0.007*** (0.001)	-0.00002 (0.001)	-0.010*** (0.001)	0.003*** (0.001)
Information and communication	-0.002*** (0.0003)	0.001*** (0.0002)	-0.003*** (0.0004)	0.001*** (0.0004)	-0.002*** (0.0003)	0.001*** (0.0003)
Finance and insurance	-0.002*** (0.0003)	0.001*** (0.0003)	-0.002*** (0.0004)	0.001*** (0.0004)	-0.002*** (0.0005)	0.001** (0.0005)
Real estate	-0.001*** (0.0002)	0.001*** (0.0002)	-0.001*** (0.0002)	0.0004* (0.0002)	-0.001*** (0.0003)	0.001** (0.0003)
Professional, scientific, and technical	-0.001*** (0.0002)	0.001*** (0.0002)	-0.001*** (0.0003)	0.0002 (0.0003)	-0.001*** (0.0003)	0.001*** (0.0003)
Administration and support	-0.004*** (0.001)	0.001*** (0.001)	-0.005*** (0.001)	0.002** (0.001)	-0.002*** (0.001)	0.001* (0.001)
Public administration	-0.006*** (0.001)	-0.001 (0.001)	-0.005*** (0.001)	-0.001 (0.001)	-0.007*** (0.001)	-0.001 (0.001)
Education	-0.002*** (0.0005)	0.003*** (0.0005)	-0.001*** (0.001)	0.001 (0.001)	-0.003*** (0.001)	0.004*** (0.001)
Human health and social work	-0.002*** (0.0003)	0.002*** (0.0003)	-0.001*** (0.0004)	0.001*** (0.0004)	-0.002*** (0.001)	0.002*** (0.001)
Arts, entertainment, and recreation	-0.003*** (0.0002)	0.001*** (0.0002)	-0.004*** (0.0004)	0.001* (0.0003)	-0.002*** (0.0003)	0.001*** (0.0003)
Other services	-0.007*** (0.001)	0.006*** (0.001)	-0.004*** (0.001)	0.004*** (0.001)	-0.010*** (0.001)	0.009*** (0.001)
Number of observations	**239,784**	**255,559**	**120,065**	**127,929**	**119,719**	**127,630**

*Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed in one of the 19 sectors or is not employed at all. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

Another major finding is that the employment situation in the agriculture sector turned out to be quite different from that of the non-agriculture sectors. The probability of employment in agriculture increased, although by a small extent, even during the onset of the pandemic. The probability of employment in this sector among men was also higher by half a percentage point in April 2020 compared to that in April 2019.

The growth in agriculture employment seemed sustained a year into the pandemic, as people were more likely to be employed in the sector by 2.5 percentage points in April 2021 than in April 2020. This time, the increase in the probability of employment in agriculture among women was also statistically significant as among men. Given that lower likelihood of employment in the non-agriculture sectors during the onset of the pandemic coincided with a higher likelihood of employment in the agriculture sector, it is possible that some of the employment losses in the non-agriculture sector had been partially cushioned by the agriculture sector.

The resilience of agriculture employment amid the pandemic may be explained by its being both a low-contact and essential sector. Being a low-contact sector means social distancing is already being practiced by default. Economic activities deemed essential by the government—which include but are not limited to activities related to health services and the production and transport of food and medicines—were covered by fewer restrictions, if any, even amid community quarantine.

4.1.2 Probability of employment by class of work and by occupational skill level

Tables 3 and 4 report the marginal effect of the period dummy on the probability of employment by given skill levels and classes of work, respectively. The marginal effect has the same interpretation as in Table 2. Looking into these aspects of employment allows us to gauge if there had been a variation in the quality of the jobs held during the pandemic.

The probability of employment in all skill levels fell from April 2019 to April 2020, but the marked decline was found in medium-skill occupations by 5.3 percentage points. This observation was more apparent among men as they were less likely to be employed in medium-skill occupations by 6.8 percentage points. The decrease in the probability of employment in high-skill occupations was also relatively large. Among women, the probability of employment in high-skill occupations was lower by 3.8 percentage points in April 2020 compared to the probability in April 2019, while in low-skill occupations, the likelihood was lower by only 1.1 percentage points.

In terms of class of work, employment loss appeared to be mostly due to wage employment. People faced a lower likelihood of wage employment by 7.9 percentage points in April 2020 than in April 2019. The negative effect on wage employment seemed to be larger among men than among women. The fall in the probability of unpaid family work observed among men was not significant, while that seen among women was significant but quite small.

The probability of employment in all skill levels was higher in April 2021 compared to that in April 2020. The expansion in low-skill and medium-skill employment seemed to be large enough to offset the decline in the likelihood of being employed in these occupations in the previous year. However, the increase in the probability of employment in high-skill occupations was subdued compared to observations

Table 3. Marginal effect of the period dummy on the probability of employment, by skill level

Skill level	All sexes		Male		Female	
	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021
Low	-0.021*** (0.001)	0.042*** (0.001)	-0.030*** (0.002)	0.050*** (0.002)	-0.011*** (0.002)	0.033*** (0.002)
Medium	-0.053*** (0.002)	0.066*** (0.002)	-0.068*** (0.003)	0.069*** (0.002)	-0.039*** (0.002)	0.064*** (0.002)
High	-0.038*** (0.001)	0.010*** (0.001)	-0.037*** (0.002)	0.006*** (0.001)	-0.038*** (0.002)	0.015*** (0.002)
Number of observations	**239,784**	**255,559**	**120,065**	**127,929**	**119,719**	**127,630**

*Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed in one of the three occupational skill levels or is not employed at all. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

Table 4. Marginal effect of the period dummy on the probability of employment, by classes of work

Class of work	All sexes		Male		Female	
	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021
Wage employment	-0.079*** (0.002)	0.059*** (0.002)	-0.106*** (0.003)	0.084*** (0.003)	-0.052*** (0.002)	0.034*** (0.002)
Self-employment	-0.030*** (0.001)	0.044*** (0.001)	-0.028*** (0.001)	0.033*** (0.002)	-0.032*** (0.002)	0.055*** (0.002)
Unpaid family work	-0.003*** (0.001)	0.016*** (0.001)	-0.001 (0.001)	0.009*** (0.001)	-0.004*** (0.001)	0.023*** (0.001)
Number of observations	**239,784**	**255,559**	**120,065**	**127,929**	**119,719**	**127,630**

*Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed in one of the three classes of work or is not employed at all. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

in other skill levels. Among men, the probability of being employed in high-skill occupations was higher by only about half a percentage point. The increase was slightly higher among women at 1.5 percentage points.

The probability of employment in all classes of work similarly rose between April 2020 and April 2021. Among men, the largest increase was seen in the probability of wage employment, followed by self-employment. Among women, the largest increase was found in the probability of self-employment, followed by wage employment. Nonetheless, the higher likelihood of unpaid family work among women in April 2021 (up by 2.3 percentage points) may also be considered substantial, since the fall in the probability of unpaid family work in April 2020 was barely half a percentage point. It can be gleaned that there had been relatively faster growth in low-skill employment than in high-skill employment among men and women, as well as in non-wage employment than in wage employment among women, a year into the pandemic.

4.1.3 Marginal effect of the pandemic by individual characteristics

Finally, we investigate which groups of people had faced relatively more adverse effects on employment during the pandemic. To answer this, we interacted the explanatory variables with the period dummy and estimated how the marginal effects of the period dummy depend on individual characteristics. Table 5 reports these marginal effects with the dependent variable being the binary indicator of employment status.

The following were observed. First, the employment of rural residents appeared to have fared better during the pandemic. Compared to urban residents, rural residents showed a smaller decline in probability of employment from April 2019 to April 2020 and a larger improvement in the probability of employment from April 2020 to April 2021. This result is consistent with our finding of a higher probability of employment in agriculture during the pandemic since the agriculture sector is more prominent in rural areas than in urban areas.

Table 5. Marginal effect of the period dummy on the probability of employment, by characteristics

Characteristics	All sexes		Male		Female	
	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021
All	-0.112*** (0.002)	0.118*** (0.002)	-0.135*** (0.002)	0.125*** (0.002)	-0.089*** (0.002)	0.112*** (0.003)
Sex						
Male	-0.138*** (0.002)	0.123*** (0.003)	-	-	-	-
Female	-0.086*** (0.003)	0.113*** (0.003)	-	-	-	-
Urbanization						
Urban	-0.120*** (0.002)	0.102*** (0.003)	-0.143*** (0.004)	0.108*** (0.003)	-0.099*** (0.004)	0.098*** (0.004)

Rural	-0.105*** (0.002)	0.134*** (0.002)	-0.128*** (0.003)	0.141*** (0.003)	-0.080*** (0.004)	0.126*** (0.004)
Age group						
15–24	-0.099*** (0.003)	0.098*** (0.003)	-0.115*** (0.005)	0.115*** (0.005)	-0.080*** (0.004)	0.080*** (0.004)
25–44	-0.137*** (0.003)	0.140*** (0.003)	-0.168*** (0.004)	0.147*** (0.004)	-0.105*** (0.005)	0.132*** (0.005)
45–64	-0.108*** (0.003)	0.121*** (0.003)	-0.128*** (0.004)	0.114*** (0.004)	-0.088*** (0.005)	0.128*** (0.005)
65 and above	-0.066*** (0.006)	0.089*** (0.003)	-0.073*** (0.010)	0.097*** (0.009)	-0.061*** (0.007)	0.083*** (0.005)
Education						
No grade completed	-0.119*** (0.013)	0.155*** (0.013)	-0.141*** (0.019)	0.157*** (0.018)	-0.102*** (0.018)	0.155*** (0.018)
Elementary level	-0.113*** (0.004)	0.135*** (0.004)	-0.137*** (0.004)	0.140*** (0.004)	-0.081*** (0.006)	0.129*** (0.006)
High school level	-0.110*** (0.003)	0.118*** (0.003)	-0.141*** (0.004)	0.127*** (0.003)	-0.079*** (0.004)	0.110*** (0.004)
Post-secondary level	-0.111*** (0.008)	0.120*** (0.009)	-0.119*** (0.011)	0.135*** (0.012)	-0.105*** (0.012)	0.105*** (0.013)
College level or higher	-0.116*** (0.004)	0.100*** (0.004)	-0.123*** (0.005)	0.100*** (0.005)	-0.109*** (0.005)	0.101*** (0.005)
Number of observations	**239,784**	**255,559**	**120,065**	**127,929**	**119,719**	**127,630**

*Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a dummy variable which indicates whether an individual is employed or not. All explanatory variables (characteristics) are interacted with the period dummy. Thus, each entry on the table reports how much the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year depends on individual characteristics. Other controls are region and household head indicator. Standard errors are in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

Second, the middle-aged group encountered larger declines in the probability of employment from April 2019 to April 2020 compared to the youngest and oldest age groups. However, the middle-aged group was also that whose probability of employment rose the most from April 2020 to April 2021. Third, regardless of education, people experienced a steep fall in the likelihood of being employed from April 2019 to April 2020, although they faced an increased probability of being employed from April 2020 to April 2021. Fourth, we note little difference in the estimates of the marginal effects of the period dummy by sex whether the pooled sample or split sample was used.

4.2 *Daily working hours*

Table 6 reports the change in daily working hours from the previous year to the current year for each group of employed individuals.[11] As expected, the number of working hours fell significantly

[11] To conserve space, the numbers of observations corresponding to each entry are summarized in Table 1 of the Appendix.

from April 2019 to April 2020. Regardless of sex, the shorter working hours were observed across urbanization types, age groups, educational levels, classes of work, and occupational skill levels. On the other hand, there was some variation on the significance of the change in hours of work across sectors. For both men and women, a statistically significant decline in working hours was seen in agriculture, construction, wholesale and retail trade and repair, education, and other services. Fewer working hours in mining and quarrying, manufacturing, water supply, transportation and storage, professional activities, and administration and support was observed only among men, while fewer hours in accommodation and food was observed only among women.

As found in the previous subsection, the probability of employment both in the aggregate and in disaggregated terms fell from April 2019 to April 2020. Thus, aside from the decline in employment, those who remained employed worked for a shorter period on average during the onset of the pandemic. These results together provide further empirical evidence of a reduction in labor supply both at the intensive and extensive margins during the pandemic. Even people in the agriculture sector, whose probability of employment had not fallen, worked fewer hours on average. We note, however, that workers in public administration showed a rise in average working hours.

Table 6. Year-on-year change in daily working hours by individual characteristics, sector, class of work, and skill level

Group	All sexes		Male		Female	
	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021
All	-0.375*** (0.013)	0.062*** (0.013)	-0.382*** (0.015)	0.091*** (0.015)	-0.366*** (0.023)	0.022 (0.022)
Urbanization						
Urban	-0.280*** (0.017)	-0.057*** (0.018)	-0.275*** (0.021)	-0.029 (0.021)	-0.286*** (0.029)	-0.098*** (0.029)
Rural	-0.440*** (0.018)	0.159*** (0.018)	-0.451*** (0.021)	0.183*** (0.021)	-0.425*** (0.034)	0.127*** (0.033)
Age group						
15–24	-0.371*** (0.033)	-0.059* (0.034)	-0.348*** (0.040)	0.029 (0.040)	-0.407*** (0.059)	-0.211*** (0.061)
25–44	-0.363*** (0.017)	0.076*** (0.017)	-0.408*** (0.020)	0.116*** (0.020)	-0.292*** (0.031)	0.019 (0.031)
45–64	-0.377*** (0.023)	0.107*** (0.023)	-0.352*** (0.028)	0.110*** (0.027)	-0.418*** (0.040)	0.111*** (0.039)
65 and above	-0.423*** (0.067)	0.065 (0.064)	-0.368*** (0.082)	0.054 (0.079)	-0.508*** (0.112)	0.109 (0.104)
Education						
No grade completed	-0.542*** (0.099)	0.349*** (0.097)	-0.625*** (0.109)	0.494*** (0.112)	-0.419** (0.201)	0.090 (0.185)

Elementary level	-0.486*** (0.027)	0.225*** (0.026)	-0.501*** (0.029)	0.243*** (0.029)	-0.447*** (0.058)	0.187*** (0.056)
High school level	-0.392*** (0.020)	0.034* (0.020)	-0.366*** (0.023)	0.064*** (0.023)	-0.440*** (0.040)	-0.015 (0.039)
Post-secondary level	-0.342*** (0.055)	0.037 (0.059)	-0.406*** (0.068)	0.027 (0.074)	-0.280*** (0.091)	0.052 (0.097)
College level or higher	-0.217*** (0.021)	-0.050** (0.021)	-0.204*** (0.031)	-0.067** (0.030)	-0.226*** (0.030)	-0.035 (0.029)
Sector						
Agriculture	-0.341*** (0.025)	0.228*** (0.023)	-0.373*** (0.028)	0.201*** (0.027)	-0.248*** (0.050)	0.291*** (0.046)
Mining and quarrying	-0.315* (0.162)	-0.070 (0.164)	-0.321* (0.170)	-0.030 (0.174)	0.548 (0.701)	-0.281 (0.710)
Manufacturing	-0.198*** (0.038)	0.068* (0.038)	-0.279*** (0.045)	0.133*** (0.047)	-0.085 (0.067)	-0.025 (0.067)
Electricity, gas, steam, and AC supply	0.063 (0.097)	-0.001 (0.144)	0.056 (0.115)	-0.060 (0.163)	-0.003 (0.083)	0.687* (0.385)
Water supply, sewerage, and waste management	-0.897*** (0.258)	0.403 (0.266)	-1.169*** (0.282)	0.573** (0.282)	0.762 (0.802)	-0.782 (0.948)
Construction	-0.033*** (0.012)	-0.022 (0.013)	-0.026** (0.012)	-0.022* (0.013)	-0.407*** (0.119)	-0.035 (0.157)
Wholesale and retail trade and repair	-0.460*** (0.033)	-0.002 (0.033)	-0.430*** (0.049)	0.060 (0.048)	-0.478*** (0.045)	-0.034 (0.043)
Transportation and storage	-0.484*** (0.045)	-0.109** (0.046)	-0.511*** (0.046)	-0.107** (0.047)	0.141 (0.230)	-0.035 (0.162)
Accommodation and food	-0.119** (0.057)	-0.129* (0.066)	0.120 (0.075)	-0.267*** (0.093)	-0.322*** (0.085)	-0.017 (0.094)
Information and communication	0.034 (0.101)	-0.180* (0.094)	-0.004 (0.123)	-0.151 (0.114)	0.208 (0.178)	-0.119 (0.171)
Finance and insurance	-0.068 (0.053)	-0.033 (0.055)	-0.089 (0.081)	-0.084 (0.087)	-0.064 (0.071)	-0.001 (0.073)
Real estate	0.186 (0.238)	-0.401* (0.238)	0.437 (0.364)	-0.508 (0.382)	-0.090 (0.329)	-0.276 (0.304)
Professional, scientific, and technical	-0.206** (0.082)	-0.001 (0.093)	-0.264* (0.141)	-0.047 (0.160)	-0.149 (0.091)	0.043 (0.108)
Administration and support	-0.099** (0.046)	-0.084* (0.043)	-0.145** (0.065)	-0.097 (0.062)	-0.041 (0.055)	-0.057 (0.051)
Public administration	0.201*** (0.031)	-0.218*** (0.031)	0.223*** (0.045)	-0.236*** (0.045)	0.173*** (0.041)	-0.201*** (0.043)
Education	-0.360*** (0.042)	0.197*** (0.042)	-0.207*** (0.080)	0.069 (0.078)	-0.421*** (0.049)	0.253*** (0.050)

Human health and social work	-0.027 (0.078)	0.012 (0.077)	-0.173 (0.141)	0.208 (0.159)	0.034 (0.094)	-0.073 (0.087)
Arts, entertainment, and recreation	0.077 (0.177)	-0.450** (0.183)	0.191 (0.242)	-0.335 (0.248)	0.063 (0.263)	-0.564** (0.280)
Other services	-0.310*** (0.063)	-0.057 (0.063)	-0.676*** (0.115)	0.116 (0.118)	-0.187** (0.074)	-0.115 (0.074)
Class of work						
Wage employment	-0.159*** (0.012)	-0.031** (0.012)	-0.163*** (0.015)	-0.028* (0.015)	-0.146*** (0.021)	-0.035* (0.021)
Self-employment	-0.621*** (0.027)	0.192*** (0.026)	-0.616*** (0.030)	0.204*** (0.029)	-0.645*** (0.051)	0.198*** (0.048)
Unpaid family work	-0.231*** (0.054)	0.099** (0.049)	-0.177** (0.086)	0.025 (0.079)	-0.268** (0.068)	0.163*** (0.061)
Skill level						
Low	-0.338*** (0.024)	0.096*** (0.023)	-0.341*** (0.025)	0.141*** (0.025)	-0.341*** (0.048)	0.027 (0.045)
Medium	-0.391*** (0.018)	0.108** (0.018)	-0.399*** (0.021)	0.091*** (0.020)	-0.373*** (0.034)	0.142*** (0.033)
High	-0.279*** (0.027)	-0.029 (0.027)	-0.289*** (0.038)	-0.005 (0.039)	-0.272*** (0.037)	-0.049 (0.037)

*Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is daily working hours. Each entry on the table reports the coefficient of the period dummy, so each entry shows the partial effect for the respective quarter of the current year relative to the same quarter of the previous year. The value for each entry is estimated using a split sample for the specified group, sex, and period coverage. Controls include sex, urbanization, age, education, and region in whichever equation they are applicable. Standard errors are in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

Results are largely mixed on whether there was a statistically significant change in daily working hours from April 2020 to April 2021. On average, men worked for longer hours in April 2021 than in April 2020. However, the change in daily working hours was not significant among women. Rural residents, middle-aged workers, those with high school education or lower, the self-employed, unpaid family workers, and those working in low- and medium-skill occupations generally worked for significantly longer periods. In contrast, female urban workers, young female workers, and wage workers faced a further reduction in working hours.

Across sectors and among men, longer working hours were found in agriculture, manufacturing, and water supply. Among women, longer hours were seen in agriculture, power, and education. In contrast, fewer working hours were observed among men in construction, transportation and storage, accommodation and food, and public administration. Women, meanwhile, worked fewer hours in public administration and in the arts, entertainment, and recreation. We find that even though there had been an improvement in the probability of employment in most sectors and in all types of jobs from April 2020 to April 2021, a fall in average working hours could still be observed in certain parts of the labor market.

4.3 *Probability of wage employment by sector*

To provide some context on the next section's discussion of the trend of wages during the pandemic, we also estimated the probability of wage employment in given sectors.[12] Table 7 reports the marginal effect of the period dummy on the probability of employment in each sector. The understanding is the same as in Table 2, but the employed individuals in Table 7 are restricted to wage workers.

Among men, the probability of wage employment in all sectors fell from April 2019 to April 2020. Among women, the probability of wage employment fell in most sectors, save for transportation and storage, and industry, where marginal effects were insignificant except in manufacturing. Nonetheless, the probability of wage employment in many sectors was higher in April 2021 compared to that in April 2020. Tables 2 and 7 present similar findings, except for the agriculture sector. The probability of wage employment in agriculture declined from April 2019 to April 2020, contrary to the gain observed for total employment in the sector. This suggests that the loss in wage employment in agriculture during the period was more than offset by the gain in non-wage employment.

Table 7. Marginal effect of the period dummy on the probability of wage employment, by sector

Sector	All sexes		Male		Female	
	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021	April 2019 vs. April 2020	April 2020 vs. April 2021
Agriculture	-0.004*** (0.001)	0.014*** (0.001)	-0.004** (0.002)	0.019*** (0.002)	-0.005** (0.001)	0.010*** (0.001)
Mining and quarrying	-0.001*** (0.0002)	0.001*** (0.0002)	-0.001*** (0.0005)	0.002*** (0.0005)	-0.0002 (0.0001)	0.0004*** (0.0001)
Manufacturing	-0.013*** (0.001)	0.010*** (0.001)	-0.018*** (0.001)	0.016*** (0.001)	-0.007*** (0.001)	0.004*** (0.001)
Electricity, gas, steam, and AC supply	-0.001*** (0.0002)	0.0002 (0.0002)	-0.001*** (0.0003)	0.0002 (0.0003)	-0.00001 (0.0001)	0.0002 (0.0001)
Water supply, sewerage, and waste management	-0.0003** (0.0001)	0.0002 (0.0001)	-0.001** (0.0003)	0.0002 (0.0002)	-0.0001 (0.0001)	0.0002* (0.0001)
Construction	-0.029*** (0.001)	0.027*** (0.001)	-0.060*** (0.002)	0.055*** (0.002)	-0.0003 (0.0003)	0.0003 (0.0003)
Wholesale and retail trade and repair	-0.013*** (0.001)	0.015*** (0.001)	-0.013*** (0.001)	0.016*** (0.001)	-0.012*** (0.001)	0.013*** (0.001)
Transportation and storage	-0.007*** (0.001)	0.005*** (0.001)	-0.015*** (0.001)	0.010*** (0.001)	0.0002 (0.0003)	0.001** (0.0003)

[12] The probability of wage employment by skill level was also estimated; the pattern of estimates between total employment and wage employment remained the same, so we no longer reported the results.

Accommodation and food	-0.008*** (0.001)	0.0002 (0.001)	-0.008*** (0.001)	-0.001 (0.001)	-0.008*** (0.001)	0.001** (0.001)
Information and communication	-0.002*** (0.0003)	0.002*** (0.0003)	-0.003*** (0.001)	0.002*** (0.001)	-0.002*** (0.0004)	0.002*** (0.0003)
Finance and insurance	-0.002*** (0.0004)	0.002*** (0.0004)	-0.002*** (0.001)	0.002*** (0.001)	-0.002*** (0.001)	0.002*** (0.001)
Real estate	-0.001*** (0.0002)	0.0002 (0.0002)	-0.001*** (0.0002)	0.00004 (0.0003)	-0.001** (0.0003)	0.0003 (0.0003)
Professional, scientific, and technical	-0.002*** (0.0003)	0.001*** (0.0003)	-0.002*** (0.001)	0.0003 (0.0004)	-0.002*** (0.0004)	0.001*** (0.0004)
Administration and support	-0.005*** (0.001)	0.003*** (0.001)	-0.008*** (0.001)	0.003*** (0.001)	-0.003*** (0.001)	0.003*** (0.001)
Public administration	-0.010*** (0.001)	0.003*** (0.001)	-0.010*** (0.001)	0.003* (0.001)	-0.010*** (0.001)	0.004*** (0.001)
Education	-0.003*** (0.001)	0.005*** (0.001)	-0.002*** (0.001)	0.002*** (0.001)	-0.004*** (0.001)	0.007*** (0.001)
Human health and social work	-0.003*** (0.0004)	0.003*** (0.0004)	-0.002*** (0.0005)	0.001*** (0.0005)	-0.003*** (0.001)	0.003*** (0.001)
Arts, entertainment, and recreation	-0.003*** (0.0003)	0.001*** (0.0002)	-0.004*** (0.0005)	0.0005 (0.0003)	-0.003*** (0.0004)	0.001*** (0.0003)
Other services	-0.009*** (0.001)	0.009*** (0.001)	-0.005*** (0.001)	0.004*** (0.001)	-0.013*** (0.001)	0.014*** (0.001)
Number of observations	**189,073**	**198,994**	**90,200**	**96,050**	**98,873**	**102,944**

*Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed as a wage worker in one of the 19 sectors or is not employed at all. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

5. Wages

5.1 *Impact on wages, by individual characteristics*

Table 8 reports the results of the wage regressions, which allow us to examine the movement of real daily wages in the Philippines during the COVID-19 crisis. Each entry shows the estimated coefficient on the pandemic dummy obtained from the regression of Equation (2) on the corresponding subsample shown in the leftmost column. These coefficients indicate how much real daily wages have changed across periods in each subsample. Robust standard errors are displayed below each coefficient estimate.[13]

Real daily wages significantly weakened during the initial months of the pandemic (immediately after the ECQs) based on

[13] To conserve space, the numbers of observations corresponding to each entry are summarized in Table 2 of the Appendix.

full-sample regressions, declining by about 3.3 percent between April 2019 and April 2020. Estimates in Table 8 further show that real daily pay deteriorated on impact across urbanization type, age, and educational attainment. The results seem to be generally driven by outcomes for males during the period, with relevant parameters found to be negative and statistically significant for almost all related subsamples except for the youngest age group.

Real daily pay among men fell by 4.6 percent annually in April 2020, with real wages of urban and rural males dipping by 4.0 percent and 5.0 percent, respectively. Among women, real daily pay fell only for rural females, and by a smaller amount (by 2.6 percent) than for rural males. Declines in real daily wages were felt by males of age groups above 24 years and all levels of education, with the steepest drops experienced by those aged 65 and above (falling by 12.0 percent) and those with no grade completed (by 18.5 percent). Declines in real daily wages among females were observed only for a few subsamples, i.e., those aged 25-44 and those with college-level education or higher.

Tying these results with those from the earlier set of regressions, one finds older males to be the most negatively affected during the initial stage of the COVID-19 crisis, as they were more likely to experience both employment and wage losses. While men and women generally endured job losses across education levels during the pandemic, it had been the uneducated males who tended to suffer the deepest pay cut.

The overall decline in real daily wages seemed to be milder a year into the pandemic, falling by only 1.3 percent annually in April 2021. Women were now more likely to experience real wage declines based on a full sample of females (by 4.0 percent) and for a greater number of subsamples, specifically across urbanization levels (with urban females rather than rural females facing a sharper real wage reduction this time), in most age groups (save for the oldest), and in subgroups of women who had high-school and college-level education. By age, the youngest female workers endured the sharpest fall in earnings, with their real daily pay falling by 9.0 percent.

In contrast, real daily pay of men showed signs of recovery in April 2021, with real wages of rural males rising by 2.6 percent. Less educated males saw a recovery of their daily earnings during the period, with the least educated benefitting from the sharpest raise in their pay (by 17.7 percent). Real daily wage declines were confined to the youngest set of male workers and college-educated males (by 2.5 percent and 2.4 percent, respectively).

Table 8. OLS regression estimates of the impact of the COVID-19 crisis on real daily wages

	April 2019 vs. April 2020			April 2020 vs. April 2021		
	All sexes	**Male**	**Female**	**All sexes**	**Male**	**Female**
Full sample	-0.033*** (0.005)	-0.046*** (0.006)	-0.011 (0.009)	-0.013*** (0.005)	0.003 (0.006)	-0.040*** (0.009)
Urbanization						
Urban	-0.026*** (0.007)	-0.040*** (0.008)	-0.001 (0.011)	-0.024*** (0.007)	-0.011 (0.008)	-0.046*** (0.011)

Rural	-0.040*** (0.008)	-0.050*** (0.009)	-0.026* (0.015)	0.005 (0.008)	0.026*** (0.009)	-0.027* (0.015)
Age group						
Ages 15–24	-0.002 (0.011)	0.002 (0.013)	-0.009 (0.019)	-0.048*** (0.011)	-0.025* (0.013)	-0.090*** (0.019)
Ages 25–44	-0.040*** (0.007)	-0.053*** (0.008)	-0.020* (0.012)	-0.01 (0.007)	0.006 (0.008)	-0.035*** (0.012)
Ages 45–64	-0.029*** (0.011)	-0.062*** (0.012)	0.025 (0.020)	-0.007 (0.011)	0.014 (0.013)	-0.039* (0.020)
Ages 65 and above	-0.108** (0.043)	-0.120** (0.057)	-0.098 (0.069)	0.101** (0.043)	0.089 (0.057)	0.088 (0.064)
Education						
No grade completed	-0.110* (0.057)	-0.185*** (0.056)	0.067 (0.142)	0.131** (0.062)	0.177*** (0.057)	-0.223 (0.208)
Elementary level	-0.035*** (0.010)	-0.040*** (0.011)	-0.014 (0.021)	0.019* (0.010)	0.021* (0.011)	0.009 (0.022)
High school level	-0.033*** (0.007)	-0.053*** (0.007)	0.014 (0.014)	-0.01 (0.007)	0.012* (0.007)	-0.062*** (0.014)
Post-secondary level	-0.054*** (0.019)	-0.078*** (0.022)	-0.017 (0.034)	-0.009 (0.021)	-0.003 (0.024)	-0.019 (0.038)
College level or higher	-0.026** (0.010)	-0.031** (0.015)	-0.024* (0.014)	-0.033*** (0.010)	-0.024* (0.015)	-0.039*** (0.014)
Skill level						
Low	-0.014** (0.007)	-0.023*** (0.008)	0.008 (0.014)	0.013* (0.007)	0.022*** (0.008)	-0.014 (0.015)
Medium	-0.031*** (0.006)	-0.047*** (0.008)	0.000 (0.011)	-0.027*** (0.007)	-0.010 (0.008)	-0.055*** (0.011)
High	-0.003 (0.013)	-0.011 (0.020)	0.004 (0.017)	-0.041*** (0.014)	-0.028 (0.022)	-0.049*** (0.018)

*Notes: ***p<0.01, **p<0.05, *p<0.10. Each entry shows OLS estimates of the coefficient of the pandemic dummy, with robust standard errors in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

5.2 *Impact on wages, across skill levels and industrial sectors*

Medium-skilled workers experienced the biggest deterioration of real daily wages—by 3.1 percent annually—in the earlier phase of the COVID-19 crisis in April 2020, shortly after the lockdowns (Table 8). This outcome was driven by the trend among men in the subsample, whose real daily pay fell by 4.7 percent. The result matches our employment analysis and indicates a sharp fall in labor demand faced by medium-skilled males. Low-skilled workers also saw their real daily pay dip by 1.4 percent, with real wages of males in the subsample declining by 2.3 percent. They underwent an improvement by April 2021, however, with a rise in real wages during the period nearly offsetting the previous pay cut.

Medium- and high-skilled female workers endured the largest decline in earnings in the latter phase of the pandemic crisis under study, with real daily pay falling annually by 5.5 percent and 4.9 percent, respectively. This indicates that the employment gains among medium- and high-skilled women a year into the pandemic occurred at the cost of facing lower wages. In contrast, the average daily wage of high-skilled men had not shown statistically significant changes in both periods of observation, despite having shown the same employment patterns as their female counterparts. This reflects greater downward flexibility of wages of high-skilled women, which could imply the lower bargaining power of females in the workplace even among those highly skilled.

Across industrial sectors, workers as expected generally experienced real daily wage declines in contact-intensive services sectors or those requiring community mobility (Table 9). These comprise transport and storage (where real daily pay fell by 11.3 percent), accommodation and food (4.7 percent), domestic (wholesale and retail) trade (4.5 percent), and other services (3.0 percent). Among industry subsectors, real daily wage cuts were seen in construction (2.2 percent) and mining and quarrying (8.6 percent). As described in Section 2, these were the same sectors that saw sharp falls in aggregate demand. The observed weakening of real wages largely reflects the worsening pay among men, particularly in other services and manufacturing, and male-dominated fields in the list such as transport and storage, and construction. Women, on the other hand, saw a deterioration of their pay in accommodation and food, administration and support, and real estate, and sectors with smaller female subsamples such as in construction, and information and communication.

Workers in accommodation and food (both men and women) and in transport and storage services (mostly men) continued to confront real daily wage reductions a year into the pandemic, by 11.4 percent and 4.4 percent, respectively. Subsectors where real daily pay began to also fall include manufacturing (by 5.3 percent) and power (15.9 percent), the latter driven mostly by male outcomes. Subsectors where real daily wages of women started to worsen include education, manufacturing, public administration, and domestic trade, while their wages recovered in information and communication. Among men, real daily pay decreased in human health and social work and in the manufacturing subsectors, but increased in agriculture, driving overall wage growth in the male-dominated sector.

Employment regressions in this study reveal that while total employment in agriculture generally grew immediately after the ECQs, wage employment in the sector declined, indicating that a growing number had moved to the rural sector and engaged in self-employment and unpaid work.[14] However, wage employment in the agriculture sector strongly rebounded by April 2021, at the same time real daily pay increased. This indicates higher demand in the sector in the latter stage of the pandemic crisis that may be attributed to two possible factors.

First, the agriculture sector received support from the private sector in the form of guaranteed purchases of agricultural products and installation of marketplaces where farmers, fisherfolk, and small- and medium-enterprises could sell their agricultural products (Poblador, 2022).

[14] This result also matches the earlier result which showed an increase in real daily wages of rural men in April 2021 (see Table 8).

Second, reallocation from non-food to food consumption among households could also have occurred during the COVID-19 pandemic[15], which would increase the demand for agricultural products and thus agricultural inputs, including labor.

5.3 *Interaction effects during the pandemic*

Finally, we check the soundness of our results by incorporating interaction terms between the pandemic period of interest and individual characteristics in the main specification and estimating the equations using the full sample for the country.[16] The estimates summarized in Table 10 generally support the findings from our previous regressions, which were based on corresponding subsamples.

Table 9. OLS regression estimates of the impact of the COVID-19 crisis on real daily wages

	April 2019 vs. April 2020			April 2020 vs. April 2021		
	All sexes	**Male**	**Female**	**All sexes**	**Male**	**Female**
Agriculture	-0.002 (0.012)	-0.01 (0.013)	0.033 (0.023)	0.023** (0.011)	0.035*** (0.013)	-0.022 (0.024)
Manufacturing	-0.001 (0.013)	-0.027* (0.015)	0.03 (0.023)	-0.053*** (0.014)	-0.045** (0.018)	-0.069*** (0.024)
Mining and quarrying	-0.086* (0.048)	-0.093* (0.052)	0.022 (0.307)	0.035 (0.048)	0.05 (0.050)	-0.121 (0.163)
Electricity, gas, steam, and AC supply	0.05 (0.072)	0.065 (0.080)	-0.026 (0.483)	-0.159** (0.072)	-0.159** (0.077)	-0.183 (0.173)
Water supply, sewerage, and waste management	-0.094 (0.128)	-0.146 (0.155)	-0.19 (0.506)	-0.092 (0.095)	-0.028 (0.108)	0.288 (0.292)
Construction	-0.022*** (0.007)	-0.018*** (0.007)	-0.212** (0.084)	0.01 (0.007)	0.007 (0.007)	0.097 (0.064)
Wholesale and retail trade	-0.045*** (0.012)	-0.052*** (0.014)	-0.029 (0.018)	-0.011 (0.012)	0.015 (0.015)	-0.043** (0.019)
Transportation and storage	-0.113*** (0.021)	-0.130*** (0.022)	0.035 (0.066)	-0.044** (0.022)	-0.034 (0.024)	-0.108* (0.062)
Accommodation and food	-0.047*** (0.018)	-0.031 (0.022)	-0.068** (0.029)	-0.114*** (0.020)	-0.124*** (0.026)	-0.096*** (0.030)
Information and communication	-0.005 (0.051)	0.102 (0.065)	-0.131* (0.071)	0.024 (0.047)	-0.03 (0.058)	0.141** (0.068)
Financial and insurance	-0.036 (0.036)	-0.003 (0.050)	-0.041 (0.050)	-0.024 (0.036)	-0.001 (0.056)	-0.05 (0.047)
Real estate	-0.09 (0.087)	0.083 (0.154)	-0.198* (0.110)	-0.065 (0.075)	-0.15 (0.130)	-0.011 (0.096)
Professional, scientific, and technical	-0.04 (0.052)	-0.102 (0.088)	0.009 (0.071)	0.009 (0.050)	0.092 (0.071)	-0.061 (0.073)
Administration and support	-0.021 (0.015)	-0.004 (0.019)	-0.049** (0.025)	-0.021 (0.015)	-0.014 (0.019)	-0.034 (0.025)
Public administration	-0.026 (0.023)	-0.047 (0.029)	0.006 (0.035)	-0.023 (0.022)	0.01 (0.029)	-0.060* (0.036)
Education	0.023 (0.018)	0.027 (0.038)	0.023 (0.020)	-0.077*** (0.018)	-0.044 (0.039)	-0.089*** (0.021)
Human health and social work	-0.005 (0.035)	-0.026 (0.052)	-0.003 (0.045)	0.001 (0.031)	-0.089* (0.050)	0.038 (0.040)
Arts, entertainment, and recreation	-0.091 (0.062)	-0.094 (0.104)	-0.059 (0.073)	-0.076 (0.062)	-0.094 (0.090)	-0.08 (0.080)
Other services	-0.030* (0.017)	-0.148*** (0.039)	0.001 (0.018)	0.018 (0.017)	0.065 (0.042)	0.006 (0.019)

*Notes: ***p<0.01, **p<0.05, *p<0.10. Each entry shows OLS estimates of the coefficient of the pandemic dummy, with robust standard errors in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

[15] Empirical evidence of this phenomenon is found in other countries, e.g., Cavallo et al. (2020), Chenarides et al. (2021), and Hirvonen et al. (2021).

[16] We also checked for possible selection bias that may come from changes in the composition of the wage-employed portion of the labor force. However, we found no practical difference among wage workers in terms of average age and sex even across industry sectors.

While real daily wages fell in both urban and rural areas at the onset of the COVID-19 pandemic (in April 2020), the difference in the severity of the measured impact was not statistically significant. Our previous regressions showed that male workers experienced real wage reductions on impact, while female workers generally did not (except for rural women), and current regressions confirm this harsher effect on the real daily pay of men compared to women (by 4.9 percentage points). The youngest workers, earlier seen to be minimally affected in terms of pay by the pandemic and related public health restrictions, are proven to be less likely to have suffered a real wage loss than older workers, whose wages were earlier seen to decline in response to the pandemic during the initial stage. Meanwhile, real daily pay of men with the least amount of education are revealed to have fallen by a significantly greater amount than more highly educated men—by 10.0 to 15.0 percentage points—reinforcing our earlier finding about the uneducated male being the most badly hit by the pandemic crisis in the initial stage.

There appear to be marked differences in wage impact during the later stage of the COVID-19 crisis. Table 10 shows that urbanization mattered considerably in April 2021, with rural workers, particularly rural males, confirmed to be significantly better off than their urban counterparts. This matches the earlier finding of real wage increases for rural males during the period in our previous regressions. Previous regressions also showed that women rather than men generally experienced real wage reductions a year into the pandemic, with the difference in wage performance—at 3.3 percentage points—found to be statistically significant in current regressions. Meanwhile, the youngest workers are revealed to be generally worse off compared to older workers in terms of real daily pay, validating earlier results that showed significant wage declines primarily for workers aged 15 to 24 in the later stage of the pandemic. Education, however, did not seem to be a consequential factor on average during this period. Overall, the finding that the youngest female workers suffered the biggest welfare losses as the pandemic crisis unfolded seems to be a robust result.

Table 10. The COVID-19 pandemic, worker characteristics, and the impact of their interaction on real daily wages

	April 2019 vs. April 2020 (Dummy: April 2020)			**April 2020 vs April 2021 (Dummy: April 2021)**		
Interaction	**All sexes**	**Male**	**Female**	**All sexes**	**Male**	**Female**
Urbanization						
Urban	0.004 (0.011)	0.005 (0.012)	0.011 (0.019)	-0.025** (0.011)	-0.034*** (0.012)	-0.017 (0.019)
Sex						
Male	-0.049*** (0.011)			0.033*** (0.011)		
Age group						
Ages 25–44	-0.034*** (0.013)	-0.053*** (0.015)	-0.002 (0.022)	0.043*** (0.013)	0.043*** (0.015)	0.044* (0.023)

Ages 45–64	-0.022 (0.016)	-0.061*** (0.018)	0.045 (0.029)	0.053*** (0.016)	0.053*** (0.018)	0.052* (0.029)
Ages 65 and above	-0.109** (0.048)	-0.085 (0.058)	-0.082 (0.078)	0.120** (0.047)	0.094 (0.057)	0.133* (0.075)
Education						
Elementary level	0.104* (0.054)	0.146** (0.060)	-0.043 (0.119)	-0.072 (0.065)	-0.095 (0.076)	0.024 (0.123)
High school level	0.098* (0.054)	0.125** (0.060)	-0.018 (0.119)	-0.087 (0.065)	-0.091 (0.076)	-0.032 (0.122)
Post-secondary level	0.069 (0.057)	0.105* (0.063)	-0.062 (0.123)	-0.095 (0.068)	-0.110 (0.079)	-0.001 (0.128)
College level or higher	0.092* (0.055)	0.149** (0.061)	-0.056 (0.119)	-0.096 (0.065)	-0.121 (0.077)	0.000 (0.123)
Number of observations	**64,145**	**39,852**	**24,293**	**62,719**	**38,473**	**24,246**

*Notes: ***p<0.01, **p<0.05, *p<0.10. The table shows the OLS estimates of the coefficients of the interaction terms formed between the pandemic dummy and the corresponding variables indicated in Column 1, with each column containing estimates from a single regression and with robust standard errors in parentheses.*
Source: Authors' calculations using the public use files of the PSA's LFS

6. Conclusions

This chapter investigated the impact of the COVID-19 crisis on the Philippine labor market, focusing on both employment and real wages and their outcomes across sectors and various worker characteristics. Apart from gaining a fuller understanding of the overall effects on the country's workforce, this allowed us to gauge the size of the labor market's role in transmitting the negative effects of the pandemic crisis, which had a broader influence on the country's production sectors than previous crises. For instance, affected sectors this time included services, which in the past three decades seemed relatively immune to a range of disturbances.

Our empirical estimations allowed us to make several important observations. First, the immediate impact of the pandemic crisis, characterized by stringent quarantines in its initial phase, turned out to be much larger on employment than on real wages, in contrast to studies on previous crises which found the reverse to be true. Second, because of the nature of the COVID-19 crisis, contact-intensive sectors suffered the worst economic pain, in terms of wage as well as employment losses. Since many of these sectors were male-dominated, the men—especially older men with lesser education and in middle-skill occupations—suffered the most, initially. Third, while the recovery a year into the pandemic was patchy in terms of employment, the trend in real wages during this period was generally

less favorable for women, particularly young females who had just entered the workforce and those with middle- and high-skill jobs, as they had to endure real wage cuts. Male workers, on the other hand, saw a recovery of their real daily pay a year after the lockdowns, with the increase largely driven by outcomes in the rural sector, which in turn largely reflected an uptick in real wages in the agriculture sector.

The experience of agriculture during the COVID-19 crisis had evidently been a unique one in the Philippines, with the sector's employment share increasing, temporarily interrupting a declining trend that had persisted over the last 15 years (IMF, 2021). Rather than productivity and wage differentials, Cerutti and Li (2021) emphasized the role of education and transport infrastructure in driving agriculture employment outflows and labor reallocation from agriculture to non-agriculture sectors.

In our research, we saw the agriculture sector helping buffer employment losses in the non-agriculture sector during the initial phase of the pandemic crisis, absorbing workers—particularly from construction and services—as originally observed in other studies such as Debuque-Gonzales (2022). However, our estimations also show that while the probability of agriculture employment generally rose at the onset of the pandemic, the probability of wage employment in the sector declined, indicating a growing number that had moved from urban to rural areas and shifted to non-wage employment and ultimately engaging in either self-employment or unpaid farm work.

Interestingly, we also saw simultaneous recovery in wage employment and real daily wages in agriculture in the latter phase of the pandemic (by April 2021), revealing a rise in demand in the sector during the period. In addition to agriculture being a low-contact sector where social distancing is naturally observed and where essential items are produced, the sector also received fiscal support from the government, whether directly or indirectly, through relief and stimulus packages—particularly under the *Bayanihan I* and *II* laws—and private sector support from large food corporations in the form of guaranteed purchases of agriculture products and provision of sales outlets. With many households practicing social distancing, the agriculture sector also seemingly benefited from household budget substitutions, away from nonfood and toward greater food consumption.

The Philippine government's labor market policy responses to the COVID-19 crisis included broad social protection programs to help displaced workers;[17] efforts to encourage a private-sector-led economic recovery through lower

[17] Under the *Bayanihan I* Law, social protection included the Social Amelioration Program that provided cash aid to low-income households, thus covering unemployed and informal sector workers; programs meant to prevent unemployment from swelling because of the lockdowns, such as the COVID-19 Adjustment Measures Program (CAMP) and the Small Business Wage Subsidy for vulnerable workers implemented by the Social Security System; off-budget credit guarantees for small businesses; and support for the agriculture sector. The *Bayanihan II* Law included expansion of the labor department's cash-for-work program called TUPAD (*Tulong Panghanapbuhay sa Ating Disadvantaged/Displaced Workers*), implementation of the Emergency Repatriation Program for overseas workers, and hiring and training of contact tracers by the Department of the Interior and Local Government.

corporate taxes and improvements in the business environment; and institutionalization of the National Employment Recovery Strategy (NERS), which serves as the government's masterplan for revival of the labor market (World Bank, 2021). The NERS, conceived in early 2021, aims to create a policy environment that encourages job creation and entrepreneurship; improve the employability and productivity of workers; and provide support to existing and emerging businesses.[18] Its framework entails restarting economic activity; restoring confidence in the economy; upskilling and reskilling the workforce; and easing labor market access.

Findings of this chapter clearly support these goals, as the deepest economic scars created by the COVID-19 pandemic crisis have been on the country's human capital. There is undoubtedly a need for active labor market policies to reskill workers, especially the long-term unemployed, and run livelihood and training programs amid widespread job losses; and to provide social protection for vulnerable workers, including the informally employed, given the sharp rise in self-employment. Scarring effects can also be reduced through better sector reallocation of workers, which would also entail investments in education and infrastructure, based on pre-pandemic labor trends in the Philippines (Cerutti & Li, 2021).

In the event of another pandemic or similar disaster, the policy implications of this study are that the heterogeneous effects of such a crisis would certainly warrant a more focused fiscal response. This would entail targeting specific sectors and types of individuals who are most likely to face the harshest labor market conditions, marked by the deepest employment and wage declines. While greater insurance for the unemployed may seem desirable under such scenarios, any such mechanism would have to be carefully designed and weighed against its fiscal cost.

[18] Bureau of Local Employment, Department of Labor and Employment. Accessible at http://www.ble.dole.gov.ph/index.php/national-employment-recovery-strategy-2021-2022#:~:text=The%20National%20Employment%20Recovery%20Strategy,adversely%20affected%20by%20the%20pandemic.

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Annex

Table A1. Number of observations in the daily working hours regressions

Group	All sexes		Male		Female	
	April 2019 and April 2020	April 2020 and April 2021	April 2019 and April 2020	April 2020 and April 2021	April 2019 and April 2020	April 2020 and April 2021
All	124,717	133,736	6,569	80,470	48,148	53,266
Urbanization						
Rural	69,090	71,033	43,852	44,140	25,238	26,893
Urban	55,627	62,703	32,717	36,330	22,910	26,373
Age group						
15–24	17,934	19,468	11,586	12,518	6,348	6,950
25–44	58,095	61,170	36,428	37,555	21,667	23,615
45–64	41,909	45,319	24,714	26,108	17,195	19,211
65 and above	6,779	7,779	3,841	4,289	2,938	3,490
Education						
No grade completed	1,877	2,073	1,248	1,355	629	718
Elementary level	32,748	33,788	22,955	23,304	9,793	10,484
High school level	52,113	55,425	33,582	34,995	18,531	20,430
Post-secondary level	6,950	5,804	3,938	3,297	3,012	2,507
College level or higher	31,029	36,646	14,846	17,519	16,183	19,127
Sector						
Agriculture	35,139	39,223	26,575	28,935	8,564	10,288
Mining and quarrying	617	709	562	633	55	76
Manufacturing	8,480	8,698	5,112	5,290	3,368	3,408
Electricity, gas, steam, and AC supply	263	246	223	194	40	52

Water supply, sewerage, and waste management	168	172	143	142	25	30
Construction	10,804	11,139	10,591	10,901	213	238
Wholesale and retail trade and repair	23,728	27,509	8,719	10,068	15,009	17,441
Transportation and storage	9,113	8,634	8,786	8,270	327	364
Accommodation and food	4,724	4,177	2,214	1,925	2,510	2,252
Information and communication	987	1,012	647	662	340	350
Finance and insurance	1,522	1,678	650	731	872	947
Real estate	469	513	214	223	255	290
Professional, scientific, and technical	736	779	362	354	374	425
Administration and support	4,666	4,892	2,938	3,021	1,728	1,871
Public administration	9,818	9,861	5,056	5,130	4,762	4,731
Education	3,736	4,414	991	1,143	2,745	3,271
Human health and social work	1,580	1,762	501	552	1,079	1,210
Arts, entertainment, and recreation	868	672	496	350	372	322
Other services	7,299	7,646	1,789	1,946	5,510	5,700
Class of work						
Wage employment	74,006	77,171	46,704	48,591	27,302	28,580
Self-employment	41,839	45,545	26,334	27,586	15,505	17,959
Unpaid family work	8,872	11,020	3,531	4,293	5,341	6,727
Skill level						
Low	33,878	37,951	22,039	24,329	11,839	13,622
Medium	65,486	71,140	43,226	45,597	22,260	25,543
High	25,353	24,645	11,304	10,544	14,049	14,101

Table A2. Number of observations in wage regressions

Group	All sexes		Male		Female	
	April 2020	April 2021	April 2020	April 2021	April 2020	April 2021
All	64,145	62,719	39,852	38,473	24,293	24,246
Urbanization						
Urban	36,201	36,609	21,794	21,786	14,407	14,823
Rural	27,944	26,110	18,058	16,687	9,886	9,423
Age group						
Ages 15–26	36,201	36,609	21,794	21,786	14,407	14,823
Ages 25–46	27,944	26,110	18,058	16,687	9,886	9,423
Ages 45–66	17,014	16,850	10,374	10,081	6,640	6,769
Ages 65 and above	1,062	1,130	636	625	426	505
Education						
No grade completed	389	365	303	275	86	90
Elementary level	11,646	10,531	8,689	7,782	2,957	2,749
High school level	26,307	24,925	18,292	17,378	8,015	7,547
Post-secondary level	4,132	3,037	2,476	1,868	1,656	1,169
College level or higher	21,671	23,861	10,092	11,170	11,579	12,691
Occupation group						
Managers	1,847	1,668	1,017	875	830	793
Professionals	6,433	6,790	2,151	2,219	4,282	4,571
Technicians and associate professionals	3,465	3,470	1,876	1,876	1,589	1,594
Clerical support workers	6,892	7,114	2,817	2,969	4,075	4,145
Service and sales workers	11,952	11,704	6,309	6,226	5,643	5,478
Craft and related trades workers	7,004	6,064	6,244	5,461	760	603
Plant and machine operators and assemblers	4,184	3,733	3,609	3,185	575	548
Elementary occupations	22,340	22,145	15,803	15,636	6,537	6,509

Skill level						
Low	22,340	22,145	15,803	15,636	6,537	6,509
Medium	30,060	28,646	19,005	17,867	11,055	10,779
High	11,745	11,928	5,044	4,970	6,701	6,958
Sector						
Agriculture	6,866	6,571	5,500	5,241	1,366	1,330
Manufacturing	6,216	5,742	3,970	3,715	2,246	2,027
Mining and quarrying	387	390	355	354	32	36
Electricity, gas, steam, and AC supply	260	235	222	185	38	50
Water supply, sewerage, and waste management	156	142	132	118	24	24
Construction	10,467	10,124	10,267	9,915	200	209
Wholesale and retail trade	7,584	7,698	4,048	4,178	3,536	3,520
Transportation and storage	2,840	2,699	2,604	2,419	236	280
Accommodation and food	3,440	2,789	1,799	1,429	1,641	1,360
Information and communication	820	837	547	544	273	293
Financial and insurance	1,393	1,490	601	647	792	843
Real estate	236	228	109	98	127	130
Professional, scientific, and technical	645	632	300	270	345	362
Administration and support	4,539	4,636	2,866	2,883	1,673	1,753
Public administration	6,800	6,533	3,663	3,548	3,137	2,985
Education	3,645	4,213	962	1,092	2,683	3,121
Human health and social work	1,429	1,538	467	492	962	1,046
Arts, entertainment, and recreation	504	358	266	177	238	181
Other services	5,918	5,864	1,174	1,168	4,744	4,696

9 | Public Health Policy and Labor Productivity

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9 | Public Health Policy and Labor Productivity

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1. Introduction

The COVID-19 pandemic and the measures taken to control its spread brought economies to a halt and turned the public health crisis into an economic one. Though most government responses (e.g., labor and social welfare protection programs) are similar when economic crises occur, such as the global and Asian financial crises in recent years, the COVID-19 pandemic is different. Being rooted on public health rather than financial markets, it put the spotlight on the health sector and its improvement to manage COVID-19 and ensure sustainable economic recovery.

In the Philippines, with the increased number of vaccinated citizens and the economy opening up again, policymakers are set on economic recovery and attaining sustainable economic growth. The endogenous growth theory (EGT) proposes that sustainable economic growth can be explained by continuous investments in human capital, which leads to increased productivity (Barro & Sala-i-Martin, 2004; Mankiw, 2022). Though traditional human capital investments are related to knowledge, such as education and training, some pieces of economic literature have examined and shown evidence of the association of investments in health and its indicators to human capital productivity (Grossman, 1972; Barro & Sala-i-Martin, 2004; V. Raghupathi & W. Raghupati, 2020; Bhargava et al., 2001).

Furthermore, the theory of labor demand suggests that the demand for workers depends on their productivity (Mankiw, 2022). But what makes an impact on labor productivity? As mentioned above, it is, primarily, human capital investment and education, and then health (Rivera & Currais, 1999; Barro & Sala-i-Martin, 1995). As for the theory of labor supply, health benefits and compensating wages/policies (i.e., hazard pay, regulations) affect the decision of a worker to participate and, consequently, to be a productive member of an economy (Ehrenberg & Smith, 2009).

Though spending on the Philippine health sector increased in response to the COVID-19 pandemic, prior to this global scare, there was evidence of underspending and challenges in the implementation of the Universal Health Care Law (Uy et al., 2022). Philippine Gross Domestic Product (GDP) rapidly increased in recent years (5.0 to 6.0 percent GDP growth), but the country has experienced only modest improvements in health outcomes compared to its neighboring countries. The slow progress could be attributed to a variety of reasons but is largely due to chronic underinvestment in health. For example, Philippine public spending on health is half (USD 50 per capita in 2018) of what upper middle-income and ASEAN (Association of Southeast Asian Nations) countries (USD 100) spend. Many of these countries are already implementing universal health care.

This chapter examines the relationship between health spending and labor productivity. Will the COVID-19

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pandemic crisis trigger more meaningful public investments in health? How can we build back better health policy for labor productivity?

Answering these questions would first require seeing if there is evidence that health policy and indicators are associated with measures of labor productivity. If such evidence exists, there is a need to examine pre-pandemic public health expenditures and policies and compare these to health policies of comparable countries with better health outcomes. Doing so would provide policy makers guidance in improving health sector outcomes and overall productivity.

Generating evidence to establish the association of health policy and indicators with labor productivity was done on two levels, across: (1) comparable ASEAN countries and (2) Philippine regions. The results showed that public health expenditures were robust and significant for GDP per capita (across ASEAN countries) and regional GDP per worker (RGDP), Philippine regional estimations). This suggests that increased public health spending is associated with increased labor productivity. For the cross-country results, life expectancy and gross capital investments were also found to be positively significant, indicating increased productivity with a longer life (i.e., a healthier population), and with physical capital/tools and infrastructure (consistent with neoclassical growth theory or NGT). For Philippine regional regressions, only the proportion of the working age population was found to be significant although it was negative, possibly suggesting that a bigger work force is associated with lower productivity (ceteris paribus, this is consistent with NGT and the law of diminishing marginal product).

The next section presents literature providing empirical evidence on health policy and labor productivity as well as a brief discussion of the Philippine COVID-19 response and increased public health expenditures. Section 3 lays out the methodological approach, data requirements and limitations of this study. Section 4 presents the results of the ASEAN cross-country and Philippine regional regressions. Section 5 discusses, and compares with other countries, current trends in Philippine health expenditures and indicators. The last section provides the summary and recommendations.

2. Related literature

2.1 Evidence on health policy and labor productivity

Economic growth theory proposes that growth can be attained with investments in both physical capital (i.e., neoclassical growth theory or NGT) and human capital (i.e., endogenous growth theory or EGT) (Barro & Sala-i-Martin, 2004; Mankiw, 2022; Bhargava et al., 2001). In addition, according to NGT, population growth and labor-augmenting technological progress affect GDP per worker negatively and positively, respectively (Mankiw, 2022). That is, rapid population growth reduces output per worker because of the increased need for physical capital, whereas labor-augmenting technological progress makes workers more productive (Barro & Sala-i-Martin, 2004). Extensions of both NGT and EGT have looked at the relationship of different measures of human capital investments and indicators for education and health. They have established a positive association between them on measures of labor productivity and economic growth.

Table 1 highlights studies providing empirical evidence of the relationship between health and labor productivity. Rivera and Currais (1999) proposed that a country would not be able to maintain a state of continuous growth without a labor force with minimum levels of education and health. The authors developed an extension of the augmented NGT Solow model to identify the role of health care in economic growth and discuss the effect between health and income, using sets of instruments as exogenous determinants of health. The augmented model showed that a nation's health affects its economic growth positively and provided evidence of a strong and positive relationship between productivity and health.

Another study by Knowles and Owen (1995) used the Mankiw-Romer-Weil (MRW) model, which augments the Solow[2] growth model by empirically including human capital (as proxied by school enrollment). The authors reported a strong and relatively robust relationship between life expectancy (as a proxy for health capital stock) and income per capita, which suggests further theoretical and empirical investigation of the importance of the health aspect of human capital for growth and development.

Bloom et al. (2001) attempted to test for the existence of the true effect of health on labor productivity and to measure its strength. The study also constructed macroeconomic measures of health and work experience to examine their ability to explain economic growth. The study estimated that health has a positive and statistically significant effect on economic growth, which is similar with the results of Rivera and Currais (1999) and Knowles and Owen (1995). Furthermore, the study suggests that with a one-year improvement in the population's life expectancy, there is a 4.0 percent increase in output.

Finally, Bhargava et al. (2001) estimated static random effects models for GDP growth rates containing endogenous regressors. Examining time-varying (lagged) total fertility, investment-to-GDP ratios, adult survival rates (ASR or life expectancy), and GDP, they found a significant association between ASR and economic growth rates for low-income countries.

2.2 Philippine fiscal response

As it did in other countries, the COVID-19 pandemic affected not only the health sector in the Philippines but also many others. Workers in the labor market could not participate because of the implementation of travel restrictions and lockdowns (Department of Labor and Employment, 2021). The unemployment rate doubled from 5.1 percent in 2019 to 10.3 percent in 2020. Similarly, registered labor force participation rate decreased from 61.3 percent in 2019 to 59.5 percent in 2020 (Philippine Statistics Authority [PSA], 2020).

Social protection systems play a huge role in recovery and resilience and can thus be seen as economic and social stabilizers in these types of crises (International Labor Organization [ILO], 2020a). According

[2] For a seminal neoclassical economic growth model that explains economic growth dependent primarily on the proportion of GDP an economy saves and, therefore, invests in (physical) capital (see Mankiw, 2022).

to the ILO (2020a), appropriate policy responses should focus on (1) health protection measures and (2) employment and income support to stimulate the economy and labor demand. The efforts of the Philippine government shortly after the start of the pandemic are in line with the recommendations of the ILO.

On 27 March 2020, the Philippine Inter-Agency Task Force on Emerging Infectious Diseases (IATF) created the Technical Working Group on Anticipatory and Forward Planning (IATF-TWG for AFP) to assess the impact of the pandemic and offer recommendations as the country adapts to the "new normal" (Department of Health [DOH], 2021). These recommendations were reflected on the IATF-TWG's (2020) "We Recover as One" report, which details the process of responding to the pandemic, mitigating its effects, and transitioning to the new normal. According to the report, the response phase deals with limiting the transmission of the virus and providing health care, while the mitigation and transition phases deal with ensuring food and financial security for vulnerable groups and coming up with measures for social and economic activities to proceed (IATF-TWG for AFP, 2020).[3]

In relation to this, the "Bayanihan to Heal as One Act" (*Bayanihan I*), the country's initial fiscal response to the pandemic, was passed.[4] Aside from the focus on preventing the spread of COVID-19, one of *Bayanihan I*'s objectives was to reduce its impact on the Filipinos' socioeconomic well-being through different forms of socioeconomic relief.[5]

Based on Presidential Proclamation No. 922, which declared a state of public health emergency, *Bayanihan I* gave the President the power to adopt temporary emergency measures. This included the provision of an emergency subsidy, ranging from PhP 5,000 to PhP 8,000, to 18 million low-income households.[6] *Bayanihan I* was also the basis for the Small Business Wage Subsidy (SBWS) Program. The SBWS Program had an approved budget of PhP 50.8 billion for the provision of subsidies, which also ranged from PhP 5,000 to PhP 8,000, for eligible workers in micro, small, and medium enterprises (MSME) (Department of Finance [DOF], 2020).

Shortly after the expiration of *Bayanihan I*, the "Bayanihan to Recover as One Act" (*Bayanihan II*)[7] was passed. *Bayanihan II* maintained the same focus on the health and social protection of the people and continued the efforts to provide emergency subsidies along with its other salient points. *Bayanihan II* was also the basis for the appropriation of an additional PhP 3.5 billion as support to local government units (LGUs). Out of this PhP 3.5 billion, PhP 1.5 billion was for the Local Government Support Fund and PhP 1 billion each to the Land Bank of the Philippines and the Development Bank of the Philippines.[8] As of 31 December 2021, *Bayanihan I* and *II* have jointly obligated PhP 575.9 billion and disbursed PHP 558.8 billion (Table 2).

[3] Created through IATF Resolution No. 16
[4] RA No. 11469
[5] Section 3 of RA 11469
[6] Section 4(c) of RA 11469
[7] RA 11494
[8] Sec. 4(q) of RA 11494

Table 1. Empirical evidence of health policy/indicator and measures of labor productivity

Article	Conceptual framework	Data	Results
Rivera and Currais (1999)	• Theory: Mankiw, Romer, and Weil (1991): Assumes an expanded Solow growth model • Estimating equation: Y=f (public health expenditures, etc.), OLS Huber's heteroskedasticity-consistent covariance estimation $\ln\left(\frac{y(t)}{y(0)}\right) = \ln y(t) - \ln y(0)$ $= \left(1-e^{-\lambda t}\right)\frac{\alpha}{\mu+\beta}\ln s_k + \left(1-e^{-\lambda t}\right)\frac{\beta}{\mu+\beta}\ln e^* + \left(1-e^{-\lambda t}\right)\frac{\eta}{\mu+\beta}$ $- \left(1-e^{-\lambda t}\right)\frac{1-\mu-\beta}{\mu+\beta}\ln(n+g+\delta)$ $- \left(1-e^{-\lambda t}\right)\ln y(0)$	• Log difference GDP per worker (Dependent Var) • Public health expenditure (explanatory var) • Panel (24 OECD countries for sample period 1960-90)	Positive association with GDP per capita and health expenditures
Knowles and Owen (1995)	• MRW Model: Explicitly include the "health capital" and "educational capital" components of human capital $Y_{it} = K_{it}^{\alpha} E_{it}^{\beta} X_{it}^{\psi} (A_{it}L_{it})^{1-\alpha-\beta-\psi}$ • OLS estimation/Wald's Test $\ln\left(\frac{Y_{it}}{L_{it}}\right) - \ln\left(\frac{Y_{i0}}{L_{i0}}\right) = \theta\ln A_0 + gt + \frac{\theta\alpha}{1-\alpha}[\ln(s_{ki}) - \ln(n_i+g+\delta)_t]$ $+ \frac{\theta\beta}{1-\alpha}\ln(e_i^*) + \frac{\theta\psi}{1-\alpha}\ln(x_i^*) - \theta\ln\left(\frac{Y_{i0}}{L_{i0}}\right)$ $\ln\left(\frac{Y_{it}}{L_{it}}\right) - \ln\left(\frac{Y_{i0}}{L_{i0}}\right) = \theta\ln A_0 + gt + \frac{\theta\alpha}{1-\alpha-\beta}\ln(s_{ki}) + \frac{\theta\beta}{1-\alpha-\beta}\ln(s_{ei})$ $- \frac{\theta(\alpha+\beta)}{1-\alpha-\beta}\ln(n_i+g+\delta)_t + \frac{\theta\psi}{1-\alpha-\beta}\ln(x_i^*)$ $- \theta\ln\left(\frac{Y_{i0}}{L_{i0}}\right)$	• Y = real output • K = stock of physical output • E = stock of educational human capital • X = stock of health capital • L = labor input • A = labor augmenting level of technology	Strong and relatively robust relationship between life expectancy as a proxy for health capital stock and income per capita
Bloom et al. (2001)	• Model output as a function of inputs and technology $Y = AK^{\alpha}L^{\beta}e^{\emptyset_1 s + \emptyset_2 exp + \emptyset_3 exp^2 + \emptyset_4 h}$ $a_{it} = +v_{it}\,, where\ v_{it} = \rho v_{i,t-1} + \varepsilon_{it}$ Total Factor Productivity (TFP): $\Delta y_{it} = \Delta a_t + \alpha\Delta k_{it} + \beta\Delta l_{it} + \emptyset_1\Delta s_{it} + \emptyset_2\Delta exp_{it} + \emptyset_3\Delta exp_{it}^2 + \emptyset_4\Delta h_{it}$ $+ (1-\rho)\left(a_{i,t-1} + \alpha k_{i,t-1} + \beta l_{i,t-1} + \emptyset_1 s_{i,t-1}\right.$ $\left. + \emptyset_2 exp_{i,t-1} + \emptyset_3 exp_{i,t-1}^2 + \emptyset_4 h_{i,t-1} - y_{i,t}\right) + \varepsilon_{it}$ This equation decomposed into four components: the growth of the world TFP; growth of inputs; TFP gap; and idiosyncratic shock	• Total output = real per capita GDP measured international PPP (chain index) x national population • Labor supply = size of economically active population • Life expectancy = used as a proxy for the health of the workforce	• Good health has a positive, sizable, and statistically significant effect on aggregate output • Little variation across countries in average work experience, thus differentials in work experience account for little variation in rates of economic growth

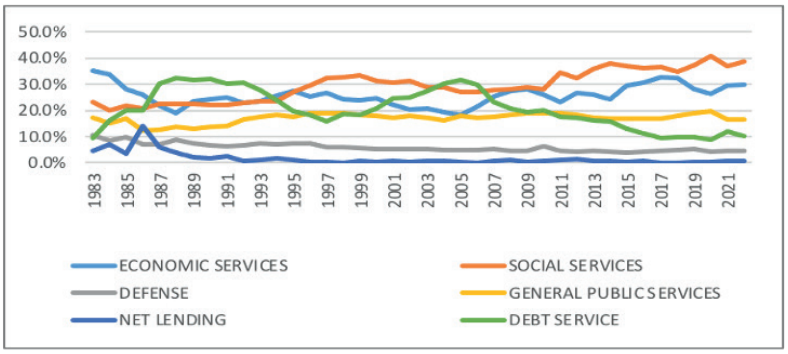
Bhargava et al. (2001)	• Estimation of statistic random effects models containing endogenous regressors $Y_{it} = \sum_{j=1}^{m} z_{ij} Y_j + \sum_{j=1}^{n_1} x_{1ijt} \beta_j + \sum_{j=n_1+1}^{n} x_{2ijt} \beta_j + u_{it}$ $(i = 1, \dots, N; t = 1, \dots, T)$ Time-varying regressors consist of (lagged) total fertility rate, investment/GDP ratio, ASR, interaction between ASR and GDP, and GDP • Wald type test for parameter stability outside the sample period $W = (b^* - b)' = [V(b^*, b^*)]^{-1}(b^* - b)$	• Penn World Table (PWT) • World Development Indicators (WDI) • GDP series in PWT and WDI • PWT GDP series involves estimation of the PPP • Total fertility rate, life expectancy, and population • Life expectancy = ASR (probability of surviving the 60th birthday after the age of 15 years)	• The health of individuals in a country can be roughly approximated in national averages. The models showed significant effects of ASR on economic growth rates for low-income countries. • Measures of cognitive function in different age cohorts may also be useful in explaining economic performance of countries.

Table 2. COVID-19 budget utilization reports as of 31 December 2021 (billion PhP)

Particulars	Allotment (amount)	Obligations	Disbursements
Total[9]	602.2	575.9	558.8
Bayanihan I	387.9	371.6	363.2
Bayanihan II	214.2	204.3	195.6

Source: Department of Budget and Management (DBM)

Figure 1. National government expenditures by sector, percent distribution (1983-2021).



Source: DBM (various years)

[9] Numbers do not add up due to rounding off

In connection with government response to the pandemic, the overall outlook for national government expenditures throughout the years has shown a recent increase in the social services sector (Fig. 1), especially in social security, welfare, and employment and in health (Fig. 2). For LGUs, there was also an increase in spending on social welfare in 2020 at the expense of the education sector (Fig. 3).

However, the increased prioritization of the health and social services sectors was an emergency measure that was not intended to make up for underinvestment in the health sector pre-COVID-19.

For example, in 2019, Republic Act (RA) No. 11223, also known as the Universal Health Care (UHC) Act, was passed. It sought to realize universal health care in the country and ensure guaranteed equitable access to quality and affordable health care, which also protects against financial risk.[10] To continue the attainment of the goals specified in the UHC Act despite the pandemic, the DOH introduced the UHC Catch-up Plan. The UHC Catch-up Plan focuses on: (1) integrating health systems to strengthen the capacity of LGUs, (2) improving health system capacities, (3) institutionalizing streamlined and digital processes and mechanisms, (4) maximizing multi-sectoral engagement, and (5) instilling more responsible community behavior (DOH, 2021).

Though the health sector had number one priority during the pandemic in terms of reforms and, to an extent, budgetary allocations, continued investment is necessary for sustainable economic growth.

3. Conceptual framework, methodology, and data

3.1 *Conceptual framework*

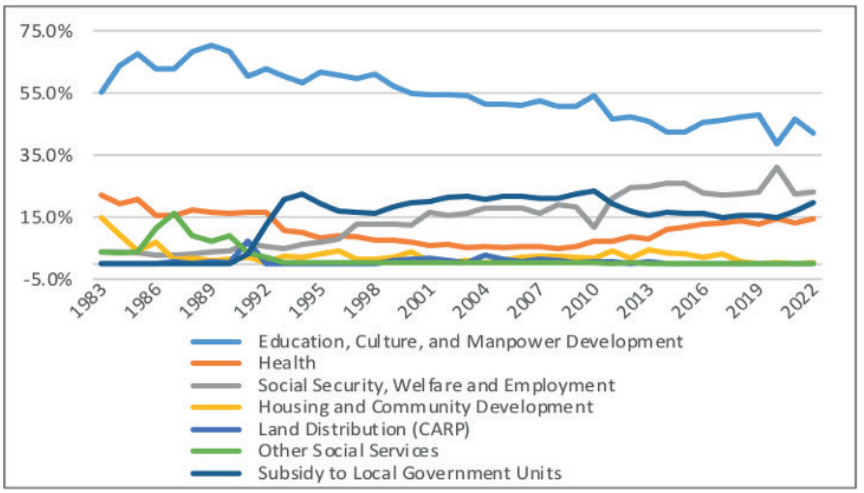
Primarily grounded on economic growth theories discussed above, this study will also be based on the neoclassical theory of distribution that explains how national income is divided among factors of production. Alternatively, this captures the contribution of factors of production to national income and the capacity of an economy to produce goods and services or aggregate supply (Mankiw, 2022). For the aggregate supply theory, factors of production (i.e., land, labor, and capital) and the existing technology that is used to transform these factors/inputs into goods and services are what determine the productive capacity of an economy.

What, in turn, explains the demand and supply of these factors of production? In the case of labor, firm demand depends on the perceived marginal productivity of labor represented by real wage (Mankiw, 2022). Real wage measures the additional output that an additional unit of labor will produce. Labor productivity, in turn, is affected by human capital investments such as education, training, and health. For health, the Grossman model (Grossman, 1972) proposes that health can be viewed as a durable capital stock that produces an output of healthy time. It is assumed that individuals inherit an initial stock of health that depreciates with age and can be increased by investment.

What, then, determines the decision for supply factors of production in the market? The theory of labor supply suggests that the choice of an individual to work (accept a job) depends on substitution and income effects. In this model, individuals are

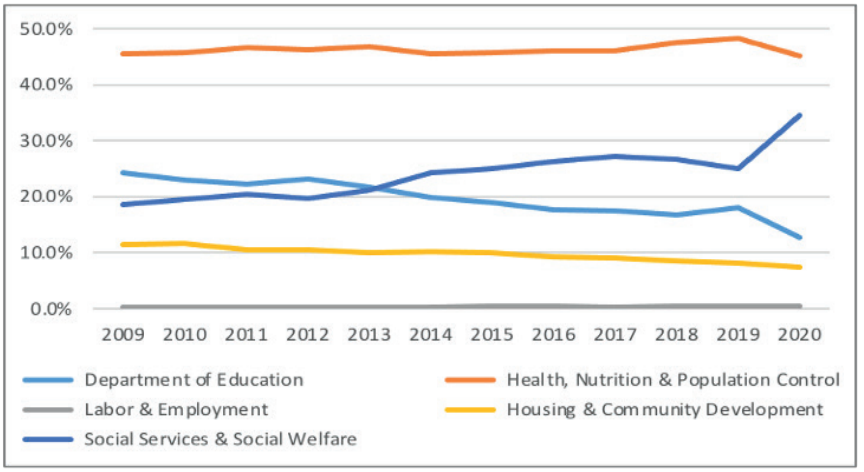
[10] From Sec. 3 of RA 11223

Figure 2. National government expenditures in the social services sector, percent distribution (1983-2022)



Source: DBM (various years)

Figure 3. Local government expenditures in the social welfare sector, percent distribution (2009-2020)



Source: DBM (various years)

faced with two choices: to work or not (engage in leisure). As wages increase, the opportunity cost of not working increases, therefore, the individual will substitute work for leisure. However, as wages increase, the employed worker will feel richer and will therefore work less. The question on which of the effects is stronger is empirical and cannot be predetermined, but evidence shows that at lower wage levels, the substitution effect is larger than the income effect (Mankiw, 2022; Ehrenberg & Smith, 2009).

More recently, compensation packages have extended beyond wage. For jobs with occupational hazards, compensation packages that include health insurance, company health expenditures on workers, paid sick days, mental wellness/health activities, organizational safety and health standards (OSH), or other non-pecuniary means of compensation factor into the worker's decision to supply labor (Ehrenberg & Smith, 2009). Based on this framework, this study tries to examine any association/correlation between public health expenditures or health outcomes and measures of labor participation and productivity.

3.2. *Methodology, data, and scope*

3.2.1 *Methodology and approach*

Before empirically testing the relationship between health policy and indicators and labor productivity, causality tests were run to provide basis for subsequent testing. Based on the discussion in the previous section of empirical models linking health sector outputs/outcomes and measures of labor productivity (such as GDP per capita/income), the study, primarily following Bhargava et al. (2001), will use the unobserved effects model for panel data (unless the robustness checks indicate the use of either pooled or simple ordinary least squares methods). The Bhargava equation is:

$$Y_{it} = \sum_{j=1}^{m} z_{ij}\, Y_j + \sum_{j=1}^{n_1} x_{1ijt}\, \beta_j + \sum_{j=n_1+1}^{n} x_{2ijt}\, \beta_j + u_{it}\ (i = 1, \dots, N; t = 1, \dots, T) \quad (1)$$

Where z is time invariant variables, x_1 and x_2 the exogenous and endogenous time-varying variables, N the number of observed countries in time T periods, and u_{it} the error. This equation is used for estimating static random effects models for situations where GDP growth rates have endogenous explanatory variables.

This equation will be tested at two different levels of data: (1) cross-country, across the ASEAN region, and (2) within the regions of the Philippines.

a) Cross-country for ASEAN comparable countries: Philippines, Vietnam, Indonesia, Thailand, and Malaysia; the study used World Bank Data for cross-country estimation.

- Two independent variables will be used as the measure of a country's performance or the country's economic output—GDP per capita and annual GDP growth rate.
- Models will be generated using the identified measurement of a country's economic growth and other factors that might influence the independent variables through national spending and some health outcomes.
- The following model for estimation, which is a reduced form equation similar to Bhargava (2001), will be used:

$$Y_{ij} = \beta_0 + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \cdots + \beta_5 X_{5ij} + \epsilon_{ij} \quad (2)$$

where:

$Y_1 = GDP\ per\ capita\ and\ Y_2 = annual\ GDP\ growth$
$X_1 = Public\ health\ expenditure$
$X_2 = Private\ health\ expenditure$
$X_3 = Mortality\ rate\ under\ five$
$X_4 = Life\ expentancyat\ birth\ (total\ years)$
$X_5 = Fertility\ rate$
$\epsilon_{ij} = c_i + u_{ij}$
$c_i = unobserved\ heterogeneity\ and\ u_{ij} = idiosyncratic\ error\ term$
$i = country\ and\ j = year$

GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. GDP per capita is based on purchasing power parity (PPP). PPP GDP is GDP converted to international dollars using PPP rates. The data used are in constant 2017 international dollars, whereas the annual percentage growth rate of GDP at market prices is based on constant local currency. Aggregates are based on constant 2015 prices expressed in US dollars. The public expenditure on health from domestic sources per capita is expressed in international dollars at PPP, and the current private expenditures on health per capita are expressed in international dollars at PPP.

For health outcomes, "under-five mortality rate" is the probability per 1,000 that a newborn baby will die before reaching age five (if subject to age-specific mortality rates of the specified year). Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Lastly, total fertility rate represents the number of children that would be borne by a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year (The World Bank, n.d.).

b) Across regions in the Philippines

The regressand to be used across regions in the Philippines is labor productivity, which is computed as GDP per worker.[11] Model estimates are generated to analyze the relationship of health outcomes and, more importantly, public health spending on labor productivity. As such, the model specification is as follows:

$$Y_{ij} = \beta_0 + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \cdots + \beta_5 X_{5ij} + \epsilon_{ij} \quad (3)$$

where:

$Y_1 = labor\ productivity$
$X_1 = public\ health\ spending\ per\ capita$
$X_2 = gross\ capital\ formation/GDP$
$X_3 = fertility\ rate$
$X_4 = infant\ mortality\ rate$
$X_5 = age$
$\epsilon_{ij} = c_i + u_{ij}$
$c_i = unobserved\ heterogeneity\ and\ u_{ij} = idiosyncratic\ error\ term$
$i = region\ and\ j = year$

The age variable is defined as the proportion of the population who are 15 years old and over. From the definition of labor productivity, which is RGDP per worker, more workers that do not reflect an adequate increase in output will result in a lower and less productive workforce. Hence, this variable may be negatively related with labor productivity.

According to Bhargava et al. (2001), high fertility rates (especially in developing countries) negatively affect investments in human capital, which lead to reduced physical work capacity. The expectation is the same in this study where fertility rates may be negatively associated with labor productivity. Infant mortality is a health outcome that has also been used

[11] PSA definitions

in literature as an indication of the health of the population. Furthermore, previous literature has delved on its relationship with economic output where higher GDP and growth is related to a lower infant mortality (Baird et al., 2011; Erdogan et al., 2013; O'Hare et al., 2013). Thus, it is expected that higher infant mortality means lower productivity.

Previous literature has included capital to models that estimate worker productivity (Siddique et al., 2020). Also, as factors of production, increasing capital may make laborers/employed persons more efficient and productive. In the same way, gross capital formation[12] per GDP across the regions may improve the model in this paper and is expected to have a positive relationship with labor productivity.

The government spends on health with the expectation that this will improve the health of the population. Workers are then more equipped with better human capital to be productive at work. In theory, it is expected that health spending will increase worker productivity.

3.2.2 Data, scope, and limitations

For the cross-country estimations, the data from 2010 to 2020 were sourced from the World Bank Databank. Regional Philippine data for the same period were taken primarily from government sources such as the Family Income and Expenditure Survey and Labor Force Survey, both of the PSA, and from the Bureau of Local Government and Finance of the DOF.

The Philippine regional regressions investigate the effect of public health spending on labor productivity across the regions in the Philippines. Other relevant articles in the literature have analyzed labor productivity, which is defined as output per hour (Raghupathi et al., 2020). However, the paper only makes use of labor productivity computed as RGDP per worker. The demographic characteristics are specific to the various regions, as such, the results would only be applicable to the country. Also, the results reflect the data gathered only from 2010 to 2020. This study is subject to the limitations of the available data on health outcomes, annual estimates of the labor force, public health spending, and other related variables. With this, the Autonomous Region in Muslim Mindanao (ARMM)[13] is not included in the estimation. Unlike the Philippine regional data, the cross-country data are more controllable as the data of each country are obtained only from one databank. However, there would have been other explanatory variables to be included in the model, but the reporting years are not consistent in each country.

4. Regression results

This section presents the results of estimations to establish evidence of correlation/association of health outcomes/public health spending with measures of labor productivity. Preliminary diagnostic causality tests showed evidence that suggests that, across Philippine regions, there might be a causal relationship

[12] Gross capital formation are investments put in place and measured by the total value of fixed assets/capital formation, changes in inventories and acquisitions less disposals of valuables (Philippine Statistics Authority https://psa.gov.ph/content/capital-formation-suffers-setbacks-second-quarter-2020-records-lowest-decline-first-quarter).

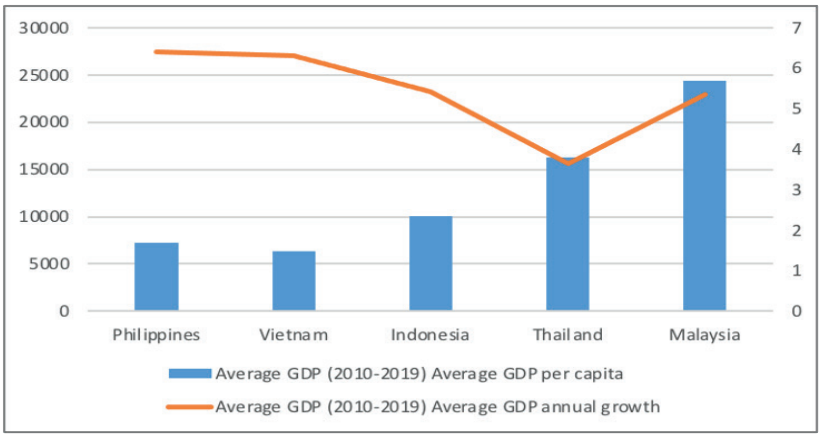
[13] Based on the Statement of Receipts and Expenditures (SRE) under the LGU Fiscal Data of the DOF Bureau of Local Government and Finance and the expenditure program for DOH in the Budget of Expenditures and Sources of Financing (BESF), no amount was regionally allocated to the ARMM for certain years.

between public health expenditures and labor productivity. There was no such evidence of causality for comparable ASEAN countries, though studies have shown robust association (Annex 1.1). This is consistent with empirical evidence in the literature and is basis for proceeding with estimations.

4.1 *Cross-country regressions*

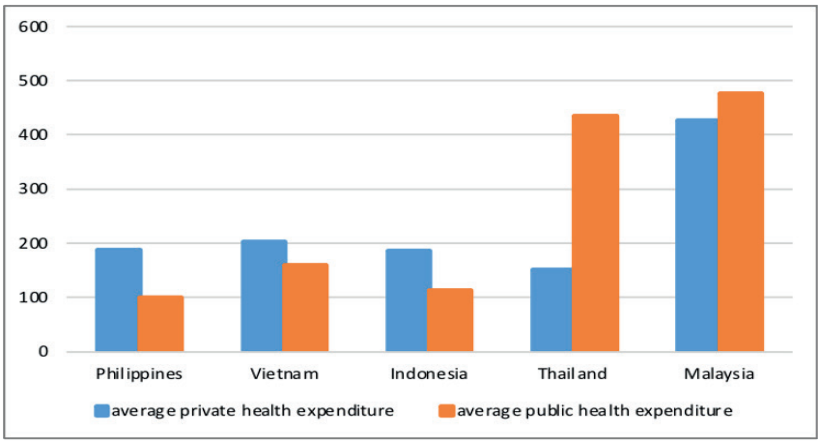
The next several figures and tables show a comparison of the Philippines to selected ASEAN countries in the region. Figure 4 shows that the Philippines' average GDP per capita is second to the lowest among the selected developing

Figure 4. Average GDP per capita and annual growth rate by country (2010-2019)



Source: The World Bank Databank

Figure 5. Average private and public health expenditure per capita (2010-2019)



Source: The World Bank Databank

Table 3. Descriptive statistics for cross-country regressions

Variable (Obs=10)	Country									
	Philippines		Indonesia		Thailand		Vietnam		Malaysia	
	Mean	StdDev	Mean	StdDev	Mean	StdDev	Mean	StdDev	Mean	StdDev
GDP per capita	7251.01	1043.28	10010.52	1164.35	16293.52	1399.95	6391.82	985.28	24371	2691.61
GDP growth annual	6.41	0.98	5.42	0.53	3.65	2.27	6.31	0.63	5.35	0.90
Private health expenditure	186.90	21.74	185.97	15.29	151.18	36.23	202.94	53.64	425.96	75.00
Public health expenditure	99.51	30.83	112.74	43.14	434.63	60.91	160.10	46.11	476.41	72.26
Mortality rate under 5 per 1,000 live births	29.67	1.51	25.43	3.12	11.15	1.55	21.94	0.61	8.16	0.21
Life expectancy at birth (total years)	70.55	0.48	70.56	0.85	75.82	1.01	75.10	0.18	75.35	0.57

Source: The World Bank

Table 4a. Results of the Hausman diagnostic test for fixed effects

	(b) Fixed	(B) random	(b-B) Difference
Public health expenditure	0.2019	0.4693	−0.2674
Private health expenditure	0.2349	0.2381	−0.0032
Mortality rate	0.0065	−0.0228	0.0293
Life expectancy	0.0295	−0.13801	0.1675
Fertility rate	−0.0618	−0.0939	0.0321
Gross capital formation	0.1120	0.1817	−0.0697

b = consistent under Ho and Ha;obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic

$$chi2(5) = (b - B)' [(V\_b - V\_B \hat{} (-1)] (b - B)$$
$$= 479.65$$
$$Prob > chi2 = 0.0000$$

countries even though its average annual GDP growth was the highest (The World Bank Databank, 2010-2020). Figure 5 shows that the Philippines also lags in terms of public health expenditures per capita. The descriptive statistics for these figures are in Table 3.

The Hausman test results identified the fixed effects model as the proper method to control for unobserved effects within each country (Table 4a). The results of the regressions, with GDP per capita (at PPP constant 2017) as the dependent variable, suggest that, after five years, every unit increase in public and private health expenditures will increase the GDP per capita by 0.202 and 0.235, respectively (Table 4b). These findings are in line with those of Rivera and Currais (1999), which found that health expenditures were positively associated with GDP per capita. Also, for the health outcomes variables, life expectancy was found to be positively associated with GDP per capita, similar to Knowles and Owen (1995). An interesting finding that is consistent with NGT is the positive association of lagged investment (gross capital formation per capita) with GDP per capita. The presence of more physical capital such as infrastructure and equipment is associated with higher productivity.

Another round of regressions was run using the annual GDP growth rate as the dependent variable.[14] The results showed that public health expenditures were negatively associated with GDP growth rate (Annex 1.2.b; more detailed results may be requested from the authors). Private health spending and life expectancy were positive and significantly related to GDP growth.

4.2. Philippine regional regressions

This section shows the results of estimations done looking at variations across regions in the Philippines. Table 5 shows the summary statistics of the variables to be used in the regressions. It should be noted that fertility rate has less observations as the data for this variable is only until 2019.[15] Thus, the regression results would only reflect data from 2010 to 2019. Fertility rate has a mean of about 6.9, a minimum value of about 4.0, and a maximum value of 9.5. Meanwhile, infant mortality rate has an average of 11.3, and a maximum value of 18.4. Public health spending per capita has a minimum value of 284.2 and a maximum value of about 7667.3.

To see the regional variations, Fig. 6 shows the RGDP per worker (in PhP) in each region in the Philippines for 2010 to 2020. Over the years, NCR has been the region with the highest RGDP per worker by a considerable gap from the other regions.

From 2010 to 2016, the Cordillera Administrative Region (CAR) has the highest public health spending per capita (in PhP) among the regions outside NCR as seen in Fig. 7. After 2016, a steep increase in public health spending per capita can be seen for NCR.

[14] Two diagnostic tests were run to determine the correct estimation method. First, the Hausman Test, which is the same method used in Table 4a, indicated that random effects (RE) is the better method of estimation than fixed effects for this dependent variable (Annex 1.2.a). On the other hand, the Breusch Pagan Test showed there was no evidence of a significant difference between RE and OLS (Ordinary Least Squares regression), so OLS seems to be the best identified specification (Annex 1.2.c).

[15] DOH has not yet published/publicized the 2020 Public Health Statistics from which the data on fertility rate is taken.

Table 4b. Regression results, dependent variable, GDP per capita, at PPP constant 2017

Variables	(1) GDP per capita	(2) GDP per capita	(3) GDP per capita	(4) GDP per capita	(5) GDP per capita	(6) GDP per capita
Lag public health expenditure	0.418***	0.240***	0.233***	0.179***	0.183***	0.202***
	(0.0205)	(0.0200)	(0.0208)	(0.0265)	(0.0275)	(0.0272)
Lag private health expenditure		0.248***	0.235***	0.256***	0.242***	0.235***
		(0.0219)	(0.0248)	(0.0245)	(0.0325)	(0.0312)
Lag mortality rate			−0.00210	0.00361	0.00270	0.00649**
			(0.00186)	(0.00259)	(0.00298)	(0.00318)
Lag life expectancy				0.0321***	0.0294**	0.0295***
				(0.0106)	(0.0115)	(0.0110)
Lag fertility rate					−0.0255	−0.0618
					(0.0411)	(0.0416)
Lag investment						0.112***
						(0.0417)
Constant	7.260***	6.885***	7.033***	4.742***	5.064***	5.156***
	(0.0971)	(0.0665)	(0.146)	(0.772)	(0.932)	(0.891)
Observations	75	75	75	75	75	75
R-squared						
Within	0.857	0.950	0.951	0.957	0.958	0.962
Between	0.850	0.907	0.886	0.752	0.751	0.741
Overall	0.832	0.844	0.839	0.704	0.715	0.702
Number of country code	5	5	5	5	5	5

*Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1; Note: Y=ln(GDP per capita) Lag investment (Gross capital formation)*

Figure 8 shows a scatterplot and the linear relationship between public health spending per capita and labor productivity. The positive relationship between the two variables shows that an increase in public health spending can be associated with an increase in labor productivity.

Similar to that of the cross-country regressions, public health spending, gross capital formation/RGDP, and health outcomes are lagged five years. In addition, to make the variables consistent for analysis, monetary variables are normalized and so labor productivity, gross capital formation/RGDP, and public health spending per capita are transformed to their natural logarithmic form. The regression model is as follows:

$$\ln(\widehat{labor\ productivity})_{ij} = \beta_0 + \beta_1(\ln(public\ health\ spending\ per\ capita\ lagged\ 5\ years)_{ij}) + \beta_2(\ln(gross\ capital\ formation/GRDP\ lagged\ 5\ years)_{ij}) + \beta_3(fertility\ rate\ lagged\ 5\ years_{ij}) + \beta_4(infant\ mortality\ rate\ lagged\ 5\ years_{ij}) + \beta_5(age_{ij}) + \mu_{ij} \quad (4)$$

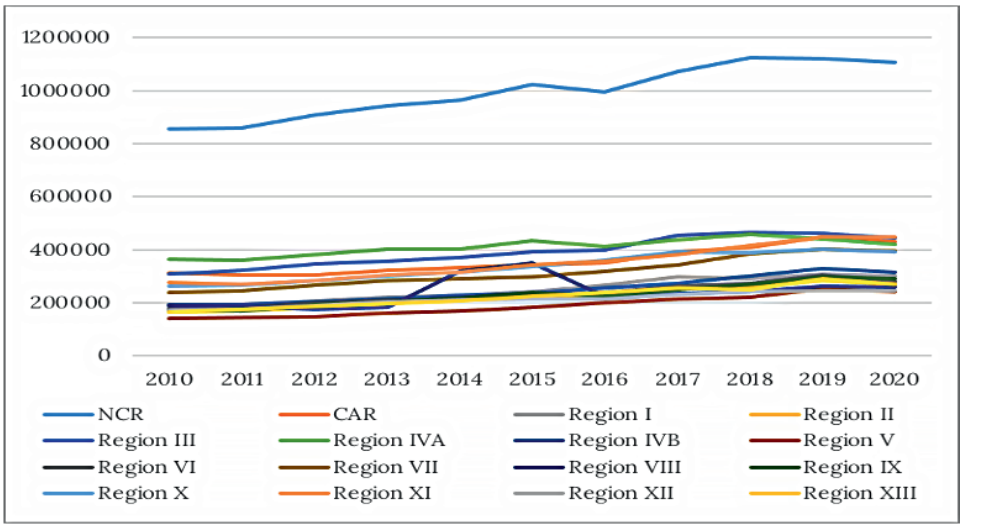
Table 6a shows the results of the regressions with labor productivity (RGDP per employed person) as the dependent variable. In the model, public health spending per capita is positively associated with labor productivity. A 1.0 percent increase in public health spending per capita may be related to an increase of about 15.1 to 17.9 percent

Table 5. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
RGDP, constant 2018 (in million PhP)	176	930489.31	1179757.3	163468	6224134.5
Total employed persons (in million PhP)	176	2.371	1.347	0.673	6.443
Labor productivity (in PhP)	176	325149.29	193586.21	141831.92	1124424.6
Labor productivity growth rate (in percent)	176	4.461	7.676	–35.469	75.572
Age (proportion of population that are 15 years and over)	176	0.67	0.04	0.384	0.74
Education (proportion of employed that at least graduated from college)	176	0.149	0.039	0.076	0.277
Fertility rate (live births per 100 female population)	160	6.87	0.835	4	9.5
Infant mortality rate (infant deaths per 1,000 live births)	176	11.294	2.673	6.801	18.4
Gross capital formation, constant 2018 (in million PhP)	176	211702.29	283761.76	23041.977	1640251.5
Gross capital formation/RGDP, constant 2018 (in PhP)	176	0.23	0.079	0.079	0.455
Public health spending[16] per capita (in PhP)	176	1192.212	858.125	284.221	7667.283
Population (in million)	176	6.035	3.659	1.62	16.057

[16] Sum of health, nutrition, and population control expenditures of LGUs (provinces, cities, and municipalities) and the regional allocation of the expenditure program of the Department of Health (BESF).

Figure 6. Labor productivity (RGDP per employed person), by region (2010-2020)



Source: Philippine Statistics Authority (PSA) regional data on gross regional domestic product and employment

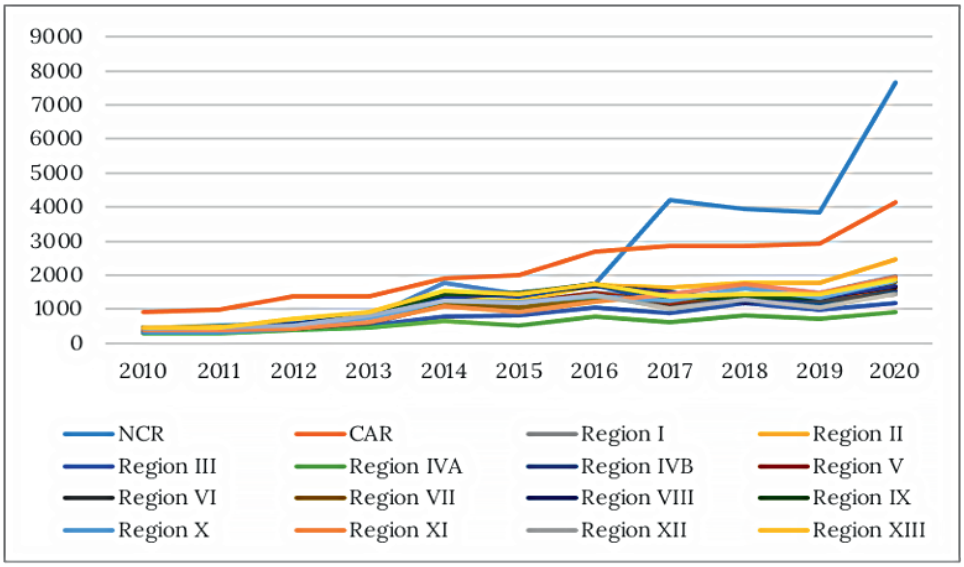
in labor productivity in five years. This is consistent with the theory that higher investments/spending in health may be related to better productivity. This is also similar to the cross-country regression results in Table 4b with GDP per capita as the dependent variable, as well as the findings from previous literature linking health expenditure with output and productivity (V. Raghupathi & W. Raghupathi, 2020; Rivera & Currais, 1999).

Fertility rate and infant mortality rate are statistically insignificant. Although this contradicts the findings of Bhargava et al. (2001), this result may be supported by the argument of Rivera and Currais (1999) that health outcomes like mortality rates might not be "sensitive indicators to improvements in quality of life" (p. 260) (which prompted their use of health expenditure as the proxy variable for health status). The age variable,[17] defined as the proportion of the population that are 15 years or over, is significant and negatively associated with labor productivity. This may mean that solely increasing laborers decreases productivity. Finally, gross capital formation/RGDP lagged five years is insignificant and negative, suggesting that the lagged gross capital formation/RGDP ratio does not explain the difference in levels of labor productivity across regions. This is contrary to the expectation of a positive relationship with productivity. The Hausman test in Tables 6b and 6c shows that the random effects model is appropriate for this model.

For this data, improved (or worse) health outcomes do not appear to be related to labor productivity in five years. However, public health spending is important and the positive association between lagged public health spending and labor productivity may show that government spending in the health sector is worth increasing with respect to further improving productivity, especially for the employed.

[17] Annex 2 shows the regression results with an education variable (proportion of the employed that at least graduated from college). Other regressions that use labor productivity growth rate as the dependent variable are in Annexes 3 and 4.

Figure 7. Public health spending per capita, by region (2010-2020)



Source: Bureau of Local Government Finance, DOF; Budget of Expenditures and Sources of Financing, DBM; and PSA data on population by region

Figure 8. Public health spending per capita with labor productivity (2010-2020)

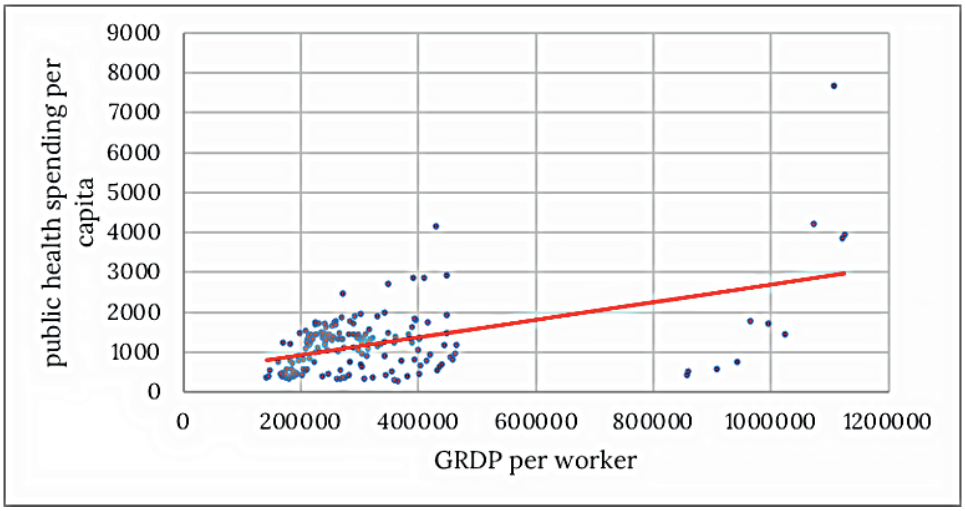


Table 6a. Regional regression results

Variables	(1) ln (labor productivity)	(2) ln (labor productivity)	(3) ln (labor productivity)	(4) ln (labor productivity)	(5) ln (labor productivity)
ln (total public health spending per capita lagged 5 years)	0.151***	0.157***	0.152***	0.161***	0.179***
	(0.0239)	(0.0288)	(0.0419)	(0.0350)	(0.0139)
ln (gross capital formation/RGDP lagged 5 years)		–0.0395	–0.0378	–0.0454	–0.0591
		(0.0565)	(0.0578)	(0.0490)	(0.0370)
Fertility rate lagged 5 years			–0.0133	–0.0107	0.00824
			(0.0463)	(0.0422)	(0.0143)
Infant mortality rate lagged 5 years				0.0171	0.00660
				(0.0135)	(0.0112)
Age (proportion of working age)					–1.518***
					(0.144)
Constant	11.72***	11.62***	11.75***	11.46***	12.34***
	(0.204)	(0.292)	(0.631)	(0.541)	(0.275)
Observations	96	96	96	96	96
Number of regions	16	16	16	16	16
Within R-squared	0.5421	0.5448	0.5470	0.5471	0.8012
Between R-squared	0.0004	0.0005	0.0008	0.3245	0.0536
Overall R-squared	0.0214	0.0273	0.0283	0.2216	0.0879

Robust standard errors in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

5. Health spending trends in the Philippines

The previous section provides empirical evidence on the role of health spending on labor productivity and participation. However, critical policy questions such as these remain: What is the country's health spending compared with regional and aspirational peers? What level of health spending does the country need? This section provides a deep-dive analysis of health spending in the Philippines, which could be used to guide the government in making medium- and long-term.

In the Philippines, the health economy has consistently grown faster than the overall economy. From 2014 to 2019, it has grown in real terms at an average annual rate of 9.0 percent compared to 5.0 percent with GDP. The rapid growth in health spending in the last decade could be attributed to the

Table 6b. Results of the Hausman (sigmamore) diagnostic test for fixed effects

	(b) fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
ln (total public health spending per capita lagged 5 years)	0.176 6616	0.17 36411	–0.002 0795	0.0014388
ln (gross capital formation/RGDP lagged 5 years)	–0.055 3124	–0.059 0656	0.00 7531	0.0044932
Fertility rate lagged 5 years	0.008 1973	0.00 2414	–0.000 0441	0.0017305
Infant mortality rate lagged 5 years	0.002 7342	0.006 5966	–0.003 3623	0.0014938
Age (proportion of working age)	–1.52 .849	–1.5 .7723	–0.0 10126	0.0065065

b = consistent under Ho and Ha;obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic

$$chi2(5) = (b - B)' [(V\_b - V\_B \hat{} (-1)] (b - B)$$
$$= 7.86$$
$$Prob > chi2 = 0.1640$$

Table 6c. Breusch and Pagan Lagrangian multiplier test for random effects

	Var	sd = sqrt(Var)
ln (labor productivity)	0.1535295	0.3918284
E	0.0022181	0.0470971
U	0.122735	0.3503356

Test: Var(u) = 0 = 196.41
chibar2(01)
(Prob >chibar2) = 0.0000

Note: If we fail to reject the null hypothesis, then random effects model is not appropriate to use.

sustained growth in government health spending. In a growth accounting model, the increases in public spending are driven by these three factors: (1) macroeconomic growth, that is, increases in real GDP per capita; (2) higher fiscal resources, that is, increases in aggregate public spending because of new policy actions, such as an expansion of earmarked consumption or income taxes; and (3) re-prioritization of health, that is, increases in the share of public spending on health budget to the total government budget (Tandon et al., 2018).[18] All these factors positively contributed to the increases in public health spending in the Philippines in the recent decade. The Philippines GDP per capita (in real terms) grew by almost 4.7 percent from 2010 to 2019, while aggregate health spending

[18] See Tandon et al., (2018) for the intuition behind the growth accounting model that explains the growth in public spending on health.

increased by 7.4 percent annually during the same period. This could be attributed to the government's newly found revenue streams, such as the landmark earmarking of excise taxes in 2013 (see RA 10351). As part of a political decision, in the recent decade, the government has prioritized social services leading to higher spending in key social sectors, such as the Department of Social Welfare and Development, DOH, and Department of Education, to fund key programs such as the conditional cash transfer and social health insurance (PhilHealth) subsidies. In 2020, during the first year of the pandemic, public spending on health further improved because of increasing aggregate public spending and the re-prioritization of public resources to the health sector to finance the pandemic response.

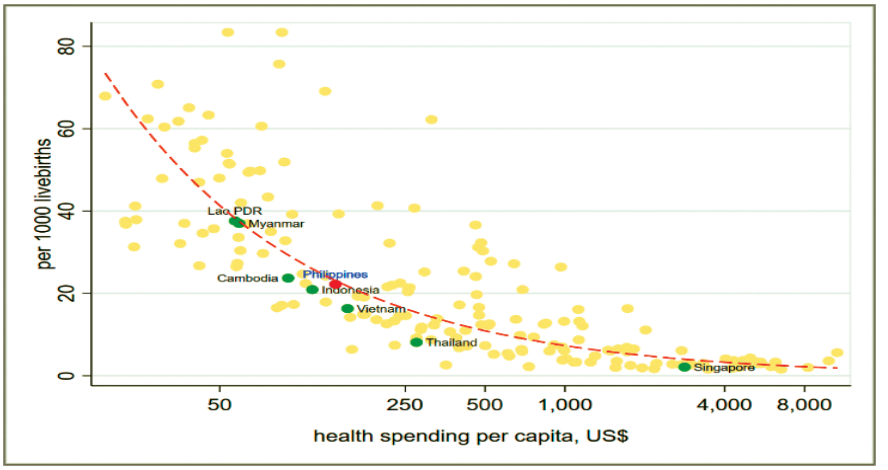
Despite the increase in health spending in the Philippines, it remains low compared to regional and aspirational peers. While public spending is increasing, private out-of-pocket (OOP) spending still accounts for almost half of the total health spending in the country. The World Health Organization (WHO) discourages the widespread use of OOP, which is a regressive form of health financing that limits access to health services and increases the risk of incurring catastrophic health expenditure, pushing more Filipinos into poverty. In the subsequent section, we conducted an in-depth examination of health spending in the Philippines. We examine the pattern and distribution over time and the different financing sources, and then benchmark it with other countries.

5.1 *Population health and health spending*

Infant mortality rate (IMR), which is the most sensitive marker for population health, have improved in recent decades. IMR declined almost threefold from 1960 to 2019. Despite progress, however, the country has plenty of room for improvement. IMR remains below average for upper middle-income countries (UMIC), the projected level of economic development of the Philippines by 2023. The country has had the slowest decline in IMR compared to its regional ASEAN peers.

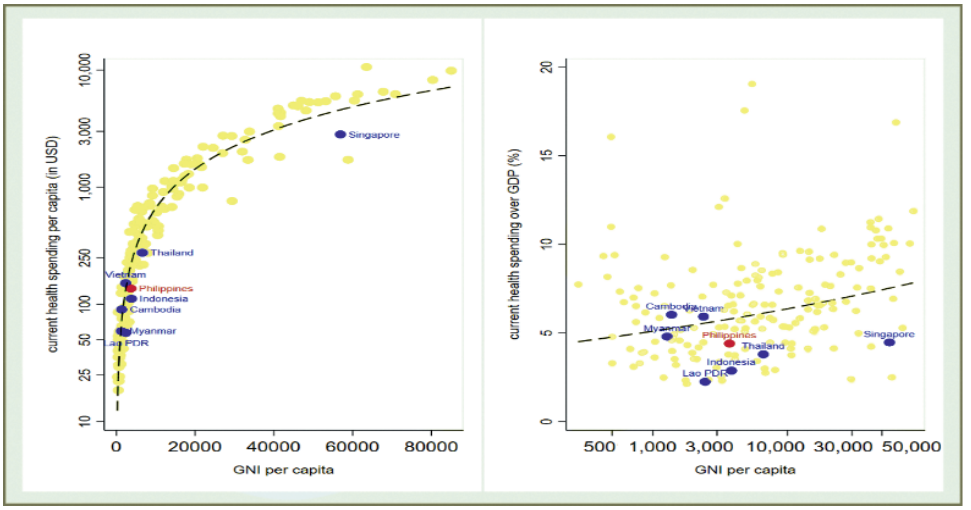
Health spending remains a critical component in improving health outcomes, which is the ultimate goal of any health system. Figure 9 shows the positive linear relationship of health spending per capita and infant mortality. The magnitude

Figure 9. Health spending per capita vis-à-vis infant mortality rate (2019)



Source: Analysis of World Development Indicators

Figure 10. Health spending in ASEAN countries (2019)



Source: Analysis of Global Health Expenditure Database

of association of health spending and population health outcomes (e.g., infant mortality rates) is fraught with possible bias because of uncontrolled factors such as social determinants of health and disease prevalence. However, health expenditure consistently predicts health outcomes and an important measure of the nation's level of health investment.

5.2. *Health spending trends in the Philippines*

Health spending in the Philippines remains low compared to aspirational peers. In 2019, the Philippines spent PhP 885 billion or USD 150 per capita. While the country's health spending is relatively higher than lower middle-income countries, it is considered low compared to Thailand (USD 296 per capita), for instance, which is one of the countries that have successfully implemented universal health care. In connection to this, the Philippines is in the bottom of the pack when compared to upper middle-income countries (USD 500 per capita) (see Fig. 10).

In examining health spending, it is critical to observe the pattern of different sources. The way health care is financed varies considerably across countries. The sources of spending can be categorized into three: public, private (e.g., household out-of-pocket or OOP and other private sources), and other sources (e.g., external funding). To improve access to health care services, public spending should be the major source and private out-of-pocket spending should be minimal (WHO, 2018).

Public spending is critical in achieving the goals of UHC. Countries that have successfully implemented UHC have a high share of public spending and low OOP spending. In Thailand, for instance, 80.0 percent of health spending are accounted for by public sources and the rest are by private OOP. In recent years, the share of OOP spending has been declining, whereas public spending has been increasing. This pattern follows the concept of a health financing transition observed globally, in which as countries become richer, the share of OOP spending declines and public spending increases (Fan & Savedoff, 2014). Figure 11 shows the share of different sources of health spending.

Public spending on health has vastly improved in the Philippines. In the recent decade, public spending on health per capita has increased from USD 32 in 2010 to USD 60 in 2019 (in 2019 constant). This is largely attributed to the increase in the budget allocated to the health sector from earmarked sin tax revenues starting in 2013, which was used to finance key sectoral programs (e.g., Health Facilities Enhancement Program, PhilHealth premium subsidy). Also, the improvement of the country's macro-fiscal environment and a robust economic growth have catapulted public spending on health. The sustained increase in public spending on health in recent years has resulted in a decline in the share of OOP spending. However, despite these improvements, public spending on health remains low compared to other countries in the region. Thailand and Malaysia spent four times more than the Philippines in 2019 (see Fig. 12). The country's public spending on health accounts for about 1.5 percent of GDP, which is significantly lower than that of Thailand, Vietnam, Singapore, and Malaysia (WHO, 2022).

The COVID-19 pandemic has compelled the government to spend more on health to strengthen the country's public health response. As shown in Fig. 11, the share of public spending on health has increased to 46.0 percent in 2020 from 40.0 percent in previous years. The pandemic could be an important catalyst for the government to further increase fiscal space for health. The government's commitment to UHC, an important political agenda, would also set off more budget allocation in the health sector. However, critical questions remain: Can the government truly sustain more public spending in the medium- to long-term? At what expense? The pandemic has unfortunately severed the country's economic output, which resulted in lower tax revenues and higher budget deficits and government debt.

Curative care accounts for the majority of health care spending in the country. Data from the National Health Accounts (NHA) show that from 2014 to 2019, almost half (41.0 to 43.0 percent) of current health spending in the country are spent on hospitals (Table 7). This is followed by spending on retailers and other providers of medical goods (around 30.0 to 33.0 percent of health spending), which include drug stores and other sellers of medical goods. Spending for primary preventive care does not even account for 10.0 percent of the total health spending. Even if this is combined with the share of ambulatory health care (which are mostly outpatient in nature), the highest total share would only be 13.0 percent (PSA, 2022; Uy et al., 2022).

Figure 11. Health spending by source, Philippines (2014-2020)

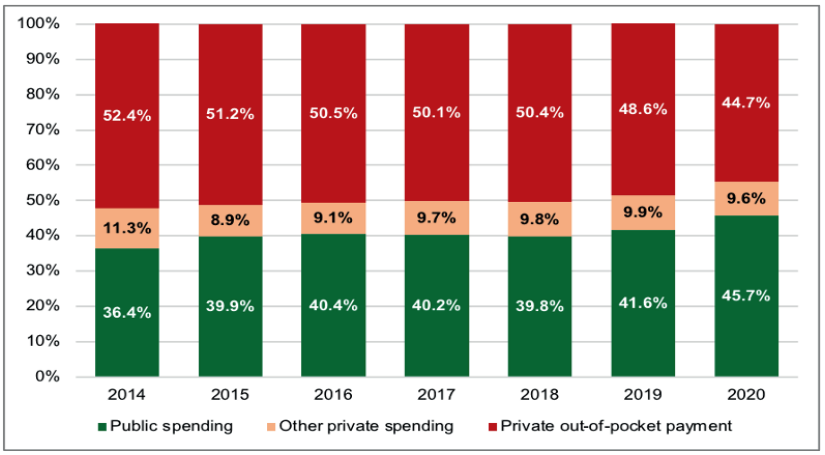
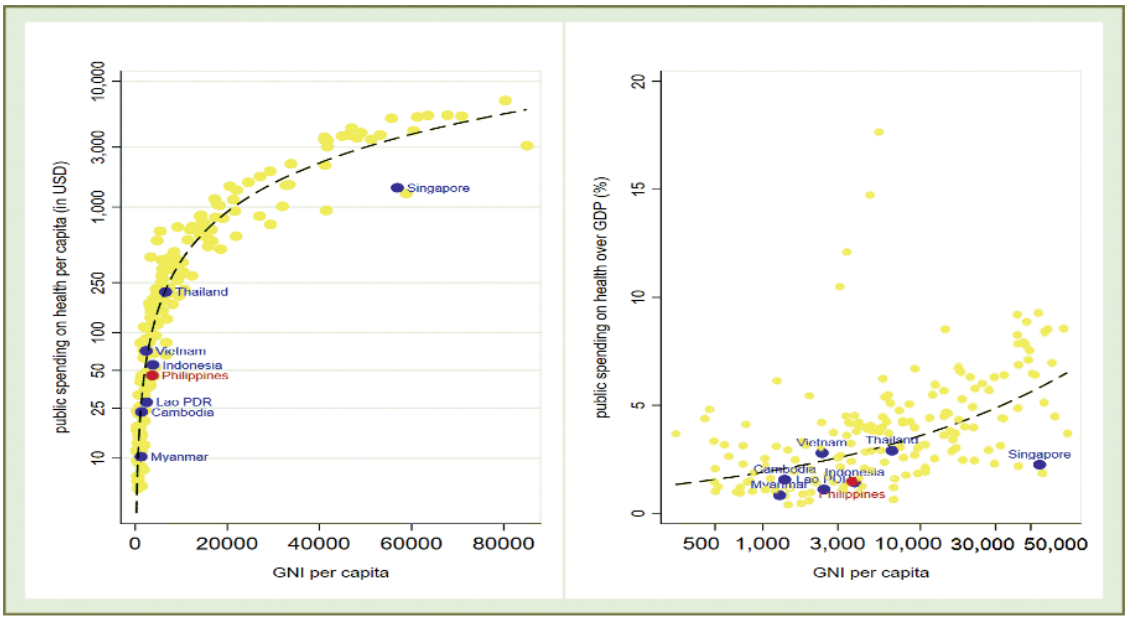


Table 7. Percent distribution of total health care expenditures, by health care provider (2014-2019)

Health care provider	2014	2015	2016	2017	2018	2019
Total expenditure (PhP billion)	489.1	543.6	598.5	655.7	714.8	792.6
Hospitals	41.0	43.0	41.2	41.2	42.1	43.6
Public general hospitals	15.9	17.4	16.7	16.7	18.0	19.0
Private general hospitals	16.7	17.4	16.6	16.2	15.7	16.1
Specialized hospitals (other than mental health hospitals)	2.4	2.7	2.5	2.4	2.6	2.6
Other hospitals	6.0	5.5	5.5	5.9	5.9	5.8
Preventive health care	8.0	8.7	9.1	9.2	7.1	7.3
Ambulatory health care	4.2	4.5	4.3	4.2	4.3	4.4
Retailers and other providers of medical goods	33.1	32.4	32.1	31.7	32.2	30.3
Other providers	13.6	11.5	13.3	13.7	14.2	14.3

Sources: PSA, 2020; Uy et al., 2022

Figure 12. Health spending and gross national income of ASEAN countries (2019)



Source: Analysis of Global Health Expenditure Database

6. Summary and policy recommendations

Our findings suggest that, in general, there is a positive association between health spending and the economic indicators of labor productivity. In terms of per capita GDP, public and private health expenditures are found to be positively related to this measure of labor productivity for both cross-country and across Philippine region regressions. For ASEAN country estimations, life expectancy and investments (as measured by gross capital formation) are also found to be positively associated with GDP per capita. These are consistent with the theory that a longer life expectancy is associated with a longer period of productivity, whereas NGT predicts that investment in physical capital leads to economic growth.

For the regional results, the only other significant variable is the proportion of those of working age, which is negatively associated with RGDP per worker. That is, as the proportion of those who are of working age increases, all else remaining the same, RGDP is expected to decrease. This is consistent with the idea in NGT that, as population increases more rapidly, workers will have reduced productivity if investments in capital do not keep up to equip the expanding workforce.

Overall, the study contributes to the growing literature on health care expenditure and economic performance. The results reinforce the need for the government to allocate resources in key areas (i.e., the health sector) that can stimulate economic growth while also improving population well-being. In light of the potential benefits of health care to the economy, the government should consider the following policy recommendations:

a) Facilitate the implementation of the UHC Act. Under the UHC Act, the government aims to increase public spending on health (both nationally and locally) to provide health care access to all Filipinos regardless of socioeconomic status. Given the findings of this study, the implementation of the UHC Act should not be considered a health sectoral agenda alone, but also part and parcel of the country's policy to improve economic productivity. While the UHC Act provides the legal framework, critical components of the law have yet to be implemented, including mobilization of health resources and reforms to the Philippine Health Insurance Corporation (PhilHealth).

b) Spend on cost-effective interventions. While the level of public spending on health matters, the type of spending is critical. The government should invest more on improving primary and preventive care, which is more efficient and effective on improving health outcomes compared to curative or hospital-based care. Studies have shown that robust primary care is more likely to lead to healthier employees (e.g., reduced absenteeism) and a healthier population, in general.

c) Invest in strategic physical capital (infrastructure). The ASEAN cross-country regressions showed that lagged investments (gross capital formation) make an impact on labor productivity. This would provide the infrastructure needed to encourage businesses and equip workers with the necessary equipment/tools/technology to be more productive.

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Annex 1

Annex 1.1.a. Granger causality test across countries.

Equation	Excluded	Chi²	df	Prob > chi²
ln (GDP per capita)	ln (public health expenditure per capita)ln (private health expenditure per capita)	0.000	5	1.000
		0.000	5	1.000
	All	0.000	10	1.000
ln (public health expenditure per capita)	ln (GDP per capita)ln (private health expenditure per capita)	0.000	4	1.000
		0.000	5	1.000
	All	0.008	9	1.000
ln (private health expenditure per capita)	ln (GDP per capita)	0.000	4	1.000
	ln (public health expenditure per capita)	0.000	5	1.000
	All	0.004	9	1.000

Annex 1.1.b. Granger causality test across countries with annual GDP growth as the dependent variable.

Equation	Excluded	Chi²	df	Prob > chi²
Annual growth rate	ln (public health expenditure per capita)	4.614	5	0.465
	ln (private health expenditure per capita)	1.694	5	0.890
	All	6.979	10	0.727
ln (public health expenditure per capita)	Annual growth rate	4.670	5	0.457
	ln (private health expenditure per capita)	4.107	5	0.534
	All	6.749	10	0.749
ln (private health expenditure per capita)	Annual growth rate	7.389	5	0.193
	ln (public health expenditure per capita)	8.670	5	0.123
	All	15.483	10	0.115

Annex 1.1.c. Granger causality test across Philippine regions.

Equation	Excluded	Chi²	df	Prob > chi²
ln (labor productivity)	ln (total public health spending per capita)	35.189	5	0.000
	All	35.189	5	0.000
ln (total public health spending per capita)	ln (labor productivity)	31.831	5	0.000
	All	31.831	5	0.000

H_0=Excluded variable does not Granger-cause Equation variable
H_a=Excluded variable Granger-causes Equation variable

Annex 1.1.d. Granger causality test across Philippine regions, with labor productivity growth rate as the dependent variable.

Equation	Excluded	Chi²	df	Prob > chi²
Labor productivity growth rate	ln (total public health spending per capita)	2.693	5	0.747
	All	2.693	5	0.747
ln (total public health spending per capita)	Labor productivity growth rate	0.873	5	0.972
	All	0.873	5	0.972

H_0=Excluded variable does not Granger-cause Equation variable
H_a=Excluded variable Granger-causes Equation variable

Annex 1.2.a. Test between fixed effects or random effects (Hausman test).

	(b) Fixed	(B) Random	(b–B) Difference	sqrt(diag(V_b-V_B)) S.E.
Public health expenditure	–0.3054326	–1.58921	1.283777	1.044321
Private health expenditure	1.193934	1.750039	–0.5561046	1.281627
Mortality rate	0.0054456	0.036462	–0.0310165	0.1319196
Life expectancy	–0.1931847	0.2851886	–0.4783733	0.4687552
Fertility rate	–0.2115507	–0.1006974	–0.1108533	1.801088
Gross capital formation				

Dependent variable: GDP growth rate (Y=GDP annual growth rate)
b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic

$$chi2(5) = (b - B)' [(V\_b - V\_B \hat{} (-1)] (b - B) = 2.37$$

$$Prob > chi2 = 0.8827$$

(V_b – V_B is not positive definite)

Annex 1.2.b. Regression results, with annual GDP growth rate as the dependent variable.

Variables	(1) Annual GDP growth	(2) Annual GDP growth	(3) Annual GDP growth	(4) Annual GDP growth	(5) Annual GDP growth	(6) Annual GDP growth	RE Annual GDP growth
Public health expenditure	–0.826***	–1.398***	–1.756***	–1.434***	–1.308**	–1.589**	–1.589**
	(0.236)	(0.293)	(0.501)	(0.517)	(0.593)	(0.635)	(0.635)
Private health expenditure		1.502***	1.458***	1.584***	1.498***	1.750***	1.750***
		(0.498)	(0.501)	(0.495)	(0.535)	(0.572)	(0.572)
Lag mortality rate			–0.0295	0.0472	0.0545	0.0365	0.0365
			(0.0335)	(0.0507)	(0.0536)	(0.0555)	(0.0555)
Lag life expectancy				0.274*	0.310*	0.285*	0.285*
				(0.138)	(0.161)	(0.162)	(0.162)
Lag fertility rate					0.194	–0.101	–0.101
					(0.440)	(0.502)	(0.502)
Lag investment						–1.417	–1.417
						(1.173)	(1.173)
Constant	9.108***	4.431**	7.050**	–16.63	–20.04	–19.05	–19.05
	(1.129)	(1.884)	(3.521)	(12.42)	(14.68)	(14.65)	(14.65)
Observations	75	75	75	75	75	75	75
R-squared	0.144	0.240	0.248	0.288	0.290	0.305	0.305

*Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*
Note: Regression for (1)-(6) OLS, (7) random effects model

Annex 1.2.c. Diagnostic test using Breusch Pagan test.

	Var	sd = sqrt(Var)
GDP growth rate	3.334685	1.826112
e	2.582334	1.606964
u	0	0

Test: Var(u) = 0
chibar2(01) = 0.00
(Prob >chibar2) = 1.0000

Note: If we fail to reject the null hypothesis, then random effects model is not appropriate to use.

Annex 2

Annex 2a. Results of the Hausman (sigmamore) diagnostic test for fixed effects

	(b) Fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
ln (total public health spending per capita lagged 5 years)	0.2000805	0.195157	0.0049236	0.0017591
ln (gross capital formation/RGDP lagged 5 years)	–0.052383	–0.0595584	0.0071754	0.0056794
Fertility rate lagged 5 years	0.0093043	0.009027	0.0002773	0.0021569
Infant mortality rate lagged 5 years	–0.0003107	0.0069506	–0.0072613	0.0020168
Age (proportion of working age)	–1.602296	–1.559836	–0.0424595	0.0116214
Education (percent share of employed that are at least college graduates)	–1.193857	–0.7715342	–0.422323	0.0933768

b = consistent under Ho and Ha;obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(6) = (b – B)' [(V_b –V_B ^ (–1)] (b – B)
= 21.28
Prob > chi2 = 0.0016

Annex 2b. Philippine regional regression with an education variable

Variables	(1) ln (labor productivity)	(2) ln (labor productivity)	(3) ln (labor productivity)	(4) ln (labor productivity)	(5) ln (labor productivity)	(6) ln (labor productivity)
ln (total public health spending per capita lagged 5 years)	0.151***	0.157***	0.151***	0.156***	0.177***	0.200***
	(0.0240)	(0.0293)	(0.0427)	(0.0384)	(0.0150)	(0.0207)
ln (gross capital formation/RGDP lagged 5 years)		–0.0362	–0.0347	–0.0379	–0.0553	–0.0524
		(0.0591)	(0.0603)	(0.0565)	(0.0393)	(0.0443)
Fertility rate lagged 5 years			–0.0132	–0.0116	0.00820	0.00930
			(0.0471)	(0.0448)	(0.0150)	(0.0118)
Infant mortality rate lagged 5 years				0.00858	0.00273	–0.000311
				(0.0124)	(0.0108)	(0.00978)
Age (proportion of working age)					–1.528***	–1.602***
					(0.142)	(0.0969)
Education (percent share of employed that are at least college graduates)						–1.194***
						(0.403)
Constant	11.72***	11.62***	11.76***	11.61***	12.41***	12.52***
	(0.156)	(0.264)	(0.647)	(0.573)	(0.255)	(0.218)
Observations	96	96	96	96	96	96
Number of regions	16	16	16	16	16	16
Within R-squared	0.5421	0.5448	0.5470	0.5509	0.8020	0.8246
Between R-squared	0.0004	0.0004	0.0006	0.1480	0.0090	0.3711
Overall R-squared	0.0214	0.0268	0.0279	0.1148	0.0543	0.0252

Robust standard errors in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

Annex 3

Annex 3a. Results of the Hausman (sigmamore) diagnostic test for fixed effects

	(b) Fixed	(B) Random	(b–B) Difference	sqrt(diag(V_b–V_B)) S.E.
ln (total public health spending per capita lagged 5 years)	0.6539724	–0.6421563	1.296129	1.370628
ln (gross capital formation/RGDP lagged 5 years)	–6.170997	–2.917183	–3.253814	4.642971
Fertility rate lagged 5 years	4.839818	1.547819	3.291999	1.846261
Infant mortality rate lagged 5 years	–0.304037	–0.2304344	–0.0736093	0.974511
Age (proportion of working age)	–56.6649	–26.35711	–30.30779	11.2921

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic

$$chi2(5) = (b - B)' [(V\_b - V\_B \hat{} (-1)] (b - B)$$
$$= 9.55$$
$$Prob > chi2 = 0.0889$$

Annex 3b. Breusch and Pagan Lagrangian multiplier test for random effects

	Var	sd = sqrt(Var)
Labor productivity growth rate	45.81395	6.768601
e	43.86835	6.623319
u	0	0

Test: Var(u) = 0 = 0.00
chibar2(01)
(Prob >chibar2) = 1.0000

Note: If we fail to reject the null hypothesis, then random effects model is not appropriate to use.

Annex 3c. Philippine regional regressions, using labor productivity growth rate as the dependent variable

Variables	(1) OLS Labor productivity growth rate	(2) OLS Labor productivity growth rate	(3) OLS Labor productivity growth rate	(4) OLS Labor productivity growth rate	(5) OLS Labor productivity growth rate	(6) RE Labor productivity growth rate
ln (total public health spending per capita lagged 5 years)	–1.600	–1.285	–0.869	–1.018	–0.642	–0.642
	(1.342)	(1.593)	(1.628)	(1.641)	(1.741)	(1.350)
ln (gross capital formation/RGDP lagged 5 years)		–2.091	–1.893	–2.009	–2.917	–2.917
		(3.291)	(3.286)	(3.284)	(3.474)	(3.018)
Fertility rate lagged 5 years			1.514**	1.599**	1.548**	1.548***
			(0.700)	(0.705)	(0.702)	(0.480)
Infant mortality rate lagged 5 years				–0.189	–0.230	–0.230
				(0.182)	(0.186)	(0.194)
Age (proportion of working age)					–26.36**	–26.36***
					(11.54)	(9.232)
Constant	14.43	9.029	–4.217	–1.909	12.81	12.81
	(8.816)	(14.42)	(16.34)	(16.79)	(12.95)	(9.789)
Observations	96	96	96	96	96	96
Number of regions	16	16	16	16	16	16
R-squared	0.015	0.025	0.054	0.059	0.079	
Within R-squared						0.1479
Between R-squared						0.0238
Overall R-squared						0.0788

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Annex 4

Annex 4a. Results of the Hausman (sigmamore) diagnostic test for fixed effects

	(b) Fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
ln (total public health spending per capita lagged 5 years)	1.553574	0.019127	1.534447	1.594347
ln (gross capital formation/RGDP lagged 5 years)	–6.058946	–3.19299	–2.865957	4.64141
Fertility rate lagged 5 years	4.882161	1.454176	3.427984	1.846861
Infant mortality rate lagged 5 years	–0.4205146	–0.0482069	–0.3723077	0.96221282
Age (proportion of working age)	–59.51251	–25.85779	–33.65471	11.85984
Education (percent share of employed that are at least college graduates)	–45.66519	–20.12088	–25.5443	52.52164

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho;obtained from xtreg
Test: Ho: difference in coefficients not systematic

$$chi2(6) = (b - B)' [(V\_b - V\_B \hat{} (-1)] (b - B)$$
$$= 11.73$$
$$Prob > chi2 = 0.0683$$

Annex 4b. Breusch and Pagan Lagrangian multiplier test for random effects

	Var	sd = sqrt(Var)
labor productivity growth rate	45.81395	6.768601
e	44.08584	6.639717
u	0	0

Test: Var(u) = 0
chibar2(01) = 0.00
(Prob >chibar2) = 1.0000

Note: If we fail to reject the null hypothesis, then random effects model is not appropriate to use.

Annex 4c. Philippine regional regressions, using labor productivity growth rate as the dependent variable and with education variable

Variables	(1) OLS Labor productivity growth rate	(2) OLS Labor productivity growth rate	(3) OLS Labor productivity growth rate	(4) OLS Labor productivity growth rate	(5) OLS Labor productivity growth rate	(6) OLS Labor productivity growth rate	(7) RE Labor productivity growth rate
ln (total public health spending per capita lagged 5 years)	–1.600	–1.285	–0.869	–1.018	–0.642	0.0191	0.0191
	(1.342)	(1.593)	(1.628)	(1.641)	(1.741)	(1.768)	(1.419)
ln (gross capital formation/RGDP lagged 5 years)		–2.091	–1.893	–2.009	–2.917	–3.193	–3.193
		(3.291)	(3.286)	(3.284)	(3.474)	(3.419)	(2.918)
fertility rate lagged 5 years			1.514**	1.599**	1.548**	1.454**	1.454***
			(0.700)	(0.705)	(0.702)	(0.700)	(0.452)
infant mortality rate lagged 5 years				-0.189	–0.230	–0.0482	–0.0482
				(0.182)	(0.186)	(0.272)	(0.218)
age (proportion of working age)					–26.36**	–25.86**	–25.86***
					(11.54)	(11.57)	(9.457)
education (% share of employed that are at least college graduates)						–20.12	–20.12
						(19.83)	(12.84)
Constant	14.43	9.029	–4.217	–1.909	12.81	9.440	9.440
	(8.816)	(14.42)	(16.34)	(16.79)	(12.95)	(13.05)	(10.56)
Observations	96	96	96	96	96	96	96
Number of regions	16	16	16	16	16	16	16
R-squared	0.015	0.025	0.054	0.059	0.079	0.086	
Within R-squared							0.1542
Between R-squared							0.0698
Overall R-squared							0.0858

Robust standard errors in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

10 | The Impact of COVID-19 on the Retirement System for Private Sector Workers in the Philippines

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UP School of Economics

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10 | The Impact of COVID-19 on the Retirement System for Private Sector Workers in the Philippines

Renato E. Reside, Jr.[1]

1. Introduction

When the COVID-19 pandemic began in early 2020, the Philippine economy was experiencing relative stability and had not experienced a recession since the Asian Financial Crisis in 1997 nor a deeper crisis since the pre-EDSA Revolution years in 1984-1985. The pandemic shocked markets for output and inputs simultaneously in 2020, producing a downturn from which the economy has not completely recovered in 2021.

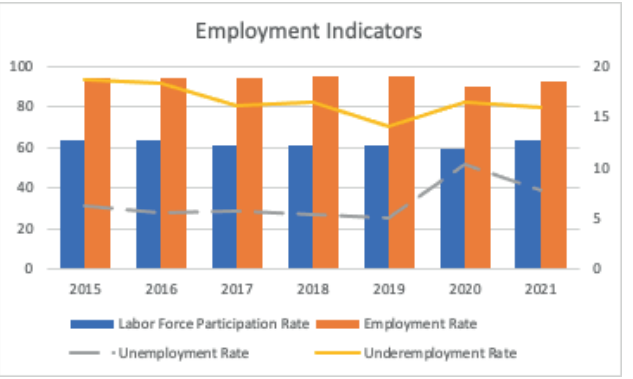
The domestic labor market was not spared. Labor supply and productivity declined due to the combined effect of corporate layoffs, lockdowns, and fear on worker mobility and workers coming down with COVID-19. Labor demand fell because of lockdowns and fear of decreased demand for goods and services. Enterprises, especially in the most vulnerable sectors, started to feel the strain of declining revenues while continuing to pay for wages and other overhead expenses.

In mid-2020, the Department of Labor and Employment introduced wage subsidies for firms in a bid to stem the pain of increased unemployment. Amid these efforts, the unemployment rate doubled in 2020, and remained elevated in 2021. Underemployment levels also increased (see Fig. 1). In addition to retrenchment of workers, the pandemic also reduced average wage by around 9 percent in 2020 compared to 2018 levels. The reduction of wages and increase in layoffs would combine to reduce average pension contributions by employed workers in 2020.

While the pandemic had very visible effects on unemployment and underemployment, it also had, though less, visible but significant impacts on the Philippine retirement system. The effects are expected to last several years into the future of many of today's workers.

This paper looked at several methodologies to investigate the impact of the COVID-19 crisis on the retirement system in the Philippines. A combination of regression analysis and evaluation of newspaper and press releases was used to assess the impact of the crisis on contributions to the Philippines' Social Security System (SSS). Valuation of vested retirement benefits under the formula embedded in the Retirement Pay Law was analyzed using spreadsheet

Figure 1. Employment indicators[2]



Source: Philippine Statistics Authority (PSA)

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[2] PSA defines the labor force participation rate (LFPR) as the fraction of the working-age population 15 years and over. Meanwhile, employment rate (ER) is a fraction of total labor force. Hence, the orange bar (ER) is higher than the LFPR; ER and LFPR have different denominators.

analysis. International accounting rules and standards were also very useful in grasping how the adoption of new rules made an impact on the SSS balance sheet.

The following is a summary of the effects of the crisis on the retirement system:

- The pandemic forced SSS to realign its assets away from investible assets to more social interventions that directly address contingencies faced by their members. Hence, SSS benefits veered away from traditional pensions into member loans and insurance.
- SSS contributions and compliance rates dropped. These effects on the SSS balance sheet, along with the social interventions cited in above reinforced the motive to seek liquidity.
- Workers joining the ranks of the newly unemployed lost all of their vested retirement benefits under Republic Act (RA) No. 7641, the Retirement Pay Law. These benefits are not portable and need policy change to reform.
- The effects of the pandemic offset the recent increases in SSS contribution rates in April 2019 and the institution of a new defined contribution (DC) scheme for higher paid workers in 2020.
- The SSS switched to a new accounting procedure in 2020, leading to greater provisions against future liabilities and losses as they were charged against income moving forward.

The rest of the paper is structured as follows. Section 2 looks at the state of the retirement system for private sector workers in the Philippines. Section 3 assesses the impact of the pandemic on the SSS. Section 4 describes the results of regression analysis performed using panel data to determine the impact of various factors on SSS contribution, especially the impact of the pandemic. Section 5 discusses the effect of the crisis on the Retirement Pay Law or RA 7641, which is the other source of retirement income for Filipino workers, as well as the Capital Market Development Act (CMDA), which attempts to remedy the non-portability of retirement benefits under the law. Finally, Section 6 offers policy advice based on the research done in this paper.

2. The retirement system for private sector workers in the Philippines

Private sector workers in the Philippines have two sources of retirement income. All workers in the private sector are eligible to become SSS members. If they are qualified members, employees who retire get SSS pension payments. In large part, the SSS determines its pension stream by applying a parametric formula, which it declares to its members. Hence, the regular SSS benefit scheme is a defined benefit (DB) scheme. The SSS DB scheme has operated for as long as the SSS has been in existence. By its nature, the DB scheme is a pure transfer from the current worker generation to the current cohort of retirees. Since the benefits are a pure transfer from one set of people to a different set of people, it does not qualify as a fully funded scheme.

In April 2019, the SSS increased its contribution rate from 11 percent to 12 percent. The maximum salary credit (MSC) would also increase from PhP 16,000 to PhP 20,000. In 2018, RA 11199, or the Social Security Act, was signed into law, paving the way for these changes.

The other source of retirement income for private sector workers is the mandatory lump sum benefit that qualified retirees can receive under RA 7641. The lump sum received by eligible workers is also determined by the formula in the law. Flows from this benefit have been undermined due to the pandemic crisis because all of the recently unemployed workers have lost their vested retirement benefits, as these are not portable under current law. This paper estimates the magnitude of this loss in vested benefits for a subset of the labor force that has high attrition rates, with or without a crisis.

It is important to study the private retirement income system at this time because the pandemic crisis has imparted stress on different aspects of the system. For the most part, the SSS contribution scheme is a pay-as-you-go (PAYG) scheme in which the current young worker cohort supports the current pensioner cohort through a direct intergenerational transfer. As in most cases, the actual level of funding via direct transfers is partial in nature and the scheme relies on reserves accumulated in the past to complete funding current pensions.

Since the DB formula is fixed by law, whether the scheme is sustainable depends on several factors, including demographic, financial, and institutional. The legal contribution rate and the integrity of accumulated reserves also play important roles in sustainability. Because SSS benefits are guaranteed but have no strict relationship with the value of contributions, a funding gap can develop in the long run.

Ideally, the funding gap should have been covered by increases in contributions, but SSS benefits have increased without corresponding increases in funding for the most part. From 1980 to 2020, the SSS increased its contribution rate four (4) times. Meanwhile pension benefits were increased 24 times. Furthermore, as life expectancy increases in the Philippines and as fertility rates decline, the number of workers supporting each pensioner is expected to continue to fall over time. This phenomenon will lead to pressure for the funding gap to rise further as the demand for SSS benefits increases over time because of the longer life of pensioners, combined with the decrease in contributions because of fewer workers. Moreover, the SSS has, in general (and more so because of the COVID-19 crisis), displayed a tendency for allocating assets to economically or socially targeted purposes, which may not have the highest financial returns.

The natural pressure on the funding gap over time makes it imperative that pension assets be invested in assets that earn a reasonable rate of return so that reserves are adequate to finance pension liabilities. If a financial crisis or any other event, such as the COVID-19 pandemic, undermines the pension reserves, it could raise the funding gap and threaten the long-term viability of the scheme. This in turn, threatens retirement income.

Sources of retirement income can help individuals satisfy the motive to smooth lifetime income. Recent research by Reside (2021) showed that the current structure of SSS benefits has a social dimension because of the way relative benefits are distributed across member beneficiaries from different income classes. Specifically, the research has shown the following attributes of the structure of SSS benefits.

- Under the current defined benefit formula, SSS replacement rates[3] are relatively skewed very much towards lower income workers. Higher income workers tend to have replacement rates that decline very rapidly as incomes rise.
- Replacement rates tend to be higher than international norms for workers below the minimum wage.

Because replacement rates tend to be much lower than cross-country norms for higher income SSS pensioners, the desired economic ideal of income smoothing across one's lifetime may not be necessarily achieved. This is especially so if the benefits received under RA7641 are inadequate. As for workers with lower career incomes, even if they have adequate to high SSS replacement rates by most norms, the SSS pension benefits are still probably inadequate given that the lifetime income base has always been low. Furthermore, other kinds of shocks (e.g., health, calamity) can easily erode the combined value of retirement benefits received under both laws. These factors, combined with uncertainty over one's exact life span after retirement, makes it important to assess whether the private retirement system is up to the task of serving the motive for income smoothing in light of the economic impact of the pandemic.

Perhaps to address the low replacement rates for higher income workers, the SSS, in 2021, introduced a mandatory provident fund for workers whose incomes were above PhP 20,000 per month. The new provident fund, mandated by the Social Security Act (SSA) of 2018, was meant to sustain the SSS in the long run, as it would provide a greater element of funding to an otherwise underfunded system. Under this scheme, workers would contribute a fraction of their salaries to an individual retirement account (over and above their contributions to the SSS DB scheme). The funds would accumulate over time in the account and be invested with returns accruing to the same individual.

Since SSS rules dictate only the fraction of one's monthly salary that will go into the personal account and not the benefit, the provident fund scheme is not a DB scheme. Rather, it is a DC scheme. Since the benefits paid out by this DC scheme come from accumulated work life pension contributions by the same individual, the scheme is a fully funded scheme (individuals who save for their own retirement and pension claims against anyone's account at retirement should always be backed by accumulated savings and returns). More details of the Mandatory Provident Fund (MPF) are in Annex A. The introduction of the MPF however, has no impact on the funding gap of the SSS, since contributions to the MPF go to individual accounts and not to the pool of reserves for the DB scheme (although it does increase SSS benefits).

Just prior to the pandemic, the SSS increased contribution rates and introduced a new DC scheme in early 2021, a provident fund for higher income workers (mandated by the SSA of 2018). The new provident fund was meant

[3] The replacement rate is the ratio of one's regular retirement income to one's regular pre-retirement income. Hence, it is a measure of the extent to which retirement income can "replace" or substitute for working age income.

to sustain the SSS in the long run, as it would provide a greater element of funding to an otherwise underfunded system.

The onset of the pandemic in early 2020, and the ensuing lockdowns, set off a chain of events that weakened some of the benefits of recent changes in the structure of the SSS DB scheme. The economic crisis exposed the funding gap to a host of risks. These will be discussed in the next section.

To improve funding levels post-pandemic, there are the usual options for DB schemes: (A) cutting benefits by introducing changes to the parametric formula; (B) increasing contribution rates; (C) raising the retirement age; and (D) increasing investment returns of the existing fund. Add to this the consideration of intensifying further the switch to DC schemes of a greater portion of the pension system.

3. Pandemic impact on the Social Security System

Being funded straight out of worker and firm contributions, it would be reasonable to expect the SSS to be quite sensitive to general economic conditions in the Philippines. Below is a graph of quarterly real GDP growth in the country from 2018 to 2020, the time horizon for which SSS data is available for this study. Growth dropped to its lowest level in the 3rd quarter of 2020 and was still negative in the last quarter of that year. The economy did not start experiencing positive growth rates until 2021.

3.1 *Pre-pandemic conditions at the SSS*

Note from Fig. 2 that, before the pandemic, the country had been growing at stable and relatively healthy real rates. These are good circumstances for any pay-as-you-go, partially funded pension system because it presumably allows reserves to grow. As employment levels rise, so do membership and contributions. Hence, the growth of reserves also alleviates the SSS funding gap. The Social Security Act of 2018 also improved funding conditions at SSS since it allowed increases in SSS contribution rates and the coverage of certain types of workers mandatory.

Sources of information about the SSS during the pandemic come from SSS financial reports (to the Commission on Audit, COA) and newspaper reports. The table in Annex B shows the pre-pandemic performance of the SSS in terms of coverage and growth in coverage (since 2000).

3.2 *Impact on SSS coverage*

A graph of SSS member coverage (defined as registered members eligible for at least one SSS benefit) as well as its annual rate of growth is shown in Fig. 3. The level of SSS member coverage in numbers is shown in vertical bars, while the rate of growth is graphed as a solid line.

Figure 3 shows that SSS coverage was increasing steadily in numerical terms. However, the annual rate of growth of SSS coverage was quite volatile during the period. It gradually declined from 2015-2019, then spiked in 2020, and then precipitously fell in 2021 (see orange line). The increased growth rate in coverage in 2020 was primarily due to the SSS making a conscious effort to increase membership to offset the negative effects of the pandemic on domestically employed members. From 2019 to 2021, the program focused on encouraging more membership from

self-employed workers and overseas Filipino workers (OFWs). This was consistent with the mandate it received under RA 11199. Under this Act, the SSS coverage was made compulsory to all sea-based and land-based OFWs as defined under RA 8042, or the Migrant Workers and Overseas Filipinos Act of 1995, as amended by RA 10022, provided they are not over 60 years of age. Table 1 shows how the structure of SSS covered members has been changed by the crisis, with OFWs and self-employed coverage increasing rapidly from 2019-2020. Despite this, however, the annual rate of change in coverage slowed in 2021, perhaps due to the cumulative effects of the pandemic.

3.3 Impact on SSS compliance

The table in Annex B lists the number of contributing members to SSS from 2000 to the present, wherever data is available. The graph below summarizes the data. Note the volatility in compliance growth occurring during the global financial crisis from 2009 onwards. Volatility returned during the COVID-19 crisis.

While the recent increases in numbers and growth rates of SSS members (Table 1) was a good indication for the institution during the height of the pandemic, other aspects of SSS operations were not. Specifically:

1. Figures from the SSS suggest a strong decline in terms of paying SSS members. The fall in compliance, measured as the number of paying (contributing) SSS members, is manifested on the right side of the graph in Fig. 1 and in Table 2.
2. Compliance among employers also fell abruptly, as the Commission on Audit (COA) recently noted that over 900,000 employers were not compliant with SSS remittance rules. COA also noted that the value of outstanding contributions amounted to PhP 321.5 billion. The number of delinquent accounts was almost twice the number recorded in 2019. The number of delinquent employers was probably even greater, given the large drop in compliant paying members in mid-2021.

The number of paying SSS members has steadily declined since 2019 primarily because of the pandemic, as former paying members have been laid off or physically unable to make contributions despite efforts to further facilitate online payments. The decline in numbers of paying members is visible across member categories, from SSS members who are employed, self-employed, voluntary, and even OFWs. Since 2019, the largest declines in paying members have occurred among the self-employed and among OFWs, both of which declined by more than half. The overall decline across all paying members from 2019 to May 2021 is around 30 percent. The very large decline in compliance from 2019 to mid-2021 is a great cause for concern. Compliance also declined among employers, as cited by the COA (Ku, 2021).

The decline in paying members reflects the intense labor market pressures faced by workers and firms since early 2020 and this is reflected in Fig. 1. Like many economies around the world, the Philippine economy was itself hit by adverse and large aggregate supply and demand shocks because of the COVID-19 pandemic. These shocks, as well as the persistence of the lockdowns and the

Figure 2. Quarterly economic growth

Source: PSA

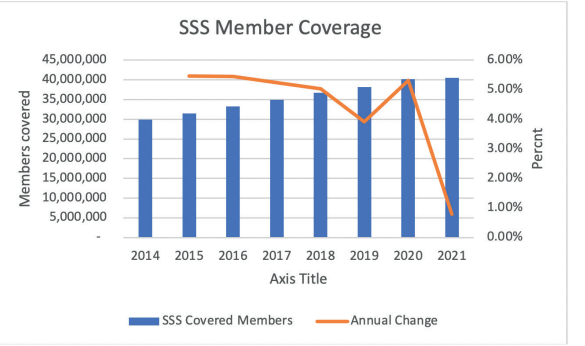
virus, led to many firms experiencing a severe liquidity crunch. In response, firms closed or let workers go, or both, negating the requirement for firms to contribute to SSS on behalf of the newly unemployed workers. It is also possible that many self-employed workers lost the means to continue contributions.

Overall, the number of paying SSS members declined by 10.9 percent from 2019 to 2020. The largest percentage declines in paying membership occurred among the self-employed (–30.4 percent), OFWs (–21 percent), and voluntary members (–12.4 percent). On the other hand, the total number of SSS pensioners continued to increase. The simultaneous occurrence of the sharp decrease in paying members and their contributions and the rising number of pensioners has likely raised the funding gap in the short run.

As of May 2021, there were a total of 40.52 million SSS members covered. Of them, 8.3 percent or 3.36 million were self-employed and 12.5 percent or 5.07 million were voluntary members. However, by that time, SSS also reported that only 12.3 million of its members were continuous contributors, which is 13.6 percent lower than the figure reported in May 2020. The latest tally of contributors was 9.6 million employed members, accounting for 78 percent of the total. It is followed by 1.9 million voluntary paying members, 476,000 self-employed members, and 333,000 OFWs.

SSS pensioners totaled 2.82 million as of December 2020, comprising 1.72 million retiree-pensioners, survivorship-pensioners from 1.02 million deceased members, and 0.08 million total and partial disability-pensioners. In addition, there were 17,958 Employees'

Figure 3. SSS member coverage



Source: Social Secuirty System (SSS)

Compensation (EC) pensioners made up of 16,364 survivorship pensioners and 1,594 disability pensioners. The SSS manages the EC funds.

Even with the SSS extending their premium payment deadlines throughout the pandemic period, the pressure brought about by the mandatory nature of contributions and other burdensome overhead costs in addition to the very weak economy led to a sudden and large-scale rise in unemployment and a large concomitant drop in paying members. Given the large drop in the number of paying members, it would not be surprising if total contributions declined as well. The decline in the value

of SSS contributions from 2019 to mid-2021 is confirmed in the tables found in the next section.

3.4 Impact of the pandemic on the value of contributions to the SSS

While the previous section detailed the large decline in compliance in terms of the number of paying workers and firms due to the pandemic, this section will describe the decline in the value of payments or contributions.

The reduction in compliant members and firms during the pandemic led to a concomitant drop in SSS contributions, which fell by around 8 percent in 2020. Aggregate contributions per member decreased by around PhP 17 billion, from PhP 223.5 billion in 2019 to PhP 206.1 billion in 2020.[4] The average value of contributions lost per worker who stopped contributing in 2020 was estimated to be around PhP 11,365.71.

A more detailed picture of the effect of the pandemic on contributions to the SSS is shown in Table 3. It shows the impact of the pandemic on contributions per type of worker from 2019-2020.

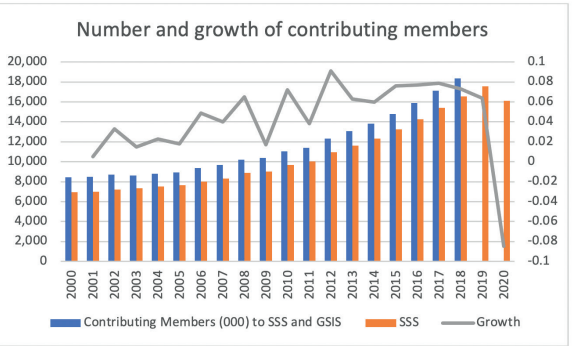
Table 1. Number of covered SSS members

Year	2019	2020	2021
Covered members (million)	38.17	40.2	40.52
Employed members (million)	30.05	30.53	30.77
OFWs (million)	1.19	1.33	1.34
Self-employed (million)	2.53	3.3	3.36
Voluntary (million)	4.4	5.08	5.07
Employers (thousand)	973.4	994	n.a.

Source: SSS; n.a. means not available

The numbers show that contributions fell across the board in 2020, with self-employed workers and voluntary paying members bearing the brunt of the fall.

Figure 4. Number and growth of contributing SSS members



Source: SSS

The decline in SSS revenue was not limited to aggregate contributions. Investment and other income also decreased in 2020, as seen in Table 4. On the expense side, benefit payments declined as well. The pandemic's effects and the switch to the new accounting methods extended the period within which SSS net revenues were negative. The decline in SSS net revenues was larger in 2020 than in 2019.

Investments and other income consolidated under the SSS fell by 30.2 percent in 2020, from PhP 46.0 billion in 2019 to PhP 32.1 billion in 2020. This, coupled with the decrease in contributions and the adoption of the Philippine Financial Reporting Standards (PFRS) 4, resulting in an increase in net policy reserves), led

[4] In 2019, SSS collections increased to PhP 220.4 billion in members' contribution, from PhP 181 billion in 2018, due to the increase in monthly contribution rate to 12 percent in April 2019.

to negative net revenues of PhP –427.7 billion in 2020 (see Table 4)[5]. The adoption of PFRS 4 by the SSS meant that the institution would have to estimate its future claims and add to it a margin for adverse deviation (MfAD).

The level and growth of worker contributions to the SSS also slowed down with the signing of RA 11548, which deferred the further increase in contribution rates from 12 percent to 13 percent in 2021. In May 2021, amidst continuing lockdowns, President Duterte signed a law granting him the power to defer increases in SSS premium contribution rates for the year. Under RA 11548, the deferment of the SSS contribution hikes would be effective "for the duration of the state of calamity" due to the COVID-19 pandemic. Republic Act 11548 amended RA 11199, the Social

Table 2. Number of paying SSS members, by category

Type of member	2019	2020	2021
Covered members	38,172,475	40,200,000	40,520,000
Employed members	30,047,091	30,530,000	30,770,000
Paying (compliant) members			**As of May 2021**
Employed	**13,072,858**	**11,984,336**	**9,600,000**
Regular	13,061,282	11,978,958	n.a.
Large account	6,698,676	6,099,500	n.a.
Branch account	6,362,606	5,879,458	n.a.
House help	11,576	5,378	n.a.
Self-employed	**1,137,411**	**791,409**	**476,000**
Voluntary	**2,754,504**	**2,412,626**	**1,900,000**
Separated	2,751,869	2,410,018	n.a.
Non-working spouse	2,635	2,608	n.a.
OFWs	**675,068**	**533,163**	**333,000**
Total paying members	**17,639,841**	**15,721,534**	**12,309,000**
Retirement pensioners	**1,588,795**	**1,716,063**	n.a.
Total pensioners	**2,630,808**	**2,820,492**	n.a.

Source: SSS

[5] From SSS (2020): SSC Resolution No. 123-s. 2021 dated 10 March 2021 approved the adoption of the PFRS 4 in the computation of the ICL for the CY 2020 financial statements and onwards and the use of the discount rate of 6 percent. Net change in policy reserves for CY 2020 is PhP 461.7 billion, representing 67.7 percent of the total expenses for the year. This is PhP 73.4 billion or 18.9 percent more than the CY 2019 provision of PhP 388.3 billion.

Security Act, which allowed the Social Security Commission, the governing body of the SSS, to implement the contribution rate hike. RA 11199 had mandated a one-percent contribution rate increase by SSS members every two years beginning 2019 until 2025. Hence, the contribution rate would have increased from 12 percent to 13 percent in January 2021, but the COVID-19 crisis and subsequent laws slowed its implementation. Full-year information about 2021 contributions was not yet available at the time of writing, but the large decline in paying members (Table 2) indicates another decrease in SSS contributions, which will be reflected in the yet unreleased 2021 Audited Financial Statements of SSS.

3.5 *Impact of the pandemic on SSS benefits*

Table 5 shows that there is a decrease in benefits paid out to members in 2020. Primarily because of the lockdowns, almost all classes of benefit payments made by the SSS to its members decreased in 2020. Figures from the SSS Annual Report for 2020 and Table 5 suggest that while retirement benefits increased by 1.6 percent to PhP 115.4 billion and maternity benefits increased by 0.8 percent to PhP 10.5 billion, the biggest increase in benefits were unemployment benefits, which increased by 860.9 percent to PhP 1.7 billion. This sharp increase represented a shift to providing contingency assistance to members affected by the pandemic.[6]

All other benefits declined, such as for disability, sickness, death, and funeral and medical services. On aggregate, benefit payments declined by PhP 1.2 billion in 2020 from PhP 196.1 billion to PhP 194.9 billion. Lockdowns, for the most part, prevented the timely filing and processing of many claims, leading to the decrease in benefit payouts.

3.6 *SSS investments and other income*

Table 6 lists annual observations on SSS investment and other income in recent years. Note that this variable has been somewhat volatile, rising in 2017, falling in 2018, rising again in 2019, and falling again in 2020. SSS investments and other income remained positive in 2020 but decreased by 23.35 percent because of the pandemic.

Part of the reason for the decline in SSS income in 2020 was the realignment of SSS assets away from investible funds and towards cash to prioritize assistance granted to members and pensioners in the form of lower-earning loans. The SSS deliberately sought to increase its liquidity, transforming part of its financial investments into credit for crisis-hit members. SSS member loan releases increased by 53.6 percent from PhP 40.6 billion in 2019 to PhP 62.3 billion in 2020. On the other hand, because of the recession and moratorium on loan repayments instituted by the government, repayments of member loans dropped by 13.9 percent to PhP 36.8 billion. Table 8 shows a breakdown of the components of the SSS investment portfolio in 2020.

[6] From SSS (2020): The unemployment or involuntary separation benefit is given to a qualified SSS member as provided under Section 14-B of RA 11199. A member who is not over 60 years of age and who has paid at least 36 months of contributions, 12 months of which should be in the 18-month period immediately preceding the involuntary unemployment or separation, shall be paid benefits in the form of monthly cash payments equivalent to 50 percent of the average monthly salary credit for a maximum of two months, provided that an employee subject to involuntary unemployment can only claim unemployment benefits once every three years and provided further that, in case of concurrence of two or more compensable contingencies, only the highest benefits shall be paid, subject to the rules and regulations that the SSC may prescribe.

Note that the principal components of the portfolio are government securities, member loans, equities, and properties. The relative weights in the SSS portfolio in Table 8 reflects the social motives of the SSS beyond its retirement income function. The SSS has a clear thrust to perform functions beyond providing pensions (e.g., member loans, housing loans). This may be a function of the low average incomes of most of its members and that domestic capital markets are still not well developed, since corporate bonds are still not a major component of the portfolio. The government can therefore do well to continue developing long-term capital markets to provide the SSS with alternative and high-earning instruments in which to invest. Long-term instruments tend to have higher returns than short-term instruments, and investment in such reduces the funding gap.

Judging by the pension asset portfolio in Table 8 and what is known about the structure of the SSS, the most significant risks of exposure are: (A) market risks, that is, price and interest and currency risks on investments in many financial instruments; (B) credit risks on loans and bond investments; (C) liquidity risk, which is inherent in investments in illiquid assets and can intensify during crises, depending on the marketability of its assets and the depth of financial markets; and (D) operational risk.

It is probably safe to assume that all of these risks got magnified during the economic crisis. The SSS bore and realized significant market risks in 2020, as evidenced by the losses in its investments, but it also started to bear increased credit risk (by its own policies) as it increasingly provided housing and calamity loans to eligible members. The deliberate increase in credit happened at the same time as the quality of its assets deteriorated. The SSS also acted as an automatic stabilizer in 2020 (but at the expense of its own liquidity) as it handed out PhP 1.7 billion in unemployment benefits, an 860.9 percent increase from that in 2019.

The current macroeconomic environment and shallow domestic financial market also limit the profitability of SSS investments. Interest rates have been held relatively low for more than a decade as risk premia and yields for many types of debt instruments have either declined or remained low, partly because of persistently loose monetary policies locally and abroad. Meanwhile, alternative instruments in the domestic capital market continue to lack depth. The number of listed shares in the Philippine Stock Exchange has not substantially increased in a while. Hence, the government is urged to continue to develop domestic financial markets to provide greater investment options for pension funds like the SSS.

3.7 Impact of the pandemic on broader SSS profitability

Table 9 lists select accounts from the 2020 audited financial statements (AFS)

Table 3. Value of aggregate contributions per type of worker, 2019-2020 (in million PhP)

Type of member	2019	2020	Percent change
Employed	193,329.88	179,104.13	–7.4
Self-employed	6,269.84	5,284.46	–15.7
Voluntary paying	15,843.35	14,276.79	–9.9
OFWs	8,062.57	7,472.70	–7.3
Total	**223,505.65**	**206,138.09**	**–7.8**

Source: SSS

of the SSS[7] and highlights the significant movements in those accounts. Note that major income accounts declined due to the pandemic in 2020. Income related to SSS investments (i.e., interest income, dividend income, and gains on financial assets) declined on aggregate in 2020. Dividend income increased by PhP 1 billion in 2020, but this was offset by lower income on interest and gains on financial instruments. The decline in investment-related income in 2020 occurred for two reasons: returns from the stock market and other instruments fell that year and funds devoted to investments in securities, including the rate of return, also declined in 2020.

The SSS recorded net losses of PhP 419.1 billion and PhP 324.8 billion in 2020 and 2019, respectively, as a result of the adoption of PFRS 4. The increase in the 2020 net loss of close to PhP 100 billion was partly due to the decrease in income from premium contributions in 2020. Expenses increased in both years due to PFRS 4 as large net changes in policy reserves were charged. The accounting change also led the SSS to disclose negative equity for the first time.

Table 4. Other indicators of SSS performance: Aggregate contributions, investment income, benefit payments, and net revenues (in billion PhP)

Year	Members' contributions	Investment and other income	Benefit payments	Net revenues
2016	144.36	30.1	132.98	29.69
2017	159.72	41.88	170.68	18.38
2018	181.92	30.54	180.08	20.37
2019	223.51	46.02	196.11	–324.86
2020	206.14	32.11	194.87	–427.71

Source: SSS

3.8 *Financial conditions in 2020-2021*

Table 10 shows the levels of assets, reserves, and investments of the SSS. Note the large reduction in reserves from 2018 to 2019 to 2020. This occurred because the SSS adopted the accounting principles of the PFRS 4 beginning in the 2020 SSS financial report. The 2020 figures require the previous years' figures to be reported as well, PFRS 4 was also applied in 2019.

Although the SSS has not yet released its 2021 AFS, it has been reported from unaudited income statements that it had incurred a net loss of PhP 843.9 billion, primarily due to the change in accounting standards implemented by the SSS. According to the management, the change in accounting standards was brought about by the adoption of the PFRS 4. SSS CEO Michael Regino said, "This increase in net loss from the previous year is due to the recognition of the MfAD in our policy reserves. MfAD serves as a buffer for conservatism, which we have considered in our financial statements beginning in 2021." Policy reserves are forward-looking estimates of net future liabilities. These include benefit payments that will be disbursed to SSS members and their beneficiaries in the future (Cabato, 2022).

Provisions for adverse deviation (PfAD) are accounts created by setting aside an amount from profit to meet probable future expenses in the institution. For pensions, PfAD can be made for unexpected movements in claims, interest rates, investment returns, etc. The provisions increase liabilities and are charged against current income.

[7] As of this writing, the 2021 AFS of the SSS are still not available.

Lockdowns, for the most part, prevented the timely filing and processing of many claims, leading to the decrease in benefit payouts.

Table 5. SSS revenues and expenditures, 2019-2020 (in billion PhP)

	2019	2020	Percent change
Revenues	269.53	238.25	−31.28
Contributions	223.51	206.14	−17.37
Investment and other income	46.02	32.11	−13.91
Expenditures	594.37	665.52	71.15
Benefit payments	196.11	194.87	−1.24
of which			
Retirement	113.62	115.44	1,6
Death	57.07	55.70	-2.4
Maternity	10.41	10.49	0.8
Disability	7.37	6.43	-12.7
Funeral grant	4.23	3.07	-27.4
Sickness	3.23	2.01	-37.7
Unemployment	0.18	1.71	860.9
Medical services	0.011	0.007	-30.5
Net changes in policy reserves	388.33	461.75	73.42
Operating expenses	9.93	8.9	−1.03
Net revenues (loss)	−324.84	−427.27	−102.43

Source: SSS Financial Reports

Pension actuaries consider the extent when it may be appropriate to adjust assumptions with margins for adverse deviation. MfAD reflects the degree of uncertainty of the best estimate assumption for certain variables in a pension scheme. Actuaries introduce these margins to make allowance for uncertainty in data, assumptions, or methodology.

MfAD may be expressed as the difference between the assumption used for the valuation and the best estimate assumption. For example, if the actuary expects the interest rate to be as high as 10 percent, and then assumes 8 percent, the MfAD is 2 percent. The PfAD is the expense that results from an MfAD. For instance, if a 2 percent MfAD in the interest rate assumption increases liabilities from USD 100 million to USD 120 million, then the PfAD is USD 20 million (or the amount of increase that results from the application of the MfAD).

By adopting MfAD, the SSS is recognizing the inherent potential risks in their policy reserves, which are accumulated commitments to pay future pensions. Changes in the value of reserves normally come about due to transactions such as claims being incurred or pension benefits being paid. However, their value can change for other reasons such as holding gains or losses on investment funded using the reserves or fluctuations in exchange rates.

By allowing its actuaries to recognize MfAD and make provisions against them, the

SSS signals transparency of reporting and disclosure, although the exact procedure they followed, along with the assumptions behind the MfAD estimates, still need to be disclosed.

Notwithstanding this, the move towards acknowledgement of possible gaps in future benefit payments and pension liabilities is a welcome part of the process of disciplining the management of the fund itself. Future public sector decision makers should always be cognizant of the additional implicit pension debt created or added by select action or inaction. The ratio of pension reserves to total pension liabilities is the key element to sustaining DB schemes.

Since the change involves recognition of future liabilities, the recognition of MfAD does not affect current SSS cash flows. Hence, they will also not affect the ability of the SSS to service pension payments in the near future. However, the fact that MfAD led to negative equity suggests that the SSS should strongly consider changes in the parametric formula, retirement age, and contribution rates in the near future. Future economic crises, pandemic or not, will only worsen the equity situation of the SSS. Notwithstanding the negative impact of the switch to PFRS 4, the large drop in compliance is also expected to have dragged SSS net income down in 2021. The SSS must find ways to raise compliance post-crisis.

The negative amount of equity implies that SSS assets are less than its liabilities. However, it is still able to operate since its cash inflows (from firm and employee contributions) are greater and occur sooner than the cash outflows necessary for meeting payments on its liabilities. The inherent long-term nature of most of SSS' liabilities and the mandatory nature of contributions sustain the SSS during periods of extreme stress. Nevertheless, the recognition of a large MfAD in 2021 is a sign that, in the long-term, efforts must still be exerted to boost its sustainability and reduce its funding gap.

Table 6. SSS investments and other income

Year	2016	2017	2018	2019	2020
Billions (PhP)	30.10	41.88	30.54	46.02	32.10
Rate of change (percent)		39.14	−27.08	37.13	−23.35

Source: SSS

Table 7. Income from select SSS investments (in billion PhP)

	2019	2020
Government securities	13.84	13.71
Member loans	8.97	6.71
Properties		5.08
Income from investing activities	42.09	33.33
Gains from investments	21.1	17.8

Source: SSS

4. Regression analysis

To further distill insights from the data about the effects of the pandemic on the SSS and its registered members, empirical estimation was performed. Quarterly frequency data were obtained from a sample of 28,486 establishments registered with the SSS. This comprises pre-COVID-19 months and the lockdown period. The data also captures the timing of the increase in the mandatory SSS contribution rate in April 2019. The start

of the COVID-19 lockdown was effective in the second quarter of 2020. Table 11 lists the characteristics of some of the variables used in analysis.

The determinants of total contributions were estimated using the panel data. Random and fixed effects regressions were estimated, but the result of Hausman tests implied that fixed effects was appropriate in all cases. Below is Table 12 with the results of panel fixed effects estimates. The dependent variable was the first difference of the log of total real contributions. The regressors include the dummy variables lockdown (variable that takes the value 1 in the second quarter of 2020, and 0 otherwise to denote the timing of the lockdown) and april2019dum (variable that takes the value 1 in the second quarter of 2019, and 0 otherwise to denote the timing of the latest increase in contribution rates).

Panel estimates are listed in Table 12. The first column of regression results (i.e., labeled 1) presents panel instrumental variable estimates of the determinants of the log of real contributions to the SSS. The succeeding columns are non-instrumental variable estimates. Columns 2 and 3 are panel estimates of the log of real contributions to the SSS in levels against the lockdown and April 2019 dummies and the log of real GDP or lagged log of real GDP.

Column 4 contains panel estimates of the first difference of the log of real contributions to the SSS against the lockdown and April 2019 dummies and the first difference of the log of real GDP. The first differencing was used to account for the possibility that the previous variables in levels are non-stationary. Phillips-Perron unit root tests were conducted for the variables in the unbalanced quarterly panel. None of the variables were found to be stationary, but regressions with differenced data are shown nevertheless. In general, the panel fixed effects estimates suggest that increases in real GDP leads to increased contributions to the SSS. Meanwhile, the lockdown period of 2020 was detrimental to total contributions, as expected. The dummy for the periods of or after the pension rate increase in April 2019 (from 11 to 12 percent) was positive and

Table 8. Components of the SSS investment portfolio, 2020

Portfolio components	Billions (PhP)	Percent
Government securities	246.56	42
Member loans	112.44	19
Equities	98.54	17
Properties	59.25	10
Corporate notes and bonds	34.34	6
Bank deposits	16.49	3
External funds	12.78	2
Housing and development loans	8.60	1

Source: SSS

significant, suggesting that, controlling for other factors, SSS members generally complied with the mandatory rate increase so that total contributions also increased. In the log-log specification (columns 1 or 2), the coefficient of the real GDP variable suggests that, when real GDP increases by 1 percent, real contributions increase by anywhere from 0.08 percent to 0.14 percent. Furthermore, a 1 percent increase in contributing employees leads to the value of contributions also increasing by more or less 1 percent. Hence, and intuitively, increases in employment, SSS membership, and GDP growth are good

for SSS contributions. SSS contributions, therefore, are very sensitive to general economic conditions and the business cycle. To increase SSS contributions in the future, one can then rely on the combination of economic growth (which raises incomes), employment generation (which increases members), and possibly, increases in SSS contribution rates (up to a threshold).

A few other observations were made based on the SSS quarterly panel data:

a. The mean number of non-agricultural contributing employees tend to be much smaller than in non-agricultural sectors, which led to (b).
b. Annual SSS contributions are much less in the agricultural sector compared to other sectors.
c. As the PSIC 5-digit number increases, employment and contributions and employment per firm increased. Firms engaged in services have, on average, more contributing employees than firms in other industries.

The lockdown reduced wages and employment in general across firms. If firms retained workers, they tended to be the higher-paid employees. Lower-wage employees tended to be retrenched more, and more quickly (as contributing employees per firm dropped, but average wages per firm increased).

Curiously, the average wage of SSS members increased by around PhP 71.00 pesos during the post-lockdown period. The number of contributing employees post-lockdown declined by almost five. The average total value of monthly contributions by firms and employees declined by more than PhP 7,000.00 post-lockdown. These imply that, on average, employees who were fired from SSS-registered firms tended to be lower-salaried workers. It is likely that firms let go of less productive workers during the lockdown.

5. Impact of the crisis on stakeholders of the Retirement Pay Law (RA 7641)

The Retirement Pay Law (RA 7641) provides mandatory lump-sum retirement benefits from enterprises to qualified employees. Since the value of the one-time benefit is determined by formula, it is a defined benefit scheme. There are two potential weaknesses with RA 7641.

- The retirement benefit is not portable. This is because the benefits previously vested by an employee with a corporation disappear when the employee resigns and moves to another employer. The workers start vesting from scratch with every new employer.
- The lump sum benefit is not a fully funded scheme, hence, the liability is typically only funded fully by the firm at the time an employee retires.

In the present pandemic crisis, any vested retirement benefits under RA 7641 are at risk. Workers can get terminated by employers when retrenchment happens. Regardless of the years spent working for the firm, all vested benefits are erased. Workers who are closer to retirement age and are terminated would lose the most.

The lump sum benefit under RA 7641 is computed by formula under the law: “In the absence of a retirement plan or agreement providing for retirement benefits of employees in

Table 9. Select accounts from the SSS balance sheet (in PhP)

Select income accounts	2019	2020	Change (billion)
Member contributions	222,745,780,797	205,697,219,568	-17.049
Interest income	20,908,556,958	19,029,176,963	-1.879
Dividend income	2,964,937,904	4,005,185,841	1.040
Other income	6,576,081,111	5,294,340,260	-1.282
Service and business income	**253,195,356,770**	**234,025,922,632**	-19.169
Gains	**21,062,268,741**	**17,780,769,713**	-3.281
Select expenses			
Benefit payments	196,112,797,505	194,870,857,224	-1.242
Net change in policy reserves	461,748,116,997	388,333,662,908	-73.414
Comprehensive income/loss	***-324,773,351,960***	***-419,089,470,801***	*-94.316*
Select equity accounts			
Retained earnings/(deficit)	**5,681,272,001,318**	**6,109,188,630,051**	427.917
Total equity	**5,707,688,553,051**	**6,127,257,253,965**	419.569

Source: SSS

the establishment, an employee upon reaching the age of 60 years or more, but not beyond 65 years which is hereby declared the compulsory retirement age, who has served at least five years in the said establishment, may retire and shall be entitled to retirement pay equivalent to at least one-half (1/2) month salary for every year of service, a fraction of at least six months being considered as one whole year."

Given the requirement to pay eligible workers a lump sum upon their retirement, RA 7641 prescribes a pay-as-you-go (PAYG) scheme with a DB. Firms typically fund the DB upon retirement. Very few firms are able to start funding the DB earlier in anticipation of retirement. Because of the PAYG nature of the scheme, the benefit is not only subject to the risk of worker layoff, but also subject to the risk of firm bankruptcy.

5.1 Estimating potential losses in vested pension benefits under RA 7641

As mentioned earlier, one seemingly sufficient motive for amending the Retirement Pay Law is the risk on vested benefits posed by employees getting laid

Table 10. Assets, reserves, and investments of the SSS (in billion PhP)

Year	Assets	Reserves	Investments
2016	476.40	464.42	440.08
2017	508.63	495.85	468.34
2018	512.65	499.54	481.33
2019	601.38	–5,707.69	548.28
2020	639.99	–6,127.26	588.35

Source: SSS

off. This section will estimate how much workers potentially lose due to the lack of portability of retirement benefits.

5.1.1 Estimated losses of vested benefits in normal times

A desirable characteristic of a pension or retirement benefit is its portability. A portable benefit under the law is one that workers can accumulate for themselves regardless of employer. This implies that, if a benefit is not portable, a worker will lose it once there is a change or transfer of employer.

Under the Retirement Pay Law (RA 7641), workers run the risk of vesting much less, or even zero, lump sum benefits than one would otherwise accumulate in a lifetime because the law specifies that workers can only start vesting benefits with their last employer. This means that workers who have gone through voluntary or involuntary job separations in their careers will accumulate less than workers who undergo less attrition and spend more time with their last employer. The lack of portability under RA 7641 is a big weakness of the law because the recent deep recession due to the COVID-19 crisis led to high levels of involuntary layoffs and potentially large personal losses of vested benefits, especially in the hardest-hit sectors (e.g., travel, tourism).

Under normal circumstances, workers lose vested retirement benefits because of normal job attrition, regardless of whether the nature of job separation is voluntary or not.

5.1.2 Estimated losses of vested benefits in the pandemic period

During the pandemic, workers lost vested retirement benefits because of crisis-led involuntary job attrition. During a crisis, the nature of job separation is likely involuntary. The spike in unemployment leads to above-normal losses in vested benefits.

Table 14 depicts simulations of losses of vested benefits under the Retirement Pay Law. The estimates are made for call center agents and call center supervisors. The assumptions underlying the estimates are based on information shared by human resource experts in the Business Process Outsourcing (BPO) industry. Note that the size of the vested loss for a particular occupation depends on several factors notably:

- The formula for computing benefits specified in the Retirement Pay Law
- Current wages
- Average time served at job prior to quitting
- Number of workers in the same occupation
- The rate of annual attrition in the industry

Because of the larger number of agents over supervisors, the aggregate loss of vested pension benefits as a share of estimated 2021 GDP is around 0.17 percent. It is about 0.02 percent for

supervisors. Industry-wide, the estimate is around 0.19 percent. Because this is only a small subset of the workers in the whole country, it is likely that the size of the loss of vested benefits for workers in the country is much larger and procyclical. Considering the severity of unemployment caused by the COVID-19 crisis and the high spike in attrition during this time, estimates of vested benefit losses in excess of 5 percent for the entire country in 2020 may be plausible. Hence, the cost of the lack of portability of these benefits on workers can be potentially high. The extended drag of the pandemic on the potential retirement benefits of employees in certain industries, especially in transport, retail, and the hospitality industry—virtually any industry relying on face-to-face interaction—can be heavy.

Therefore, one way to address the lack of portability in RA 7641 is to reconfigure the law so that workers never lose the benefits they vest in and that they start vesting benefits immediately. This can happen when the contribution scheme is converted into a DC scheme. Under a DC scheme, workers accumulate pension savings through their own personal retirement accounts and the scheme is no longer an intergenerational transfer of savings. Under a DC scheme, workers save for themselves and no funding gap exists (as the scheme is fully funded at the outset).

5.2 *The Capital Market Development Act*

The CMDA was a bill passed by Congress in late 2021 to address problems associated with the Retirement Pay Law. The CMDA seeks to replace the current DB system with a DC system.

Numerous studies (Reside, 2020; Mesa-Lago et al., 2011; Reyes, 2015; Valderrama, 2016) and anecdotal evidence strongly suggest that retirement pay and pensions in the Philippines do not provide adequate replacement income for retirees. Part of the problem is the nature of RA 7641 itself. Benefits lack portability because the workers lose all accumulated benefits when they move. The current proposal is to address this problem by replacing the DB scheme under current law with a DC scheme. Under a DC scheme, workers save for their own retirement by way of making regular contributions to an account under their name. The account is invested by a fund manager and, upon the worker's retirement, all accumulated savings and interest can be withdrawn. Because the account is under the name of the individual worker, the accumulated savings are portable and never lost even if the worker moves from job to job.

If passed into law, the fundamental change from DB to DC for retirement pay leads to the following changes in obligations in the labor market:

- Imposition of mandatory additional employer contributions to employees (4 percent of their monthly salary) for firms of a certain size (apart from contributions made under the SSS) even if the workers do not retire with the firm;
- Employers will contribute to retirement pay in regular gradual amounts, rather than making lump-sum payments upon the worker's retirement;
- If their wages are above the minimum wage, employees will now contribute to their own retirement savings account, which is not the case under the current law. Creation of personal retirement pension accounts for all employees becomes mandatory.
- Employee benefits now become portable.

Based on these parameters, the initial expected value of aggregate contributions that can be reasonably raised by the CMDA was recently estimated to be from PhP 50–60 billion, with certain exclusions from the contributing base, to at most around PhP 81 billion, without exclusions (Reside, 2021).

To gauge the potential impact of the switch from DB to DC, this paper will draw inferences from the estimated responses of employers and employees to the changes in contribution rates under the SSS. The model to be estimated is inspired by Gruber (1997) and Summers (1989). It should be noted that, because the new scheme is a DC scheme, it is different from the DB scheme of RA 7641. Notwithstanding this, however, when the DC scheme is imposed, the likely effects include workers exerting more effort in their jobs because of the new benefits they would get. This would tend to have similar effects on wages than any kind of payroll-based contribution scheme, but would lead to increased employment.

Based on the previous statements, the new scheme imposes new contributions out of payroll on both employers and workers. This will have repercussions in labor markets, the analysis of which follows.

Table 11. Select variables in the SSS quarterly panel data from 28,486 establishments

Stats	Mean	SD	Min	Max	Description
Totwage (PhP)	291,938.70	3,589,434.00	–	317,000,000.00	Total wages per firm
Contremp	25.08	403.10	–	94,279.66	Number of contributing employees per firm
Contemp (PhP)	11,459.62	202,155.10	–	48,600,000.00	Contributions per employee
Contempr (PhP)	23,484.20	417,020.20	–	101,000,000.00	Contributions per employer
Contrib (PhP)	34,943.82	619,169.20	–	150,000,000.00	Value of contributions per firm per quarter
Avgwage (PhP)	10,318.11	88,014.37	–	15,700,000.00	Average wage per employee
Lockdown			0	1	Variable that takes the value 1 in the second quarter of 2020, and 0 otherwise to denote the timing of the lockdown
april2019dum			0	1	Variable that takes the value 1 in the second quarter of 2019, and 0 otherwise to denote the timing of the latest increase in contribution rates

Sources: Author's calculations; SSS

Table 12. Fixed effects regression results (coefficients are listed above p-values)

	Instrumental variables (IV) estimates[8]	Non-IV estimates			
	Log in levels	**Log in levels**	**Log in levels**	**Log first-difference**	
	Lrlcontrib	lrlcontrib	Lrlcontrib	D1.lrlcontrib	**Dependent variable: real contributions**
	1	2	3	4	
lcontremp	1.13	0.98	1.02		**Log of contributing employees**
	0.00	0.00	0.00		
Lockdown	–0.08	–0.11	–0.13	–0.05	**Dummy variable for quarters during and after first lockdown**
	0.00	0.00	0.00	0.00	
april2019dum	0.09	0.10	0.11	0.03	**Dummy variable for quarters during and after contribution rate increase**
	0.00	0.00	0.00	0.00	
lrgdp	0.14	0.08			**Log of real GDP**
	0.00	0.00			
l.lrgdp			–0.15		**Lagged log of real GDP**
			0.00		
D1.lrgdp				0.24	**First difference of the log of real GDP**
				0.00	
D1.lcontremp				1.00	**First difference of the lag of the log of contributing employees**
				0.00	
Constant	4.29	5.45	8.81	–0.01	
	0.00	0.00	0.00	0.00	
Within	0.82	0.84	0.83	0.85	
Between	0.92	0.92	0.92	0.91	
Overall	0.91	0.92	0.91	0.86	
Obs	219,530	230,938	219,530	198,826	
Groups	28,444	28,486	28,444	27,182	

Source: Author's estimates

[8] The log of total contributing employees is instrumented by the following variables: lockdown april2019dum lrgdp l.lrgdp

Table 13. Comparison of means of variables pre- and post-lockdown

Variable	Pre-lockdown	Post-lockdown
Average nominal wage (PhP)	10,301.33	10,372.21
Number of contributing employees per firm	26.29	21.46
Total value of monthly contributions per firm (PhP)	36,869.76	29,166.00
Total monthly contributions by employers per firm (PhP)	24,793.69	19,555.73
Total monthly contributions by employees per firm (PhP)	12,076.07	9,610.27

Source: Author's calculations using SSS data

Table 14. Estimated loss in vested retirement benefits in the call center industry

Job title	Monthly salary (PhP)	Years of service	Monthly salary in RA 7641 (PhP)	**Lump sum retirement benefit to vest in year (PhP)**	No. of workers	**Potential loss per year (PhP)**	**Percent of GDP**	**Loss in vested benefits (PhP)**	**Percent of GDP in 2021**
Full time call center agents 2021	16,408.92	5	12,866.08	**32,165.21**	1,155,556	**37,168,696,745.14**	**0.19%**	**33,451,827,070.63**	**0.17%**
Call center supervisors	22,441.33	5	17,596.05	**43,990.11**	144,444	**6,354,107,974.09**	**0.03%**	**3,812,464,784.45**	**0.02%**
Full time call center agents 2021	16,408.92	15	12,866.08	**96,495.62**	1,155,556	**111,506,090,235.43**	**0.57%**	**301,066,443,635.65**	**1.55%**

Source: Authors' estimates and calculations

6. Conclusions

This paper has highlighted the effects of the COVID-19 economic crisis on the private retirement system in the Philippines. It is not surprising that the effects are not positive. These negative effects on the SSS have gone through the following channels:

1. Compliance dropped and, as a consequence, the value of contributions fell. This exerted a downward drag on SSS net income.
2. Meanwhile, the SSS hiked certain benefits owing to the crisis, such as unemployment insurance, but saw other benefits reduced as a result of lockdowns and their deterrent effect on member mobility. But the reduction in benefit expenses did not offset reductions on the contribution side.
3. The SSS decided to adopt PFRS 4, which, while desirable, led to large MfADs being charged to income, leading to large losses that have been reflected in recent financial statements. The adoption of the new accounting rules signal that the institution is intent on increasing the transparency of the extent of its funding gap.

While negligible in terms of its impact on worker resources, the fact that the SSS processed a large amount of unemployment benefits portends its role as an automatic stabilizer in future crises. This would then tend to reduce liquidity in future crises as it also will have to contend with declines in compliance and contributions. The greater the frequency of crisis events, the more intense will the need be to restore funding levels for sustainability. In addition, the demand to either raise the retirement age, to raise the contribution rate, and/or to alter the parametric formula will be greater and more frequent to ensure the sustainability of the scheme.

Apart from the weakening of the SSS, the pandemic has wiped away retirement benefits that were previously vested by employees under the Retirement Pay Law. This is the result of stress on another channel from the economy to the retirement system. When workers in the private sector are laid off, their vested retirement benefits under the Retirement Pay Law are wiped out because these are not portable across employers. An estimate of the value of non-portable benefits that were wiped out was estimated for call center workers, so selected because of their known high rates of turnover. For these workers on aggregate, the value of lost benefits per year can be high. The losses would be even greater if projected to the entire labor force across all industries, and may be especially high for the worst-hit sectors during the pandemic where worker attrition and layoffs were the highest.

The lack of portability will lead to undesirable outcomes further down the road, such as low replacement rates and non-smoothing of lifetime consumption, which violates the principle of consumption optimization in economics. Hence, the government should consider strengthening the law to add portability. One option to consider is to pass the CMDA (Congress of the Philippines, 2021), which aims to increase the level of funding and portability of retirement benefits while creating greater savings for financial market development and economic growth. The CMDA was approved by the Lower House

of Congress in 2021 but is still pending in the Senate.

The crisis brought by the COVID-19 pandemic demonstrated how vulnerable retirement systems can be during times of economic stress. Such systems are very sensitive to the business cycle, as these depend on healthy levels of employment and incomes. When both variables fall, funding levels also fall. The effects can be immediate, as funding gaps increase for both institutions and the lump-sum benefit under RA 7641, and may also manifest in the long run, increasing fiscal stress. In the short run, the government is urged to explore actions to enhance the sustainability of the system, such as considering the following:

- Raising statutory retirement ages and reducing incentives for early retirement or increasing incentives for delaying retirement;
- Raising contribution rates;
- Controlling future increases in pension and retirement benefits and linking these more clearly to funding sources;
- Limiting the non-pension and non-retirement related expenditures/benefits of the SSS;
- Streamlining of SSS operations and administration for greater efficiency and reducing operational costs and reviewing investment policies to find ways to enhance profitability and returns;
- Finding ways of restoring pre-pandemic compliance and raising compliance rates immediately;
- Further developing capital markets to further mobilize savings and stimulate supply of and demand for long-term instruments with higher returns;
- Strengthening educational systems will raise real wages of workers in the long run, the base for the contribution rate;
- Investing in mechanisms to retrain workers and sustain their productivity and earning capacities throughout their working life;
- Exploring more ways to work with private retirement product providers to enhance replacement rates; and
- Enhancing the DC component of the scheme to reduce the funding gap.

Furthermore, given its sensitivity to the business cycle, the SSS can also be strengthened as a by-product of sound macroeconomic management that mitigates the effects of crises on employment and income. To help the SSS, the government should look to restore the economy to health and make it resilient to future crises. Changes to SSS internal policies would also make it more resilient to future crises, that is, limit its role as a stabilizer during future crises and explore other safety nets to preserve its reserves and sustain its profitability.

General economic recovery is also essential to encourage compliance and increase membership. The country is urged to adopt growth-oriented policies consistent with increases in productivity (to increase wages, the wage base, and savings in the long run). These reforms are expected to mitigate the increasing effects of the funding gap in an aging population.

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Annex A

The new SSS Mandatory Provident Fund (MPF)[9]

All employees covered by the SSS with earnings of over PhP 20,000 per month are automatically enrolled in the MPF. MPF contributions are levied at the same rate as SSS retirement contributions, based on the employee's Monthly Salary Credit (MSC) between PhP 20,000 and PhP 25,000. Employer contributions range between PhP 42.50 and PhP 425 per month, while employees contribute between PhP 22.50 and PhP 225 per month.

The Social Security Commission will manage MPF assets. The initial investment mix will be at least 15% in government debt, up to 20% in corporate or multilateral institutions and equities, up to 25% in loans to MPF members, and up to 40% in money market or other approved investments, subject to an initial management fee of 1% per annum charged to all MPF accounts. Investment returns are tax-free. In-service withdrawals are not allowed, but the account balance will be payable in the event of preretirement death or total disability.

Upon retirement, all MPF assets accumulated are converted into a monthly tax-free pension. The regular pension equals the accumulated account balance divided by 180. This pension will be payable for a period of at least 15 years. Upon pensioner death, any remaining balance will be paid to the designated beneficiaries as a tax-free lump sum.

[9] Sourced: SSS website

Annex B

Number of contributing members to SSS and changes in contributions

Indicator	Number of contributing members ('000s) to SSS and GSIS	SSS	Growth	Of which: Employees
2000	8,443	6,951		5,519
2001	8,481	6,985	0.005	5,491
2002	8,715	7,215	0.033	5,587
2003	8,636	7,326	0.015	5,678
2004	8,808	7,497	0.023	5,875
2005	8,939	7,629	0.018	6,034
2006	9,350	8,001	0.049	6,303
2007	9,679	8,323	0.040	6,564
2008	10,227	8,862	0.065	6,851
2009	10,380	9,012	0.017	6,845
2010	11,030	9,659	0.072	7,339
2011	11,412	10,024	0.038	7,666
2012	12,338	10,939	0.091	8,195
2013	13,066	11,627	0.063	8,624
2014	13,802	12,320	0.060	9,136
2015	14,782	13,256	0.076	9,753
2016	15,896	14,275	0.077	10,466
2017	17,121	15,409	0.079	11,142
2018	18,360	16,540	0.073	12,277
2019		17,581	0.064	
2020		16,100	–0.085	**14,200 (May 2020)**
2021				**12,300 (May 2021)**

Sources: PSA, SSS

11 | Remittances from Overseas Filipinos in the Time of COVID-19: Spillovers and Policy Imperatives

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11

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Maria Almasara Cyd N. Tuaño-Amador, Veronica B. Bayangos, Marie Edelweiss G. Romarate, and Carl Francis C. Maliwat[1]

1. Introduction

In 2019, global remittances to low- and middle-income countries reached a record-high of USD 554 billion, exceeding official development aid flows (World Bank, 2020a). Expectations of a sharp downfall in remittances due to the pandemic have been a major concern for policymakers in countries that rely substantially on this type of flows, given the various macroeconomic implications, including on private consumption, the balance of payments, and exchange rates.

While remittances are private funds, they confer macroeconomic benefits to the Philippine economy, which has a large segment of its population residing and working overseas and sending money back home. Remittances augment foreign currency resources, alleviate pressures on the exchange rate, and reduce the need for foreign borrowing. Moreover, since remittances are unrequited transfers, they do not create future obligations unlike foreign borrowing or investments. Remittances also help develop capital markets, enabling recipients to accumulate productive assets and invest in financial instruments as well as improve human capital resources. Furthermore, remittances have important social welfare implications, as these private transfers can take off some of the burden on the government's finances that need to be directed toward household welfare programs.[2]

In the Philippines, the share of remittances to nominal gross domestic product (GDP) has been broadly stable since 2010, ranging from 9 to 10 percent.[3] Remittances are a particularly attractive source of foreign exchange because they are a more stable and, therefore, a more dependable source of funding than private capital flows—of either debt or equity (both portfolio and direct investments). Table 1 shows that, over 2010-2021, remittances have provided a significant source of foreign exchange in the Philippines, next to foreign borrowing. Moreover, remittances are less likely to suffer the sharp withdrawal or surges that characterize portfolio flows.

Stability tests indicate that remittances to the Philippines have been more stable than other foreign exchange flows stemming from net exports, foreign direct investments, foreign portfolio investments, and external borrowing. A substantial reduction in remittance flows would have important macroeconomic implications on the country's growth prospects.

A substantial fall in remittances due to the COVID-19 pandemic would have major consequences not only at the economy-wide level but also at the household level. The impact of lower remittances would fall most heavily on vulnerable remittance-receiving households, potentially reducing their access to education and health care, and more generally adversely affecting their quality of life. There could

[1] BSP Research Academy. *The authors are grateful to the Department of Economic Statistics (DES) for their assistance in compiling data and information on overseas Filipino remittances and to Dr. Dante Canlas for his excellent comments. The usual institutional disclaimer applies.*

[2] The adverse macroeconomic and microeconomic repercussions of remittances have also been widely examined, including its impact on reservation wages and labor supply as well as its contribution to the so-called Dutch disease (Bayangos & Jansen, 2011; Tuaño-Amador et al., 2006; Puri & Ritzema, 1999). Concerns have also been raised that remittances can promote a culture of dependence and policy complacency.

[3] Personal remittances include cash and in-kind transfers. Annex A presents a detailed discussion on the treatment of remittances in the balance-of-payments reporting framework.

Table 1. Magnitude and volatility of selected foreign exchange inflows, 2010-2021 (year-to-date)

Sources of foreign exchange inflows	Percent to nominal GDP	Standard deviation
(Net) Exports of goods and services	–1.8	0.7
External borrowing	27.4	4.1
Overseas Filipino remittances	2.4	0.1
Foreign direct investments	0.5	0.3
Foreign portfolio investments	0.1	0.4

Sources: Bangko Sentral ng Pilipinas (BSP) Department of Economic Statistics; authors' calculations

likely be differentiated impacts on local communities. Some that rely heavily on remittances face elevated risks of economic disruptions. Based on the 2021 Fourth Quarter Consumer Expectations Survey (CES),[4] more families of overseas Filipino workers (OFWs) have saved and invested less in the fourth quarter of 2021 compared to previous quarters. Specifically, the percentage of households that use remittances as a means to save declined slightly to 31.7 percent from 33.4 percent in the fourth quarter of 2020. Similarly, OFW families using remittances for investments dropped to 9.2 percent from 11.0 percent in the third quarter of 2021.

Globally, the World Bank (2020b) projected that remittances would decline by 7 percent in 2020, larger than the 5 percent drop recorded during the global financial crisis in 2009. A similar decline is expected in 2021. There are a number of reasons for the projected decline in remittances due to the pandemic. One explanation rests on (temporary and/or permanent) migrants' loss of jobs or underemployment in host countries whose economies have contracted or have experienced significant growth slowdowns. Many temporary/permanent migrants engage in vulnerable occupations (such as service and hospitality industries) that have been disproportionately affected by the pandemic. Other reasons involve the repatriation of overseas workers and migrants as well as the slowdown in the deployment of those seeking work or residence overseas.

Mobility restrictions could have also hampered access to some financial services, particularly those offered by brick-and-mortar entities. The drop in oil prices due to slower global economic growth in the first half of 2020 could have also contributed to the decline in remittances.

This study traces the impact of the pandemic on overseas remittances and the spillover effects of a shock in remittances on the monetary, financial, and labor markets. This study also looks into the role of the government in helping to manage the impact of the pandemic on overseas workers and their beneficiaries. Policy

[4] The Q4 CES covered 5,495 respondents, including 325 OFW households. It was conducted during the period 1-13 October 2021 when the National Capital Region and adjacent provinces were placed under enhanced community quarantine anew due to the emergence of the more contagious Delta variant of the SARS-CoV-2 virus.

imperatives and the prospects for overseas remittances are also examined. This study is guided by two research questions. First, has the impact of the pandemic on overseas remittances been significant? Second, what are the spillover effects of a shock in remittances on the monetary, financial, and labor markets?

To shed light on the first policy question, a reduced-form model is estimated to capture the factors driving the growth of overseas remittances. The study estimates the determinants of the year-on-year (YoY) growth of personal overseas remittances from January 2009 to December 2021 using the generalized method of moments (GMM). To answer the second policy question, the paper uses impulse response functions (IRFs) from standard and Bayesian vector autoregressive (VAR) models from January 2009 to December 2021.

This paper finds that, first, remittances of overseas Filipinos are procyclical with the GDP of the Philippines and with those of major host countries. Second, the growth of personal remittances is driven by domestic inflation, interest rate differentials, the real effective exchange rate of trading partners, the business cycle of the United States, and the growth of domestic liquidity. Third, the pandemic has a negative and significant impact on the growth of personal remittances. Fourth, labor force growth, minimum wage rate, and employment growth, along with the growth of real GDP, inflation rate, interest rate differential, peso-dollar rate, and growth of domestic liquidity respond to a one standard deviation shock on the growth in personal remittances.

The chapter is organized as follows: Section 2 briefly examines the relevant literature, Section 3 presents salient remittance trends, Section 4 empirically examines the determinants of remittances and its cyclicality as well as the impact of the pandemic on the macroeconomy and the spillover effects of a shock in remittances, and Section 5 concludes by looking at prospects and offering some policy implications.

2. Review of related literature

There are several reasons behind the decision to send remittances. These include altruism; consumption smoothing; investments in human, real, and financial capital; and insurance and precautionary motivation. Simpson and Sparber (2019) note that the models of remittance behavior involve a utility-maximizing migrant or household that chooses to send remittances when the net benefits outweigh the costs or when doing so increases expected utility. They conclude that the underlying reason for migrating is to increase one's earnings abroad and to relax the budget constraint for the family members back home.

One of the most cited reasons for sending funds is altruism, linked to the desire to maintain strong linkages with one's family in the origin (or home) country. Altruism is measured by estimating how remittances respond to the increases in income that occur due to migration (Stark, 1991). McCracken et al. (2017) develop a simple two-period model of remittance behavior and decompose movements of remittances into altruistic and self-interest components. Their theoretical model suggests that a higher level of income in the home country is associated with a rise in remittances. However, a lower level of income has ambiguous effects on remittances and depends on whether the altruistic motive dominates. Lower income levels in the origin country will increase the need for more remittances if individuals are sufficiently altruistic but will decrease if they are self-interested.

Another major motivation for remittances is that people will migrate to smoothen

household consumption and diversify income sources (Rosenzweig & Stark, 1989). As with the altruism model, consumption smoothing models suggest that more funds will be transferred when the economy worsens in the origin country. This complements the work by Mandelman and Zlate (2012) who find that remittance flows are responsive to business cycles in the source and destination countries. Beti et al. (2008) and Amuedo-Dorantes and Pozo (2011) investigate the use of remittances as a mechanism to cope with adverse economic shocks. Some households send migrants abroad to accumulate funds to help pay for specific investments or large purchases in the origin country, including education, medical care, and real property. In addition, migrants may build precautionary savings through remittances. Amuedo-Dorantes and Pozo (2006) provide models of insurance and precautionary saving in this context. They predict that remittances will be larger for those facing greater uncertainty in the host country and for recent migrants. Remittances thus serve as a type of insurance in case the migration experience did not turn out as expected.

Remittance decisions are complicated by demographic, geographic, cultural, and economic conditions that vary across host and home countries. Given the complexity of remittance motivations and the diversity of the countries relying on remittances, the various motives for such are not mutually exclusive. A particular migrant will often have a combination of reasons to remit, and motives vary across migrants and over time.

Several papers have empirically estimated the determinants of remittances, using household/migrant characteristics and macroeconomic indicators. Tests involve cross-sectional, time-series, or panel data. These studies consider the complex, often varied, motivations behind the factors influencing remittance-sending behavior. Some studies use gravity models to estimate the microeconomic and macroeconomic determinants of remittances, involving push and pull factors as well as distance or proxies for the distance variables.

Income and wage differentials between migrant-hosting and migrant-origin countries are recurring determinants of remittances found in empirical literature. An obvious benefit of migration, particularly from less to more developed countries, is the increase in a migrant worker's income and that of his or her family from remittance receipts (Ratha et al., 2011). Adenutsi and Ahortor (2021), Bunduchi et al. (2019), and Yoshino et al. (2017) are some studies that have found that income and wage differentials have a positive relationship with remittances. Bunduchi et al. (2019) expand their analysis to include the fiscal burden on wages. They find that the tax rates on labor income have a negative impact on remittances as higher tax burdens imply lower disposable income to remit back home.

The cyclicality of remittances with respect to the economic cycles of both the origin and host countries has also been investigated in a number of research papers. Mandelman and Zlate (2012) find that remittance flows are responsive to business cycles in the source and host countries. Some studies have shown that remittances are countercyclical with respect to the economy of the origin/home country. Migrants tend to send more transfers to their families back home to help them cope with the economic contraction or slowdown. Remittances are thought of as providing an insurance against income shocks, with workers being expected to send more to their families during economic downturns to help them in periods of unemployment or reduced income.

There is cross-country evidence indicating a negative relationship between remittances and income for some countries, with remittances tempering the magnitude of the drop in GDP in times of severe economic crises and acting as a stabilizer to large fluctuations in output over the business cycle (Sayan, 2006). The latter notes that remittances also respond to the state of economic activity in the host countries. If the business cycles in the home and host countries move in tandem, it may be difficult for migrants in a crisis-struck economy to assist family members facing similar conditions at home. Sayan (2006) adds that, because of this, the remittance flows themselves in some cases can contribute to the transmission of the effects of a contraction in the host economy to the recipient country.

Using a micro foundation approach and panel techniques, Chami et al. (2003) find that remittances move countercyclically based on the collective data of all countries included in their study. Meanwhile, Barajas et al. (2012), using panel data, show that remittance flows increase the business cycle synchronization between remittance-receiving countries and the rest of the world. They find that a 1 percent decrease in a host country's output gap translates to a similar decline in the output gap of a recipient country when the latter's remittance receipts represent at least 10 percent of its annual GDP.

Other studies that have examined the correlation between remittances and GDP however have obtained the opposite result. Lueth and Ruiz-Arranz (2007) find that Sri Lankan remittances drop when the investment and political climate worsen. They conclude that remittances provide little insurance against a balance-of-payments (BOP) crisis. Sayan (2006) confirms cross-country differences in the cyclicality of remittances. He examines the behavior of workers' remittances in 12 developing countries and finds that countercyclicality of receipts is not commonly observed across these countries. His results show that remittances move procyclically or acyclically, with output for some countries within the group. Giuliano and Ruiz-Arranz (2005) find procyclicality in two-thirds of the 100 developing countries that they examined.

Lucas and Stark (1985) as well as De et al. (2016) observe that the cyclicality of remittances is contingent on the motives of those sending the remittances. Remittances driven by altruism or transfers sent to relatives without expectations of personal gain tend to run counter to the business cycle of the home economy, whereas remittances motivated by self-interest as well as those that are intended for investment in the home country are likely to be procyclical with respect to the business cycle of the home economy. Ruiz and Vargas-Silva (2014) recognize that migrant workers from the same home country may have different reasons for sending remittances and that one individual may have multiple motives for remitting. Other studies argue that the remittances-growth effect is country-specific, where institutional and development factors and cultural idiosyncrasies have a profound role in determining the outcome of remittances (Kadozi, 2019; Piteli et al., 2019).

More recently, Sayeh and Chami (2020) also examine the motivations behind remittance flows, with their definition of remittances—private income transfers that flow from migrants to their home economies when their home country experiences macroeconomic shocks—assuming the altruistic view.

According to them, remittances sync the business cycles of migrant-hosting and remittance-receiving countries. Their definition of remittances is particularly relevant in the context of the global economic crisis induced by the COVID-19 pandemic. On the one hand, during economic upswings, migrant workers furnish labor to host economies and provide income to their home economies. On the other hand, shocks to the host economy, such as those being induced by the pandemic, can be transmitted to remittance-receiving economies, which, in the current context, are likewise experiencing similar shocks.

De et al. (2016) point out that empirical literature on cyclicality has been largely inconclusive. In their study of 109 countries, they find that remittances do not systematically move with or against business cycles. Ruiz and Vargas-Silva (2014) likewise note that the findings of empirical literature dedicated to the subject have been country-specific and that the cyclicality of remittances must be studied using a more dynamic framework. For their part, Ruiz and Vargas-Silva (2014), using data from Mexico, find that the cyclicality of remittances with respect to the business cycle of the home economy is unstable and changes over time—that is, they are countercyclical during some periods and procyclical at others. Their empirical results show that remittances are more likely to react positively after negative shocks to the Mexican GDP (implying that remittances sent during such periods are altruistically motivated) in cases where the United States' economy remains stable. They also find that during times of global economic sluggishness, as in the 2008 Global Financial Crisis, migrants also experience economic distress and face challenges in compensating their households for the difficult economic conditions in the home economy.

Mallick and Cooray (2013) conclude that macroeconomic factors present in both host and home countries matter in understanding remittance flows. Using panel data for 116 countries, they find that remittances decline under increasing economic uncertainty in home countries (seemingly consistent with the investment-motive theory of remittance flows) but increase under growing uncertainty in host economies. Their finding however applies only to middle-income countries, as other groupings show acyclicality. The authors attribute the latter result to the less-explored insurance motive of remittances (Amuedo-Dorantes & Pozo, 2006), which has to do with the risk aversion of migrant workers, that is, when migrants are faced with greater income uncertainty in the host country, they tend to send more money back home. They acknowledge that the motives to remit are complex, as these are affected by the individual migrant characteristics, as well as host and home country-specific factors.

The discussions in this study reveal that the remittance decision is quite complex, as the various motivations are not mutually exclusive and could differ across time and circumstances. The methodology in this study consists of two parts. A reduced-form model is estimated to capture the variables driving the growth of overseas remittances from January 2009 to December 2021 using GMM. The issue of endogeneity needs to be considered when studying the impact of migration and remittances as remittances are considered part of the home country's gross national product (GNP). Growth of personal remittances is used since it is conceptually broader than cash

remittances. The model is then estimated to determine the impact of the pandemic on the determinants of YoY growth of remittances from January 2009 to December 2019 (pre-pandemic period) and from January 2009 to December 2021 (including pandemic period) using a dummy variable for the COVID-19 pandemic.

Moreover, the IRF of a VAR model from January 2009 to December 2021 is used to analyze the spillover effects of a shock in the growth of personal remittances. The IRF is also used to see the impact of the cumulative number of new confirmed COVID-19 cases in the Philippines on the growth of overseas remittances.

3. What do remittance statistics tell us?

3.1 Recent developments

In 2020, the World Bank recorded the flow of remittances worldwide at USD 646.2 billion, only about 1.2 percent lower than the previous year (Table 2) and a much smaller decline than forecast at 7 percent (World Bank, 2020b; World Bank, 2021). The decline in transfers was notably smaller than the decline recorded during the GFC, during which, remittances worldwide fell by 4.8 percent in 2009 compared to 2008. On a regional basis, the contraction in 2020 of personal remittances to Asia-Pacific economies was considerably lower (–1.9 percent)

Table 2. Personal remittances by region, 2010-2020 (in billion USD)

Region	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
East Asia and the Pacific	68.8	76.7	81.9	88.4	106.2	111.5	108.1	114.1	115.6	113.2	111.1
Europe and Central Asia	134.1	150.4	149.8	167.6	170.8	154.2	155.3	169.4	183.5	188.0	175.8
Latin America and the Caribbean	56.9	60.6	60.9	62.3	65.2	69.1	74.1	82.3	90.3	97.7	103.7
Middle East and North Africa	38.2	40.2	47.4	49.0	54.9	51.5	50.9	53.9	54.9	56.7	58.1
North America	8.4	8.5	8.7	9.2	9.2	9.3	9.1	9.1	9.4	9.6	8.6
South Asia	82.0	96.4	108.0	110.8	115.8	117.6	110.7	117.3	131.8	139.8	147.1
Sub-Saharan Africa	31.7	37.1	37.2	37.6	39.7	42.2	38.6	42.3	48.8	48.8	41.8
World	420.1	469.8	494.1	524.7	561.8	555.5	546.8	588.4	634.3	653.9	646.2

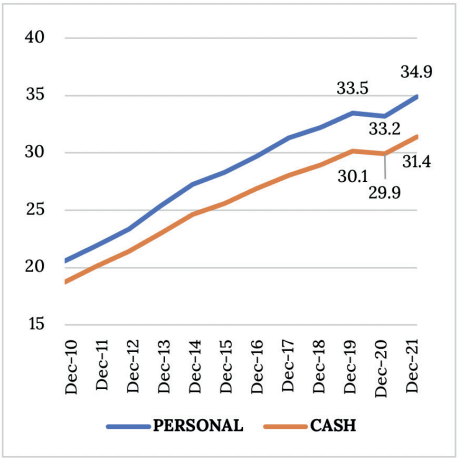
Source: The World Bank

Table 3. Growth rate of personal remittances by region, 2010-2020 (in percent)

Region	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
East Asia and the Pacific	17.0	11.5	6.8	7.8	20.2	5.0	−3.1	5.5	1.4	−2.1	−1.9
Europe and Central Asia	4.5	12.2	−0.3	11.9	1.9	−9.7	0.7	9.1	8.3	2.5	−6.5
Latin America and the Caribbean	2.6	6.5	0.5	2.2	4.8	6.0	7.2	11.0	9.7	8.3	6.1
Middle East and North Africa	19.1	5.1	18.1	3.2	12.2	−6.2	−1.1	5.8	2.0	3.3	2.5
North America	1.3	1.4	2.8	4.9	0.2	1.2	−2.5	0.6	3.0	2.0	−10.4
South Asia	9.5	17.6	12.0	2.6	4.5	1.6	−5.9	6.0	12.3	6.1	5.2
Sub-Saharan Africa	11.4	17.1	0.5	0.9	5.7	6.3	−8.5	9.6	15.3	−0.1	−14.3
World	8.7	11.8	5.2	6.2	7.1	−1.1	−1.6	7.6	7.8	3.1	−1.2

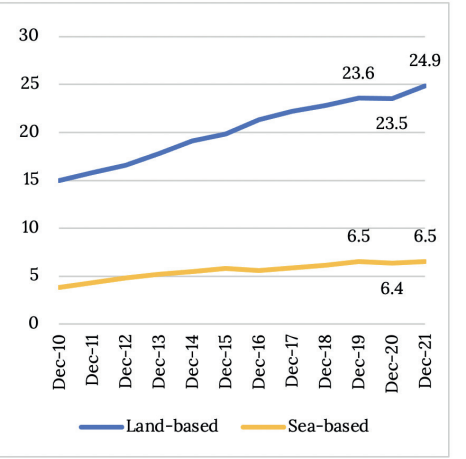
Source: The World Bank

Figure 1. Remittances of overseas Filipinos in 2010-2021 (billion USD)



Source: BSP

Figure 2. Remittances of overseas Filipinos, by type of sender, in 2010-2021 (billion USD)



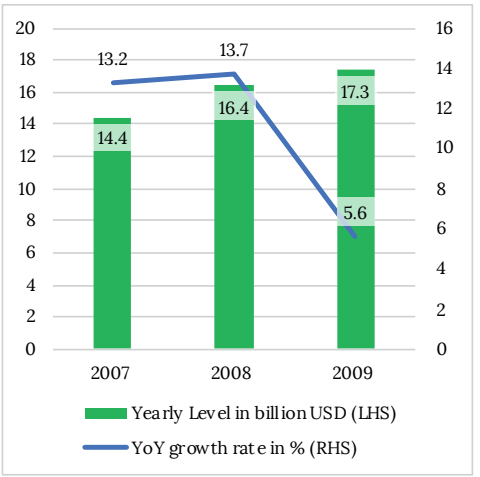
Source: BSP

compared to the declines recorded in the other regional groupings of Europe/ Central Asia (–6.5 percent), North America (–10.4 percent), and Sub-Saharan Africa (–14.3 percent) (Table 3).[5]

Defying expectations of a sharp reduction in remittance flows in the wake of the pandemic, remittances to the Philippines remained broadly stable in 2020. Remittances dropped by only 0.8 percent (for both personal and cash remittances) in 2020 compared to 2019 (Fig. 1).[6] Personal remittances dropped only slightly to USD 33.2 billion in 2020 from USD 33.5 billion in 2019, whereas cash remittances slid to USD 29.9 billion from USD 30.1 billion. The trend of slightly lower inflows is observed for both land-based and sea-based workers (Fig. 2). In 2021, both personal and cash remittances (largely from land-based workers) grew by 5.1 percent to reach USD 34.9 billion and USD 31.4 billion, respectively (Fig. 1).

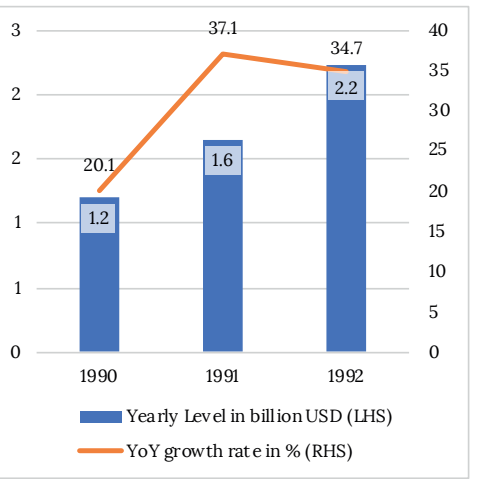
By comparison, at the height of the GFC, the level of cash remittances to the Philippines rose by 5.6 percent in 2009 relative to the previous year (Fig. 3), although its growth slowed down

Figure 3. Remittances of overseas Filipinos during the Global Financial Crisis (billion USD)



Source: BSP

Figure 4. Remittances of overseas Filipinos during the Gulf War (billion USD)



Source: BSP

[5] By contrast, personal remittances rose in 2020 compared to 2019 in Latin America and the Caribbean (6.1 percent), Middle East and North Africa (2.5 percent), and South Asia (5.2 percent).

[6] Cash remittances move closely in tandem with personal remittances. Cash remittances are those sent through the local banking system and are a subset of personal remittances. BSP started to release data on personal remittances in June 2012. The *Balance of Payments Manual*, 6th Edition (BPM6) defines personal remittances as current and capital transfers in cash or in kind between resident households and non-resident households, including compensation of employees, less taxes and social contributions paid by non-resident workers in the economy of employment, less transport and travel expenditures related to working abroad. It thus includes all household-to-household transfers as well as the net earnings of non-resident workers (Annex A).

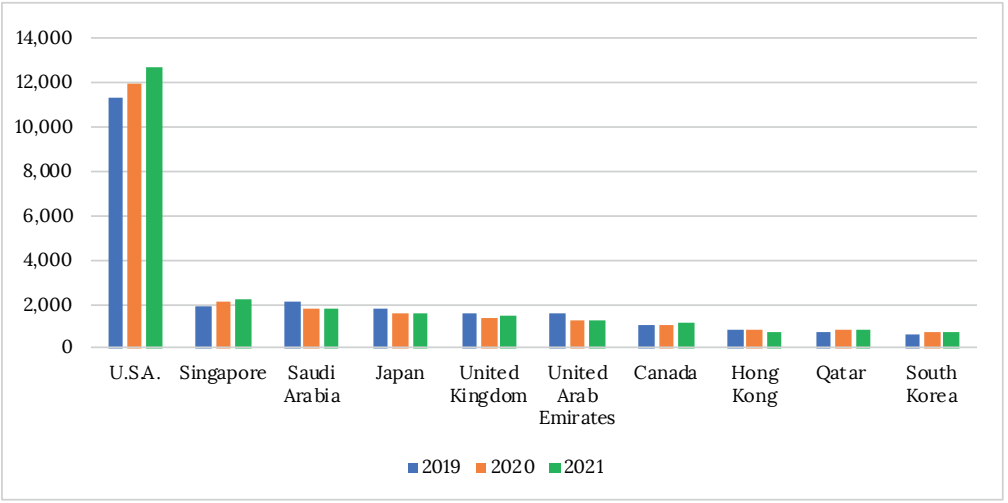
significantly. During the Gulf War in the early 1990s, remittances were remarkably strong, with cash remittances growing in double-digits (Fig. 4).[7] Policymakers have noted the resiliency of remittances as a major force that has helped prop up the Philippine economy amid global economic shocks.

Data on remittance flows by source country are quite revealing.[8] Transfers from the U.S., Singapore, and South Korea have continued to increase in 2020,[9] partially offsetting the declines recorded in the United Kingdom, United Arab Emirates, Saudi Arabia, and Japan.

In 2021, except for transfers from Hong Kong, which dropped by 12.0 percent, overseas remittances from major source countries recovered, rising by more than 5 percent relative to the levels recorded in the previous year (Fig. 5, Table 4). This was true for transfers coming from Canada, South Korea, and the United States, which grew by 11.6 percent, 11.4 percent, and 6.7 percent, respectively (Table 4). This would further suggest that remittances are indeed a highly resilient source of foreign exchange resources.

There are limitations on remittance data compiled and published by the BSP and the Philippine Statistics Authority (PSA). In

Figure 5. Remittances of overseas Filipinos from the top 10 source countries in 2019-2021 (million USD)



Source: BSP

[7] It could well be, however, that the rise in recorded remittances during the early 1990s is partly due to better data capture.

[8] There are some limitations on remittances data by source. A common practice of remittance centers based overseas is to course these transfers through correspondent banks, most of which are based in the United States. Moreover, the data on remittances coursed through money couriers cannot be disaggregated by actual country source and are lodged under the country where the main offices are located, which is also often the United States. These factors could partly explain the sizable magnitude of remittances coming from the USA.

[9] Year-to-date 2021.

Table 4. Cash remittances of overseas Filipinos from the top 10 source countries, 2019-2021

Country	Level (million USD)			Growth rate (percent)	
	2019	2020	2021	2019-2020	2020-2021
United States	11,318	11,936	12,736	5.5	6.7
Singapore	1,906	2,148	2,201	12.7	2.4
Saudi Arabia	2,098	1,812	1,835	(13.7)	1.3
Japan	1,795	1,577	1,611	(12.2)	2.2
United Kingdom	1,567	1,371	1,483	(12.5)	8.1
United Arab Emirates	1,592	1,287	1,320	(19.2)	2.6
Canada	1,016	1,029	1,148	1.3	11.6
Hong Kong	802	821	722	2.4	(12.0)
Qatar	758	820	829	8.2	1.1
South Korea	683	708	788	3.6	11.4
Total (Top 10)	23,537	23,509	24,674	(0.1)	5.0
Total (all)	30,133	29,903	31,418	(0.8)	5.1

Note: Top 10 source countries ranked for the full year (FY) 2020.
Source: BSP

the Survey of Overseas Filipinos (SOF) of the PSA, overseas Filipinos include, among other entities, overseas contract workers, Filipino immigrants and residents in other countries, and Filipinos abroad with non-immigrant visas (tourist/visitor, student, medical treatment, and others). The data on personal remittances published by the BSP also include remittances from OFWs with work contracts of less than one year and one year or more, as well as transfers between Filipinos who have migrated abroad and their families in the Philippines. These data sources on overseas remittances, however, do not provide disaggregated data by residency of the sender. Moreover, there is currently no data on the amount of remittances used for specific purposes. BSP's CES provides information on the share of OFW households, which use remittances for various purposes such as food and household needs, education, medical needs, savings, and investments. However, it does not provide data on the actual amount of remittances according to use.

There are several possible explanations for the observed strength of remittance flows to the Philippines during the pandemic. First, overseas Filipinos are a heterogeneous group, and their

motivations, willingness, and capability to send remittances are varied. Overseas Filipinos who have steadier sources of income, as their usual work arrangements have not been significantly disrupted by the pandemic, are likely to have continued sending money as they did before. This is most likely the case for those who work in essential occupations such as medical/health care and some personal services. Meanwhile, remittances have declined for OFs who are more vulnerable to the economic downturn. Based on PSA's SOF,[10] these groups include managers/professionals, clerical support workers, service and sales workers, craft and related trade workers, and plant and machine operators and assemblers.

Second, there is anecdotal evidence that overseas Filipinos find ways to augment their income by risking taking second jobs, working longer hours, or switching occupations where employment is less uncertain. The income support from targeted fiscal stimulus measures that have been adopted in some countries could have also contributed to the steadier remittance flows, particularly from advanced economies. Studies find that the size of the fiscal stimulus in host countries is positively associated with remittances as the fiscal response have cushioned the economic impact of the pandemic (Kpodar et al., 2021). Using the change in the government spending ratio to GDP in 2020, relative to pre-COVID-19 levels, Kpodar et al. (2021) argue that in countries with larger fiscal responses to avert the health and economic fallout of the pandemic, migrants are able to send more money to their families back home. Statistics show that remittances from the United States have held up quite well in 2020 (rising by 5.5 percent) and 2021 (rising by 6.7 percent).[11] This was also observed in remittances coming from Canada, South Korea, Singapore, and Qatar.

Third, overseas Filipinos, in times of difficulties, could have dipped into their savings to continue to support their household members back home. Mindful of the sharp contraction in real economic activity in the Philippines as it grapples with the COVID-19 pandemic, overseas Filipinos could have been prompted to send more or the same amount of remittances to help their households during times of economic hardships. The altruism motivation is very much in evidence. The projected two-speed recovery of the global economy would likely see this factor explaining the future trends in remittances to the Philippines. Overseas Filipinos, seeing that the Philippines is being hit especially hard, could prop up the income support they provide to their households so they can have enough funds to ride out the doldrums. This is the countercyclical nature of remittances relative to the origin country.

Fourth, stable remittance flows could be due to the diversion of remittances from informal to formal modes due to mobility restrictions that could have hampered access to some physical remittance centers. The shift in flows from cash to digital means, and the better capture of these digital transactions coursed through the formal channels could also have supported remittance numbers. However, official data on this are sketchy. (There are recent pronouncements on

[10] PSA-SOF estimates cover remittances six months prior to the survey of overseas Filipinos whose departure occurred within the last five years and who are working or had worked abroad during the past six months (April to September) of the survey period. The latest survey results are for 2020.

[11] Please refer to Table 4.

initiatives in digital banking services aimed at facilitating remittances.)[12] Nonetheless, data show that transfers to banks have been on a rising trend while transfers using other modes have been on a declining trend (Table 5).

Fifth, repatriation, perhaps temporarily or permanently for some, could be another explanation for the observed rise in remittances. This last reason deserves careful examination. The number of repatriated workers has risen considerably. The May 2021 International Organization for Migration (IOM) report, "COVID-19 *Impact Assessment on Returned Overseas Filipino Workers*," stated there was a record number of repatriated overseas Filipinos, numbering 791,623, in 2020. About 60.8 percent (or 481,305) of overseas Filipinos are land-based, and 38.9 percent (or 308,332) sea-based.[13] Of the total repatriated overseas Filipinos, 327,511 were repatriated by the Department of Foreign Affairs (DFA).

Meanwhile, the Overseas Workers Welfare Administration (OWWA) also estimated that, for March 2020 until 21 September 2021, they expedited the return of

Table 5. Cash remittances of overseas Filipinos by mode of transfer, 2010-2020 (billion PhP)

Mode	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Banks	77.3	82.0	85.1	79.7	82.2	84.3	88.1	92.2	89.4	91.5	57.7
Agency/local office	3.2	5.3	3.0	3.6	5.9	5.4	3.5	4.6	3.3	1.0	2.5
Friends/co-workers	0.9	0.6	0.5	0.6	0.2	0.2	0.4	0.2	0.2	0.4	0.2
Door-to-door	8.4	7.1	4.4	2.7	2	3.2	1.8	1.2	0.1	0.6	0.2
Money transfer [a]	-	-	-	-	-	-	-	-	76.3	64.3	51.9
Others	15.1	19.1	27.1	31.6	36.4	42.6	52.3	48.6	0.1	0.1	0.5
Total	104.9	114.1	120.1	118.1	126.8	135.6	146	146.8	169.4	157.9	113.1

Note: [a]Money transfer as a mode of transfer/remittance was only included starting in 2018.
Source: PSA Survey of Overseas Filipinos (SOF), a note in which states: The estimates cover remittances during the six months prior to the survey of overseas Filipinos whose departure occurred within the last five years and who are working or had worked abroad during the past six months (April to September) of the survey period.

[12] For instance, UniTeller Philippines announced in December 2021 that, in partnership with Universal Storefront Services Corporation (USSC)—one of the largest one-stop digital shops in the Philippines—it plans to increase customers' accessibility in redeeming their remittances. In addition, in February 2022, Digital Wallet Group (DWG), a Japan-based global IT and FinTech company, introduced Smiles Mobile Remittance (Smiles), an international money transfer app, to the Canadian market where a large segment of the overseas Filipino population is.

[13] The remaining 0.2 percent (or 1,986 OFs) are transferees from Sabah.

Table 6. Deployment of OFWs in thousands, 2006-2021[a]

Year	Total	Land-based			Sea-based	Percent of total	
		Total	New hires	Re-hires		Land-based	Sea-based
2010	1,471	1,124	342	782	347	76.4	23.6
2011	1,688	1,319	438	881	369	78.1	21.9
2012	1,802	1,435	459	977	367	79.6	20.4
2013	1,836	1,469	465	1,004	367	80.0	20.0
2014	1,833	1,431	487	944	402	78.1	21.9
2015	1,844	1,438	515	923	407	78.0	22.0
2016	2,112	1,670	583	1,087	443	79.0	21.0
2017	2,045	1,595	459	1,136	449	78.0	22.0
2018	1,989	1,507	421	1,086	482	75.7	24.3
2019	2,157	1,649	486	1,163	508	76.5	23.5
2020	550	333	100	232	217	60.5	39.5
2021	743	397	268	129	346	53.5	46.5

Note: [a]Data for 2018 to 2021 are preliminary.

Source: Philippine Overseas Employment Administration (POEA)

693,395 OFWs. The Department of Labor and Employment estimates that OFW displacement could reach 1 million by December 2021, as migrant populations struggle with job losses and indefinite furloughs/leaves. These numbers are significantly higher than the repatriation that was recorded during the Global Financial Crisis period. Some of the reasons cited by repatriated Filipinos include the expiration and non-renewal of work contracts because of the pandemic. OFs who have come back whether on a temporary or permanent basis could have sent their savings and other accumulated capital (recorded in the BOP as migrant transfers) to the Philippines for their financial needs, even as they plan for their next actions or deployment. It could well be argued that the numbers of those being repatriated could even be higher if not for the global travel restrictions.

At the same time, there has been a marked reduction in the number of contracts processed and, more significantly, in the number of deployed OFWs (both new hires and rehires). There is also a significant slowdown in the processing of visas for those who seek permanent residence overseas.[14] Total OFW deployment dropped from 2.157 million in 2019 to 549,800 in

[14] Based on POEA issuances. On 28 September 2020, the POEA issued a rejoinder stating that the slowdown in deployment of OFWs was attributed to some countries still not accepting foreign nationals, restrictions on travel, temporary disruption of government office operations due to community quarantine protocols, and closing of licensed recruitment and manning agencies.

2020, contracting by 74.5 percent. By contrast, from 2010-2019, average annual deployment was at 1.878 million for an average annual deployment growth rate of 4.4 percent. Of the total deployment in 2020, land-based workers accounted for 60.5 percent, whereas 39.5 percent were sea-based. This compares to 76.5 percent and 23.5 percent respectively in 2019. The numbers of both new hires and rehires dropped considerably as well. For 2021, the total number of deployed workers have recovered, rising by 35.1 percent from the total in 2020. The rise in the number of deployed workers is seen largely in sea-based workers, posting an annual increase of 59.4 percent from 2020. Land-based workers also rose by 19.2 percent and are mostly new hires.

According to the 2021 Senate Economic Planning Office (SEPO) report, the decrease in the number of deployed workers in 2020 was mainly attributed to the travel restrictions imposed to address the rising transmission rate of COVID-19, including the ban (deployment cap) on the deployment of health care workers. The government placed a deployment cap of 5,000 health care workers (per annum), much lower than the annual average of 16,651 nurses deployed from 2016 to 2019. This has subsequently been lifted in December 2020. While OFWs are now permitted to enter some countries subject to flight availability, visa regulations, and medical protocols, other countries still restrict the entry of Filipinos.[15] Constraints on local travel/flights as well as to and from some of the host countries for OFs/OFWs are expected to affect the numbers in 2021 and 2022.

Aggravating the decline in the number of deployed workers was the rise in the COVID-19 cases among OFWs. As of 27 December 2021, the DFA reported a total of 24,258 confirmed cases of infection among Filipinos abroad. More than half (14,407) have already recovered, 8,399 were undergoing treatment, and 1,452 have succumbed to the virus (DFA, 2021).

3.2. *Cyclicality of remittances*

The timing of remittance flows is important because remittances can amplify or moderate income volatility, depending on their cyclical behavior. The issue of income volatility, in turn, is important because macroeconomic stability is a desired characteristic for sustained and balanced economic growth.

Procyclicality in remittances has the potential to exert a destabilizing force. It could magnify output fluctuations, leading to serious macroeconomic effects, including deepening a crisis even further. Procyclicality in remittances could also reduce the creditworthiness or external liquidity of countries at a time when they are most in need of external financing. Knowing the cyclicality of remittances is therefore important so that policymakers are forewarned about the need to formulate appropriate policies that would minimize income volatility.

A review of literature shows that cyclicality is largely dependent on the motivation behind or the nature of the transfers. If remittances are altruistically motivated, then one would expect countercyclicality. If remittances are motivated by portfolio investment, self-interest, or insurance

[15] There is also a deployment ban not related to COVID-19 restrictions. A deployment ban on household service workers and construction workers to Saudi Arabia will remain until it has complied with the demand of the Philippine government for the fair treatment and protection of Filipino workers and the settlement of PhP 4.5 billion in back wages and benefits for some 10,000 Filipinos. (Source: POEA pronouncement, 10 February 2022)

Table 7. Cyclicality of overseas Filipinos' cash and personal remittances

Variable	**Remittances (actual/HP*** trend) March 2009-December 2021**	
	Cash	**Personal**
Real GDP level (in million USD) Actual/HP*** trend March 2009-March 2021		
Philippines[a]	Procyclical *	Procyclical *
Real consumption spending (actual/HP*** trend)	Countercyclical*	Countercyclical*
Americas	Procyclical *	Procyclical *
Asia and the Pacific	Procyclical *	Procyclical *
Europe	Procyclical *	Procyclical *
Gulf countries	Procyclical **	Procyclical **
Americas		
United States	Procyclical *	Procyclical *
Canada	Procyclical *	Procyclical *
Asia and the Pacific		
Of which:		
Hong Kong	Procyclical *	Procyclical *
Japan	Procyclical *	Procyclical *
South Korea	Procyclical **	Procyclical **
Singapore	Procyclical *	Procyclical *
Taiwan	Procyclical **	Procyclical **
Australia	Procyclical *	Procyclical *
Europe		
Of which:		

Cyprus	Procyclical *	Procyclical *
Germany	Procyclical *	Procyclical *
Greece	Procyclical **	Procyclical **
Italy	Procyclical *	Procyclical *
Spain	Procyclical **	Procyclical **
The Netherlands	Procyclical *	Procyclical *
United Kingdom		
Gulf countries	Procyclical *	Procyclical *
Of which:		
Bahrain	Procyclical *	Procyclical *
Kuwait	Procyclical *	Procyclical *
Saudi Arabia	Procyclical *	Procyclical *

*[a]Cash and personal remittances are also procyclical with the Philippines' GNP level/HP*** trend.*

*Note: * Significant at 5 percent and 10 percent levels of significance.*

*** Not significant at 5 percent and 10 percent levels of significance.*

**** Hodrick-Prescott*

considerations, then one would expect procyclicality as remittances behave like other investment-related capital flows. More typically, remittances are likely to be motivated by varied considerations across time and across individuals. In this case, remittances could exhibit an acyclical behavior as the net effect would depend on which flow (altruistically or investment motivated) is of greater magnitude. It could also depend on migrant characteristics, with the expectation that remitters from low-income households would be remitting more for altruistic reasons while remitters from more affluent households would be remitting more for investment and insurance considerations.

Following the methodology used by Frankel (2009), the bilateral/pairwise coefficient of correlation is estimated between OFs' personal and cash remittances and real GDP of major sources of overseas remittances to the Philippines from March 2009 to December 2021. We also include the pairwise correlation between OFs' personal and cash remittances and the Philippines' real GDP and real consumption spending. OFs' cash and personal remittances are detrended using two-sided Hodrick-Prescott (HP) filter. All real GDP of source countries are scaled by their own trend real GDP using the two-sided HP filter to see the relative difference between actual real GDP and the trend.

Table 7 shows the following results:

- Overseas Filipinos' cash remittances are procyclical with the incomes (real GDP) of the host country groups: Asia and the Pacific, the Americas, Europe, and the Gulf countries. OFs' personal and cash remittances from South Korea, Greece, Spain, and Taiwan are not significant at the 5 percent and 10 percent levels of significance.

- The finding of procyclicality in both the origin and majority of the host countries could explain why remittances are expected to go down in the COVID-19 period, as all economies have been suffering setbacks in a scale that are greater than those seen in previous episodes when remittances have also been affected (i.e., the Gulf crisis period in 1990 to 1991 and the Global Financial Crisis period in 2008 to 2009). Procyclicality of remittances with respect to the economic cycles in host countries imply that remittances are a significant channel for the transmission of global shocks. This is an often-underappreciated spillover impact in contrast to global investment and trade flows.

- Procyclicality of remittances with respect to the Philippines' economic cycle means that the stabilizing impact of remittances can be less than is often assumed.[16] In addition, this finding suggests that remittances are also motivated by portfolio investment or insurance considerations. However, Table 7 shows that Philippine cash and personal remittances are countercyclical with Philippine real consumption spending, an indication of the presence of altruism as another motivation in sending remittances to beneficiaries in the Philippines. This means that remittances are also meant to help smoothen spending patterns of OFs' beneficiaries. These findings must be recognized by policymakers when considering dependence on remittances for much-needed policy space.

The correlation tests conducted here deal only with bivariate relationships. In fact, the relationships are much more complex. The impact of remittances on the real exchange rate, wages, and labor productivity are part of a complex set of interactions in the economy. Moreover, it is equally important to note that when studying the impact of remittances, the issue of endogeneity needs to be considered as remittances form part of GDP. Most studies use the two-stage least squares (instrument variable) and the GMM approach. This study uses GMM in addressing the issue of endogeneity.

4. Empirical methodology and results

4.1. Determinants of remittances

Empirical strategy. A reduced-form model that identifies the drivers of growth of overseas remittances (R_t) with lags t-j is used to investigate the impact of the pandemic by estimating the macroeconomic determinants of the YoY growth of overseas remittances to the Philippines from January 2009 to December 2021. These factors are the origin/home country's growth, inflation rate, interest rate differential, exchange rate, host country's economic growth, and the level of financial development. As in other studies, the drivers of growth

[16] Cash and personal remittances are procyclical with Philippines' GDP and GNP level/HP trend.

of overseas remittances are assumed to behave with lags. To the best of the authors' knowledge, this is the first time that this approach has been used in studies on the impact of the pandemic on overseas remittances to the Philippines. Some recent studies focus on the regional impact of the pandemic on overseas remittances.[17]

$$R_t = a_t + \beta_1 Yd_{t-j} + \beta_2 r_{t-j} + \beta_3 REER_{t-j} + \beta_4 Yf_{t-j} + \beta_5 M_{t-j} + u_{t-j} \quad (1)$$

Specifically, the growth of remittances is expected to be positively related to the origin/home country's (in this case, the Philippines) real GDP (*Yd*), reflecting the dominance of the self-insurance/investment motives over the altruism motive, and as borne out in the cyclicality tests.[18] Inflation is also considered separately as an indicator of macroeconomic prospects, with higher inflation readings possibly motivating

Table 8. A priori relationships of selected factors that drive the growth of overseas remittances

No.	Indicator	Parameter in Eq. 1	Expected relationship with overseas remittances	Studies
1 or	Home country's real GDP growth[a]	*Yd*	Positive	Cazachevici et al. (2020); Olayungbo and Quadri (2019); Yoshino et al. (2017); Borja (2013)
2	Inflation[a]	II	Positive	Rivera and Tullao (2020)
3	Interest rate differential	*r*	Positive	Olayungbo and Quadri (2019)
4	Exchange rate (nominal and real effective exchange rate[b] of advanced trading partners)	REER	Positive	Yoshino et al. (2017); Lin (2011)
5	Host country's real GDP growth	*Yf*	Positive	Yoshino et al. (2017); Borja (2013)
6	Growth of domestic liquidity in home country	M	Positive	Cazachevici et al. (2020); Olayungbo and Quadri (2019)

[a] *In the empirical estimation, multicollinearity is seen when both Yd and II are in the equation.*

[b] *The real effective exchange rate is calculated as REER = e(Pd/P*), where e is the nominal effective exchange rate, Pd is price of domestic good, P* is the price of foreign good.*

[17] These studies include Kikkawa et al. (2021), an ADB study that analyzes the impact of the pandemic on labor mobility and remittances in the Asia and the Pacific region.

[18] In the estimation, growth of real consumption spending was initially included. However, the regression yielded insignificant coefficient. This was removed from the final regression.

overseas Filipinos to send more. Specifically, Rivera and Tullao (2020) find that increases in Philippine inflation can prompt the sending of more remittances at least in the short run.

The interest rate differential between local and international rates (*r*) determines whether investment considerations are at play. Equation 1 uses the difference between the monthly overnight BSP policy rate and the Federal (Fed) funds rate. Movements in the peso-dollar rate (REER) estimate the impact of exchange rates on growth of overseas remittances. Specifically, the real effective exchange rate is posited as being positively associated with remittance inflows. The cyclicality of remittances from the host countries (*Yf*) will show if remittances vary with the business cycles of host countries, such that, in good times, better employment opportunities and higher wages allow overseas Filipinos to transfer more. The impact of remittances on monetary conditions is also posited in Equation 1: an increase in remittances is associated with an increase in domestic liquidity (M3), which can indicate a higher level of financial development or efficiency of banking services in the home country.

Estimation method. In analyzing the drivers of overseas remittance flows, many studies use instrumental variables in two-stage least squares and GMM as well as IRFs in vector autoregression with a variable ordering assumption. Other studies use the autoregressive distributed lag (ARDL) Model to identify the presence of a long-run equilibrium relationship. The results are sensitive to the details of model specification. In this study, the parameters in the models are estimated using the GMM. This study considers this to be a more appropriate empirical methodology to address the endogeneity among the factors driving the growth of personal remittances. GMM controls for endogeneity by including instrument variables that are lagged values of the explanatory variables and previous annual growth of personal remittances as an explanatory variable in the model. The GMM model ultimately addresses the three major sources of endogeneity, namely (a) omitted variable,[19] (b) simultaneity,[20] and (c) measurement errors.[21]

Robustness checks. Descriptive diagnostics tests are used to check the stability of indica¬tors used in the study. A critical as¬sumption for the validity of GMM estimates is that instrument variables are exogenous. The findings from GMM will not be valid if the instruments are endogenously determined. The Durbin-Wu-Hausman test is used to determine whether the regression model is valid or not, and whether the instruments are correctly specified or not. The null hypothesis of the test is that the regressors used are exogenous. If the null hypothesis is rejected, the instruments used in the estimation need to be reconsidered. The standard error of regression is also used to see if the residuals of the model are stable and to check the overall fit of the model. The 1 percent, 5 percent, and 10 percent levels of significance are looked into.

[19] Omitting a relevant variable from the right-hand side of the regression, which is correlated with at least one of the included independent variables, causes endogeneity (i.e., the included variable becomes correlated to the error term).

[20] This source of endogeneity occurs when both the dependent variable and independent variable affect each other simultaneously.

[21] Failing to measure a relevant and included explanatory variable appropriately causes a portion of the variable's effect to be embodied into the error term.

Table 9. Variable name and description

No.	Variable	Description	Source(s)
1	DRGDP	YoY growth of the Philippines' real GDP	National income accounts, BSP
2	INF	YoY growth of consumer price index (2012 as base year)	Domestic consumer prices, BSP
3	LINT	Log of interest rate differential: BSP overnight policy rate less Fed funds rate	Selected interest rates, BSP
4	LM3	YoY growth of domestic liquidity (M3)	Deposit corporations survey, BSP
5	DREER	YoY growth of real effective exchange rate (advanced economies)	Exchange rate, BSP; Trend based on HP filter
6	USLGDP	Actual US real GDP/HP trend of US real GDP	CEIC Database; Trend based on HP filter
7	DCOV	Dummy for COVID-19 pandemic	Value of 1 from March 2020 to May 2021; 0 otherwise

Results. Following diagnostics and robustness checks, the estimates from January 2009 to December 2021 revealed important findings. Model 1 in Table 10 is the baseline model. Model 2 includes all the variables used in Model 1 and a dummy variable for COVID-19 pandemic. Model 3 re-estimates Model 1 from January 2009 to December 2019 only (pre-pandemic period). The results of Model 1, Model 2, and Model 3 are examined to determine the impact of the pandemic on the growth of overseas remittances.

In Model 1, the results show that the YoY growth of personal remittances are positively and significantly related to the lag of inflation. In the initial estimation, real GDP growth (DRGDP) of the Philippines is used to see if remittances tend to stabilize real GDP. However, the estimation yielded insignificant coefficients. The interest rate differential (INT) is positive, which indicates that investment or insurance considerations drive the growth of personal remittances. The growth of the real effective exchange rate of trading partners (advanced economies) (DREER) positively affects the growth of personal remittances. In addition, the growth of personal remittances varies with the business cycles of the U.S. economy (USGDP). This means that, in good times, better employment opportunities and higher wages in the United States allow overseas Filipinos to transfer more to their beneficiaries in the Philippines. Finally, Model 1 shows that financial market development as indicated by the accelerated growth of domestic liquidity attracts overseas Filipinos to send more remittances. This is consistent with Olayungbo and Quadri (2019) who find that, in the case of Sub-Saharan Africa (SSA), improved banking services and investment opportunities in the home countries attract higher remittances.

Table 10. Year-on-year growth of personal remittances (DPERM), January 2009-December 2021

Independent variables	Model 1 (baseline) DPERM (Year-on-year growth of personal remittances) Jan. 2009-Dec. 2021		Model 2 DPERM (Year-on-year growth of personal remittances) Jan. 2009-Dec. 2021		Model 3 DPERM (Year-on-year growth of personal remittances) Jan. 2009-Dec. 2019	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	−0.558	0.288**	−0.266	0.353	0.033	0.165
INF (-1)	0.593	(0.247)***	0.662	(0.346)**	0.423	(0.291)**
LINT (-1)	0.031	(0.010)***	0.007	0.014	0.027	(0.008)***
DM3 (-1)	0.181	(0.041)***	0.171	(0.048)***	0.215	(0.031)**
DREER(-1)	0.092	(0.060)*	0.170	(0.069)*	0.177	(0.043)**
USGDP(-1)	0.679	(0.299)***	(0.039)	0.365	0.089	(0.162)***
DPERM (-1)	0.032	0.091	−0.040	0.107	−0.192	(0.065)*
DCOV (Dummy variable for pandemic)			−0.060	(0.028)**		
Instrument variables are all lagged dependent and independent variables						
Diagnostics						
Adjusted R^2	0.140		0.129		0.145	
Sample period	2009M1-2021M12		2009M1-2021M12		2009M1-2019M12	
Durbin-Wu-Hausman Test[a]	0.120		0.201		0.199	
Standard error of regression[b]	0.014		0.054		0.045	

*Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10 percent, 5 percent, and 1 percent, respectively. [a]Reports p-values for the null hypothesis that the regressors used are exogeneous. [b]Reports p-values for the null hypothesis that the residuals or errors in the regressions are stable.*

Given the results in Model 1, the impact of the pandemic on growth of personal remittances is expected to be significant. In Model 2, a dummy variable (DCOV) 1 from March 2020 to December 2021 (0 from January 2009 to February 2020) is included to control for the impact of COVID-19 pandemic on the growth of personal remittances. Table 10 shows that DCOV has a negative and significant impact on the growth of personal

remittances. This finding is consistent when we use the monthly growth of the cumulative number of confirmed new COVID-19 cases from the Department of Health (CUMCOV) from January 2020 to December 2021. These findings show that mobility restrictions in host economies and the Philippines contributed to the slowdown in remittance flows. Once lifted, the trend in remittances can be expected to stabilize, if not reversed.

Model 1 is then re-estimated (as Model 3) using data from January 2009 to December 2019 (pre-pandemic period). There are two observations on the factors driving personal remittances in Model 3 when compared to results in Model 1 (with pandemic period or from January 2009 to December 2021) and in Model 2. First, the positive trajectory in Model 3 (constant at 0.033) turns negative in Model 1 (constant at −0.558). This further substantiates that personal remittances have been affected by the pandemic. Second, comparing Model 2 and Model 3, the coefficients of interest rate differential and U.S. real GDP gap have become insignificant and negative in U.S. real GDP gap in Model 2. This finding indicates that both investment and growth opportunities in the host countries and the Philippines have declined following the outbreak of the pandemic.

4.2 The macroeconomic effects of a shock in Philippine overseas remittances

Empirical method. Section 3 highlights the sizable remittance inflows that the Philippines has been receiving since the 1990s, indicating that the country is more globally connected and vulnerable to external shocks than what traditional measures would suggest. Remittance flows represent an important and distinct channel of spillover effects from the global economy. The IRF from a VAR exercise is used to see the impact of a shock on overseas remittances on the macroeconomy from January 2009 to December 2021. A VAR expresses a variable as a function of its lag values and the lag values of other variables in the model. An IRF traces the impact of a one-time shock to the current and future values of a variable. To get a first insight into the relationships between the variables, we ran Granger causality tests from January 2009 to December 2021 on the following indicators: YoY growth of overseas Filipino personal remittances (DPERM), interest rate differential (INT), labor force (LF), a proxy for wages, minimum wage rate (MINR), nominal peso-dollar exchange rate (FXR), growth of real effective exchange rate of major advanced trading partners (DREER), growth of domestic liquidity (DM3), real GDP growth (DRGDP), and inflation rate (INF).

In including labor market indicators such as the minimum wage rate, labor force, and employment, Bayangos and Jansen (2011) find that when looking at the impact of migration and workers' remittances on the competitiveness of the home economy, it is significant to consider not just the exchange rate effects but also the labor market effects.

The results of Granger causality test in Table 11 show that (Granger) causation runs from YoY growth of personal remittances to growth of real effective exchange rate and minimum wage rate. Table 11 also shows that there is bi-directional causality between the growth of personal remittances, interest rate differential, average nominal peso-dollar rate, labor force (YoY growth and gap from HP trend), employment (YoY growth and gap from HP trend), and inflation. These results imply that personal remittances are indeed a major economic source of income in the Philippines, having important impacts on the exchange rate, labor force, and employment. Notably, it is well recognized that these Granger tests deal only with bivariate relationships while, in fact, the impact of overseas remittances on real

Table 11. Granger causality test results, January 2009-December 2021[a]

No.	Significant one-way causality (from DPERM to variables)	Significant one-way causality (from variables to DPERM)	Significant bi-direction causality (DPERM and variables)[b]	No significant causality
1	Average nominal peso-dollar rate	Philippine real GDP gap (gap from HP trend)	YoY growth of labor force	YoY growth of domestic liquidity (M3)
2	YoY growth of nominal peso-dollar rate	Labor force gap (gap from HP trend)	YoY growth of employment	Minimum wage rate
3		Employment gap	YoY growth of real GDP	Inflation rate
			Interest rate differential	

[a]At 1 percent, 5 percent, and 10 percent levels of significance.

[b]In this exercise, the U.S. real GDP gap (gap relative to its HP trend) causes growth of personal remittances.

exchange rates, wages, labor force, and employment are part of a complex set of interactions in the economy.

The IRF from the VAR exercise is used to see the impact of a shock on overseas remittances on the macroeconomy from January 2009 to December 2021 using the baseline ordering DPERM DRGDP INF INT DM3 DFXR MINR DFOR.[22] Table 12 describes these variables.

The innovation of the baseline ordering is the explicit introduction of labor supply and personal remittances as endogenous variables. It is assumed that the specification is largely demand driven. Aggregate demand translates into demand for labor. This demand is linked with supply to determine unemployment and wage pressures. It is further assumed that the output gap then feeds into interest rate differential to growth of domestic liquidity to YoY growth of nominal peso-dollar rate. Changes in monetary policy and domestic liquidity affect the labor market indicators: growth of labor force, minimum wage rate, and growth of employment. These relationships are expected to strengthen the link between overseas remittances and inflation.

Robustness checks. Diagnostics tests are used to check the VAR lag length order using the Akaike information criterion (AIC) and the stability of indicators using the autoregressive (AR) roots. Using the AIC, the appropriate lag length is eight months while the

[22] Real GDP of the United States relative to its HP trend is treated as an exogenous variable.

Table 12. Variable name and description

No.	Variable	Description	Source
1	DPERM	YoY growth of personal remittances	Overseas remittances, BSP
2	DRGDP	YoY growth of real GDP	National income accounts, BSP
3	INF	YoY growth of consumer prices (2012=100)	Consumer prices, BSP
4	INT	Log of interest rate differential: BSP overnight policy rate minus Fed funds rate	Selected interest rates, BSP
5	DM3	YoY growth of domestic liquidity	Deposit corporations survey, BSP
6	DFXR	YoY growth of nominal peso-dollar rate	Exchange rate, BSP; Trend based on HP filter
7	MINR	Minimum wage rate	Labor sector, PSA
8	DFOR	YoY growth of labor force	CEIC Database (Labor force refers to the population 15 years and older who contribute to the production of goods and services in the Philippines)
9	FORCE_POT	Trend labor force relative to actual labor force	Trend labor force based on HP filter/actual labor force
10	DEMP	Actual employment/HP trend of employment	Number of employed persons

AR roots are stable. Another type of VAR called Bayesian VAR and three-alternative ordering are used to check the robustness of our results. Specifically, Bayesian vector autoregression or BVAR uses Bayesian methods to estimate a VAR model. BVAR differs from standard VAR models in that the model parameters are treated as random variables, with prior probabilities rather than fixed values. Vector autoregressions are flexible statistical models that typically include many free parameters. Given the limited length of standard macroeconomic datasets relative to the vast number of parameters available, Bayesian methods have become an increasingly useful way of dealing with the problem of over-parameterization. As the ratio of variables to observations increases, the role of prior probabilities becomes increasingly important. The general idea is to use informative priors

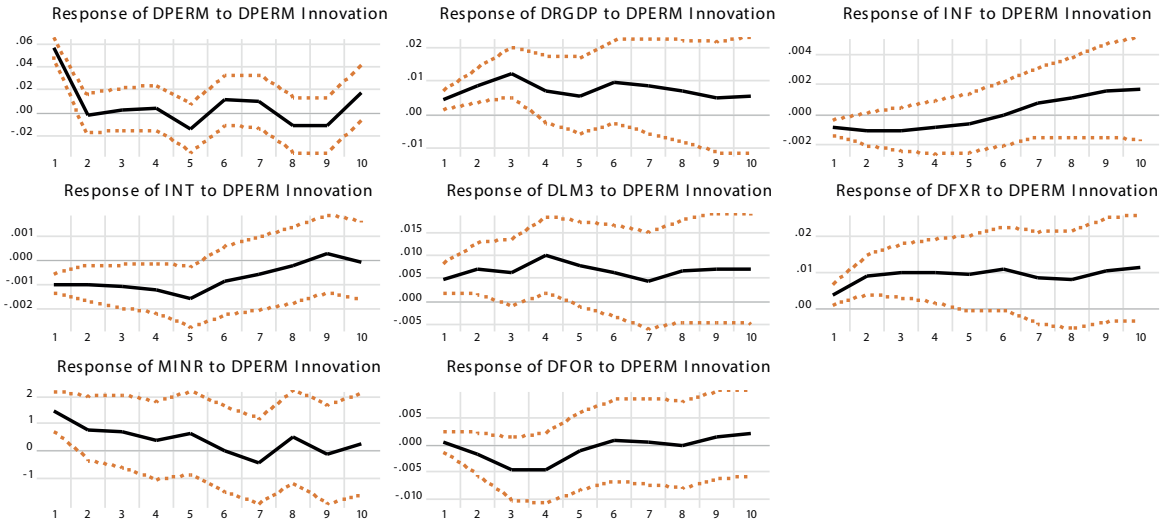
to shrink the unrestricted model towards a parsimonious naïve benchmark, thereby reducing parameter uncertainty and improving forecast accuracy. Specifically, the three-alternative ordering are as follows (Table 13).

Results. Following diagnostic checks and alternative ordering, Fig. 6 (baseline ordering) shows that a one-standard deviation shock on growth of personal remittances significantly affects real GDP growth, inflation, interest rate differential, nominal peso-dollar growth, and domestic liquidity growth.[23] Figure 7 also reveals that a one-standard deviation shock in the YoY growth of personal remittances leads to significant changes in growth of real GDP and growth of nominal peso-dollar rate.[24] Figures 8 and 9 show that real GDP

Table 13. Summary of VAR ordering: baseline and alternative ordering

VAR ordering	Variables
Baseline ordering	DPERM DRGDP INF INT DM3 DFXR MINR DFOR
Alternative ordering 1	DPERM DRGDP INF INT DM3 DFXR MINR DEMP
Alternative ordering 2	DPERM DRGDP INF INT DM3 DREER MINR DEMP
Alternative ordering 3	DPERM DRGDP INF INT DM3 DREER MINR FORCE_POT

Figure 6. Impulse response functions: Baseline ordering



[23] Changes in minimum wage rate and growth of labor force are not significant.

[24] Changes in inflation rate, interest rate differential, domestic liquidity growth, minimum wage rate, and labor force growth are not significant.

Figure 7. Impulse response functions: Alternative ordering 1

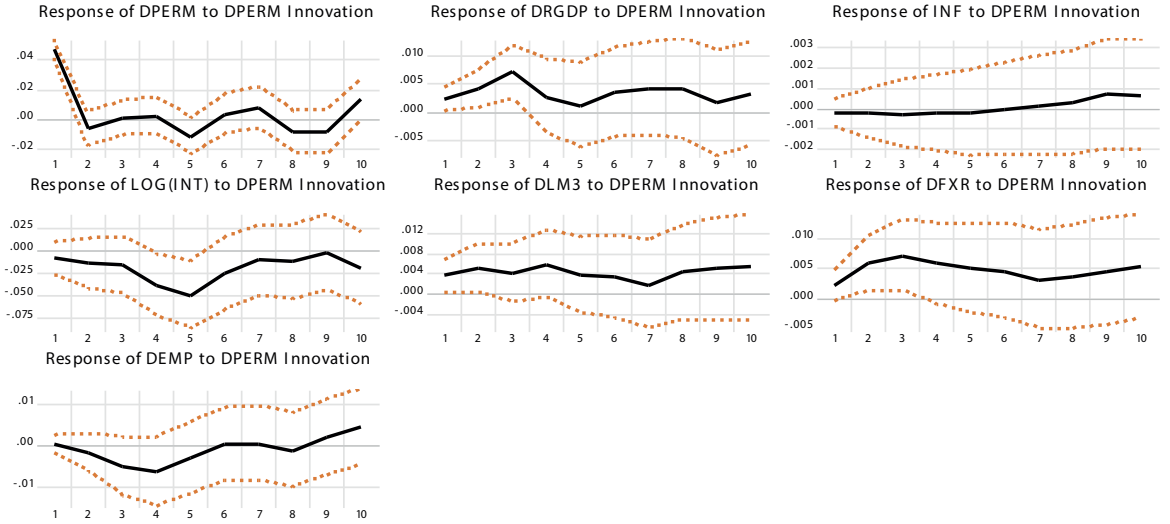


Figure 8. Impulse response functions: Alternative ordering 2

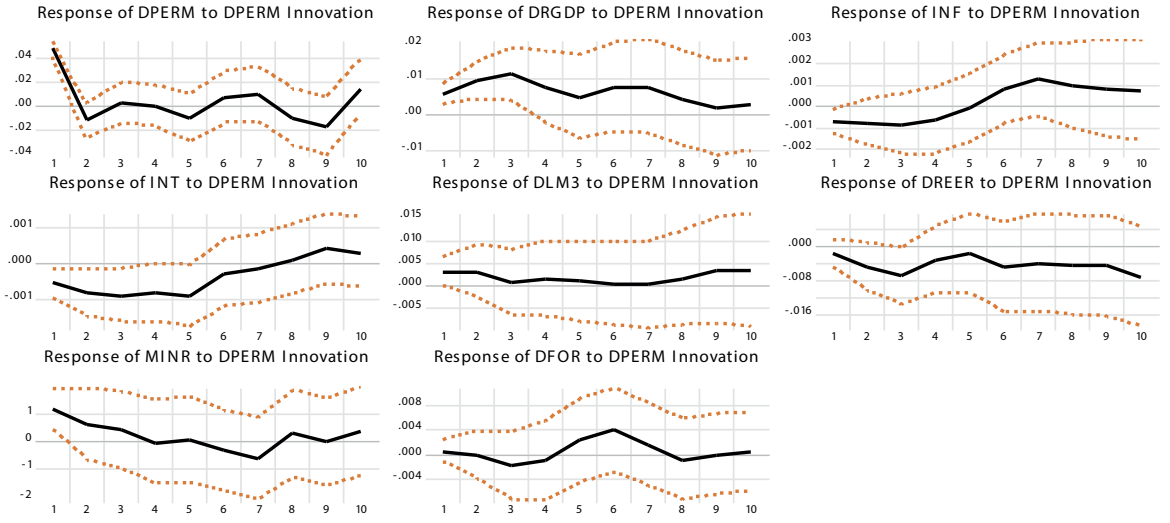
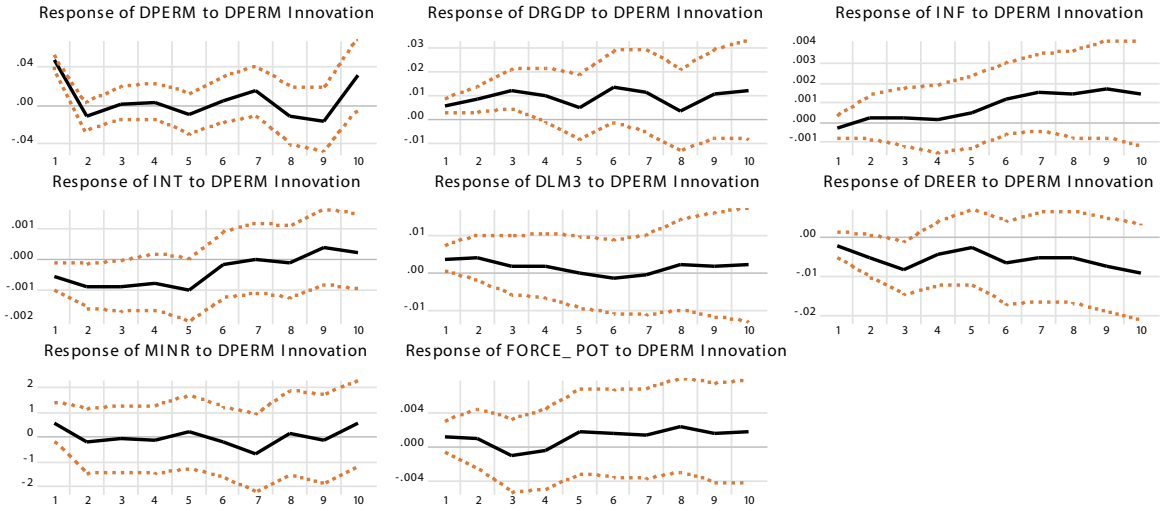


Figure 9. Impulse response functions: Alternative ordering 3



growth, interest rate differential, and growth of the real effective exchange rate of trading partners and minimum wage rate (only in Fig. 8) respond significantly to a one-standard deviation shock in the YoY growth of personal remittances. In all the IRFs, the responses of real GDP growth and interest rate differential are consistently significant. However, the response of the growth of labor force is not significant. This finding may be due to the impact of the various measures introduced and adopted by the government to cushion the effect of the pandemic on the OFWs and their beneficiaries. Annex B outlines these measures.

Meanwhile, the results using the standard VAR exercise are generally consistent with findings using Bayesian VAR in Figs. 10 to 13 in Annex C. Growth of personal remittances responds to the monthly growth of the cumulative number of confirmed new COVID-19 cases from the Department of Health from January 2020 to December 2021 (CUMCOV) (Fig. 10). Moreover, Fig. 11 shows that real GDP growth, interest rate differential, domestic liquidity growth, peso-dollar rate growth, minimum wage rate, and growth of labor force respond to a one-standard deviation shock on growth of personal remittances. Figure 12 also reveals that a one-standard deviation shock in the YoY growth of personal remittances leads to changes in growth of employment and labor force gap (Fig. 13). Notably, the IRFs from the Bayesian VAR find significant responses of labor market indicators such as labor force growth, employment growth, and minimum wage rate. These findings imply that shocks to overseas remittances have significant spillover effects on the monetary, financial, and the labor sectors.

5. Conclusions

Remittances have been an important source of financial resources to the Philippines, providing much needed foreign exchange and fiscal space. This chapter addresses two important policy questions. First, has the impact of the pandemic been significant on the remittances of overseas Filipinos. Second, what are the spillover effects of a shock in remittances on monetary, financial, and labor markets? Using a reduced-form equation estimated by GMM and Impulse Response Functions from standard and Bayesian VAR models from January 2009 to December 2021, the findings reveal that, first, overseas Filipinos' cash and personal remittances are procyclical with the incomes of the Philippines and with major host country groups. Second, the growth of personal remittances is driven by domestic inflation, interest rate differential, growth of real effective exchange rate of trading partners, the business cycle of the United States, and growth of domestic liquidity. Third, the pandemic has a negative and significant impact on the growth of personal remittances. Finally, the labor force growth, minimum wage rate, and employment growth, along with real GDP growth, inflation rate, interest rate differential, peso-dollar rate, and growth of domestic liquidity respond to a one-standard deviation shock on growth in personal remittances. These results imply that remittance flows represent an important and specific channel of spillover effects from the global economy.

Indeed, remittances will continue to be a significant force in the Philippine economy over the medium term. For one, rising incomes in host countries will continue to serve as a magnet to those whose skills are in demand overseas. For another, the migration network (chain migration) continues to be a powerful force. Remittance inflows to Asia and the Pacific are also expected to recover strongly over the near term (Kikkawa et al., 2021). In the Philippines, the BSP expects the OFs' remittances to rise by 4.0 percent in 2022 following the increased global demand for foreign workers, with host countries starting to reboot their economies as mobility restrictions are minimized because of the rollout of COVID-19 vaccines.

There is, however, some potential uncertainty on remittance flows arising from the Russia-Ukraine war. First, weaker economic activity in Russia, Belarus, and Ukraine would dampen the employment and income of Filipinos based in these countries and their ability to send remittances. The second channel of impact would be through a weakening of the currencies of Russia, Belarus, and Ukraine against the U.S. dollar, which would reduce the peso value of remittances sent in these currencies. Importantly, the sanctions on the Russian banking system in the form of exclusion from the SWIFT network for fund transfers is likely to disrupt remittances through formal channels, which could lead to a shift to indirect and informal channels. However, the magnitude and share of the combined cash remittances from Belarus, the Russian Federation, and Ukraine are minimal at USD 2.4 million or around 0.01 percent of the total cash remittances for 2021.[25] This indicates that the impact of the Russian-Ukraine conflict on remittances may not be significant.

[25] Based on the BSP data on overseas cash remittances by source country.

More employment opportunities could bode well for OFW job prospects and remittances, helping support the country's economic recovery. Empirical evidence from past crises has shown that labor mobility picks up as economies recover, with migrant workers playing an essential role in post-crisis recovery in host and origin countries (Kikkawa et al., 2021). Rising remittance flows could take off some of the burden on public finances needed for income support, especially at a time when fiscal revenues have declined due to the economic slowdown. It is notable that, in the aftermath of the Gulf War and the GFC, a rising trend was seen in overseas deployment of Filipino workers. In fact, there has been a strong demand for medical and health care staff. However, the adverse impact on service workers could be longer because of possible job destruction in some of the occupations where OFWs could be concentrated.

The findings in this study indicate that OF remittances are a crucial source of funding for the country's economic growth. Remittances have provided the much-needed foreign exchange and policy space to undertake the necessary macroeconomic policy adjustments and institute structural reforms. However, dependence on remittances as development flows is not healthy, especially at the household level. The most widely cited concern is that remittances could breed dependency by discouraging household members from working, thus distorting labor supply decisions. Remittances, by easing budget constraints, raise reservation wages and, through the income effect, reduce employment likelihood and hours worked by individuals receiving remittances.

How can the Philippines optimize the use of remittances? Some policy measures include the following:

- Declare the provision of remittances as an essential financial service to facilitate its flow. This would help ensure the continued remittance of service providers in times of mobility restrictions such as during a pandemic.

- Continue to support the development and scaling up of digital remittance channels for migrants and families through FinTech and digital technology modes. In fact, many remittance centers have improved upon their digital services, providing better services at lower costs, thus stimulating remittance inflows.

- Continue efforts to reduce remittance costs. The average cost of sending remittances to the Philippines (calculated as a percentage of a typical transfer amount of USD 200) based on the World Bank database[26] have gone down considerably from 6.2 percent in 2011 to 5.7 percent in 2016 to 4.6 percent in 2020.

[26] From the World Bank Remittance Prices Worldwide database: Average transaction cost of sending remittance to a specific country is the average of the total transaction cost in percentage of the amount sent for sending USD 200 charged by each single remittance service provider included in the Remittance Prices Worldwide database to a specific country.

- Continue efforts to improve the remittance environment by enhancing transparency and promoting competition in the remittance market. This can also be done by cultivating financial education among OFWs and their beneficiaries with a view of leveraging remittance flows for economic development by encouraging them to increase their savings and investments.

For its part, BSP has strongly advocated for and promoted learning programs for OFs and their beneficiaries. These programs include fostering competition in the remittance market. BSP issued Circular No. 534, dated 26 June 2006, requiring banks and non-bank financial institutions to post remittance charges, classification of costs, and other relevant information for the benefit of remitters and beneficiaries. To facilitate access to information on different banks, the BSP website has a portal to bank data on remittance services and products, location of branches/centers, and corresponding service fees. BSP has also encouraged OFs and their families to increase savings and investment through its financial learning campaigns that aim to promote a culture of savings among OFs and their families and encourage turning these savings into productive investments in financial instruments and business ventures.[27]

[27] Financial learning campaigns are conducted using lectures and multimedia presentations focusing on the importance of remittances, financial planning, rewards and risks associated with various financial instruments, and ways to protect remittances and savings.

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Annexes

Annex A

Treatment of remittances in the BOP (based on the *Balance of Payments and International Investment Position Manual, 6th Edition*)

As defined by the Commission on Filipinos Overseas (CFO), overseas Filipinos consist of: (a) permanent residents or Filipino immigrants or legal permanent residents abroad whose stay do not depend on work contracts (including those who have acquired foreign citizenship); and (b) overseas Filipino workers (OFWs). The latter refers to temporary workers or those whose stay overseas is employment-related and who are expected to return at the end of their work contract.

The Department of Foreign Affairs (DFA) obtains the data from the Philippine consulates and embassies in the host countries. These data are complemented by information from the Overseas Workers Welfare Administration (OWWA) under the Department of Labor and Employment (DOLE).

Remittances are financial resource flows arising from the cross-border movement of nationals of a country. In this chapter, remittances cover transfers sent by both Filipino migrants and overseas workers. In the Philippines, remittance data are sourced from the balance of payment (BOP) statistics under the following classifications:

1. Personal remittances are defined as current and capital transfers in cash or in kind between resident households and non-resident households, plus compensation of employees, less taxes and social contributions paid by nonresident workers in the economy of employment, less transport and travel expenditures related to working abroad. In short, this item includes all household-to-household transfers and the net earnings of non-resident workers.

Following the Balance of Payments Manual (BPM) framework, the country's data on personal remittances are computed as the sum of the following:

- Net compensation of employees (primary income account) – refers to gross earnings of "resident" OFWs, that is, those with work contracts of less than one year, including all sea-based workers, less taxes, social contributions, and transportation and travel expenditures in their host countries;

- Personal transfers (secondary income account) – refers to all current transfers in cash or in kind by "non-resident" OFWs, that is, those with work contracts of one year or more, as well as other household-to-household transfers between Filipinos who have migrated abroad and their families in the Philippines; and

- Capital transfers between households (capital account) – refers to the provision of resources for capital formation purposes, such as for construction of residential houses, between resident and non-resident households without anything of economic value being supplied in return.

2. Remittances in kind of non-resident overseas Filipinos are included in the personal transfers in the second bullet point. These are also reflected as part of imports in the trade in goods account.

3. Travel expenditures of resident and non-resident overseas Filipinos are recorded as part of the trade in services account. Residents' expenditures in host countries are recorded under travel imports, whereas non-residents' expenditures in the Philippines while on vacation are recorded under travel exports.

4. Cash remittances refer to remittances that were coursed through the local banking system. Cash remittances are a subset of personal remittances.

Annex B

Fiscal measures for OFWs due to the COVID-19 pandemic

- The Abot-Kamay ang Pagtulong (AKAP) program of the Department of Labor and Employment (DOLE) provides PhP 10,000 or USD 200 financial assistance to displaced OFWs. PhP 5.487 billion has been distributed by the DOLE to 540,876 displaced OFWs as of December 2021. Funding for the DOLE-AKAP is covered by Republic Act (RA) No. 11469 or Bayanihan to Heal as One Act (*Bayanihan 1*) dated 24 March 2020 and RA 11494 or Bayanihan to Recover as One Act (*Bayanihan 2*) dated 11 September 2020.
- From March 2020, the DOLE and OWWA have been assisting the repatriation of displaced or distressed OFWs through the use of the Emergency Repatriation Fund which is funded by:
  - *Bayanihan 1*: PhP 15 million and additional PhP 1.75 billion for FY 2019, PhP 130 million and additional PhP 3.25 billion for FY 2020.
  - *Bayanihan 2*: PhP 500 million and additional PhP 5 billion for FY 2020.
  - Regular funds: additional funding of PhP 3.3 billion and PhP 216.45 million for FY 2021.
- The Bayanihan to Arise as One Bill or *Bayanihan 3* was approved by the House of Representatives on 1 June 2021 and has been passed to the Senate where deliberations are ongoing. *Bayanihan 3* is a PhP 401 billion stimulus package that allocates PhP 25 billion for displaced workers, including OFWs, and PhP 500 million for testing for COVID-19 of seafarers and OFWs.

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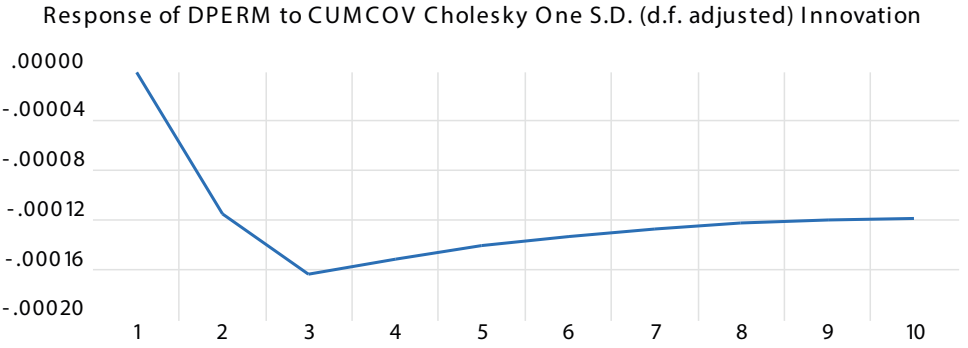
Annex C

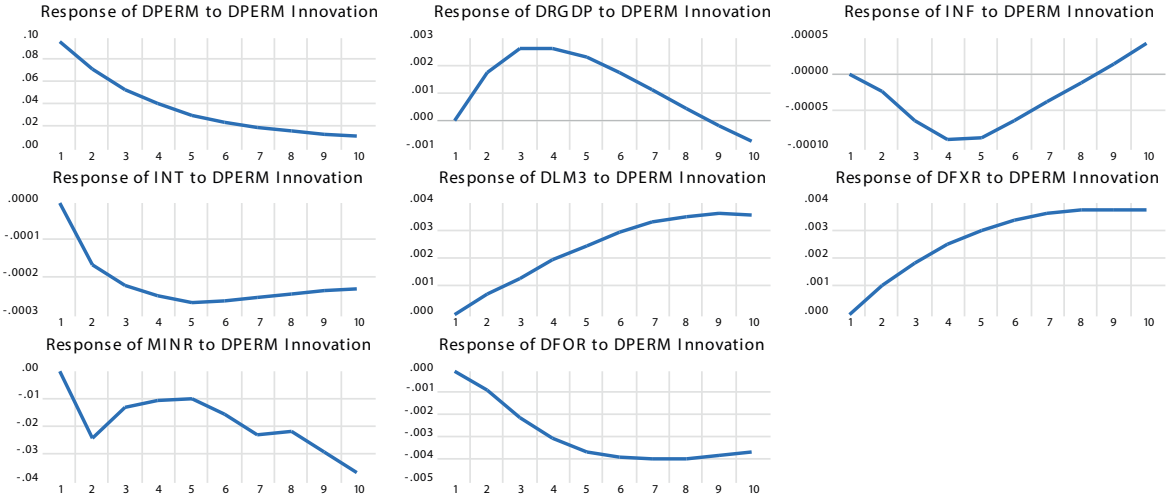
Impulse response functions using Bayesian VAR

Figure 10. Impulse response function: Remittances and number of confirmed new COVID-19 cases



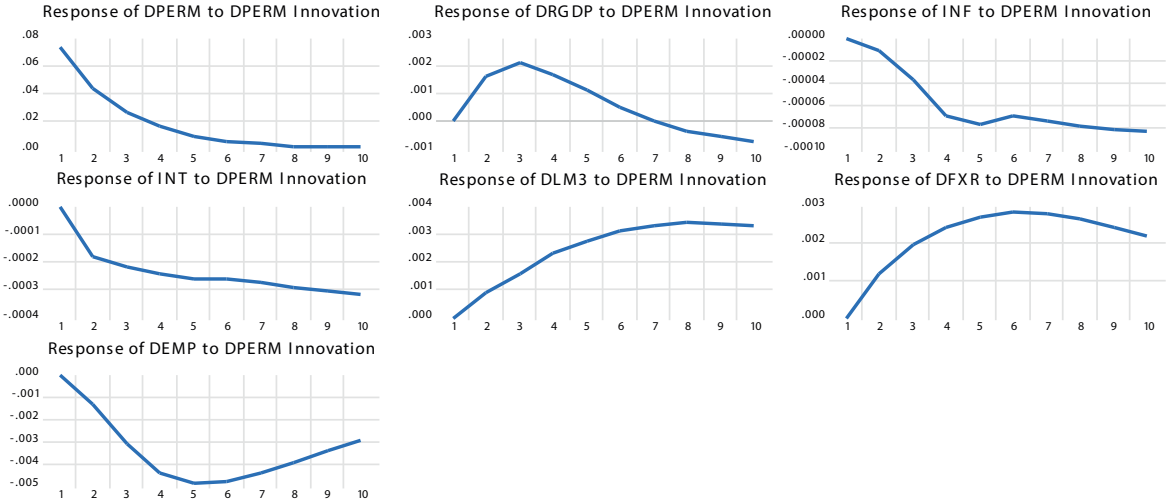
Source: Authors

Figure 11. Impulse response functions: Baseline



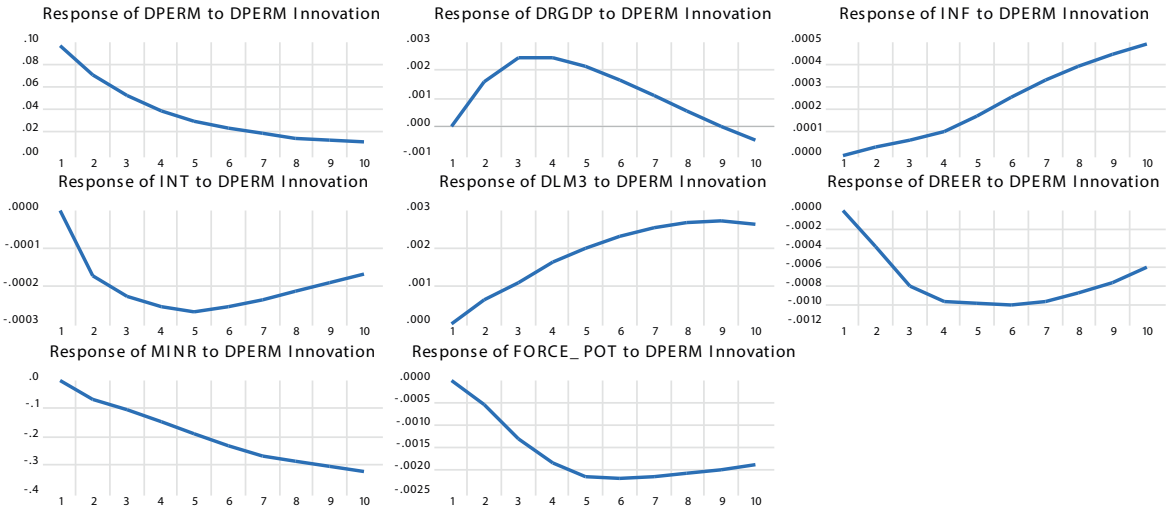
Source: Authors

Figure 12. Impulse response functions: Alternative ordering 1



Source: Authors

Figure 13. Impulse response functions: Alternative ordering 2



Source: Authors

12 | Monetary Policy Formulation and the Labor Market During the COVID-19 Pandemic

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Mark Rex S. Romaraog
Bangko Sentral ng Pilipinas

12

12 | Monetary Policy Formulation and the Labor Market During the COVID-19 Pandemic

Zeno Ronald R. Abenoja[1], *Jasmin E. Dacio*[2], *and Mark Rex S. Romaraog*[3]

1. Introduction

The focus of the Bangko Sentral ng Pilipinas (BSP) on its primary mandate of price stability allows monetary policy to support economic growth and employment over the long run by reducing inflation variability and economic uncertainty. Low and stable inflation facilitates the efficient allocation of economic resources. It supports consumption as well as capital formation, which, along with productivity growth, are essential drivers of economic growth.

Like many modern central banks, the BSP adopted inflation targeting (IT) as its main monetary policy framework in January 2002. Under this approach, the BSP publicly announces an explicit annual inflation target[4] at least two years in advance, putting primacy in the institution's price stability mandate. The inflation target is a quantitative representation of the optimal level of inflation in the country, conducive to the balanced and sustainable growth of the economy. Since 2010, the BSP has adopted medium-term inflation targets, covering three years, to help raise the predictability of monetary policy and better guide long-term inflation expectations. As of end-December 2021, at least 18 IT central banks have the practice of announcing fixed annual inflation targets to help stabilize inflation expectations at a longer horizon (see Table 1).

This chapter aims to describe the monetary policy assessment at the BSP and how labor market conditions are considered in the monetary policy formulation process. It can be noted that the BSP's practice of the IT framework had been sufficiently flexible to support employment and output growth objectives while focusing on its price stability mandate. This chapter also presents the impact of the COVID-19 pandemic on the Philippine labor market and the corresponding monetary and non-monetary policy responses to the adverse economic impact of the pandemic. These include BSP's accommodative monetary

Table 1. Target horizon of IT central banks

Variable annual	Fixed annual
1. Bank of Thailand 2. Central Bank of Armenia	1. Bank Indonesia 2. Bank of England 3. Bank of Ghana 4. Bank of Guatemala 5. Bank of Israel 6. Bank of Mexico 7. Bangko Sentral ng Pilipinas 8. Bank of the Republic Colombia 9. Central Bank of Brazil 10. Central Bank of the Republic of Turkey 11. Central Reserve Bank of Peru 12. Czech National Bank 13. Hungarian National Bank 14. National Bank of Poland 15. National Bank of Romania 16. National Bank of Serbia 17. South African Reserve Bank 18. Sveriges Riksbank
Average multi-year	
1. Bank of Canada 2. Bank of Korea 3. Central Bank of Chile 4. Norges Bank 5. Reserve Bank of Australia 6. Reserve Bank of New Zealand	

Source: Various central bank websites

[1] *Managing Director, Bangko Sentral ng Pilipinas*
[2] *Deputy Director, Bangko Sentral ng Pilipinas*
[3] *Bank Officer V, Bangko Sentral ng Pilipinas*

[4] The National Government, through the DBCC, sets the inflation target two years ahead in consultation with the BSP.

policy stance, the implementation of extraordinary liquidity measures, and the grant of regulatory relief to BSP-supervised financial institutions (BSFIs). Along with provisional advances to the national government, the amount of liquidity injected into the financial system was estimated at about 11.3 percent of the country's full year nominal GDP for 2021 (using the 2018-based series) as of end-March 2022. These helped ensure ample liquidity in the financial system, restore proper functioning of financial markets, shore up market confidence, and provide support to economic recovery.

The chapter begins with a brief review of how the practice of flexible inflation targeting has allowed the BSP to achieve its price stability mandate. This is followed by a discussion on how labor market conditions are integrated in BSP's monetary policy assessment in line with the flexible inflation targeting framework, which had become even more crucial due to the impact of the COVID-19 pandemic. The last section presents BSP's policy responses to the adverse economic impact of the pandemic, including the disruption in the labor market.

2. Monetary policy assessment at the BSP: A flexible inflation targeting framework

The emergence of inflation targeting (IT) as a monetary policy framework benefitted from the long discussion between "rules" and "discretion" built on the time inconsistency analysis of Kydland and Prescott (1977). The idea of discretion comes from the belief that policymakers can exploit the short-run tradeoff between output and inflation without generating inflation bias in the long run. Discretionary conduct of monetary policy implies that monetary authorities are unrestricted in adjusting their policy objectives, which they have committed to in the past—in this case some notion of price stability—to increase the country's output or employment above its equilibrium level.

Meanwhile, the delegation of monetary policy to an independent monetary authority with an explicit targeting rule offers a way to constrain inflation bias.[5] Policy based on rules promotes economic and price stability by compelling central banks to adhere to a consistent policy that helps shape expectations of economic agents. However, critics of rules-based monetary policy argue that rules reduce the flexibility of central banks to respond to economic shocks and the scope for stabilization policies. The compromise between the two opposing policy regimes may be gleaned in the increasing adoption of a flexible inflation targeting framework in the conduct of monetary policy.

The framework has likewise provided a credible nominal anchor in the form of the inflation target, aided by increased transparency and accountability in monetary policy formulation. The BSP has made great strides over the years to strengthen its infrastructure for monetary policy communication. This enabled the BSP to explain the factors behind its monetary policy actions, particularly during episodes of financial pressures, market volatility, and economic shocks, which has helped enhance its credibility in fighting inflation and stabilizing the economy as a whole. The shift to a more forward-looking approach in the conduct of monetary policy and the commitment of the BSP to keep the inflation within target has influenced market agents to adopt a

[5] Section 7.4 of Walsh (2010) provides an empirical discussion of said inflation bias in accounting for high inflation episodes.

more forward-looking perspective in their assessment of inflation developments (Guinigundo & Cacnio, 2019).

The BSP has not been mechanical in implementing the IT framework. With the possible wide-ranging impact of its policy instruments, the Bank does not pursue price stability independent of other objectives. It is cognizant that price stability is closely linked to sustainable economic growth and could contribute to financial stability, capital market development, and an efficient payments system. Stable and efficient financial markets, after all, are requirements for effective monetary policy transmission.

IT allows monetary policy sufficient flexibility to respond effectively to various shocks in the economy. This flexibility has been central in the BSP's efforts to help stabilize the economy amid various domestic and external shocks, including the COVID-19 pandemic. The BSP IT framework has the flexibility to support employment and output growth objectives while continuing to give primacy to the inflation mandate. This is the case particularly when the inflation outlook is manageable and the announced inflation target is not at risk. This flexibility also allows central banks to look through the impact of supply-side inflation factors and focus on potential second-round effects of price pressures.

The BSP's experience with IT has generally been favorable as it has been associated with lower and more stable inflation (see Table 2). The IT framework provided greater discipline in the conduct of monetary policy in the Philippines by considering an extensive range of information in the assessment of the outlook for inflation and the macroeconomy. The success of bringing down inflation in the post IT period could be traced in part to the predictability of the monetary policy, which, in turn, helped anchor inflation expectations in the country. The period of great moderation as well as broader economic reforms to reduce the structural bottlenecks in the Philippine economy also led to a more manageable inflation environment.

Table 2. Mean and standard deviation of year-on-year inflation (percent)

	Mean	Standard deviation
Pre-IT period (1958-2001)	10.1	8.9
Post-IT period (2002-2021)	3.7	1.8

Source: BSP-DER Staff Computation

From 2002 to 2021, the actual inflation outturns in 14 of the 20 years of IT adoption were below or within the announced target range (see Fig. 1), while the upper bound of the target range was breached six times. In cases where the BSP fails to achieve the inflation target, the BSP Governor issues an Open Letter to the President[6] outlining the reasons why actual inflation did not fall within the target, along with the steps that will be taken to bring inflation towards the target, as part of its transparency and accountability measures. Inflation pressures owing to supply-side factors, which are traditionally outside the purview of monetary policy, were often behind the inflation target breaches. For instance, headline inflation averaged at 4.5 percent (2012-based consumer price index, CPI) in

[6] The BSP Open Letters to the President are found here: https://www.bsp.gov.ph/SitePages/PriceStability/OpenLetterList.aspx

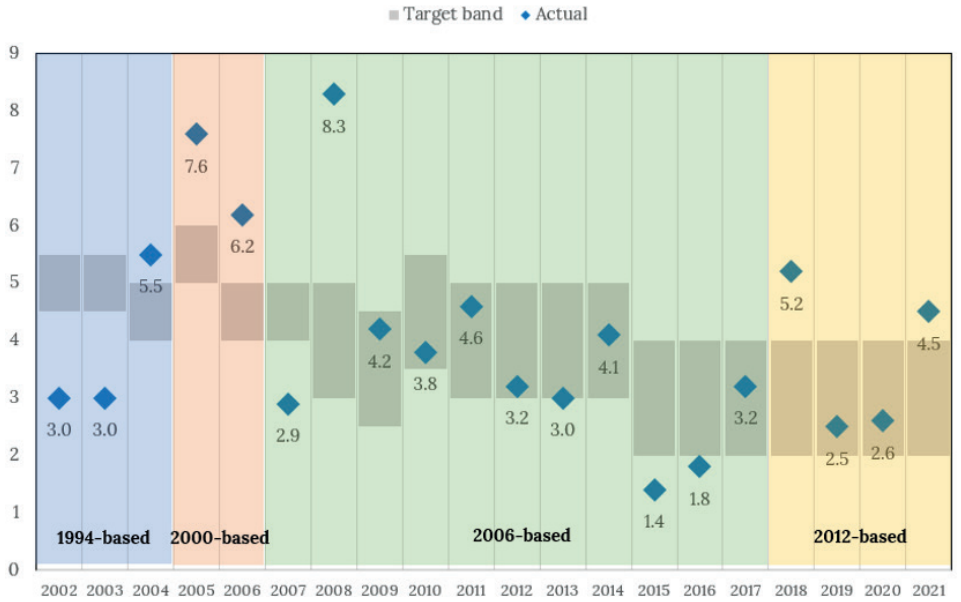
2021, above the inflation target range of 3.0 percent ± 1.0 ppt. Price pressures during the year were mainly driven by constraints on the supply of key food items along with rising energy prices. Meanwhile, demand-side pressures on inflation appeared to be limited given stable core inflation numbers,[7] while inflation expectations remained broadly anchored to the target.

BSP monetary policy decisions are based largely on its assessment of the macroeconomic outlook—particularly inflation and output growth—over the policy horizon, along with the risks surrounding this outlook.[8] The BSP has always taken great care in characterizing its decision-making as being data-dependent. Each policy decision is based on all available information to monetary authorities at the time of its policy review. At the same time, the BSP relies on a suite of models to generate macroeconomic forecasts and simulation exercises in line with the forward-looking nature of monetary policy.[9]

3. Monetary policy formulation and labor market conditions

The monetary policy review at the BSP regularly takes into account conditions in

Figure 1. Actual headline inflation rate and target inflation rate



Source: BSP-DER Staff Computation

[7] Core inflation trended close to the midpoint of the target band in 2021, averaging at 3.3 percent from 3.2 percent in 2020.

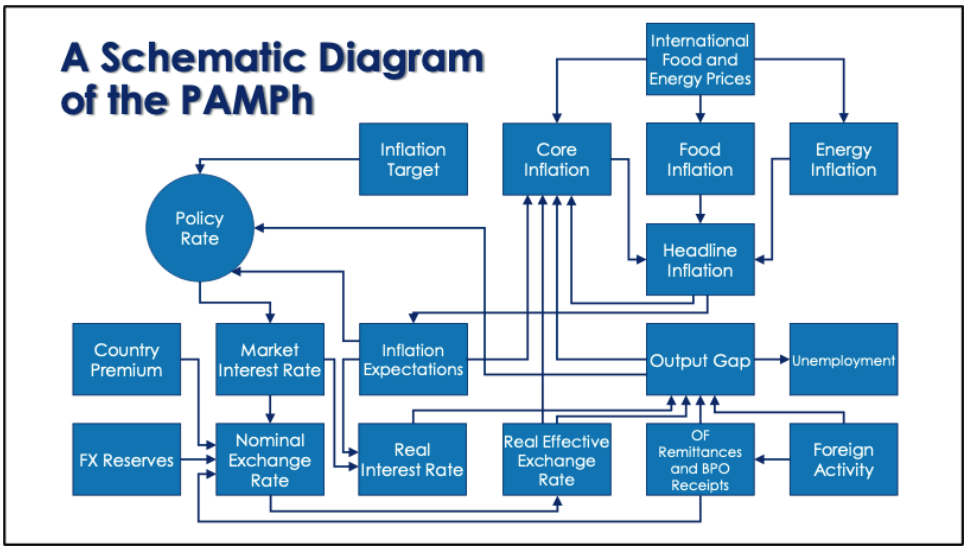
[8] See Abenoja et al. (2022) for a discussion of the BSP's forecasting process and monetary policy analysis.

[9] Abenoja et al. (2022) also provides a discussion of the BSP's workhorse model for forecasting and policy simulation.

domestic demand and the labor market. During the COVID-19 pandemic, the bank has increasingly looked at the quality of employment generation to gauge the extent of economic recovery as well as the possible long-term scarring given the pandemic's impact on actual labor supply and the economy's productive capacity. The release of the monthly Labor Force Survey beginning in January 2021 has also provided the government more frequent data to examine the state of the country's labor market given the adverse impact of the COVID-19 pandemic.

Output and employment conditions are also sufficiently considered in the BSP's economic models. BSP's Policy Analysis Model for the Philippines (PAMPh) captures the interlinkages between inflation, output gap, unemployment gap, and the endogenous policy rule.[10] The schematic diagram shown in Fig. 2 highlights the key relationships between these variables in the model.

Figure 2. Schematic diagram of the PAMPh



Source: Alarcon et al. (2020)

[10] PAMPh is a monetary policy model for a small open economy like the Philippines. It is a semi-structural gap model based on New Keynesian foundations with a general equilibrium framework and forward-looking features that allow for the assessment of the dynamic path of key macroeconomic variables in a theoretically consistent manner. This model is used primarily for medium-term forecasting and policy simulations. PAMPh also features an endogenous policy rule that can serve as a guide for monetary policymaking. The model was developed by the Department of Economic Research with the assistance of the Global Projection Model Network (GPMN). It is currently undergoing review under a multi-year technical assistance project with the IMF Institute for Capacity Development, with the end view of enhancing the model's forecasting capabilities as well as developing extensions to better represent the dynamics of the Philippine economy.

For example, a positive output gap suggests a build-up of demand-side price pressures. At the same time, a higher output gap lowers the unemployment rate as firms expand production and employment to meet higher demand.[11] Both the output and inflation gaps are considered in the monetary policy rule.[12] These dynamics are in line with how monetary policy formulation has been viewed and conducted at the BSP, consistent with the framework of flexible inflation targeting.

The endogenous policy rule in the PAMPh is designed to respond to both the inflation gap (i.e., deviation of future inflation from target) and the output gap. As such, the model can recommend an adjustment in the policy rate even if future inflation is within target if the output gap is not closed.

Holding all other things constant, a positive output gap could suggest a build-up of inflationary pressures over the forecast horizon. Consequently, the model would suggest that the central bank could consider tightening its policy rate to rein in excess demand. In contrast, a negative output gap, which is currently the case due to the adverse economic impact of the COVID-19 pandemic, could moderate inflation. This could prompt the model to recommend a more accommodative monetary policy stance to foster economic activity and steer future inflation back to the target.

Meanwhile, BSP's policy stance could influence the labor sector via the direct link between real sector trends and the jobs market. In the PAMPh, the output gap is the key determinant of the unemployment gap. A positive output gap reduces the unemployment rate, whereas a negative output gap contributes to higher unemployment. As the endogenous policy rule in the model helps close the output gap, it also helps bring the unemployment rate to its long-term trend.

Figure 3 presents the impact of a negative output gap shock due to an economic contraction on unemployment using the PAMPh framework.[13] With the drop in the output gap to about –3.0 percent, the unemployment gap widens, pushing the unemployment rate upwards to peak at about 13 percentage points (ppts) above its steady state. The economic contraction likewise results in lower core and headline inflation rates. Owing to negative output gap as well as a lower headline inflation, PAMPh suggests a reduction in the monetary policy rate by at least 25 basis points (bps) to reduce real interest rates and help spur economic activity.

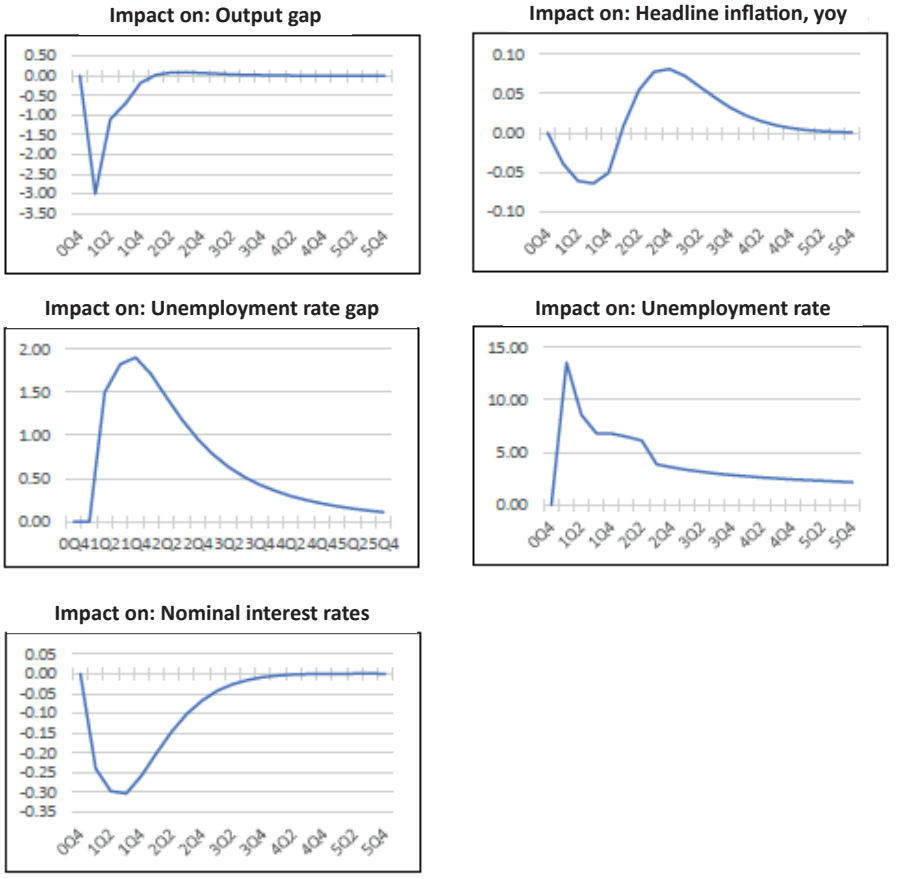
In the following quarters, economic activity improves, supported by the accommodative monetary policy stance. The negative output gap narrows to close within two years from the last quarter that the shock was introduced while inflation continues to approach its steady state level, that is, mid-point of the inflation target range. The unemployment rate gap also begins to gradually close, resulting in a steady decline in the unemployment rate. Two years after the introduction of the negative output shock, the unemployment rate is only about 4 ppts higher than its steady state.

[11] For more details, please refer to Alarcon et al. (BSP Working Paper No. 2020-12).

[12] Output gap refers to the deviation of actual real GDP from potential GDP. In the PAMPh, output gap depends on its lagged and lead terms, real interest rate gap, real remittance gap, REER gap, foreign output gap, foreign residual activity, and a shock to domestic demand.

[13] Analysis is relative to the variable's steady state.

Figure 3. Impact of negative output gap shock on unemployment



Source: BSP-DER estimates

In assessing price pressures in the domestic economy, the BSP also closely monitors wage dynamics, which are duly considered in BSP inflation models. The BSP's baseline inflation forecast incorporates adjustments in minimum wages that are consistent with the country's labor productivity growth and historical wage adjustments. Wage increases that are significantly larger than historical wage growth and productivity following a supply shock, may be considered a second-round effect.[14] This could result in a potential wage-price spiral as firms pass on the higher wage input cost to the final price. Once fully entrenched in the price dynamics, second-round effects could lead to prolonged

[14] Persistent supply-side inflation pressures can lead to second-round effects in the form of broadening price increases, petitions for higher wage and transport fare hikes, and rising inflation expectations.

periods of elevated inflation, disanchoring inflation expectations away from the inflation target over a protracted period. Stronger monetary policy responses are likely needed to bring back the inflation target should this take place.

4. Impact of the COVID-19 pandemic on the Philippine labor market

The COVID-19 pandemic has left a lot of Filipinos unemployed. The unemployment rate reached a peak at 17.6 percent in April 2020 from 5.3 percent in January 2020 and 5.1 percent in April 2019 as the strictest community quarantine was imposed throughout the country (see Table 3). The closing of some businesses and downsizing of their operations also contributed to the sharp increase in the unemployment rate. During this period, the number of employed persons declined by 19.0 percent compared to the same period in the previous year. The reduction in the number of employed persons was seen across all economic sectors, with services and industry contributing 18.3 percentage points (ppts) to the 19.0 percent total reduction.

The conduct of person-to-person services was severely affected by mobility restrictions imposed to address the COVID-19 pandemic. Of the 7.9 million people affected by employment loss in April 2020 relative to the same period in the previous year, 5.3 million persons belonged to the services sector, particularly in trade; transportation and storage; accommodation and food service activities; arts, entertainment, and recreation; and other service activities (see Fig. 4).

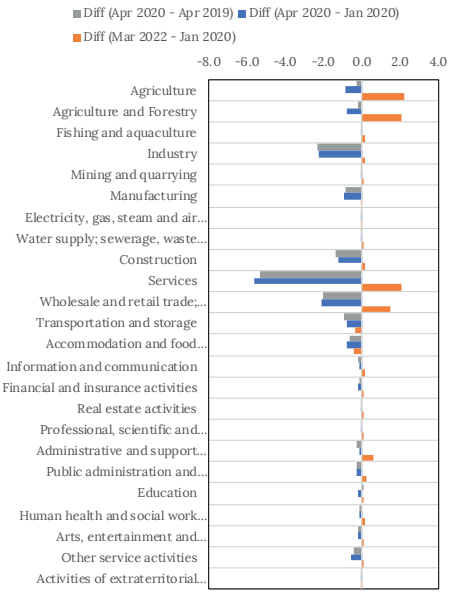
Similarly, the decrease in the number of employed persons was seen across

Table 3. Employment situation (percent)

Period		Labor force participation rate	Employment rate	Unemployment rate	Underemployment rate
2020	January	61.7	94.7	5.3	14.8
	April	55.7	82.4	17.6	18.9
	July	61.9	90.0	10.0	17.3
	October	58.7	91.3	8.7	14.4
2021	January	60.5	91.3	8.7	16.0
	February	63.5	91.2	8.8	18.2
	March	65.0	92.9	7.1	16.2
	April	63.2	91.3	8.7	17.2
	May	64.6	92.3	7.7	12.3
	June	65.0	92.3	7.7	14.2
	July	59.8	93.1	6.9	20.9
	August	63.6	91.9	8.1	14.7
	September	63.3	91.1	8.9	14.2
	October	62.6	92.6	7.4	16.1
	November	64.2	93.5	6.5	16.7
	December	65.1	93.4	6.6	14.7
2022	January	60.5	93.6	6.4	14.9
	February	63.8	93.6	6.4	14.0
	March	65.4	94.2	5.8	15.8

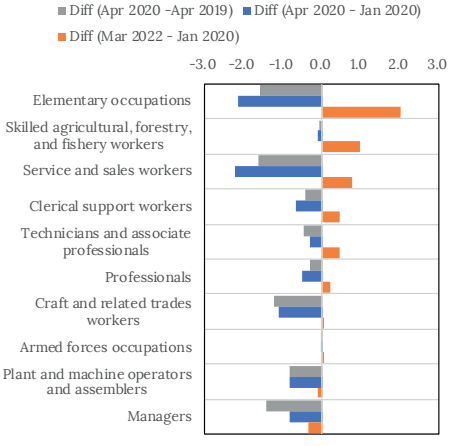
Source: Philippine Statistics Authority's (PSA) Labor Force Surveys (LFS)

Figure 4. Number of employed persons, by sector (in millions)



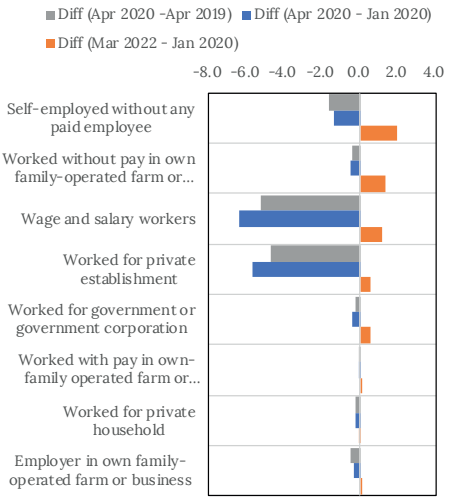
Source: PSA's LFS

Figure 5. Number of employed persons, by occupation (in millions)



Source: PSA's LFS

Figure 6. Number of employed persons, by class of worker (in millions)



Source: PSA's LFS

occupation type in April 2020 as compared to the same period in the previous year. Services and sales workers, elementary occupations, craft and related trade workers, and managers were affected the most, accounting for 5.9 million out of the 7.9 million reduction in the number of employed persons during the reference month. By class of workers, wage and salaried workers were affected the most with 5.3 million employees losing their jobs out of the 7.9 million in April 2020 (see Figs. 5 and 6).

The high national unemployment rate in April 2020 was observed in all regions. Double-digit unemployment rates were recorded in all regions, with seven of the 17 regions exceeding the national average of 17.6 percent. In terms of magnitude, the regions with the highest number of unemployed persons during the reference period were Central Luzon (1.2 million) and CALABARZON (1.1 million) (see Fig. 7). Moreover, a significant increase in unemployment rate was also seen across ages in April 2020. Youth unemployment

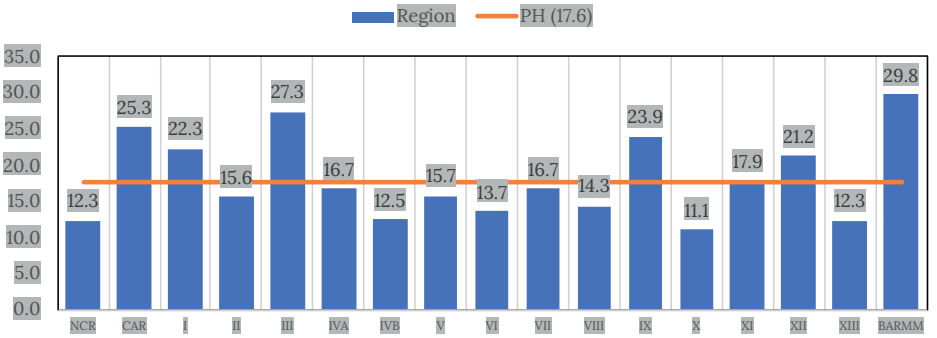
rate (15-24 years old) rose significantly to 31.5 percent, which is a lot higher than the 17.6 percent national average. Similarly, unemployment rate for adults 25 years old and above registered a double-digit increase at 15.0 percent. Youth unemployment rate is consistently higher than unemployment rate for adults 25 years and above.

The unemployment rate continues to remain above the pre-pandemic rate. From the 7.2 million unemployed Filipinos in April 2020, it went down and hovered around 3 million to less than 5 million starting in July 2020 but remained higher than the 2.4 million unemployed Filipinos in January 2020. Employment conditions in the last two years have generally depended on the quarantine restrictions imposed. On one hand, stricter community quarantine disrupts mobility and economic activities leading to employment loss. On the other hand, easing of quarantine restrictions will encourage increase in mobility and economic activities, leading to employment creation and increased economic activity.

With the relaxation of quarantine restrictions in many parts of the country as the number of COVID-19 cases decreased, labor market conditions improved gradually. In March 2022, the unemployment rate decreased to 5.8 percent, the lowest since the start of the pandemic. The labor force participation rate also improved to 65.4 percent. This translated to 1.5 million additional jobs relative to the previous month, and 4.4 million Filipinos employed compared to the pre-pandemic level.

However, the quality of employment in the country has not recovered as much. The share of the underemployed further rose to 15.8 percent in March 2022 from 14.7 percent in December 2021. Likewise, the breakdown by occupational employment shows that new jobs generated are largely in low-productivity, low-skilled, and thus less-remunerative segments. From the onset of the pandemic, employment gain was recorded mostly in workers engaged in elementary occupations, services and sales workers, and skilled agricultural, forestry, and fishery workers. Meanwhile, managers are still below the pre-pandemic level. By class of worker, work generated since the pandemic mostly came from self-employment without any paid employee, and those who worked without pay in their own-family-operated farm or business. It may still take time for the quality of employment in the country to return to pre-pandemic levels as pandemic uncertainty remains, affecting expansion and investment plans of businesses.

Figure 7. Unemployment rate, by region (April 2020)



Source: PSA's LFS

5. Monetary policy response to the adverse economic impact, including disruption in the labor market, of the COVID-19 pandemic

At the onset of the pandemic in 2020, the BSP pursued accommodative monetary policy and implemented extraordinary liquidity measures commensurate to the magnitude and speed of the adverse impact of the health crisis. The measures were aimed to ensure ample liquidity in the financial system, restore financial market functioning, shore up market confidence, and prevent significant economic scarring over the medium term.

The BSP reduced the interest rate on its overnight reverse repurchase (RRP) facility by a cumulative 200 basis points (bps) from February 2020. The RRP rate was reduced by 25 bps in February, followed by an additional 50-bp cut each in March and April, another 50 bps in June, and 25 bps in November. The interest rates on overnight lending and deposit facilities were likewise reduced to 2.50 percent and 1.50 percent, respectively. These policy rate cuts aimed to help reduce the cost of borrowing as well as encourage banks to lend to businesses and households and help bolster economic activity. Subsequently, the overnight RRP rate had been maintained at 2.00 percent until 19 May 2022.

The BSP also lowered the reserve requirement (RR) ratios by 200 bps, effective on 3 April 2020, for universal and commercial banks (UKBs) and non-bank financial institutions with quasi-banking licenses. They did the same, this time by 100 bps effective on 31 July 2020, for thrift banks and rural/cooperative banks. The reduced RR helped infuse additional liquidity into the financial system and aimed to encourage banks to continue lending to both retail and corporate sectors affected by the COVID-19 pandemic.

In addition, the BSP adjusted its monetary operations to help ensure adequate liquidity in the financial system amid the uncertainty brought about by the pandemic.[15] The volume offerings in BSP's RRP window and Term Deposit Facilities were temporarily reduced. At the same time, the BSP actively purchased government securities from the secondary market. This provided liquidity to banks who needed it, increasing confidence in the financial system, as well as helped shore up demand in the local government securities (GS) market to improve funding capacity of the national government (NG).

As part of the whole-of-government effort, the BSP also extended to the NG provisional advances (PA) to help finance its programs and measures needed to mitigate the adverse impact of the pandemic in line with provisions of the BSP Charter. The provisional advances are meant to be short-term relief measures that are temporary and time-bound, intended to give the NG the additional fiscal flexibility to finance its COVID-19 programs amid reduced revenue and borrowing capacity in view of the pandemic. In March 2020, the BSP first entered a repurchase (repo) agreement in the amount of PhP 300 billion with the Bureau of Treasury, which was settled in end-September 2020. Further tranches of PA were provided by the BSP to the NG upon full settlement of the loan amount during the two-year pandemic period. The latest PA, amounting to PhP 300 billion, was availed in January 2022 to mature in June 2022. In addition, the BSP decided to remit dividends to the NG in the amount of PhP 38.9 billion in 2020 to 2021, even though the newly amended BSP Charter no longer mandates the BSP to provide dividends to the NG.

[15] The BSP announced its extraordinary measures in a press release on 10 April 2020: https://www.bsp.gov.ph/SitePages/MediaAndResearch/MediaDisp.aspx?ItemId=5242

Table 4. Estimated liquidity impact of the BSP liquidity-easing measures (as of 31 March 2022)

BSP measures	Percent GDP[a]
RRP cut[b]	0.7
Provisional advances to NG[c]	1.5
GS purchase in secondary market (as of 31 March 2022)	6.3
RRR cut[d]	1.1
Alternative RR compliance[e] (as of 29 March 2022)	1.4
Dividend remittance to NG[f]	0.2
Total[g]	11.3

Source: BSP

Notes: [a]The full year nominal GDP for 2021 is recorded at PhP 19.4 billion (using 2018-based series). [b]A 25-bp RRP rate cut is estimated to raise domestic liquidity by PhP 6.6 billion in the first year and by PhP 16.7 billion in the second year. [c]The PhP 540-billion provisional advances released on 16 July 2021 was fully settled by the NG on 10 December 2021, ahead of its extended maturity on 12 January 2022. A new tranche of provisional advances amounting to PhP 300 billion was released on 12 January 2022 to the NG. [d]Includes impact of the 1 ppt RR cut for thrift banks (TBs) and rural banks (RBs), effective end-July 2020. [e]The MB approved a policy allowing newly granted loans to MSMEs and Les as alternative compliance with RRs effective on 24 April and 29 May, respectively. [f]To aid in the COVID-19 response, the BSP remitted dividends to the NG on 26 March 2020 and 28 July 2021. [g]May not add up due to rounding off.

The BSP also extended regulatory relief measures to BSP-supervised financial institutions (BSFIs) to ease pressure on their balance sheets and enable them to extend, in turn, a similar breathing space to their borrowers experiencing financial difficulty amid the COVID-19 pandemic and quarantine restrictions. In particular, the Monetary Board (MB) allowed banks to count newly granted loans to micro, small, and medium enterprises (MSMEs), and large enterprises as part of their compliance with RRs to encourage lending to affected businesses and thus support economic recovery. The approved limits on loans to MSMEs and large enterprises used as alternative RR compliance are at PhP 300 billion and PhP 425 billion, respectively.

Through these liquidity-easing measures, the amount of liquidity injected into the financial system was estimated at about 11.3 percent of the country's full year nominal GDP for 2021 (using the 2018-based series) as of end-March 2022 (see Table 4). Consequently, market interest rates as well as participation in both the domestic GS market and BSP's open market operations have stabilized, reflecting ample liquidity in the financial system.

The BSP maintained key monetary policy settings all throughout 2021. The MB was of the view that the manageable inflation outlook and downside risks to domestic growth prospects warrant keeping monetary policy settings unchanged to help the momentum of economic recovery gain more traction as well as help boost domestic demand and market confidence. Providing support to overall domestic demand was a key priority for monetary policy amid the expected manageable inflation path.

It remained prudent for the BSP to maintain its ongoing monetary stimulus as prospects of delays in the easing of containment measures and a weaker-than-expected global recovery—owing to the possible spread of new COVID-19 variants—continue to cloud the outlook for domestic economic activity. Moreover, BSP's accommodative policy settings are deemed necessary as economic slack is likely to persist given delays in investment and expansion plans following the COVID-19 pandemic. The risk of a protracted pandemic due to virus resurgence remains high and prospects for sustainable recovery remain largely dependent on the progress of the vaccine rollout and how soon the recent COVID-19 surge will be controlled. A more protracted pandemic gives way to longer imposition of mobility restrictions that have adverse

impact on employment and aggregate demand. Continued monetary policy support, therefore, remains a necessary complement to expansionary fiscal policy measures including Financial Institutions Strategic Transfer (FIST) and Government Financial Institutions Unified Initiatives to Distressed Enterprises for Economic Recovery (GUIDE). in reviving aggregate demand and helping to reduce potential long-term economic scarring, amid the manageable inflation outlook.

The BSP has drafted a carefully calibrated exit strategy from all its extraordinary liquidity measures to return to normal policy in preparation for the period when financial market conditions have stabilized and economic recovery has gained traction. It is important to provide monetary policy support as needed without stoking inflation and financial stability risks down the line. The exit strategy will serve as a framework to guide BSP actions and facilitate policy communication or guide the public's expectations. It shall also ensure proper timing of withdrawal of monetary stimulus (i.e., not too early or too late) to help strengthen economic recovery. It is also important that the return-to-normal policy will safeguard the independence and credibility of the BSP as an inflation fighter.

Meanwhile, the Department of Labor and Employment (DOLE) has been implementing job programs for local and overseas workers affected by the COVID-19 pandemic. The programs include the COVID-19 Adjustment Measures Program (CAMP), Tulong Panghanapbuhay sa Ating Disadvantaged/ Displaced Workers (TUPAD), and Abot-Kamay ang Pagtulong (AKAP). Under CAMP, the DOLE granted a one-time financial assistance worth PhP 5,000 to affected workers in private companies, including those working in tourism and education. For the TUPAD program, qualified beneficiaries will work to disinfect/sanitize houses and the immediate vicinity and get paid based on the prevailing minimum wage in the region where they were hired. Under AKAP, Overseas Filipino Workers who have returned to the country, and those who opted to stay in their host countries, received financial assistance of PhP 10,000 or USD 200 each.

In addition, a full implementation of Executive Order No. 166 adopting a 10-point policy agenda will be able to accelerate and sustain economic recovery from the COVID-19 pandemic. The policy agenda proposes to: (1) strengthen health care capacity, (2) accelerate and expand the vaccination program, (3) further reopen the economy and expand public transport capacity, (4) resume face-to-face learning, (5) reduce restrictions on domestic travel and standardize local government unit requirements, (6) relax requirements for international travel, (7) accelerate digital transformation through legislative measures, (8) provide for enhanced and flexible emergency measures through legislation, (9) shift the focus of decision-making and government reporting to more useful and empowering metrics, and (10) enhance medium-term preparation for pandemic resilience.

6. Conclusion

The COVID-19 pandemic in its peak has left a lot of Filipinos unemployed. It has significantly affected the conduct of person-to-person services due to mobility restrictions. The pandemic highlights the importance of both monetary and fiscal policy responses to support economic recovery. In response to the adverse economic impact of the COVID-19 pandemic, the BSP pursued accommodative monetary policy and implemented extraordinary liquidity measures that aimed to ensure ample liquidity in the financial system, restore financial market functioning, shore up market confidence, and prevent significant economic scarring over the medium-term. The BSP also extended to the NG provisional advances to help finance programs and measures needed to mitigate the adverse impact of the pandemic in line with provisions of the BSP Charter, as well as extended regulatory relief measures to BSFIs. The continued implementation of a well-targeted recovery program by the government would help mitigate the impact of the COVID-19 pandemic and will help restore confidence in the country, fostering a durable and broad-based recovery of economic growth and employment.

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Annexes

Table A1. Number of employed persons, by sector (in millions)

Sectors	Apr 2019	Jan 2020	Apr 2020	Mar 2022	Diff (Apr 2020-Apr 2019)	Diff (Apr 2020-Jan 2020)	Diff (Mar 2022-Jan 2020)
Total	41.8	42.5	33.8	47.0	−7.9	−8.7	4.4
Agriculture	9.1	9.6	8.8	11.9	−0.3	−0.9	2.2
Industry	8.1	8.0	5.8	8.2	−2.3	−2.2	0.2
Services	24.6	24.9	19.3	27.0	−5.3	−5.6	2.0

Source: PSA's LFS

Table A2. Number of employed persons, by occupation (in millions)

Occupation	Apr 2019	Jan 2020	Apr 2020	Mar 2022	Diff (Apr 2020-Apr 2019)	Diff (Apr 2020-Jan 2020)	Diff (Mar 2022-Jan 2020)
Total	41.8	42.5	33.8	47.0	−7.9	−8.7	4.4
Elementary occupations	11.0	11.5	9.4	13.5	−1.6	−2.1	2.0
Skilled agricultural, forestry, and fishery workers	4.8	4.9	4.8	5.8	0.1	−0.1	1.0
Services and sales workers	7.8	8.5	6.2	9.2	−1.6	−2.2	0.8
Clerical support workers	2.6	2.8	2.2	3.3	−0.4	−0.7	0.5
Technicians and associate professionals	1.8	1.6	1.3	2.1	−0.5	−0.3	0.4
Professionals	2.3	2.5	2.0	2.7	−0. 3	−0.5	0.2
Craft and related trades workers	3.4	3.3	2.2	3.3	−1.2	−1.1	0.0
Armed forces occupations	0.0	0.1	0.1	0.1	−0.0	−0.0	0.0
Plant and machine operators and assemblers	3.4	3.4	2.6	3.3	−0.8	−0.8	−0.1
Managers	4.6	4.0	3.1	3.7	−1.4	−0.8	−0.3

Source: PSA's LFS

Table A3. Number of employed persons, by class of worker (in millions)

Class of worker	Apr 2019	Jan 2020	Apr 2020	Mar 2022	Diff (Apr 2020-Apr 2019)	Diff (Apr 2020-Jan 2020)	Diff (Mar 2022-Jan 2020)
Total	41.8	42.5	33.8	47.0	–7.9	–8.7	4.4
Self-employed without any paid employee	11.4	11.1	9.7	13.1	–1.7	–1.4	1.9
Worked without pay in own-family-operated farm or business (unpaid family worker)	2.6	2.6	2.1	4.0	–0.5	–0.5	1.3
Wage and salary workers	26.6	27.8	21.4	28.9	–5.3	–6.4	1.1
Worked for private establishment	21.0	21.9	16.2	22.4	–4.8	–5.7	0.6
Worked for gov't or gov't corporation	3.8	3.9	3.5	4.4	–0.3	–0.4	0.5
Worked with pay in own-family-operated farm or business	0.1	0.1	0.1	0.2	–0.0	–0.0	0.0
Worked for private household	1.8	1.9	1.6	1.8	–0.2	–0.3	–0.0
Employer in own-family-operated farm or business	1.1	1.0	0.6	1.1	–0.5	–0.4	0.0

Source: PSA's LFS

13 | Rethinking the Frontier Between Monetary Policy and Fiscal Policy in the Post-COVID-19 Era

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13 | Rethinking the Frontier Between Monetary Policy and Fiscal Policy in the Post-COVID-19 Era

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1. Introduction

The key objective of macroeconomic policies is to achieve sustainable economic growth characterized by price stability and a stable external sector. This entails the use of monetary and fiscal policy tools and instruments to address fluctuations in growth, inflation, employment, investments, current account, fiscal position, and financial stability. While monetary and fiscal policy can independently affect these economic variables, their effects on the economy are interconnected. Tobin (1984) asserts that, as key determinants of aggregate demand, monetary and fiscal policy are substitutes. Monetary and fiscal authorities can either tighten or loosen the policy stance as needed and changes in one policy can be offset by variations in the other. Nonetheless, under certain conditions, monetary and fiscal policy can be complementary in that one can provide the other with more space for policy maneuver. This was evident during the COVID-19 pandemic.

As the COVID-19 situation turned into a global pandemic, policymakers around the world swiftly implemented a broad range of fiscal and monetary measures to provide extraordinary support to their economies and to mitigate the severe impact of lockdown measures and physical mobility restrictions on output and incomes. The mix of policy responses was consistent across different countries. Monetary authorities fully utilized the tools in their policy kits to shore up market confidence, ensure adequate liquidity and credit in the system, support aggregate demand, and sustain the proper functioning of financial markets. Reminiscent of the role they played during the 2008 Global Financial Crisis (GFC), central banks undertook conventional and unconventional measures to help economies stay afloat amid the significant shocks to the real sector. Meanwhile, fiscal policy responded to the crisis through the provision of direct subsidies and transfers to deeply affected economic sectors and to vulnerable households and members of society. Guarantee programs were also initiated to help businesses, particularly, micro, small, and medium enterprises (MSMEs), to access credit to continue their operations amid the pandemic. Estimates show that the fiscal policy response to the COVID-19 pandemic is more than double the amount that was provided during the GFC (European Commission, 2021).

While monetary and fiscal authorities acted in accordance with their respective mandates, their policy responses strongly supported each other. During the pandemic, the policy space that was created by fiscal and monetary policy for each other was crucial for the success of the stimulus programs and initiatives that were implemented (Bartsch et al., 2020). Whether monetary and fiscal policy are substitutes or complements, the policy mix matters as this can lead to different outcomes.[2] Thus, the pursuit of macroeconomic stability requires coordination between monetary and fiscal policy.

This chapter discusses the coordination between fiscal and monetary authorities in the Philippines, particularly during the

[1] The authors are grateful to Mr. Neil Fidelle G. Lomibao for his excellent assistance in the preparation of this chapter.

[2] Tobin (1987), however, notes that, while monetary and fiscal policy can affect growth, employment, external accounts, financial stability, and fiscal sustainability, these cannot independently affect prices and output. Rather, monetary and fiscal policy determine aggregate demand or nominal income (i.e., the product of price and output).

COVID-19 pandemic. The significant roles that monetary and fiscal policy played during the pandemic rekindled discussions on the coordination between these two instruments. The issue of fiscal dominance and loss of central bank independence are two particularly important issues that have been raised in the context of the monetary and fiscal policy responses to the COVID-19 crisis. Our empirical results indicate that decisions on debt management in the Philippines are influenced by both fiscal and monetary policy. Although we find no evidence of fiscal or monetary dominance in the conduct of macroeconomic policy, decisions on debt maturity as well as on the inflation rate as a target variable are highly sensitive to the evolution of debt to GDP. This has direct implication on the issue of the country's debt sustainability. Given the significant changes to the global economy and to domestic markets brought about by the pandemic, the scope and roles of fiscal and monetary policy may need to evolve, and a closer coordination may be warranted during periods of crisis and recoveries.

This chapter is organized as follows: Section 2 provides stylized facts on monetary and fiscal policy in the Philippines, Section 3 investigates the existence of fiscal dominance and its implications for monetary policy in the country, Section 4 discusses monetary and fiscal policy coordination in the post-COVID-19 era, and Section 5 provides chapter conclusions.

2. Monetary and fiscal policy in the Philippines

In the decades after World War II, monetary policy was subservient to fiscal policy in many countries. Central banks have often financed public sector deficits, including those from quasi-fiscal activities, and adopted measures that would help minimize the government's debt-service burden (e.g., keeping long-term interest rates at very low levels). However, the ready accommodation by monetary policy of fiscal policy led to an inflationary bias.

A different perspective emerged in the 1990s. Efforts were made to provide a clear delineation of the scope and roles of monetary and fiscal policy and to keep these instruments separate. There are contributing factors to this development. First, following the collapse of the Bretton Woods system, more countries preferred flexible exchange rates. This gave monetary policy instruments ample capability to attain the goals of stable prices, higher aggregate demand, and employment independent of fiscal policy. Second is the growing concern on policy excesses. Without defined mandates and accountability, the risks of policy excesses run high (Phillips, 2017). Sargent and Wallace (1981) note the importance of fiscal discipline for monetary policy to achieve price stability.[3] This has led to increased central bank independence and the design of optimal fiscal rules.[4] Greater central bank independence safeguards monetary policy from political influences and pressures.

[3] Sargent and Wallace (1981) argued that, to the extent that the path of a country's fiscal deficit becomes unsustainable, monetary policy and the price level become endogenous to it. The same reasoning was made by Woodford (1995) in his discourse on the fiscal theory of the price level.

[4] Moreover, the Lucas critique (1976) and the time inconsistency of the optimal policy rules argument (Kydland & Prescott, 1977) have pointed out that discretionary policy compromises credibility, which is essential for the effectiveness of macroeconomic stabilization policies. Thus, policy discretion is constrained, leading to a trade-off between policy credibility and flexibility (Bartsch et al., 2020).

Meanwhile, rules-based arrangements can better ensure fiscal discipline.

Nonetheless, the effectual implementation of fiscal and monetary policy entails coordination between the respective authorities. Monetary and fiscal policy coordination takes into account two important considerations. First, monetary and fiscal policy should be set on a sustainable path, whether as independent policy or in a policy mix. Second, monetary and fiscal policies operate in different time frames. Monetary policy has shorter decision and implementation lags compared to fiscal policy. However, the effects of fiscal policy are more immediate than the effects of monetary policy (Laurens & de la Piedra, 1998). Effective coordination ensures that monetary and fiscal authorities remain committed to mutually agreed objectives, thereby addressing the problem of time inconsistency in policy design (Laurens & de la Piedra, 1998).

2.1 *Frameworks and coordination*

The Philippine macroeconomic framework designates separate roles for monetary and fiscal policy. On one hand, monetary policy tames business cycles to preserve price stability and safeguard robust financial conditions. On the other hand, fiscal policy ensures robust aggregate demand. While these two tools pursue specific policy objectives, the country's monetary and fiscal authorities coordinate to align their actions toward achieving sound macroeconomic fundamentals. We give an overview of monetary and fiscal policy frameworks in the Philippines and the coordination process between them in this section.

2.1.1 *Monetary policy*

During its early years, the Central Bank of the Philippines (CBP) was geared to be a development-oriented institution. Policymakers deemed this proper given that the domestic economy was still recovering from the effects of World War II (Lamberte, 2002). The CBP extended funds to the national government (NG) for productive and income-producing projects, or for the repayment or servicing of its external obligations. Aside from maintaining monetary stability and preserving the international value of the peso into other freely convertible currencies, the CBP also helped promote rising levels of production, employment, and real income. The pursuit of multiple objectives resulted in the seemingly incoherent policy actions of the CBP. In addition, there was no central bank independence. Thus, the demand for fiscal stimulus often took precedence over the need of the economy for sound monetary policies (Guinigundo & Cacnio, 2019).

Over the decades, the legal and institutional frameworks of the Philippine central bank evolved. These were prompted by developments in the country's macroeconomic environment. In 1993, the Philippine government restructured and recapitalized the central bank. Fundamental changes were carried out, including the adoption of a new charter and the renaming of the CBP to Bangko Sentral ng Pilipinas (BSP).

The establishment of an independent central bank in the country in 1993 is considered as the most significant economic reform since the 1960s (Gochoco-Bautista & Canlas, 2003). Prior to this, the Philippines struggled with episodes of balance-of-payments crises. The prevailing conditions then—fiscal deficits, fixed nominal exchange rate, and accommodative monetary policy—were triggers for these crises. With a reconstituted central bank, the Philippine economy managed to withstand periods of volatilities, some of which were caused by severe domestic and external shocks. Likewise, the shift from fixed to market-determined exchange rate allowed the exchange rate to operate as a "shock absorber." This helped cushion the economy from supply shocks. The central bank reform is also considered as the key explanation for why the Philippines has not experienced

a serious economic crisis since the early 1990s and why it has managed to attain a sustained positive economic growth for almost two decades (Clarete et al., 2018).

Consistent with modern central banking, the New Central Bank Act established price stability as the overriding objective of BSP. In line with this objective, in 2002, the Philippines adopted inflation targeting as its framework for monetary policy. Empirical assessments have highlighted the benefits that the economy gained with the implementation of flexible inflation targeting (Guinigundo, 2017; Guinigundo & Cacnio, 2019). These include decline in inflation persistence, gradual shift of inflation process from a backward looking to a more forward-looking approach, and increased monetary policy credibility. Chapter 12 of this book gives a more detailed discussion of the changes in the Philippines' monetary policy framework over the years.

2.1.2 Fiscal policy

Since 1986, the choice of fiscal policy, which involves deficit financing, public-debt servicing, tax reforms, and expenditure management, has evolved from having to simply respond to crisis after crisis, to ensuring that reforms translate to fiscal consolidation. Policy decisions and implementation vary according to the time-dependent preconditions of the economy and the statutory processes required (e.g., legislative actions to formulate and implement tax policies and expenditure programs). Table 1 presents the different economic and fiscal policy regimes in the country between 1986 and the present.

Post-EDSA Revolution recovery (1986-1989). As shown in Fig. 1, the Philippines emerged from an economic crisis that saw an economic decline of 8.2 percent in 1985 and a deterioration of fiscal balance that reached 9.7 percent of GDP in 1986. Fiscal reforms on the revenue side focused on raising the tax effort and introducing new types of taxes. Meanwhile, government spending was made prudent with target deficit-to-GDP ratio set by standby credit arrangements with the International Monetary Fund (IMF).

Between 1986 and 1989, the reforms and emphasis on fiscal policy involved all aspects of public finance, including reforms in revenue, higher expenditure levels, and debt restructuring. Despite the relatively high deficit (as a percentage of GDP), fiscal policy contributed to an improved economic performance, with growth averaging 4.1 percent during this period (Table 1). Overall, fiscal policy managed to offset the negative effects of changes in tax policy and administration with improvements in the multiplier effects of higher public spending and debt-restructuring.

Power crisis, coup, and natural disasters (1990-1993). During this period, external and domestic events produced risks and challenges to the economy. Underinvestment in the energy sector led to a power sector crisis that resulted in higher levels of inflation and slowdown in average economic growth during this period. Government aid packages and related fiscal stimulus programs were put in place. However, higher public sector expenditure required debt financing activities that eventually led to a higher average debt-to-GDP ratio of 63.3 percent (Table 1). This resulted in greater risks to fiscal conditions. Fiscal policy during this period had to contend with rising deficit amid decelerating growth and elevated inflation.

Asian Tiger-style growth (1993-1996). The Philippines began to reap the benefits from key economic reforms that included fiscal sector reforms, trade liberalization, and opening up of the domestic financial sector over this period. Lower debt levels and accelerated growth were supported by improvements in fiscal balances. Fiscal deficit declined to an average of 1.92 percent (Table 1). The Philippines experienced high levels of growth comparable with its

neighboring economies. On the back of robust growth, the country achieved fiscal surplus. Fiscal condition was on track toward a sustainable path as debt was managed well and interest payments were going down sharply (Diokno, 2010).

Asian Financial Crisis (AFC, 1997-1999). The AFC caused a reversal of the gains in the previous period as real GDP growth turned negative for some quarters and decelerated to an average of 1.6 percent (Table 1). Fiscal deficit returned to higher levels as fiscal stimuli were undertaken to buoy the economy. Overall, fiscal conditions were negatively affected by the decline in public revenues, leaving less room to finance the productive sectors of the economy.

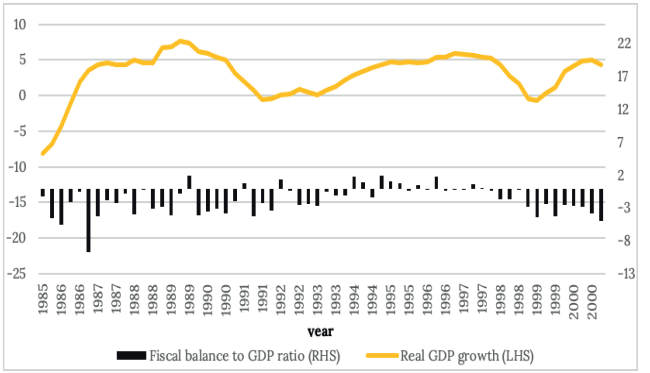
Post-AFC and fiscal tightening (2000-2005). The negative effects of the financial crisis, including the big fall in government revenue and the need to maintain large expenditures, resulted in the sharp increase in public debt as a percentage of GDP, averaging 63.9 percent (Table 1). Although economic growth and lower inflation was achieved, there were limitations to fiscal tightening as government deficit and debt-to-GDP ratio peaked during the period (Table 1).

Fiscal reforms and consolidation (Part 1, 2006-2008). Fiscal policy focused on reforming the tax system[5], which resulted in the relative increase in revenue and a decline in the government's budget deficit. Fiscal discipline (i.e., in terms of reduced government spending as a percentage of GDP) was accompanied by an acceleration of the country's real GDP growth.

Global Financial Crisis (GFC, 2009-2011). The economy experienced external shocks arising from the GFC. However, given the economy's broad-based growth and stable price conditions, the crisis partly spilled over only to some selected sectors of the economy. Even as the government budget deficit widened during that period, due to continued infrastructure spending and other related socioeconomic stimulus programs, the fiscal sector retained its good condition. Sovereign credit ratings saw major improvements as debt levels declined relative to the country's GDP.

Fiscal reforms and consolidation (Part 2, 2012-2019). The Philippine economy was said to have gone into a "sweet spot" during this period as it experienced robust growth with low and stable inflation. Aggregate demand expanded at an average rate of 6.7 percent annually (Table 1), comparable to the growth rates of China and India at that time. Meanwhile, inflation averaged at 3.3 percent. During this period, the NG undertook fiscal consolidation and tax reforms[6] were continued. Public spending on infrastructure and other high-return socioeconomic programs and projects were implemented, which led to macroeconomic stability.

Figure 1. Real GDP growth and fiscal balance, 1985 to 2000



Sources: BSP, CEIC, and Bloomberg

[5] Tax reforms during the period included expansion of the country's value added tax (VAT) from 10 percent to 12 percent, among others.

[6] Major tax reforms during the period included the imposition of sin taxes and expanding such coverage; adjustments in income tax structure for both personal and corporate income taxes; amnesty, rationalization of tax incentives, and expanding the coverage of the country's value added taxes.

Table 1. Various economic and fiscal policy regimes in the Philippines, 1986 to 2021

Period	Revenue to GDP ratio	Expenditure to GDP ratio	Fiscal balance	Debt-to-GDP ratio	Real GDP growth	Inflation
Post-EDSA Revolution recovery (1986-1989)	12.9	15.6	−2.74	n.d	4.14	n.d.
Power crisis, coup, and natural disasters (1990-1993)	15.8	17.7	−1.92	63.33	1.69	11.81
Asian Tiger-style growth (1993-1996)	16.9	16.5	0.42	53.22	4.78	8.34
Asian Financial Crisis (AFC, 1997-1999)	14.8	17.3	−2.49	50.10	1.53	7.77
Post-AFC and fiscal tightening (2000-2005)	13.6	17.6	−4.03	63.87	4.51	4.49
Fiscal reforms/consolidation-part 1 (2006-2008)	15.0	16.0	−0.98	61.37	5.48	4.81
Global Financial Crisis (2009-2011)	13.7	16.1	−2.46	51.14	4.52	5.23
Fiscal reforms/consolidation-part 2 (2012-2019)	15.3	18.2	−2.82	40.57	6.65	3.26
Pandemic and recovery (2020 to 2021)	16.1	23.8	−7.70	54.46	−4.36	3.22

Sources: BSP, CEIC, Bloomberg; 2021 data up to June only

COVID-19 pandemic and the road to recovery (2020-present). The lockdown measures and physical mobility restrictions that were implemented beginning in March 2020 generated sizeable shocks on the country's economic and fiscal conditions. Between 2020 and 2021, real GDP declined sharply at an average rate of 4.4 percent (Table 1). Government expenditure as percent of GDP substantially grew to 23.8 percent (Fig. 2). Fiscal authorities implemented measures to provide subsidies to the vulnerable sectors of society and credit guarantees to support businesses, particularly the MSMEs.

The gradual re-opening of the Philippine economy resulted in a handsome growth rate of 8.3 percent in the first quarter of 2022. This robust growth stems from the resilient conditions of the macroeconomy and the financial system. However, the road to recovery is paved with significant risks and challenges.

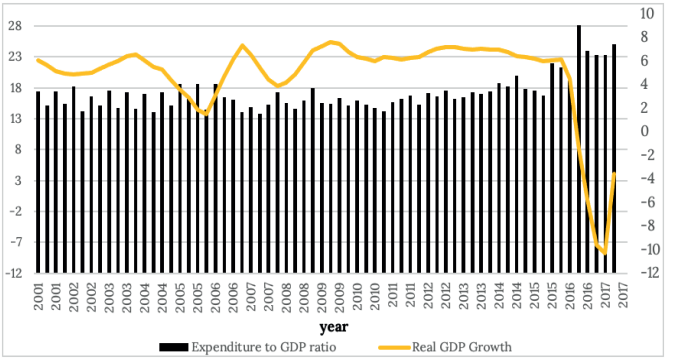
High inflation rates have been plaguing both advanced and domestic economies, and the threat of stagflation is growing in many others. This has led to central banks increasing their policy rates to curb the surge in prices. These developments, in turn, have raised concerns over tightening global financial conditions and ballooning fiscal debts. Monetary and fiscal policy would therefore have to work together to surmount these challenges to attain a sustainable and robust recovery.

2.1.3 Coordination between monetary and fiscal policy

The coordination between monetary and fiscal policy in the Philippines occurs through the inter-agency body known as the Development Budget Coordination Committee (DBCC).[7] Through the DBCC, the country's macroeconomic targets (e.g., GDP, fiscal balance, overall balance of payments position) are set as well as the formulation of the revenue, expenditure, and financing programs of the NG. In addition, the DBCC is tasked to prepare and submit to Congress

[7] The DBCC is an inter-agency body composed of the Secretary of the Department of Budget Management as chair and the BSP Governor, the Secretary of the Department of Finance, the Director General of the National Economic and Development Authority, and a representative of the Office of the President as members.

Figure 2. Expenditure and real GDP growth, 2001-2017



Sources: BSP, CEIC, and Bloomberg

the NG's annual budget, which is officially referred to as the National Expenditure Program (NEP), for review and approval. The DBCC provides a venue for coordinating the NG's efforts of carrying the budget through from its proposal up to the time that it is spent judiciously.[8]

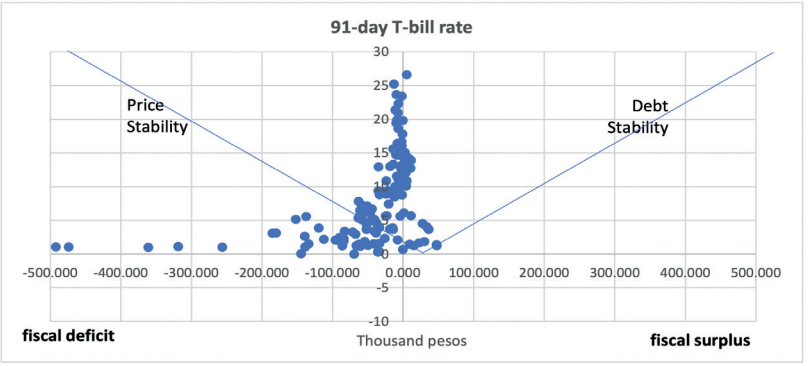
The BSP participates as an observer and resource institution at the DBCC. Its participation allows the synchronization of the macroeconomic objectives that concern both fiscal and monetary policies, including the assumptions for interest rates, exchange rates, and balance-of-payment accounts such as imports and exports. Formally and through the DBCC, the NG sets the inflation target two years ahead in consultation with the BSP. This is in line with the BSP's commitment to greater transparency and accountability in its conduct of monetary policy, as the BSP Governor makes the public announcement of the inflation target. Although price stability is the primary objective of the BSP, by no means does this imply that it focuses exclusively on this policy goal to the exclusion of others. Promoting financial stability and achieving broad-based, sustainable economic growth are also given consideration in the BSP's policy decision-making. Thus, the BSP coordinates with other government agencies to ensure that its policies form part of a consistent and coherent overall public policy framework (Guinigundo & Cacnio, 2019).

Mason and Jayadev (2018) provide a framework to make observations about the coordination of fiscal and monetary policies such as in the Philippines. The framework was also applied in the Euro area under a pandemic or post-COVID-19 setting (Bonatti et al., 2020). Fig. 3 shows the various interest rates (91-day T-bill rates) and corresponding level of fiscal balance for each period. The "price stability" line contains the locus of points involving combinations of interest rates and fiscal balances where real GDP and inflation are generally on target or in full capacity. Periods or points at the right side of this line provide some "fiscal space," where some amount of deficit can be accommodated without affecting GDP and inflation negatively. Alternatively, interest rates may need to be reduced so that the economy will move closer to price conditions that are conducive for full employment. Periods or points at the left side of the line require either or both raising the interest rates and reducing fiscal deficit.

The "debt stability" line contains the locus of points involving interest rates and fiscal balances where debt-to-GDP ratio are at relatively sustainable levels. Periods or points at the right side of this line provides some "fiscal space" where some amount of deficit can be allowed without affecting debt stability (i.e., desirable debt-to-GDP ratio). An increase in interest rates in this case will not negatively affect the country's

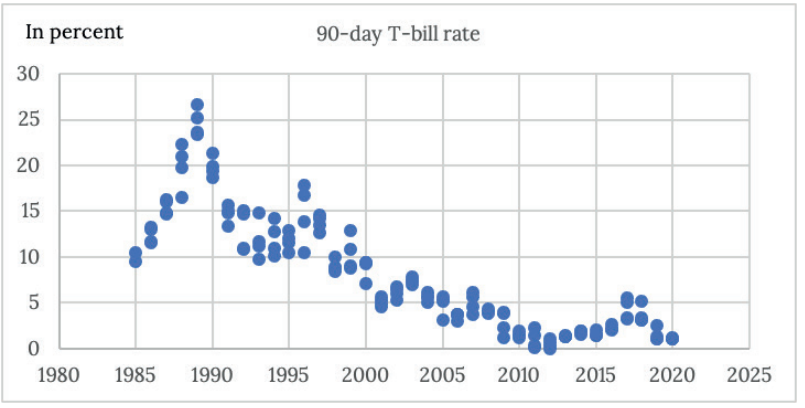
[8] The current process for formulating the NEP starts with the President's submission of a proposed annual NEP to Congress. The NEP goes through a long process of deliberation in the two chambers of the Philippine Congress (i.e., the House of Representatives and the Senate). After deliberation and approval, it is enacted as the General Appropriations Act (GAA). The GAA includes both the NG budget and the allocations for local government units (LGUs). It also spells out guidelines on spending and deficit financing.

Figure 3. Interest rates and fiscal balances and resulting price and debt stabilities in the Philippines, 1985-2021



Note: Fiscal balance data are in nominal terms. Using real-term data and as a ratio of GDP will not change the analysis.
Sources: BSP, CEIC, Bloomberg, and PSA

Figure 4. The evolution of Philippine interest rates, 1985-2020



Sources: BSP, CEIC

debt stability conditions. Periods or points at the left side of the line require the reduction of either or both the interest rates and fiscal deficit.

Actual monetary and fiscal policy interactions between 1995 and 2021 are reflected in the plot of interest rates and fiscal balance in Fig. 4. Consistent with textbook macroeconomic principles, short-term interest rates are generally set or influenced by the BSP. The price stability line involves the set of market interest rates that allows inflation rate to be within a target or one that allows the economy to be close to full capacity.

During the pandemic, the points representing fiscal deficits ranged from –300 to –500 (in thousand PhP), which were way below the "price stability" line. This implies monetary policy support to economic growth and related fiscal objectives. Interest rates were relatively low during that period which provided ample room for policy rate increases to ensure price stability.

The periods of high interest rates (i.e., above 10.0 percent) between 1986 and the Asian Financial Crisis in 1998-1999 (Fig. 4) reflect the challenge of achieving both price and debt stability in crisis periods. At that time, monetary policy was tight compared to what fiscal conditions warranted. A decline in interest rates eases the burden on the country's debt conditions and allows the economy to move closer to debt stability. On the other hand, decreased interest rates during the fiscal consolidation periods (i.e., 2005-2008 and 2012-2019) were periods when fiscal deficit or surplus was relatively close to balance (Fig. 4).

2.2 Monetary and fiscal responses to the COVID-19 pandemic in the Philippines

When the COVID-19 pandemic broke out, the Philippines had ample fiscal and monetary spaces that allowed it to undertake the needed policy measures to calm the markets and restore confidence in the financial system amid the public health and economic crisis. The country's robust growth, good fiscal performance, stable financial system, and secure external position gave it enough headroom to deal with the sizeable real shocks of the pandemic. The Philippines' fiscal position before the pandemic was at a historic high. Total revenues as a share of GDP (2019) was at its highest at 16.1 percent, whereas total debt as a share of GDP (2019) stood at its lowest at 39.6 percent. Thus, the fiscal policy provided the needed support to the NG's programs to combat the adverse effects of the pandemic. Meanwhile, the benign inflation outlook allowed monetary policy to take a more accommodative stance to support aggregate demand and preserve the stability of the country's financial system. The combined actions of the fiscal and monetary authorities maintained the stability of the domestic economy amid the COVID-19 pandemic.

The Philippines adopted a whole-of-government response to the COVID-19 pandemic through a four-pillar socioeconomic strategy: (1) emergency support for vulnerable groups, (2) marshalling resources to fight COVID-19, (3) monetary actions to keep the economy afloat and other financing support for emergency response and recovery initiatives, and (4) an economic recovery program to create jobs and sustain growth.

The first pillar gives emergency support, such as assistance programs and wage subsidies, to poor and low-income households, small business employees, and other vulnerable groups. Meanwhile, the second pillar provides frontline health workers with a special risk allowance, hazard pay, and personal protective equipment (PPE). It also grants health insurance coverage for all COVID-19 patients and resources to increase testing capacity. The third pillar involves monetary actions to keep the economy afloat and funding support for emergency responses and recovery initiatives. The fourth pillar comprises the NG's programs and initiatives for economic recovery (e.g., creating jobs and sustaining growth). These include provisions under the Bayanihan to Recover as One Act (*Bayanihan* 2).

The socioeconomic strategy is estimated to have amounted to PhP 3,035.5 billion (USD 61.6 billion), equivalent to 15.6 percent of the Philippines' GDP in 2021 (Table 2).[9]

The prudent fiscal response to the COVID-19 pandemic reflects the balanced policy approach of the NG to the health crisis. Based on a conservative third-party assessment of the IMF (2021), the country's major fiscal policy responses are estimated to have reached 5.0 percent of GDP. These include the NG's total direct budgetary support, which amounted to 4.4 percent of the country's 2020 GDP. Aside from direct budgetary support, the NG also introduced "below-the-line" measures

[9] Sourced from the presentation of DOF Sec. Carlos G. Dominguez in the Philippine Economic Briefing–Six Years of Institutionalizing Game-Changing Reforms and Shaping the New Economy: The Philippine Economic Report, 5 April 2022.

Table 2. The 4-pillar socioeconomic strategy against the COVID-19 pandemic

	Description	In PhP billion[a]	In USD billion[b]	As percent of GDP[c]
Pillar I	Emergency support for vulnerable groups	648.2	13.2	3.3
Pillar II	Marshalling resources to fight COVID-19	227.3	4.6	1.2
Pillar III	Monetary actions to keep the economy afloat	1,410.0	28.6	7.3
Pillar IV	An economic recovery program to create jobs and sustain growth	749.98	15.2	3.9
Total for fiscal stimulus (Pillars I, II, IV)		1,625.5	33.0	8.4
Total for monetary stimulus (Pillar III)		1,410.0	28.6	7.3
Grand total		**3,035.5**	**61.6**	**15.6**

Notes: [a]As of 7 February 2021; [b]Conversion to U.S. dollar is based on the 2021 average peso dollar exchange rate of PhP 49.25/USD 1; [c]Nominal GDP for 2021 is estimated at PhP 19,410.6 billion. Sources: Domestic Finance Group (DFG) and Legislative Liaison, Department of Finance (DOF)

that were mainly for credit guarantees. These amounted to about 0.6 percent of the 2020 GDP.

The fiscal response measures implemented during the COVID-19 pandemic included programs aimed at alleviating the impact of the pandemic on affected workers and mitigating the potential scarring effects on the domestic labor market. One of these programs is the Small Business Wage Subsidy Program (SBWSP), which benefited around 3.4 million workers. Under this program, eligible workers affected by the Enhanced Community Quarantine (ECQ) received a monthly subsidy amounting to PhP 5,000 to PhP 8,000 for a maximum of two months. Another is the COVID-19 Adjustment Measures Program (CAMP) of the Department of Labor and Employment (DOLE), which provided a one-time aid worth PhP 5,000 to private sector workers who were affected by lockdown measures. Meanwhile, the DOLE and Overseas Workers Welfare Administration (OWWA) implemented the Abot Kamay Ang Pagtulong (AKAP) program to help returning overseas Filipino workers (OFWs) directly affected by the COVID-19 pandemic. The DOLE-OWWA AKAP program provided financial assistance worth PhP 10,000 each for displaced OFWs who temporarily or permanently lost their jobs overseas because of the COVID-19 pandemic.

Multilateral agencies such as the Asian Development Bank (ADB) and the Asian Infrastructure Investment Bank (AIIB) also provided aid of USD 1.5 billion through the COVID-19 Active Response and Expenditure Support (CARES) Program to finance the Philippine government's programs and policies to alleviate the socioeconomic impact of the COVID-19 pandemic. It included support for, but was not limited to, displaced workers, formal and informal sector workers, health care workers, and OFWs. A percentage of the budget of this program was also allocated to the Department of Trade and Industry's COVID-19 Assistance to Restart Enterprises (CARES) program, and DOLE's SBWSP and the *Tulong Panghanapbuhay sa Ating Disadvantaged/Displaced Workers* (TUPAD). TUPAD is a program that provides temporary wage employment to displaced workers in the informal sector.

Meanwhile, the BSP responded to the COVID-19 pandemic with prompt and unprecedented actions. The BSP's COVID-19 pandemic response can be broadly categorized in three key objectives: (1) to shore up market confidence and safeguard the flow of credit in the economy, (2) to complement government programs through extraordinary liquidity measures, and (3) to maintain the stability

of the financial system and guarantee continued public access to financial services (Table 3). The BSP's COVID-19 response measures are estimated to have released PhP 2.3 trillion in liquidity and credit support to the financial system and to the general economy amid the pandemic. This is equivalent to 11.7 percent of the country's GDP in 2020.

Legislative measures were also enacted to help cushion the socioeconomic impact of the COVID-19 pandemic and to strengthen economic recovery in the post-pandemic period (Table 3). These include the Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act and Financial Institutions Strategic Transfer (FIST) Law (Republic Act [RA] No. 11523). Meanwhile, on 30 August 2022, the House Committee on Banks and Financial Intermediaries approved the proposed Government Financial Institutions Unified Initiatives to Distressed Enterprises for Economic Recovery (GUIDE) Act.

2.3 *Estimating the fiscal multiplier*

To analyze the impact of fiscal policy actions on the economy during the pandemic, it is important to observe changes in the estimated size of the fiscal multiplier over time. One way to analyze the impact is to obtain estimates of impulse responses of economic variables (e.g., inflation and output) to fiscal policy shocks (i.e., the average ratio of fiscal variable to output over a given period).

A Bayesian vector autoregression (BVAR) model is applied to Philippine data from 1992 to 2021 to estimate the impact of fiscal policy on price conditions and output growth (i.e., "fiscal multipliers"). The model specification generally follows the baseline VAR in Gechert and Mentges (2017) and the VAR application in a COVID-19 setting in Dime et al. (2021). Specifically, a BVAR of the following equation is used to estimate the fiscal effects on the country's aggregate economic conditions.

$$X_t = c + \sum \beta_i X_t + \sum_{i=1}^{4} G_{t-i} + Covid + Covid * G_{t-1} + \varepsilon_t \quad (1)$$

The output X_t is the vector of time t variables reflecting general aggregate economic conditions, including corresponding contemporaneous stabilization policies adopted by fiscal and monetary authorities. These include real GDP growth, trade (imports and exports), government spending, government revenue, reserve requirement, and inflation. The β_i vector contains the coefficients corresponding to each of the variable in X_t. Trade data, government spending, (G_{t-1}) and (G_{t-i}), and revenue variables are transformed as percent changes. The term *Covid* is the dummy variable for periods when there is a COVID-19 pandemic. The interaction variable Covid * G_{t-1} is applied in several regressions. The ε_t represents the regression equation's error term. Consequently, the fiscal multiplier over time is obtained by dividing the estimated impulse responses by the average ratio of fiscal variable to output. Major macroeconomic variables, namely, real GDP growth and inflation data are shown in Fig. 5 along with the fiscal spending variable.

The resulting time series over time of estimated fiscal multipliers is shown in Fig. 5 along with real GDP growth and inflation. Results show relative decline in the fiscal multiplier during the COVID-19 pandemic (2020-2021). This is consistent with findings indicating minimal fiscal effects during the pandemic. Even as government subsidies and various assistance programs to businesses and employees were extended during the pandemic, legal limits to mobility and voluntary restrictions in economic activities may have minimized the traditionally and significantly large role of fiscal stimulus during normal slowdowns or recessions. The decline in the fiscal multiplier was thereby accompanied by a large drop in real GDP growth.

Table 3. Key fiscal and monetary policy responses to the COVID-19 pandemic

Fiscal

RA 11469 or the "Bayanihan to Heal as One Act" (*Bayanihan 1*)
- Granted the President additional authority to implement emergency measures to combat the COVID-19 pandemic, including providing emergency subsidy to 18 million low-income households; granting of COVID-19 special risk allowance to all public health workers; ensuring availability of credit to the productive sectors of the economy; and safeguarding the availability of essential goods, particularly food and medicine.
- Allowed the President to reallocate and realign funds from the 2020 national budget to finance the COVID-19 response of the government.

RA 11494 or the "Bayanihan to Recover as One Act" (*Bayanihan 2*)
- Provided support to vulnerable households and workers as well as hard-hit sectors such as tourism, agriculture, and transportation.
- Gave additional capital to state-owned banks and Government-Owned and -Controlled Corporations (GOCCs), including for the COVID-19 Assistance to Restart Enterprises (CARES) program of the Small Business Corporation (SBCorp).

Monetary

- Cut the policy rate by a cumulative 200 basis points starting in February 2020 (RRP rate at 2.0 percent as of November 2020).
- Reduced the reserve requirement ratios of universal and commercial banks (UKBs) and non-bank financial institutions with quasi-banking functions (NBQBs) by 200 basis points, from 14 percent to 12 percent.
- Lowered term spread of peso rediscounting loans relative to the overnight lending rate to zero.
- Entered into a PhP 300-billion (around USD 5.9 billion) purchase of government securities from the NG under repurchase agreement with a term of 3 months in March 2020, which can be extended by another 3 months subject to Monetary Board (MB) approval.
- Provisional advances amounting to PhP 540 billion (USD 10.9 billion) were granted in October 2020, January 2021, and July 2021; latest tranche of provisional advances in January 2022 at PhP 300 billion (USD 6 billion).
- Opened a window for purchases of government securities in the secondary market.
- Remitted PhP 20 billion in advance dividends to the NG in March 2020 and another PhP 15 billion in August 2021.

Prudential

- Temporary exclusion of loans of affected borrowers from the past-due and non-performing classification
- Allow banks to stagger booking of allowance for credit losses for loans extended to affected borrowers
- Banks with outstanding rediscounting obligations with the BSP are entitled to either a grace period for their payments or restructure the rediscounted loans
- Reduction of credit risk weights of loans granted to MSMEs
- Allow peso-denominated loans to MSMEs and certain large enterprises as forms of alternative compliance with banks'/quasi-banks' reserve requirements against deposit liabilities and deposit substitutes
- Temporarily raised the Single Borrower's Limit
- Deferred the implementation of the revised risk-based capital framework for stand-alone thrift banks (TBs) and rural and cooperative banks (R/CBs)
- Temporarily reduced the minimum liquidity ratio of stand-alone TBs and R/CBs
- Banks/quasi-banks were allowed to utilize capital conservation and Liquidity Coverage Ratio buffers during the crisis

Legislative

Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act
- Provides private corporations and enterprises with an estimated PhP 1.0 trillion pesos of tax relief over the next 10 years.

Financial Institutions Strategic Transfer (FIST) Law (RA 11523)
- Seeks to help financial institutions (FIs) in the resolution of their bad debts and management of their Non-Performing Assets (NPAs).
- Encourages FIs to sell their NPAs to asset management companies that are registered with the Securities and Exchange Commission (SEC).

Government Financial Institutions Unified Initiatives to Distressed Enterprises for Economic Recovery (GUIDE) Act (HB 7749)
- Expands the loan assistance, rediscounting, and other credit and financing facilities of the Development Bank of the Philippines (DBP) and Land Bank of the Philippines (LBP) to MSMEs to help them cope with the effects of the COVID-19 pandemic.
- Authorizes the LBP and DBP to invest in or enter into a joint venture agreement to incorporate a special holding company tasked to rehabilitate strategically important companies affected by the COVID-19 pandemic and to ensure that they remain solvent.

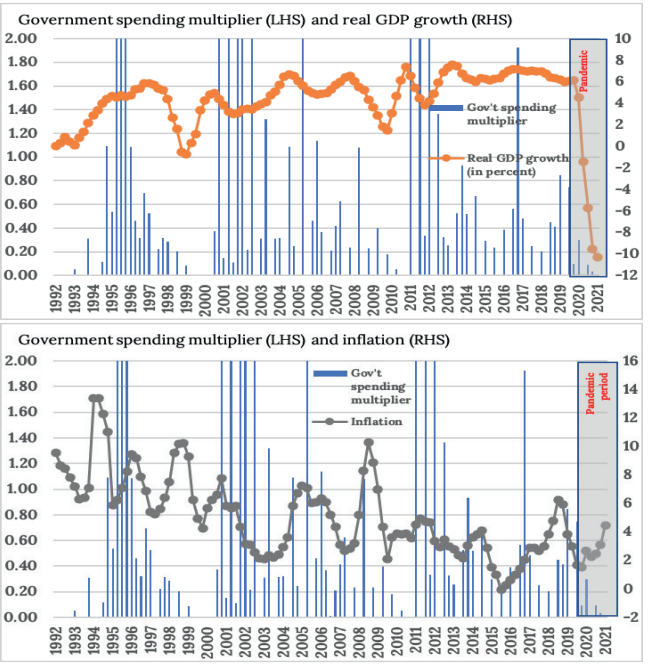
Sources: DOF, BSP, and the House of Representatives

3. Investigating the presence of fiscal dominance and its implications for monetary policy in the Philippines

The wide-ranging accommodation in monetary policy rates and the expansion of central bank balance sheets to contain the economic and financial impact of the COVID-19 pandemic brought about questions on the theory and practice of monetary policy vis-à-vis fiscal policy. One lasting effect of both the Global Financial Crisis of 2008-2009 and the COVID-19 crisis beginning in 2020 is the large increase in general government debt worldwide.[10] The expected persistence in fiscal deficits in many countries and high public debt-to-GDP ratios for many years have created huge challenges for central banks and public debt managers alike. Evidently, there are also potential costs to accommodative monetary policy and particularly so in the case of unconventional monetary policies (UMPs) such as the asset purchases by central banks during the pandemic. If the asset purchase programs (APPs) of central banks is especially large-scale and open-ended, then these could heighten risks. The credibility of institutions and the central bank is threatened; capital outflow pressures are intensified, especially for emerging countries with weaker macroeconomic performance; and concerns about fiscal dominance may arise.[11]

What is fiscal dominance? One way to view fiscal dominance is that it generally pertains to periods when expansionary fiscal policies are coupled with easy monetary conditions in order to alleviate the burden of debt. According to Dorn (2021), fiscal dominance is also understood to occur when central banks use their policy tools to support the prices of government securities and to keep interest rates at low levels to lower the costs of servicing national government

Figure 5. Government spending multiplier, real GDP growth, and inflation



Sources: Authors' estimates, PSA, and BSP

debt. The U.S. Federal Reserve may not yet call its unconventional monetary policies as "fiscal dominance," but the thin line between fiscal and monetary policy has narrowed significantly beginning in the 2007-2008 financial crisis and more so, at the onset of the pandemic.[12]

IMF analysis suggests that bond purchases of emerging markets in response to the COVID-19 pandemic had a generally positive effect on local financial markets. In particular, asset purchases by the central banks of emerging markets helped reduce government bond yields without seeing accompanying depreciation in local currencies. They also gradually helped decrease local market stress (IMF, 2020). Nevertheless, what is relatively certain is that government debt-to-GDP ratios in major advanced and emerging countries will continue to rise, ushering in, one way or another, some form of fiscal dominance.

[10] Bank for International Settlements (BIS), 2012.
[11] *Ibid.*
[12] Dorn, 2021.

In this section, we seek to investigate fiscal dominance and its implication for monetary policy in the Philippines. We provide a quantitative analysis on this growing debate and investigate the interaction between public debt management, monetary policy and fiscal policy, especially under conditions of serious fiscal vulnerabilities and higher sovereign risk, such as the COVID-19 pandemic.

3.1 *Literature review*

According to the IMF, general government debt as a share of GDP increased by around 60 percentage points, from 71 percent in 2007 to around 132 percent in 2021, the period covering the GFC and the COVID-19 crisis (IMF, 2020).[13] Such a surge in sovereign debt has led to concerns about losing the inflation-fighting credibility of central banks in the future. When monetary authorities conduct accommodative monetary policy to alleviate the public debt burden, this is tantamount to high future inflation. Viewed this way, fiscal dominance is a situation in which governments continue to pursue expansionary fiscal policies despite already higher levels of total public debt. Many economists and central bank practitioners counter this view. Central banks are now well equipped to deal with the expected increases in inflation, given central bank independence and the wider policy toolkit at their disposal, such as central bank bills, interest on reserves, and reverse repos.

Blanchard and Pisany-Ferry (2020) note that there is still no cause for concern over fiscal dominance, particularly in Europe. Nonetheless, they believe that there is an additional factor compromising the inflation-fighting credibility of central banks. Since the GFC, many central banks, including the European Central Bank (ECB) and the U.S. Federal Reserve, have pursued policies geared toward supporting asset prices and compressing risk premia.[14] Meanwhile, the purchase of government bonds by emerging market central banks may be resonant of the days of monetary financing (MF) by the NG. This was often followed by rising inflation and currency depreciation. Under this scenario, if inflation expectations were to become unanchored, the concern is that central banks may respond slowly if and when risks to financial stability emerge later on. Monetary policy tightening and macroprudential policies may result in asset price deflation and increased volatility, which might be worse. Blanchard and Pisany-Ferry (2020) submits that concerns for asset prices could diminish the willingness of central banks to fight renewed inflation through increases in interest rates. However, the successful actions by several central banks to buy government bonds during the COVID-19 pandemic, in the face of consistently low inflation outturns, countered this MF history and the concern on financial stability.

3.1.1 *Emerging Asia and the Philippines' version of "unconventional" monetary policy during the COVID-19 crisis*

The limited scale and duration of the APPs in emerging economies, particularly in Asia and especially in the Philippines, were consistent with their goals to mitigate financial market disruptions, provide liquidity, and repair monetary policy transmission mechanisms. These set their APPs apart from the quantitative easing employed by advanced economy central banks, which aimed to provide additional stimulus in the context of policy interest rates at or near the effective lower bound. Some types of APPs in emerging countries were mostly implemented

[13] As cited by Schnabel, 2020.
[14] Blanchard and Pisany-Ferry (2020)

alongside or even preceding the easing of conventional monetary policy. The pandemic has manifested itself as a negative demand shock of a deflationary nature. Nonetheless, an exogenous shock, such as recent geopolitical risks associated with the war between Russia and Ukraine, and the resulting trade sanctions of advanced economies on Russia, has resulted in higher global commodity and oil prices. These pushed up inflation around the world, including in the Philippines. The question then becomes whether or not emerging Asian central banks like the BSP can remain capable and ready to fight potentially higher inflation in the future.

Going into the COVID-19 pandemic, emerging market economies (EMEs) in Asia depended highly on non-resident capital flows. In the aftermath of the GFC, foreign investors and foreign exchange funds entered domestic financial markets at varying degrees in their search for yield. In many local sovereign debt markets in Asia, foreign investments withdrew in the first half of 2020. This capital flow reversal had important implications for ASEAN economies. Many of them have responded to the pandemic and the resulting sharp global economic downturn by allowing their currencies to depreciate and by easing monetary policy, as they did during the GFC.

Expectations are for substantially larger fiscal deficits as most fiscal authorities in emerging market economies, including the Philippines, responded to the COVID-19 crisis by letting automatic stabilizers operate and adopting fiscal packages to support the recovery. The conventional view is that economies should enact fiscal stimulus to the extent that their government debt allows. But Asian EMEs generally have limited fiscal space, with an average government debt-to-GDP ratio of more than 50 percent at the end of 2019. This is close to historically critical levels for emerging economies.

Even before reaching the zero lower bound on policy rates, several emerging market central banks, such as the BSP, have started to engage in long-term government asset purchases, which is effectively a version of quantitative easing (QE)—one of the unconventional monetary policy tools employed by advanced economy central banks during the GFC and subsequently expanded in response to the COVID-19 shock. Government bond markets and foreign investors have responded positively to these announcements of QE or QE-like programs by emerging economy central banks, with long-term interest rates falling significantly in all but three cases, and exchange rates either appreciating or having a slow depreciation. Benigno et al. (2020) finds that the argument in support of APPs for emerging economies is that EMEs with a flexible exchange rate regime and well-anchored inflation expectations could reap the benefits of QE to stabilize financial conditions and help finance the government budget deficit caused by the pandemic.

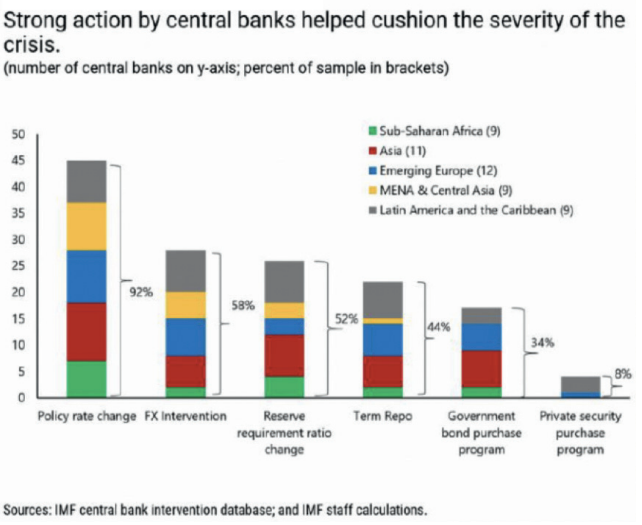
Ole (2020) posits that unconventional measures can also be used to address limits in monetary policy transmission, such as ensuring that non-financial corporations have access to financing to meet their obligations and working capital needs in a crisis like the COVID-19 pandemic. While targeted financial support is the most appropriate tool to address such needs, it may not be available or mobilized in time. In this case, central banks may intervene, specifically to address impairments in bank lending that block the non-financial sector from access to credit, to ensure the effectiveness of the monetary transmission channel. He adds that countries with credible institutions, benign inflation, and ample reserves are better positioned to benefit from the use of APPs as a monetary policy tool.

APPs in advanced markets involved an expansion of reserves once central banks reach their effective lower bounds, and

this is what has effectively happened in the U.S., the UK, Japan, and the euro area. By contrast, most EME central banks have traditional operating frameworks where reserves are largely in line with requirements and rates that remain far from the lower bound. Ole (2020) pointed out that the stated objectives of QE-like measures in many EMEs have been to address disruptions in market functioning and to stabilize government bond markets in the face of non-resident capital outflows rather than providing deficit financing (Fig. 6).

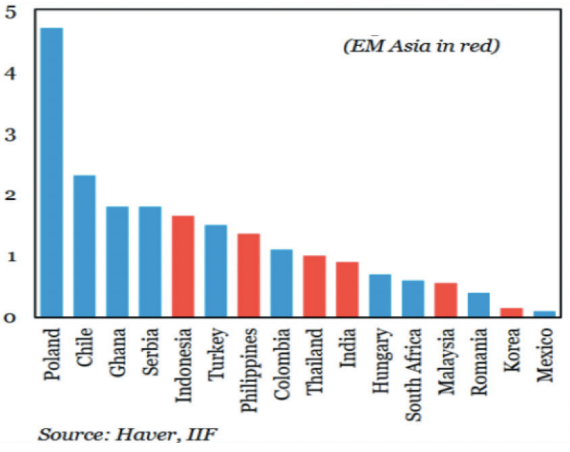
According to Drakopoulos et al. (IMF Blog, 23 October 2020), however, the motivation for quantitative easing or APPs by emerging market central banks varied across countries. These asset purchases can be grouped into three main policy objectives. First, central banks with policy rates well above zero (e.g., India, South Africa, and the Philippines) tended to use asset purchases as a tool to improve bond market functioning. Second, central banks with policy rates closer to the zero lower bound (e.g., Chile, Poland, and Hungary) partially sought a course similar to advanced-economy central banks as they used quantitative easing to relieve financial conditions and provide additional monetary stimulus, as well as for market functioning and liquidity objectives. Third, some central banks explicitly stated that one of their objectives was to temporarily ease government financing pressure in the face of the pandemic (e.g., Ghana, Guatemala, Indonesia, and the Philippines). Only a few central banks in Asia, including Bank Indonesia and the BSP, have stated explicitly that government bond purchases are intended to facilitate COVID-19-related spending in the context of cyclical revenue weakness (see Fig. 7). In 2020, six emerging market economies in Asia have engaged in QE or QE-like government bond purchasing programs—India, Indonesia, Korea, Malaysia, the Philippines, and Thailand (see Fig. 8; Ole, 2020).

Figure 6. Central bank policy actions



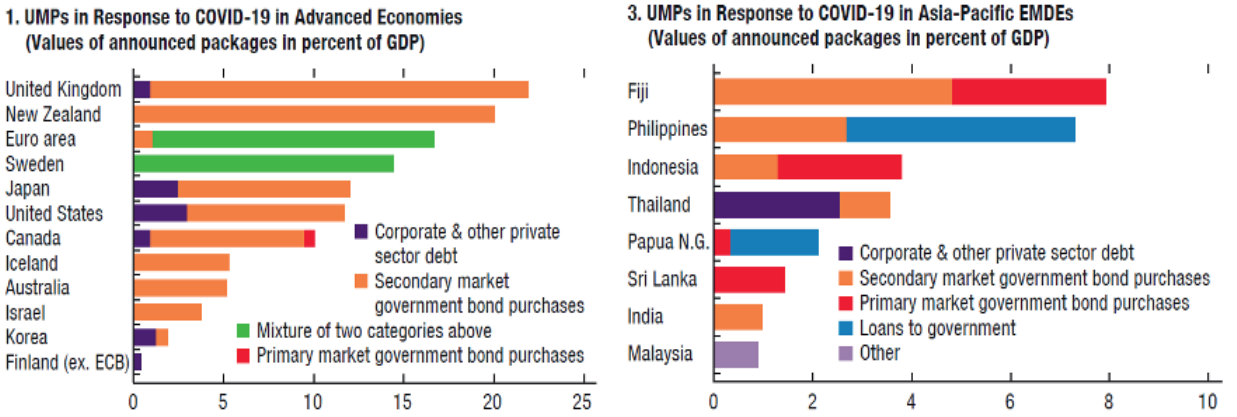
Source: Drakopoulos et al. (2020)

Figure 7. Central bank purchases of government bonds year-to-date, in percent GDP



Source: Institute of International Finance (IIF, 23 September 2020) as cited in Ole, R. (2022).

Figure 8. UMPs in advanced economics versus UMPs in Asia-Pacific emerging markets and developing economies (EMDEs) in 2020



Source: Agur et al. (IMF, 2022)

3.1.2 *The risk of APPs for emerging economies: The fear of fiscal dominance*

Asset purchases can be useful additions to the policy toolkit for emerging and developing economies but these carry some risks, such as to central bank balance sheets by increasing the banks' exposure to maturity and credit risk. Increased exposure to longer-term debt may raise concerns about a central bank's willingness to increase interest rates in the future, which may de-anchor inflation expectations. Capital outflow pressures may intensify, especially in countries with weaker fundamentals and where corporate bond purchases face limited market depth. These, in turn, create negative consequences for financial market development and raise governance issues.

More importantly for the case of the BSP, its QE-like measures pose the risk that the exchange rate depreciates and may weaken institutional and central bank credibility by creating undue perceptions of monetary financing, especially if APPs are large-scale and open-ended. The prospect of larger balance sheet losses may heighten the risk of fiscal dominance (Ole, 2020; Drakopoulos et al., 2020). Lastly, both foreign and domestic investors might choose to exit the country position altogether, which could increase the sensitivity of the exchange rate to QE and QE-like policies in countries with currency mismatches in private sector balance sheets.

An excessive depreciation of the exchange rate could at least partly offset the expansionary effect of QE and QE-like policies by tightening overall financial conditions thereby raising spreads. The growing use of APPs by emerging market economies' central banks has raised the issue of central bank independence, including in the Philippines and other ASEAN economies. Carstens (2020) lists two factors, which would allow the specter of fiscal dominance to be kept at bay: (A) governments need to safeguard fiscal sustainability, and (B) central banks must remain focused on their price and financial stability mandates and not stray into continuously financing government debt. Nevertheless, several recent studies in literature point out how the separation between fiscal and monetary policies have become more blurred compared to previous periods. Despite this, APPs seem to work for as long as they remain within limits and within an environment of stability in macroeconomic fundamentals.

3.1.3 *Monetary financing as another "unconventional" monetary policy*

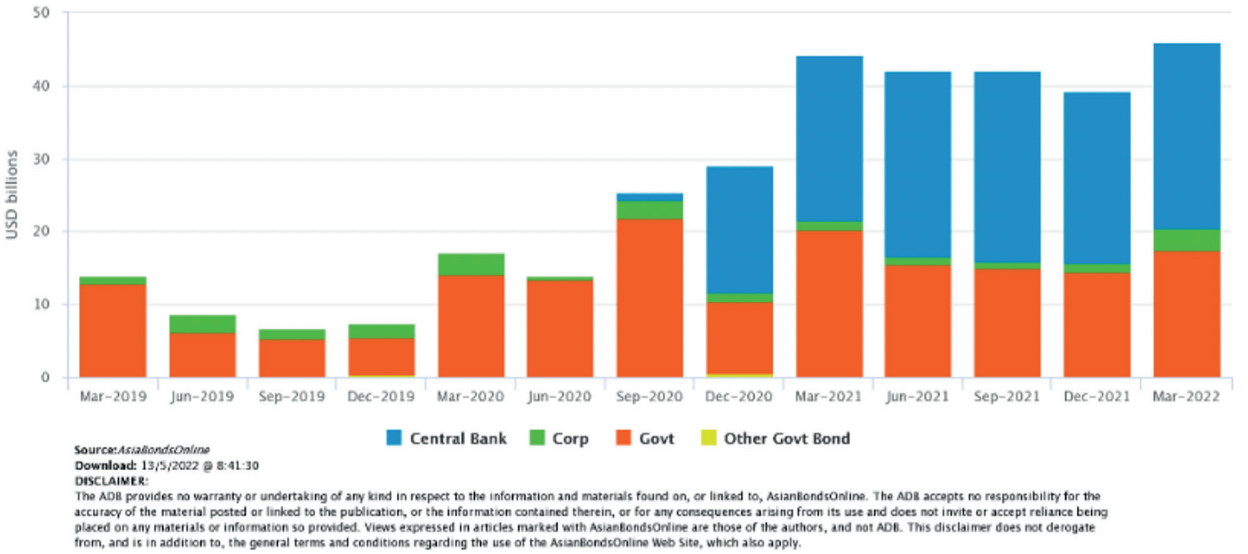
Agur et al. (2022) discusses monetary financing as a separate form of

unconventional monetary policy altogether, distinct from APPs or the QEs implemented in advanced countries. Their seminal paper comprehensively looks into monetary financing (MF) in a novel way, such that it is given its due emphasis in discussing about the implications of the financing of government spending through a permanent increase in the monetary base, in relation to the specter of fiscal dominance. Agur et al. (2022) reviews the theoretical pros and cons of monetary financing and presents an empirical assessment of its impact on inflation. The paper noted how the unprecedented effects and distinct nature of the pandemic invited support for fiscal stimulus, and this proved useful in reinforcing weak economies and averted any social or political turmoil. As a direct result, however, national government debt has now become exceptionally high in many countries. It is only the prevailing expectation of continued low interest rates at that time which are maintaining the confidence of investors and authorities regarding the sustainability of debt. Nonetheless, the abnormally high levels of public debt limits additional fiscal spending such that any emerging risks to investor sentiment on debt sustainability could derail this level of investor confidence.

According to Agur et al. (2022), MF pertains to monetary policy that permanently increases base money even beyond levels which are consistent with the inflation target. By contrast, those not in favor of MF argue that it is just like exchanging government domestic debt with central bank liabilities. Hence, MF does not carry palpable benefits in terms of stimulating macroeconomic performance and the sustainability of public debt in the case where the central bank remunerates its reserves. In addition, the view is that MF induces fear of fiscal dominance and volatile inflation and threatens central bank credibility. Under this scenario, the NG may pressure the central bank to provide additional MF or further compress sovereign yields. Moreover, if the implementation of MF undermines central bank independence, negative sentiment could result in higher inflationary expectations and, subsequently, result in runaway inflation.

The novel contributions of this study include a clear tabulation on how MF differs from other APPs or QE programs of central banks (see Table

Figure 9. Breakdown of local currency bond market issuance (PH)



Source: AsianBondsOnline (ASEAN+3 and ADB)

4). This helps guide our analysis within the context of pandemic-related responses from both the fiscal and monetary authorities in the Philippines, which was discussed in the previous section. Looking at this definition in Table 4 as our guide, the bond purchases and lending to the NG from the BSP may be viewed as a form of cross between quantitative easing and monetary financing. For one, the BSP explicitly supported macroeconomic stimulus from the fiscal side via the purchase of local currency-denominated government securities (see Fig. 9), but this support represented a modest but semi-permanent expansion in the central bank balance sheet. Semi-permanent because the BSP's current policy toolkit would still be able to absorb this added liquidity in the future, and the loans to the NG are not open-ended.[15] In addition, it is not yet a departure from inflation targeting, as the inflation outlook remained low at the time of the pandemic.[16] The BSP's liquidity support was timely and just enough to calm domestic financial markets. Nonetheless, significantly higher debt-to-GDP ratios does bring up the question of fiscal dominance.

3.2 *Theoretical framework*

We borrow from the framework presented in BIS (2012) that expresses the fundamental link between public debt management (PDM), monetary policy, and fiscal policy. It is therefore instructive to use the consolidated government budget constraint. The terms are defined as follows: t = time, Dt = budget deficit, Bt = stock of government bonds (i.e., paper with a maturity greater than one year), TBt = stock of Treasury Bills (with a maturity of less than one year), Mt = Base money. We therefore make use of Table 5 as a very simple representation of the financing of the government.

This basic representation of government financing means that ***government deficit = change in monetary base + change in government bonds and change in T-bills = government spending – taxes.*** While monetary policy is separated from PDM and fiscal policy, the monetary transmission mechanism may be affected through the impact of the structure of debt on market expectations. Circumstances that involve a risk of fiscal dominance (i.e., high public debt ratios and heightened sovereign risk that weaken the local banking system) also increase uncertainty about future interest rates. According to Sargent and Wallace (1981) and Sargent (1993), this may result in expectations of time-inconsistent monetary policies. Additionally, BIS (2012) notes that as asset sustainability across the maturity spectrum declines, conventional central bank policy tools, such as the main overnight policy rate, become less effective and direct CB transactions in bond markets become more effective.

Monetary policy in this representation pertains to demand for domestic debt. Meanwhile, sovereign debt managers around the world are facing substantial challenges in managing the massive increase in the global stock of government debt. There has been an increase in the level of sovereign risk, and there is significant uncertainty about the size of future budget deficits and the financing of such deficits. There is an ongoing debate on the short-term versus long-term impact of fiscal reform measures after the pandemic and there is a plethora of diverging views on how quickly deficits and sovereign debt should be and would be reduced to achieve fiscal sustainability. If government debt-to-GDP ratios continue to rise in major

[15] Please refer to BSP monetary policy press releases 10 April 2020 and onwards at https://www.bsp.gov.ph/SitePages/MediaAndResearch/MediaDisp.aspx?ItemId=5242

[16] Please see the BSP Inflation Report Q2 2020 at https://www.bsp.gov.ph/SitePages/MediaAndResearch/Inflation%20Report.aspx

Table 4. Conceptual difference between quantitative easing and monetary financing

	Goals	Effects of central bank balance sheets	Departure from inflation targeting?	Main risks
Quantitative easing	Macroeconomic stimulus	Large temporary expansion	No	Central bank losses
	Macroeconomic stimulus	Modest permanent expansion	Yes	Fiscal dominance
Monetary financing	Prevent self-fulfilling crises	Potentially large expansion off-equilibrium	Only off-equilibrium	Central bank losses, fiscal dominance

Source: As cited in Agur, et al (2022)

economies around the world, the questions that emerge are: what choices could and should governments make and how will these affect inflation down the road? How have decisions on the management and financing of debt been related to macroeconomic policies?

3.3 *Empirical approach*

In order to answer the questions above, we conduct a simple regression to see how the quarterly average maturity of outstanding government bonds is related to two simple policy variables: the main reverse repurchase (RRP) rate and the deficit-to-GDP ratio (lagged 1 period). We run ordinary least squares (OLS) regression using quarterly data from 2004 to 2021, corrected for first-order serial correlation. In a second specification, we replace the RRP rate with the differential between the 10-year rate and the RRP rate, as well as the 10-year rate and the 5-year rate, to see if average maturity is sensitive to a measure of spread. We use the following specification:

$$y_t = f(x_{1t}, x_{2t-1},) \qquad (2)$$

where y_t is the average maturity of outstanding domestic debt and the x_t's are the RRP overnight (O/N) rate, deficit to GDP in percent, debt to GDP in percent, and interest rate differentials. This simple OLS regression will answer whether or not there have been in the past a strong empirical link between actual debt management choices and two simple measures of both fiscal policy and monetary policy in the case of the Philippines.

Following Mishkin (2000), a second approach we wish to implement is adopting a vector error correction (VECM) estimation method to examine the possible presence of fiscal dominance in the conduct of monetary policy by investigating the responses of inflation to shocks in money supply, budget deficit, and domestic debt. This empirical exercise is a second approach to establish whether or not there is fiscal dominance versus monetary dominance in affecting the inflation rate, which is the main target variable of the BSP and given that price stability is its primary monetary policy objective. Based on our framework in Table 5, the idea is that, if the deficit is

Table 5. Links between public debt management, fiscal policy, and monetary policy

Fiscal policy	Debt management	Debt management or monetary policy?	Monetary policy
D_t	$= [B_t - B_{t-1}]$	$+ [TB_t - TB_{t-1}]$	$+ [M_t - M_{t-1}]$

Source: "Threat of fiscal dominance? BIS/OECD workshop on policy interactions between fiscal policy, monetary policy and government debt management after the financial crisis." Basel. BIS Papers No 65. 2 (December 2011)

financed by an increase in bond holdings by the public, there is no effect on monetary base and hence, on money supply. But, if the deficit is not financed by increased public bond holdings, the monetary base and the money supply will increase. In summary, a deficit can be the source of sustained inflation only if it is persistent rather than temporary and if the government finances it by creating money rather than by issuing bonds to the public.

VECM is considered the best empirical methodology to capture the linear interdependencies among multiple time series.[17] We will use M3 growth, domestic debt, and deficit as percent of GDP as x_t's, and the inflation rate as y_t in the specification below:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i}\, \Delta y_{t-i} + \sum_{i=1}^{k} \alpha_{2i}\, \Delta x_{t-i} + \gamma_1\, ECM_{t-1} + \varepsilon_{1t} \quad (3)$$

$$\Delta x_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i}\, \Delta y_{t-i} + \sum_{i=1}^{k} \beta_{2i}\, \Delta x_{t-i} + \gamma_2\, ECM_{t-i} + \varepsilon_{2t} \quad (4)$$

3.3.1 *Data and estimation*

For the empirical exercise in this study, we are covering quarterly data from 2004 to 2021. The data we are using include the average maturity of Philippine domestic debt, which were calculated based on basic data from ADB's Asian Bonds Online, deficit-to-GDP and domestic debt-to-GDP data, which were taken from the Bureau of the Treasury PH's basic data on quarterly deficits and domestic debt as well as the national income accounts data from the Philippine Statistics Authority (PSA) for quarterly GDP levels. The BSP's RRP overnight rate from 2004 to 2021 as the main policy rate was used. As a robustness check, the weighted monetary operations rate (WMOR) beginning in June 2016 was also used to replace the overnight rate beginning that period to denote the BSP's shift to an interest rate corridor (IRC) system. The WMOR is the average of the yield rates on the BSP's different Term Deposit Facilities and the BSP bills, weighted by the volume issuance. The inflation rate (2018=100) was also taken from the PSA. Quarterly year-on-year growth rate in domestic liquidity, or M3, was sourced from the BSP's Depository Corporations Survey based on the Standardized Report Forms (SRF), a unified framework for reporting monetary and financial statistics to the IMF.

3.3.2 *Results from the regression estimation*

The results from OLS regression of year-to-year change in the average maturity of bonds outstanding per quarter, the main RRP rate, and the deficit-to-GDP ratio (lagged 1 period) are shown in Table 6. In a second specification, we replaced the RRP rate with the differential between the 10-year rate and the RRP rate, as well as the differential between the 10-year rate and the 5-year rate, to see if average maturity is sensitive to a measure of spread. We then replace the RRP overnight rate with the WMOR in an alternative specification. In a final estimation, we replaced the deficit-to-GDP with debt-to-GDP. We also

[17] Vector autoregressive (VAR) integrated model comprises multiple time series and is quite a useful tool for forecasting. Time series models for VAR are usually based on applying VAR to stationary series, with first differences to original series and, because of that, there is always a possibility of loss of information about the relationship among integrated series. Differencing the series to make them stationary is one solution, but at the cost of ignoring possibly important ("long run") relationships between the levels. A better solution therefore is to use VECM to test whether the level regressions are trustworthy ("cointegration"). The usual approach is to use Johansen's method for testing whether or not cointegration exists. If the answer is "yes," then VECM, which combines levels and differences, is the better approach.

divided the full period between the period before the IRC (i.e., Q1 2000 to Q1 2012) and the period when the IRC was implemented (i.e., Q2 2016 to Q4 2021). This is to verify whether or not there is any significant change in either of the intercept or the coefficients over the two subperiods.

All variables in the preferred equation (2) are statistically significant (see Table 6). The simplicity of the regression for equation (2) allowed us to investigate, even using a naïve representation, the degree to which decisions on the average maturity of outstanding domestic debt respond to both monetary and fiscal policies. The results indicate that the average maturity of outstanding debt is longer when the RRP rate is falling. Another way to put it is that the average maturity of debt shortens during monetary policy tightening, whereas average maturity of outstanding debt lengthens during monetary policy accommodation. What this means is that debt managers seem to respond to reduced BSP policy rates by investing in longer-dated yields in the domestic asset market. This is contrary to the results in U.S. literature, in which the maturity of outstanding debt usually shortens when the Federal Funds Rate is lower. In the Philippines, debt managers interpret reduced policy rates to mean that the BSP is confident that inflation outturns will remain benign and stay within target over the policy horizon, despite an accommodative stance, improving the sentiment of investors in the long run.

Running equation (2) in the two subperiods did not change the signs of the coefficients. However, in the earlier subperiod, the coefficient on the RRP rate was significantly larger (–1.056) than in the latter subperiod when the IRC was already in place (–0.11). In addition, in the latter subperiod, this variable became insignificant in affecting the average maturity of bonds. Meanwhile, the impact of the ratio of deficit-to-GDP to the average maturity of domestic debt remains the same for the two sample periods. Results indicate that deficit-to-GDP as a determinant of the average maturity of outstanding domestic debt is positive, significant and with a coefficient of between 0.32 to 0.47 during the full period as well as for the two subperiods. This means that a larger fiscal deficit is associated with lengthening in maturities of domestic debt. In lieu of a cost-risk strategy, this result indicates that longer maturities are needed to spread out the cost of the fiscal deficit over longer time periods.

Subsequently, we then change *a* by replacing the RRP O/N rate with the WMOR—a weighted average of the returns on the RRPs, the Term Deposit Facilities of the BSP, as well as the BSP's own CB bills by their respective volumes beginning June 2016 when the IRC was implemented—and run this equation, *a1*, for the full sample period and for the two subperiods. Results indicated that the direction of the relationship remains the same, as the coefficients for the WMOR remained negative (see Table 6). Similar to *a*, running regression *a1* indicated that the relationship between the alternative monetary policy rate indicator WMOR and the average maturity of domestic debt is negative and significant for the full period as well as for the earlier subperiod of Q1 2004 to Q1 2016, but is insignificant for the latter subperiod although with the same direction or sign. The coefficient for deficit-to-GDP in this specification remains significant and positive.

The robustness of these results is confirmed by the results of two other regressions. In another specification (*a2* and *a3*), we replace the monetary policy indicator by the differential between the 10-year rate and the RRP O/N rate, and that between the 10-year rate and the 5-year rate. We obtain similar findings of negative but significant signs in the coefficient. Using the yield spread instead of a monetary policy rate did not change

Table 6. Regression results: response of average maturity of government debt issuance to macroeconomic variables

	Sample/ Variables	Constant	RRP O/N RATE	WMOR	Deficit/ GDP (-1)	10-Year - RRP Rate	10-Year - 5 Year Rate	Debt/GDP	Adjusted R-squared	F Stat	DW
a	Q1 2004 to Q4 2021	13.79 [32.38]***	-0.944 [-12.74]***		0.471 [7.76]***				70.9	87.7	0.213
a	Q1 2004 to Q1 2016	14.06 [25.65]***	-1.056 [-10.43]***		0.322 [2.71]***				72.6	67.8	0.154
a	Q2 2016 to Q4 2021	10.64 [22.11]***	-0.11 [-0.98]		0.34 [8.51]***				83.3	56.0	1.000
a1	Q1 2004 to Q4 2021	13.71 [31.76]***		-0.919 [-12.366]***	0.499 [7.506]***				70.0	83.0	0.232
a1	Q1 2004 to Q1 2016	14.09 [26.48]***		-1.062 [10.68]***	0.323 [2.75]***				73.2	68.0	0.156
a1	Q2 2016 to Q4 2021	10.638 [23.047]***		-0.099 [-0.942]	0.355 [7.99]***				83.5	54.0	1.098
a2	Q1 2004 to Q4 2021	9.97 [32.24]***			0.048 [0.53]	-0.768 [-6.73]***			41.7	26.0	0.208
a3	Q1 2004 to Q4 2021	8.97 [27.32]***			0.167 [1.61]*		-0.436 [-1.88]*		72.0	3.8	0.066
a4	Q1 2004 to Q4 2021	61.62 [19.71]***	-0.606 [-7.95]***					-17.91 [-6.64]***	65.1	68.1	0.171

*Note: Values shown for each period and variable are the coefficients; Numbers in brackets are the t-statistics; *** = significant at 1% CI; ** = significant at 5% CI; * = significant at 10% CI.*
Source: Authors' estimates

the message. In addition, the differential between the 10-year rate and the RRP rate appears to have a relatively larger and more significant influence on the average maturity of debt in terms of magnitude when compared to the effect of the differential between the 10-year rate and the 5-year rate. Adding a first-order autoregressive term raises the R-squared to about 97 percent and corrects the DW statistic close to 2.0 in many of the regression runs. This reveals the sticky nature of the average maturity portfolio of debt managers at any given period.

Meanwhile, using domestic debt-to-GDP in place of deficit-to-GDP as the indicator for fiscal policy as another alternative specification (*a4*) yielded very interesting results. The sign of the coefficients has turned negative, the magnitude of the coefficients is much larger than in the case of the fiscal deficit-to-GDP, and it remains highly significant. This implies that, at higher overall domestic debt, the average maturity of bond holdings declines. This may be a sign that investors are less likely to put money into longer-dated yields with a view that as the Philippine government becomes more indebted, there may be issues on fiscal sustainability. This is an important finding, given that debt levels have increased significantly in response to the COVID-19 pandemic. This may push debt managers to invest less in longer securities and more in shorter-dated ones because of a more cautious longer-term view, thus lowering average maturity.

It is interesting to highlight that, if we go by the magnitude of response of the decisions on debt management as represented by the average maturity of debt, monetary policy—whether represented as the RRP rate, the WMOR or the differentials—appear to have a bigger influence than fiscal policy as represented by the deficit-to-GDP variable. Nevertheless, when we replace the fiscal deficit with debt-to-GDP as the fiscal policy

variable, the results paint a different picture. The response coefficient of the average maturity of debt to total debt as a share to GDP almost increases close to 20-fold in terms of magnitude and changes in sign. Debt managers are more sensitive to debt levels in ratio to GDP than they are to deficit-to-GDP. Moreover, they tend to shorten the maturity of outstanding debt when debt levels in ratio to GDP is rising.

More importantly, though, the empirical link between the evolution of the average maturity of domestic debt and measures of macroeconomic policies borne out of our empirical exercise suggests that decisions on debt management have been influenced or affected by both fiscal and monetary policies. Our empirical results provide evidence of the endogeneity of debt management choices in the Philippines with respect to both monetary policy and fiscal policy. There appears to be no consistent dominance in fiscal versus monetary policy or vice versa--they both influence debt management decisions. The relative magnitude of each coefficient would differ depending on the period investigated and depending on which fiscal variable or monetary policy variable is used. This is true for the full period and, particularly, prior to the IRC system in the case of monetary policy. This is despite some debt managers implying that their decisions are independent of macroeconomic policy in practice.

3.3.3 *Results from the vector error correction model estimation*

We then adopt a VECM to investigate the responses of inflation to shocks in money supply, budget deficit, and domestic debt. The variables used in our empirical exercise include growth in domestic liquidity or M3, which measures the total volume of money in circulation; demand deposits; savings deposits; and time deposits (or M2). In addition to these are deposit substitutes (securities other than shares included in broad money); domestic debt as a percent of GDP, where domestic debt is the total borrowings of the government from within the national boundary; budget deficit as a percent of GDP, where budget deficit is total government revenues minus total government expenditures; and the inflation rate, which is the average quarterly year-on-year change in the Consumer Price Index (CPI), with base 2018=100 coming from the PSA. All variables have been tested for unit root and all have been confirmed to be integrated of order I(1), and appropriate lags for the variables identified via Augmented Dickey Fuller tests.

Results from the VECM and the Johansen Cointegration Test confirmed that there is at least one cointegrating equation and, in terms of the long-run equation, the three variables are significant determinants of the inflation rate. Both the deficit-to-GDP ratio and the domestic debt-to-GDP ratio positively affect the inflation rate in the long run. In addition, looking at the coefficients that we obtained, the inflation rate has the largest degree of response from changes in domestic debt as a percent of GDP compared to deficit-to-GDP as well as M3 growth, our monetary policy indicator. The long-run cointegrating equation is thus:

Table 7. Results of the vector error correction model estimation**

Long Run (LR) Equation: Inflrate =	**-5.78**	**+**	**-0.675*m3growthave**	**+**	**2.984* deficittoGDP**	**+**	**45.1 * debttoGDP**
			[4.64]		**[-4.00]**		**[-2.59]**
While the ECM D (Inflrate) = 0.601*D(Inflrate(-1)) + 0.096*D(M3Growthave) - 0.29*D(deficittoGDP) - 13.657*D(debttoGDP) equation:							
	[5.47]		**[2.92]**		**[1.33]**		**[1.49]**

*** For brevity, we have included here only the lagged variables with the highest significance. Values in [ ] refer to t-statistics.*

Looking at the long-run response of inflation rate to average M3 growth, the result is interesting on so many accounts. For one, the relationship we obtained in this exercise is significant and negative, contrary to theory, which says that increases in M3 growth is expected to result in higher inflation. This is prima facie evidence of how the supposedly direct relationship between inflation rate and domestic liquidity growth has been negated in the long run, in the case of the Philippines. Stylized facts have indeed shown time and again that there were several periods where a continued rise in domestic liquidity growth did not result in higher inflation and, in contrast, were associated with periods of benign inflation.

In the past, Friedman's famous statement, "Inflation is always and everywhere a monetary phenomenon..."[18] had been backed by empirical evidence, also showing a positive relationship between inflation and growth in excess money supply for many countries. Both theory and empirical literature suggest that, if growth in the money supply is greater than the actual growth in GDP, this should push up inflation in the medium term. However, since the start of 2007, the relationship between both variables in the Philippines seems to have weakened to the point of having an opposite relationship, except perhaps for some periods, such as in 2013–14 during the Taper Tantrum event (see Fig. 10a). Available literature provides us several conjectures on the main factors that lie behind this decoupling between monetary aggregates and prices in the last few years.

As discussed in the earlier sections, the ECB and other advanced central banks such as the Federal Reserve, the Bank of Japan, and the Bank of England have begun raising their balance sheets by buying up assets under their QE programs in the periods after the GFC. However, inflation has continued to fall steadily since then, even before the pandemic in 2020, and had begun to anchor inflation expectations for the medium- and long-term on economies at the other end of the range, that is, inflation outturns and forecasts were lower than the central bank target. In 2020, as the COVID-19 situation turned into a global pandemic, policymakers around the world—both from advanced and emerging market economies alike—swiftly implemented a broad range of fiscal and monetary measures, which involved extraordinary liquidity support and both conditional and unconditional cash transfers. However, inflation remained subdued.

Under this paradigmatic scenario, it is important to understand how monetary policy affects monetary aggregates. In general, when a central bank provides additional liquidity to the financial system, either by offering long-term credit, purchasing bank assets, or directly purchasing Treasury Bills from the NG, the monetary base increases. Traditionally, banks would use the liquidity provided by central banks to increase the supply of credit. Movements in money supply would therefore be in line with the growth in base money, ultimately leading to higher consumption and investment and thereby raising inflation.

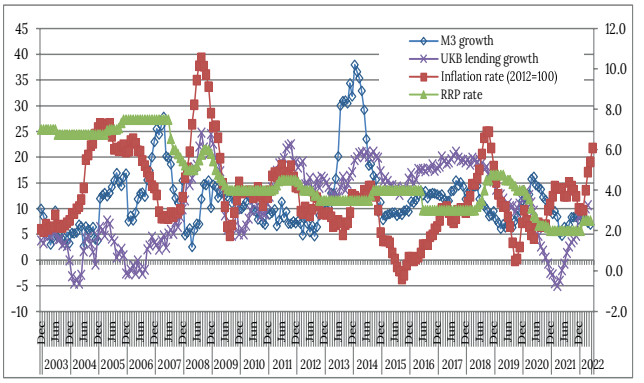
[18] According to Friedman (1970,), this relationship is based on a mathematical identity, M x V = P x Y or dM + dV = dP + dY. where M is money supply (dM are the variations in this variable), V is the velocity of money circulation, P are prices, and Y is GDP in real terms, according to which the value of transactions carried out in an economy (understood as nominal GDP) is equivalent to the amount of money circulating in that economy (understood as the amount of money in an economy multiplied by the number of times this changes hands, i.e., the velocity of money). If we assume that the velocity of money is constant, in an economy without economic growth, the inflation rate equals the rate of growth in money. Therefore, if money supply increases, there will be more money chasing the same goods, so prices will go up. Similarly, if the rate of growth for economic activity and the quantity of money is the same, prices should remain constant.

The significant rise in the reserve or base money occurring over the last few years, however, did not necessarily lead to a similar increase in M3 in the Philippines (see Fig. 10b). The factors limiting the growth path for credit can be traced from its demand and supply. Specifically, a significant part of demand underwent a wide-ranging deleveraging process after the GFC (Martinez, 2016). In 2020, this is even more pronounced, as the healthier part of the private sector did not demand credit either (see Fig. 10a), given the uncertain environment that encouraged them to save and postpone decisions to consume and invest. On the supply side, the heightened level of uncertainty has encouraged banks to be very cautious when granting loans and to hold onto their funds as a considerable buffer. Thus, the money multiplier plummeted (see Fig. 11), due as well to the impact of heightened uncertainty and economic shutdowns to consumer demand.

Another factor to consider is the increasing role of alternative sources of financing to deposits even in the pre-crisis period. Traditionally, the Philippine economy is bank-centric, and so, financial transactions are mainly through banks. This means that their liabilities—the traditional monetary aggregates—were a good indicator of the quantity of money in the economy. However, this relationship has changed with the expansion of other forms of financing, which may not be captured in the traditional measure of M3. For example, interbank loans are used by banks to lend funds to each other, using a security as a guarantee. This practice became an important source of liquidity that also helped to increase the supply of credit that is not reflected in M3.

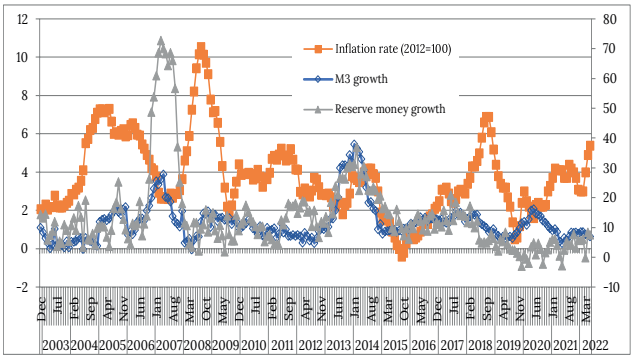
Deposits with the central bank, specifically the Special Deposit Account facility of the BSP now termed as the Overnight Deposit Facility (ODF), are also not captured in the measure of traditional monetary aggregates, and so, this is a form of liquid asset held by banks not being counted as domestic liquidity. Being an overnight facility with a return equal to the ODF rate, it may be considered a liquid asset because banks can easily move these funds around and has almost zero risk. When banks are faced with excess funds but are in an uncertain environment, they tend to prefer placing their funds with the BSP via the ODF. In this case, the overall *effective* liquidity in the economy is underestimated. For banks, deposits with the central bank act as close substitutes for Treasury Bills in terms of return and safety.[19]

Figure 10a. M3 and UKB lending (LHS) and the RRP rate and inflation rate (RHS), year-on-year growth in percent



Source: BSP

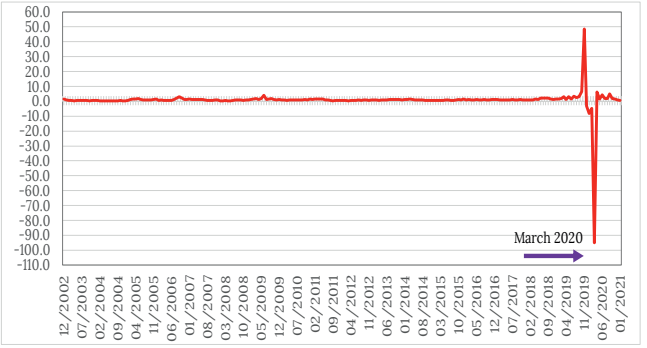
Figure 10b. M3 and reserve money growth (RHS) and inflation rate (LHS), year-on-year growth in percent.



Source: BSP

[19] Williams, J. (2012)

Figure 11. Money multiplier (December 2002 to January 2021)



Source: Authors' estimates

This is why the past relationship among reserve or base money, the money supply, and the inflation rate, based on theory and earlier empirical work, have broken down and are unlikely to persist in the future. Instead, what matters now for the economy is that monetary policy affects the path of market interest rates. If banks are happy to hold reserves or deposit funds with the BSP, then the marginal money multiplier on those funds could be close to zero. A natural question according to Williams (2012) is, if reserve money is not affecting the money supply, then why did central banks raise them during the pandemic? The most important reason is that it was a pervasive policy move by almost all central banks to support financial market stability and stimulate their respective economies. In particular, the additional stimulus to the economy from BSP's extraordinary measures is primarily a result of lower interest rates, rather than coming from reserve creation, leading to the growth in domestic liquidity as would have been expected from theory. Therefore, a marked economic recovery in the future could build inflationary pressures later on. But what is critical to understand is that it is through its effects on interest rates and other financial conditions that monetary policy affects the real economy.[20]

It is even more meaningful when we look at the impulse response functions and variance decomposition resulting from our VECM exercise. Looking at Fig. 12, the response of inflation to innovations in money supply is a continuous decline to the 12th quarter , which fluctuates back to equilibrium at the 16th period, then resumes its decline until the 24th quarter. This indicates a protracted decline. In contrast, shocks to both deficit-to-GDP and debt-to-GDP result in higher inflation from the 1st period and peaks at about the 5th period. However, the impact of innovations in debt-to-GDP to the inflation rate is steeper at its peak during the 5th quarter. This subsequently declines and eventually fades back asymptotically close to zero by the 16th period. Meanwhile, shocks to the fiscal deficit have a lower peak than debt-to-GDP during the 5th period, but begins to increase further and indicates a higher trajectory than the debt variable by the 12th quarter.

When we now look at the evolution in M3 growth given shocks to inflation, it indicates a decline, which remained below zero over 24 months. On the one hand, the impact of debt-to-GDP is slightly negative at the onset, then makes a sharp increase thereafter, waxing and waning over the course of our review period of 24 months. The impact of deficit-to-GDP, on the other hand, depicts the same peak and trough pattern, but begins straightaway from positive territory, peaking at about 5 months, and shows a somewhat rough opposite or mirror-image impact when compared with the effect of innovations in debt-to-GDP. To a certain extent, the impulse response in Fig. 12 also shows some degree of countercyclicality between the impact on M3 growth of innovations to the inflation rate and impact on M3 growth of innovations to the fiscal deficit. Shocks to the inflation rate make M3 growth fall, whereas shocks to the fiscal deficit prompts a rise in M3 growth from the 1st to the 4th quarter, and then the opposite is true, moving from the 8th the 16th period, and the reverse again up to the 24th period.

[20] Williams, J. (2012)

Based on the variance decomposition of our VECM estimation, 15.4 percent of the variances in the inflation rate are accounted for by debt-to-GDP, 14.0 percent by deficit-to-GDP, and about 5.0 percent by innovations in M3 growth. Meanwhile, 15.6 percent of the variances in M3 growth are accounted for by the inflation rate, whereas the debt-to-GDP and deficit-to-GDP indicators account for 11.0 percent of the variations in M3 growth. Notably, 41.0 percent of the variances in debt-to-GDP in the Philippines are accounted for by the deficit-to-GDP variable, whereas the inflation rate and M3 growth account for only about 1.5 percent and 0.6 percent of its variations, respectively. Lastly, deficit-to-GDP largely accounts for its own variances in our chosen VECM equation by about 90 percent, the rest of its variances are shared by the other three indicators in this manner: 4.5 percent M3 growth, 2.5 percent inflation rate, and 3.0 percent debt-to-GDP.

Given these results, what appears as the compromise solution for potential concerns about central bank participation in domestic bond issuances and any form of monetary financing in extraordinary times and their impact on local financial markets, and to minimize the specter of fiscal dominance, is for fiscal and monetary authorities to coordinate more closely. This may be achieved, for example, in a simple form of coordination such as sharing the tenor offers, the timing of issuances, and the exchange of information on new issuances. This is similar to what is being practiced by the Bank of Thailand and their Ministry of Finance (Medalla & Fermo, 2020, forthcoming), whereby the Bank of Thailand and the Thai Ministry of Finance agree on the maturity of assets being offered by both institutions in the primary market to ensure that all tenors are priced in and that the yield curve is complete. The pandemic responses of both fiscal and monetary authorities beginning in 2020 make the dynamics between fiscal policy and monetary policy even more complex, thus giving additional impetus for the BSP and the Department of Finance to coordinate. As the frontier between debt management and monetary policy becomes even narrower, this creates a need for greater policy coordination and may, in fact, entail a broader interpretation of existing monetary policy or PDM mandates.

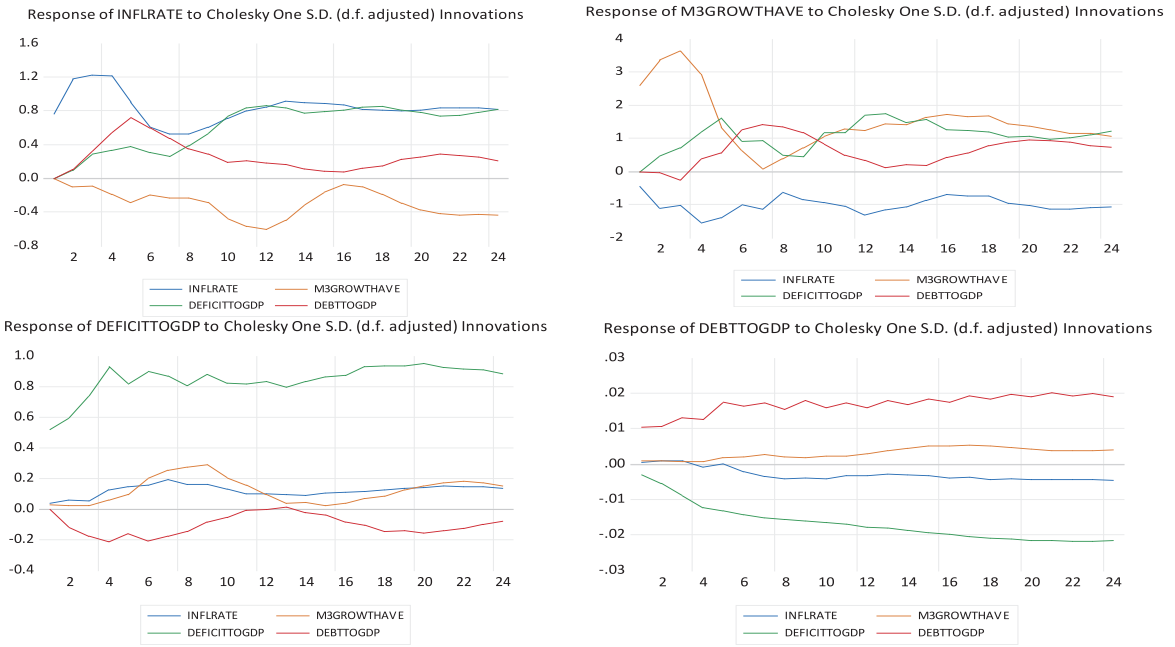
4. Monetary and fiscal policy coordination: The way forward

An observation during the 2009 GFC is that the extended fiscal stimulus paled in comparison to the massive monetary support that central banks provided to economies. Advanced economies, like the U.S. and European Union, grappled with concerns about the ballooning size of government debt and potential market reaction to it. Fiscal rules in some of these economies also limited the extent of their fiscal response. These considerations urged the provision of fiscal stimulus. Meanwhile, as the central banks reached the zero lower bound interest rate, they turned toward the use of unconventional monetary policies, like quantitative easing.[21] These are intended to sustain the proper functioning of financial markets and intermediation and to provide further monetary policy accommodation at the zero lower bound (IMF, 2013). The substantial role that central banks played during the GFC earned them the reference as the "only game in town" (El-Erian, 2016).

Compared to its response during the GFC, fiscal policy reacted more strongly to the COVID-19 pandemic. The fiscal policy

[21] Quantitative easing is a monetary policy that central banks adopt to stimulate the economy when standard monetary policy becomes ineffective (i.e., when short-term interest rates are near the zero lower bound). It entails the purchase of specified amounts of financial assets (commonly of longer-term maturities) from commercial banks and private institutions, which raise their prices, lower long-term yields, and increase the money supply in the economy. Japan was the first country to have used quantitative easing in the early 2000s to fight deflationary pressures in its economy.

Figure 12. Impulse response functions



Source: Authors' calculations

response to that crisis is estimated to be more than double the amount provided during the GFC (European Commission, 2021). The IMF (2022) estimates that global fiscal policy responses to the COVID-19 pandemic over the past two years (i.e., 2020-2021) totaled USD 10.8 trillion, equivalent to around 10.2 percent of global 2020 GDP.[22]

The BIS (2020) notes that the fiscal and monetary policies have effectively responded to the COVID-19 pandemic. Leveraging on their comparative advantage, the two instruments closely moved together to tide over economies. Together, monetary and fiscal measures averted a much deeper economic contraction and created potential pathways to recovery.

However, while countries are still dealing with COVID-19 surges, global and domestic economies are facing significant risks and daunting challenges that threaten prospects for recovery. An immediate concern is high inflation. According to the BIS (2022), nearly 75 percent of economies around the world are currently experiencing inflation above 5 percent. Several factors have been cited as stoking the rise in prices. The pent-up spending of households combined with a considerable policy stimulus resulted in an unexpectedly strong aggregate demand. However, the rebound in aggregate demand was met by supply problems. Bottlenecks in global value chains have constrained production around the world. The Russian-Ukranian war that started in early 2022 further put pressure on the price of commodities, particularly oil and food.

To arrest the upward spiral of prices and deter potential second-round effects, central banks have started to normalize policy rates. The pace of increase in policy rates varied across countries, reflecting country-specific conditions (BIS, 2022). Since December 2021, the Bank of

[22] *Fiscal Monitor Strengthening the Credibility of Public Finances*, October 2021. Estimates as of 27 September 2021.

England has raised its key interest rate from 0.1 percent to 1.25 percent as it tries to counter soaring energy and fuel prices. The Federal Reserve also delivered its most aggressive rate hike since 1994 in June 2022, when it increased the target range for the federal funds rate by 75 basis points. This brought the Federal fund target range between 1.50 percent and 1.75 percent. The policy move came as the U.S. economy grappled with high inflation rates not seen in over four decades. The BSP has similarly raised its key policy rate by a combined 50 basis points to 2.5 percent to counteract higher-than-target inflation rate.

The apparent shift of the global economy from a low to high inflation regime has a bearing on the calibration of monetary and fiscal policy in the near- to long-term. Higher interest rates increase the size of fiscal debt and, thus, the required adjustment for fiscal consolidation. Moreover, as the sharp increase in prices raise the cost of living, fiscal policy may be called on to provide additional subsidies and transfers. This could further expand government debt.

At the start of the COVID-19 crisis, monetary and fiscal authorities had ample policy spaces. However, as monetary and fiscal policy responded to the sizeable threats of the pandemic, the policy spaces considerably narrowed (Borio, 2021). Over the medium-term, monetary and fiscal authorities have to start rebuilding these policy spaces. In doing so, monetary and fiscal policy actions may run counter to each other. Thus, there is a need for coordination between these two instruments.

In the case of the Philippines, authorities are cognizant of the emerging risks and their implications for fiscal and monetary policy. On the fiscal side, the latest Fiscal Risk Statement (2021) projects the Philippine budget deficit to more than double as revenue collection declines and government speeds up spending on pandemic response measures. This is seen as being short-term as the NG responds to the challenges brought about by the COVID-19 pandemic and as it facilitates economic recovery. Over the medium-term, the NG will resume fiscal consolidation with the deficit and debt levels being brought down (DBCC, 2021).

On the monetary side, the BSP is careful in its formulation and implementation of exit strategies. The timing for the winding down of its pandemic response measures will be based on a thorough assessment of domestic and external developments, inflation outlook, growth prospects, and the stability of the financial system (Dakila, 2021). To ascertain a smooth exit process, the BSP coordinates with fiscal authorities to minimize policy inconsistencies.

The successful reduction of the debt-to-GDP ratio of economies entails running fiscal primary surpluses and a favorable differential between interest rate and economic growth. Thus, it is important that monetary and fiscal policies work toward raising long-term growth. This will improve the differential between interest rate and economic growth and allow fiscal consolidation to occur at higher real interest rates (Borio, 2021). Moreover, the GFC showed that monetary policy interventions provide valuable support to economies during times of crisis. However, these must be complemented by fiscal and structural reforms to enhance their effectiveness in helping economies get back on track (Lagarde, 2020).

The new consensus on fiscal policy underscores some important points that developed countries and emerging markets can consider as they try to revitalize their economies in the post-COVID-19 period (Blanchard et al., 2021). The new fiscal consensus can be summed up in three propositions. First, macro policy measures are needed to increase aggregate demand to match supply because private sector demand has been persistently weak. Second, given that monetary policy tools have largely been exhausted, fiscal policy has to be the main macro instrument to close the output gap. Third, there is a leeway to use fiscal policy to achieve this objective, because even as government debts are high, they appear to be sustainable. Advanced economies have increasingly subscribed to these propositions. Emerging economies can also take these into account as they adjust in the post-pandemic era.

5. Conclusions

The significant roles that monetary and fiscal policies played during the pandemic renewed discussions on the coordination between these two instruments. When the COVID-19 pandemic unfolded, the Philippines had ample fiscal and monetary spaces that allowed it to undertake the needed policy measures to calm the markets and restore confidence in the financial system amid the public health and economic crisis. The country's robust growth, good fiscal performance, stable financial system, and strong external position gave it enough latitude to deal with the sizeable real shocks of the pandemic.

Fiscal dominance and loss of central bank independence are two particularly important issues that have been raised in the context of the monetary and fiscal policy responses to the COVID-19 crisis. Our empirical results imply that decisions on debt management in the Philippines are influenced by both fiscal and monetary policies. Although there seems to be no indication of any consistent dominance in the conduct of macroeconomic policy in favor of either fiscal policy or monetary policy indicators, decisions on debt maturity as well as the inflation rate are both highly sensitive to the evolution of debt-to-GDP. This has a direct implication on the issue of debt sustainability.

As economies gradually recover from the COVID-19 pandemic, the settings and interaction between monetary and fiscal policies need to be pragmatically considered. The observed shift of the global economy from a low to high inflation regime has an important bearing on the calibration of monetary and fiscal policies in the near- to long-term. Higher interest rates increase the size of the fiscal debt and, thus, the required adjustment for fiscal consolidation. Moreover, as monetary and fiscal policies responded to the sizeable threats of the pandemic, their policy spaces considerably narrowed. Over the medium-term, monetary and fiscal authorities have to start rebuilding these policy spaces. In doing so, monetary and fiscal policy actions may run counter to each other. Thus, there is a need for closer coordination between these two instruments.

The successful reduction of the debt-to-GDP ratio of economies entails running fiscal primary surpluses and a favorable differential between interest rate and economic growth. Hence, it is important that monetary and fiscal policies work toward raising long-term growth. This will improve the differential between interest rate and economic growth and allow fiscal consolidation to occur at higher real-interest rates.

Given the significant changes to the global economy and to domestic markets brought about by the pandemic, the scope and roles of fiscal and monetary policies need to evolve and a closer coordination may be warranted during periods of crisis and recoveries.

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14 | Alternative Data Sources and Labor Market Surveillance

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14 | Alternative Data Sources and Labor Market Surveillance

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1. Introduction

The COVID-19 pandemic has provided further impetus for economic policymakers and researchers to tap alternative data sources and employ new analytical tools. Specifically, there are three important factors that became more prominent during the global health crisis and fueled the increased interest in these non-conventional data sources.

First, the COVID-19 pandemic posed a challenge to traditional data collection, particularly during the period of heightened mobility restrictions. Nationwide surveys, such as the April 2020 Labor Force Survey (LFS) and Q2 2020 Bangko Sentral ng Pilipinas (BSP) Consumer Expectations Survey, were either delayed or canceled.

Second, the unprecedented economic shock from this pandemic undoubtedly necessitated appropriate policy responses that require the availability of timely and granular data for analysis. Policymakers, including central banks, recognize the need for supplementing official statistics, which usually have a long lag prior to release, with higher frequency data in order to obtain near real-time information to support policy formulation.

Third, the COVID-19 pandemic might have the unintended but welcome impact of accelerating the digitalization of transactions due to the required social distancing measures that resulted in higher demand for digital services and, correspondingly, increased digitized data. Many of these data such as search queries, web-based job postings, mobility indicators, and online price data are non-traditional data and fall under the category of alternative data sources.

In the area of labor market surveillance, it is notable that the Philippine Statistics Authority (PSA) decided to shift from quarterly publication of the LFS to monthly publication beginning in February 2021 (PSA, 2021). This shift to more frequent data collection illustrates the relative importance of timely data for effective labor market monitoring and analysis during and after the pandemic. Nonetheless, while there is an increase in the frequency of the release of official labor market statistics in the country, there remains room to explore the use of alternative data, or so-called big data, to supplement labor market surveillance.[4,5] Mezzanzanica and Mercorio (2019) argued that big data analytics for the labor market can be used for predictive analytics as well as for deriving more granular insights in near real-time, such as the identification of skills mismatches.

This chapter examines the usefulness of big data for surveillance of the Philippine labor market. In particular, the key research objective of this chapter is to determine if the addition of Google Trends can help improve the nowcasting performance of a simple time series model of the unemployment rate. Similar to other related studies, this chapter finds that the inclusion of a Google index modestly reduces in-sample and out-of-sample nowcasting errors. The remainder of this chapter is structured as follows: Section 2 provides a review of related

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[4] Please refer to Section 2.2 for a brief discussion of big data.
[5] The monthly LFS results are still published one to two months after the reference period, i.e., the actual data for March 2022 is published in early May 2022.

literature, Section 3 discusses the data and methodology employed to ascertain the usefulness of internet search data for predicting the jobless rate, Section 4 presents the results, Section 5 delves into the limitations of the study, and Section 6 concludes the chapter.

2. Review of related literature

2.1 *Traditional data and the labor market*

Researchers have typically employed official data releases (e.g., gross domestic product [GDP], gross national income [GNI], wages, and population data) to investigate factors that drive the unemployment rate in the Philippines (Brooks, 2002; Cacnio, 2012; Urrutia et al., 2017). Brooks (2002), for example, reported that the Philippine employment growth and unemployment rate strongly correlated with real GDP growth and that the unemployment rate positively correlated with increases in the real minimum wage for 1999-2000. On the other hand, Cacnio (2012) found evidence of the flattening of the inflation-unemployment relation (Phillips curve) in the Philippines between 1989-2001 and 2002-2011 due to: (1) adoption of inflation targeting framework by the BSP, which helped anchor inflation expectations; (2) intense competition due to globalization; and (3) rigidities in the labor market and the country's wage structure. In addition, Urrutia et al. (2017) used GDP, GNI, and population data to formulate a SARIMA $(6,1,5) \times (0,1,1)_4$ model, which was able to forecast the unemployment rate with a 72.0 percent forecast accuracy.[6]

2.2 *Big data and the labor market*

More recent studies on the labor market have attempted to incorporate big data. While used ubiquitously, the term big data has no strict definition, but can be described by its characteristics. Big data is characterized *by high volume, velocity or variety of data that cannot be processed using conventional tools and software and that require specific technology and analytical algorithms for its transformation to value for mission-critical processes.*[7] At the BSP, any dataset with one of the attributes of high volume, velocity, or variety, which requires specific analytical methods or technology for processing, qualifies as big data.[8] In the area of labor market studies, the most frequently used big data indicators are internet searches and data from online job portals.

2.2.1 *Internet search data*

Internet search data refers to data derived from the search queries of individuals who use internet search engines, such as Google, Bing, and Yahoo, to obtain specific information. Aggregated as a whole, internet search data would capture popular or trending topics on the internet. In many of the studies involving internet search data, Google search volume for certain keywords is added as an additional regressor to existing economic models to improve its nowcast and forecast performance. Examples of empirical work in this field include Askitas and Zimmerman (2009), Choi and Varian (2009), D'Amuri and Marcucci (2012), Tuhkuri (2016), and Brake (2017). This methodology of incorporating Google

[6] Seasonal autoregressive integrated moving average (SARIMA) model is an extension of an ARIMA model, which accounts for the seasonality of the data.

[7] This definition of big data is from the BSP Big Data Inventory Report. (Source: BSP Data Governance Manual)

[8] BSP Data Governance Manual version 1.0001, with MES Local Guidelines as of 2 May 2022.

search data into econometric models is coined as Google econometrics by Askitas and Zimmerman (2009).

Google econometrics have been successful in improving forecast accuracy of unemployment models across several countries. Askitas and Zimmermann (2009) first suggested that internet search data can be a potential short-term predictor of economic behavior under complex and changing circumstances. In particular, their results show that search words in German such as those for "unemployment office or agency," "unemployment rate," "personal consultant," and popular job search engines in Germany (e.g., Stepstone, Jobworld, and Jobscout) strongly correlated with the unemployment rate in Germany. D'Amuri and Marcucci (2012) reported that the inclusion of the Google index for the search term "jobs" in autoregressive moving average (ARMA) models for unemployment outperformed the forecasting performance of traditional ARMA models, which use initial claims as a regressor, a widely accepted leading indicator for the monthly U.S. unemployment rate.[9] Brake (2017) found that a Google index-augmented model of unemployment in the Netherlands produced up to 27.8 percent additional accuracy to a one-month-ahead forecast. Likewise, Tuhkuri (2016) found that using a Google search index constructed by aggregating top unemployment-related search queries by volume, such as "unemployment benefits," "unemployment office," and "unemployment claims," among others, can help predict U.S. unemployment rate one month in advance. In addition, Tuhkuri (2016) found that improvements in the forecast performance in augmented seasonal autoregressive (SAR) models are modest and episodic, that is, they are more useful during a recession, when economic indicators are harder to predict.

During the COVID-19 pandemic, Doerr and Gambacorta (2020) constructed a COVID-19 employment exposure (CV19 exposures) index derived from local employment data of the most affected industries in the U.S., particularly mining, oil and gas. The CV19 index measures the regional impact of COVID-19 and identifies regions at risk or likely to suffer a decline in economic activity over the next quarters. Doerr and Gambacorta (2020) used Google searches for "corona" and "unemployment benefits" to cross-check and validate the representativeness of the constructed CVI9 index. Their results show a positive linear relation of Google searches with the CV19 index, such that a 0.1 point increase in the CV19 index is accompanied by a 4.3 percent increase in search volume for "corona" and 6.4 percent increase for "unemployment rate."

2.2.2 *Online job portal data*

It is important to note that the Philippine LFS concepts are stock variables (e.g., employed, unemployed, and labor force size). However, researchers are also interested in flow variables (e.g., number of job vacancies) that can help model and better understand labor market dynamics. As an example, the Eurostat derives flow variables, allowing the generation of transition equations, which help interpret changes in the levels of labor market stock variables.[10] In general, big data can serve as

[9] Initial claim is that which is filed by an unemployed individual after separation from an employer. The data can be accessed via fred.stlouisfed.org/series/ICSA.

[10] For technical discussion on the EU Labor Market Flow, please access the web article via ec.europa.eu/Eurostat/statistics-explained/index.php?title=Labour_market_flow_statistics_in_the_EU.

supplementary data of labor market flow variables and help refine the analysis of the LFS data.

Job posting websites (e.g., LinkedIn, Indeed, JobStreet, and Rozee.pk) are considered potential big data sources for labor market surveillance. Job posting sites can be mined for information on labor demand, labor supply, salaries, job location, and required skills. A number of researchers have tapped job posting data to describe trends and identify mismatches in the labor market (Matsuda et al., 2019; Wong & Ng, 2021).

Matsuda et al. (2019) used online job vacancy postings and resumes from an online job search portal (Rozee.pk) to provide new descriptives for skills demand and supply in the Pakistan labor market. Their analyses also showed that matching between an applicant's qualification (i.e., education attainment, skills, years of work experience) and job requirement remains important, whereas overqualification did not lead to any advantages.

Wong and Ng (2021) also showed that the number of new job advertisements per day, an indicator of labor demand, fell at a fast pace in Q1 2020–Q2 2020, followed by the rise in unemployment rate in Hong Kong. They concluded that job postings may provide timely information on labor demand when official data sources are not yet available.

3. Data and methodology

This section presents the data sources for this study and provides a discussion of the construction of this study's Google search index. It also outlines the estimations that were undertaken to determine the statistical significance of the constructed Google search index as a regressor for unemployment rate and the metrics used to assess the in-sample and out-of-sample nowcasting performance of Google index-augmented regression equations.

3.1 *Data sources*

A mix of traditional economic and internet search data were used to model the unemployment rate. The unemployment rate and GDP data were sourced from the PSA. Internet search data, comprising of time series on relative volume of Google searches queries, were downloaded from the Google Trends website (trends.google.com).

The unemployment rate is measured as the number of individuals (as percentage of the labor force) who are unemployed for the reference period, that is, the past week or seven days precedent to the date of visit of the interviewer.[11] The period of the interview is between the 8th and the last day of the survey month. The PSA defines the unemployed as: persons who are 15 years old and above that are (a) without work, (b) currently available for work, and (c) seeking work during the reference period.[12] From January 2005 to January 2021, the PSA LFS was conducted in the months of January, April, July, and October, referred to as JAJO in this chapter. Beginning in February 2021, the LFS is conducted monthly and the results are released to the public with a lag of 1 to 2 months.[13]

[11] Labor force refers to persons 15 years of age and older who are either employed or unemployed.

[12] For details, see PSA LFS technical notes at www.psa.gov.ph/content/technical-notes-labor-force-survey-lfs.

[13] PSA Enjoins Support for the Conduct of Monthly Labor Force Survey (LFS) in 2021 (Press Release Reference No. 2021-81, 15 February 2021).

There have been only 15 monthly LFS releases as of writing, which is still insufficient for a time-series analysis. Moreover, these monthly observations correspond to the pandemic years, a period of large shocks and likely structural changes. To abstract from these, this study will use the JAJO unemployment releases from the PSA, which cover January 2005 to October 2019.[14] This JAJO unemployment series is deseasonalized using the X-12 autoregressive integrated moving average (ARIMA) method.

Meanwhile, Google Trends provides access to anonymized, categorized, and aggregated data of search requests using the Google search engine. The data, which are the normalized volume of search queries, can be downloaded from the Google Trends' website. The search results are normalized to the time and location (region) of a query such that the output is scaled on a range of 0 to 100. The key input parameters that refine the collected data are search term, location, and period.

The data downloaded from Google Trends are only a representative subsample from Google's database. A fresh subsample is randomly drawn whenever an update or new entry in the data set is added (Simionescu & Zimmermann, 2017). Thus, researchers need to store that data to produce exact replications of the studies. For forecasting and modeling purposes, the variability of Google Trends data can be minimized by averaging the subsamples of the same specifications (i.e., word, period, location) downloaded at different times (Medeiros & Pires, 2021). For this study, the variability of the search volume was checked by collecting the same time series using the same parameters (i.e., same keyword, period, and region) at different days and found minimal differences in the data.[15]

3.2 *Keyword selection and construction of Google search index*

Instead of relying on single search terms for nowcasting of the unemployment rate, this study follows the approach of Tuhkuri (2016) and constructs a Google Index (GI). A number of search terms are aggregated using the Boolean search operator "OR" in Google Trends. Such an approach allows the incorporation of more information that could be relevant in predicting unemployment as opposed to using a single search term.

In order to pinpoint the appropriate search queries for inclusion in the index, the authors first identified 130 job-related search terms. Twelve of these were pre-identified by authors while 118 words were obtained under the related topics tab in Google Trends.

Each of the 130 downloaded series is deseasonalized using X-12 ARIMA. These are then assessed based on their relative search volume and correlation with the official PSA-released unemployment rate. A scoring method for the keywords was devised to facilitate selection. The score metric, S, for each keyword is defined as the sum of its search volume relative to "job" and its estimated correlation coefficient with the unemployment rate.[16] Keywords with scores that are close to 2.0 are shortlisted.[17] Essentially, this

[14] LFS data before 2005 are not included because there was a change in the definition of unemployed. LFS data starting 2005 are aligned with the international standard definition of unemployment (see PSA LFS technical notes).

[15] This may not be an important consideration for this chapter as the question at hand is to determine if Google Trends can help nowcast the unemployment rate. Future nowcasting exercises that include Google Trends can follow the approach of Medeiros and Pires (2021).

[16] Search volume is scaled against the search volume for "job," consistent with D'Amuri and Marcucci's (2012) argument that "job" is the most popular keyword used by job seekers as evidenced by its large search volume.

[17] The highest possible score, S, under this metric is 2.0. Search volume is scaled against "job" search volume and would therefore be between 0 and 1. Meanwhile, the correlation coefficient is between –1 to 1.

Table 1. Top job-related search queries

Rank	Keyword	Correlation coefficient (Corr)[a]	Average search volume[b]	Score metric, S
1	job	0.686	1.000	1.686
2	Corporation	0.785	0.313	1.098
3	Management	0.671	0.398	1.069
4	Training	0.810	0.231	1.041
5	Resume	0.768	0.255	1.023
6	call center	0.875	0.143	1.018
7	JobStreet	0.812	0.190	1.002
8	PagIbig	0.871	0.106	0.977
9	Marketing	0.728	0.206	0.934
10	Company	0.543	0.352	0.896
11	employment	0.754	0.109	0.863
12	Typing	0.766	0.096	0.862
13	Skill	0.709	0.150	0.859
14	resignation letter	0.765	0.094	0.858
15	Engineering	0.660	0.192	0.851
16	Convergys	0.818	0.033	0.850
17	Letter of resignation	0.827	0.022	0.849
18	PagIBIG Fund	0.832	0.016	0.848
19	vacancy	0.806	0.033	0.840
20	recruitment	0.768	0.071	0.840
21	Labor	0.710	0.129	0.839
22	resignation	0.725	0.106	0.832
23	Cover letter	0.760	0.037	0.797
24	Career	0.659	0.114	0.773
25	POEA	0.605	0.162	0.768

Notes: [a]Correlation coefficients (Corr) were calculated for 2005-2019. [b]Average search volume pertains to the mean search volume for 2005-2019, scaled against the search volume for "job."
Sources: Google Trends (extracted on 5 April 2022); authors' estimates

score metric helped in the identification of keywords that are more frequently searched and have high positive correlation with the unemployment rate. Table 1 presents the top 25 job-related search topics based on their score.

To further filter the list, the authors applied judgment to eliminate words that may ambiguously relate with unemployment despite large search volume and/or high correlation coefficient (e.g., "corporation," "management," and "company"). In further narrowing this list, the authors weeded out search terms that are not likely to be the first searches an unemployed individual types into Google.

Furthermore, individual search and multiple combinations of Google search data are tested for Granger causality with unemployment to identify the appropriate search query combination. Following these steps, the final search queries that form the Google search index are "resignation," "JobStreet," and "job." Hereinafter, this composite index of the search volume of these keywords is referred to as the Google Index or GI.

Table 2 presents the Granger causality tests between GI and unemployment rate. The result from the Granger causality test suggests that the chosen GI contains information that could be useful in predicting the unemployment rate. Conversely, the unemployment rate does not Granger cause GI.

Table 2. Granger causality tests

Null hypothesis	*p-value*	F-stat
GI does not Granger cause unemployment rate	0.019*	3.035
Unemployment rate does not Granger cause GI	0.156	1.683

*Note: * denotes statistical significance at 5 percent level*
Source: Authors' estimates

Alternatively, the Google search terms could be aggregated using principal component analysis (PCA). The first principal component, which captures the co-movement among search terms, could be used as the representative Google indicator.[18] This study explored this approach but the results are less robust (particularly for out-of-sample nowcasting) and are no longer reported in this chapter.[19] This is probably because some of the search topics included in the PCA do not offer useful information for nowcasting the unemployment rate even if these are top related topics based on Google Trends. This justifies the role of judgment in selecting appropriate search queries that would be incorporated into GI.

3.3 *Nowcasting equations*

The statistical relevance of the inclusion of GI in simple time series modeling is evaluated by comparing the model fit and nowcasting performance of a naïve autoregressive (AR) model and GI-augmented AR model similar to the approach in other studies (Choi & Varian, 2009; D'Amuri & Marcucci, 2012; and Tuhkuri, 2016). In particular, the following equations are estimated:

$$\log(U_t) = \alpha_{11} + \alpha_{12}\log(U_{t-1}) + e_t \quad (1)$$

$$\log(U_t) = \alpha_{21} + \alpha_{22}\log(U_{t-1}) + \alpha_{23}GI_t + e_t \quad (2)$$

where U_t is the seasonally adjusted unemployment rate at time t, GI is the seasonally adjusted Google Index at time t as discussed in Section 3.2 and e_t is the error term. The logarithmic transformation of the unemployment series helps stabilize the variance (see Tuhkuri, 2016; Lütkepohl & Xu, 2012).

In addition, this chapter estimates equations (3) and (4), which are replications of Tuhkuri's (2016) nowcasting model for the U.S. unemployment rate. Notably, Tuhkuri (2016) used non-seasonally adjusted data and instead incorporated a seasonal autoregressive term to ensure that the relationships captured in the model are not entirely due to common seasonality.

$$\log(U_{Nt}) = \beta_{31} + \beta_{32}\log(U_{Nt-1}) + \beta_{33}\log(U_{Nt-4}) + e_t \quad (3)$$

$$\log(U_{Nt}) = \beta_{41} + \beta_{42}\log(U_{Nt-1}) + \beta_{43}\log(U_{Nt-4}) + \beta_{44}GI_{Nt} + e_t \quad (4)$$

In equations (3) and (4), the non-seasonally adjusted unemployment rate (U_{Nt}) is modeled as function of autoregressive lag of order 1 (U_{Nt-1}) and the seasonal autoregressive term (U_{Nt-4}). Equation (4) is augmented with non-seasonally adjusted Google Index, GI_{Nt}.

As argued by Tuhkuri (2016), the choice of a naïve AR(1) model as benchmark is

[18] This method of aggregating search volumes of key search queries or topics was employed by Matsumoto et al. (2013) to nowcast travel outlays in Japan.

[19] The top 30 job-related search topics as identified from Google Trends were included in the PCA.

a first test to ascertain if Google search data can help improve unemployment rate modeling. If the addition of GI does not do well with a simple model, it is unlikely to perform better in more complicated models. Moreover, given a relatively small sample (n=59 in-sample observations), simpler models are preferred to avoid overfitting.

For additional robustness check of results and to minimize the possibility of omitted variable bias, this study deviates from that of Tuhkuri (2016) by incorporating an additional regressor. Equations (5) and (6) are extensions of equations (2) and (4), respectively. Both equations (5) and (6) include the seasonally adjusted quarter-on-quarter GDP growth rate, ($dlog(GDP_t)$), as an additional independent variable.[20]

$$\log(U_t) = \gamma_{51} + \gamma_{52}\log(U_{t-1}) + \gamma_{53}GI_t + \gamma_{54}dlog(GDP_t) + e_t \quad (5)$$

$$\log(U_{Nt}) = \rho_{61} + \rho_{62}\log(U_{Nt-1}) + \rho_{63}\log(U_{Nt-4}) + \rho_{64}GI_{Nt} + \rho_{65}dlog(GDP_t) + e_t \quad (6)$$

The stated equations are estimated for the period covering January 2005 to October 2019 and are used to produce in-sample forecasts. Moreover, (pseudo) out-of-sample, one-period-ahead nowcasts are generated for January 2020 to April 2022. Model performance is then assessed using standard metrics such as coefficient significance and adjusted R-squared (R^2). For in-sample and out-of-sample nowcasting, model performance is evaluated based on the root mean square error (RMSE), mean absolute error (MAE), and mean absolute percentage error (MAPE).

4. Results

Table 3 presents the estimation results. The model fit for all equations can be considered reasonable with adjusted R^2 hovering between 77.0 percent and 82.0 percent. All regressors across different specifications carry the expected sign and are statistically significant, except for the GDP variable in equation (6).

Equations (2) and (4) show that the GI is a statistically significant determinant of the unemployment rate, but the estimated coefficients are relatively small. Moreover, the addition of GI led to some improvement in the model fit, as indicated by the increase in the adjusted R^2—although arguably small—when compared to the benchmark AR models, equations (1) and (3).

Meanwhile, equation (5) indicates that the GDP is a statistically significant regressor of unemployment and its inclusion in the specification improves the goodness of fit. However, it is worth noting that the GI indicator retains its statistical significance in both equations (5) and (6), even if GDP is added into the equations.

The in-sample and out-of-sample static, one-period-ahead nowcasting performance of these equations are assessed using the usual metrics for forecast evaluation.[21] Table 4 summarizes the results. For the in-sample (July 2005 to October 2019) forecast evaluation, the addition of GI helps reduce the forecasting errors, as indicated by the decline in the RMSE, MAE, and MAPE of equations (2) and (4) relative to those of equations (1) and

[20] The authors considered the output gap as an additional regressor. However, the output gap is an unobserved economic indicator. Different methodologies for estimating the output gap are likely to yield varying estimates. The BSP, for instance, measures the output gap using different methodologies. There are several instances when the estimates of these models diverged not only in magnitude but also in the signs of the estimates (i.e., whether output gap is positive, negative, or neutral).

[21] The in-sample and out-of-sample nowcasts pertain to the JAJO months, as the different specifications are estimated using JAJO LFS data. Going forward, the equations can be re-estimated using monthly data, when monthly observations are sufficient. Nowcasts will then be on a monthly basis as well.

Table 3. Estimation results

Equations	(1)	(2)	(3)	(4)	(5)	(6)
log (U_{t-1})	0.893 *** (<1E-3)	0.719 *** (<1E-3)	-	-	0.723 *** (<1E-3)	-
log (U_{Nt-1})	-	-	0.372 *** (<1E-3)	0.355 *** (<1E-3)	-	0.344 *** (<1E-3)
log (U_{Nt-4})	-	-	0.584 *** (1<E-3)	0.375 *** (<1E-3)	-	0.383 *** (<1E-3)
GI_t	-	0.00411 * (0.012)	-	-	0.00412 ** (0.008)	-
GI_{Nt}	-	-	-	0.00477 *** (<1E-3)	-	0.00482 *** (<1E-3)
dlog (GDP)	-	-	-	-	–5.294 ** (0.009)	–1.814 (0.397)
Constant	0.196 (0.107)	0.264 * (0.027)	0.058 (0.668)	0.180 (0.159)	0.289 * (0.012)	0.192 (0.138)
Adj-R^2	0.780	0.807	0.772	0.815	0.821	0.814
n	58	58	56	56	58	56
AIC	–141.8	–146.5	–127.1	–138.0	–152.0	–136.8
BIC	–135.5	–138.3	–119.0	–127.9	–141.7	–124.7

*Notes: *, **, and *** denote statistical significance at 5 percent, 1 percent, and 0.1 percent levels, respectively.*
The numbers in parenthesis () are p-values.
Sources: PSA; Google Trends (extracted on 5 April 2022); authors' estimates

(3), respectively. This finding also holds for equations (5) and (6), which registered similar reductions in RMSE, MAE, and MAPE compared to the benchmark AR models.

The addition of GI also improves forecasting accuracy for the out-of-sample (January 2020 to April 2022) forecast evaluation. Notably, the RMSE, MAE, and MAPE generally showed a larger reduction in the out-of-sample forecast evaluation compared to the observed decline in the in-sample forecast evaluation. This is noteworthy as the out-of-sample period covers the COVID-19 pandemic period. For example, the MAPE between equations (1) and (2) has improved by 0.091 percent (5.092–5.183) in the in-sample forecast evaluation. For the out-of-sample forecast evaluation, this improvement in MAPE was 3.598 percent (18.072–21.670). These findings also hold true for the comparisons of the MAE and MAPE for the out-of-sample forecast evaluation of equations (2) and (5) and equations (4) and (6), relative to equations (1) and (3), respectively. This is consistent with the findings in other studies that the improvements in the models with the addition of internet search data tend to be episodic and that such models tend to outperform naïve models during crisis periods (D'Amuri & Marcucci, 2012; Matsumo et al., 2013; Tuhkuri, 2016; and Woloszko, 2020).

Table 4. Nowcast evaluation

Period	Metric	Equations					
		(1)	(2)	(3)	(4)	(5)[a]	(6)[a]
In-sample (July 2005 to October 2019, 58 observations)	RMSE	0.433	0.409	0.478	0.421	0.390	0.416
	MAE	0.338	0.333	0.376	0.345	0.311	0.344
	MAPE	5.183	5.092	5.662	5.200	4.677	5.196
Out-of-sample (January 2020 to April 2022, 10 observations)	RMSE	4.011	3.918	4.452	4.453	2.549	4.708
	MAE	2.297	2.082	2.957	2.473	1.862	2.709
	MAPE	21.670	18.072	29.207	21.520	18.353	23.116

Note: [a]Out-of-sample nowcast evaluation for models (5) and (6) covers the period January 2020 to January 2022 (9 observations) as 2022 Q2 GDP is not yet available as of writing.
Sources: PSA, Google Trends (extracted on 16 June 2022); authors' estimates

Overall, the inclusion of GI in naïve AR models help improve the goodness of fit and nowcasting accuracy. The improvements are, however, relatively modest. Similar to other studies, this one finds that the reduction in forecast errors tend to be more pronounced during crisis periods.

5. Limitations

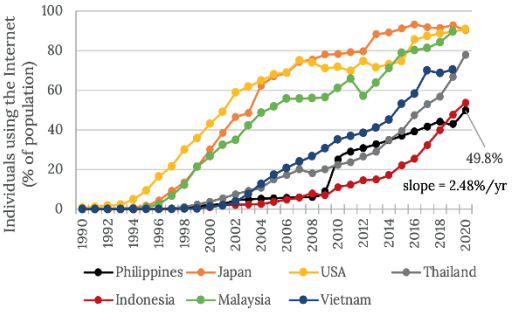
What could possibly explain the relatively small contribution of Google search data in nowcasting unemployment rate in the Philippines? The informative power of internet search data may depend on the proportion of a country's population using the internet. Data from the World Bank show that advanced economies such as the United States and Japan have more than 90 percent of their population using the internet in 2020 (Fig. 1). In contrast, emerging economies such as the ASEAN-5 have lower internet penetration, ranging from 49.8 percent to 77.8 percent.[22] The Philippines, with 49.8 percent internet penetration, lags behind its neighboring ASEAN-5 economies, which could limit the information content and representativeness of internet search data.[23]

In addition, those who have access to the internet may be using it for other purposes, such as social media (e.g., Facebook, Twitter, and Instagram). The PSA Functional Literacy, Education, and Mass Media Survey (PSA-FLEMMS)

[22] Internet penetration refers to the percentage of the population that has access to the internet.

[23] The BSP's Financial Inclusion Survey (BSP-FIS) reported a slightly higher internet penetration of 53.0 percent in 2019. The data can be accessed from the BSP Financial Inclusion Dashboard at www.bsp.gov.ph/Media_And_Research/Financial%20Inclusion%20Dashboard/2021/FIDashboard_3Q2021.pdf.

Figure 1. Share of population using the internet across selected countries



Source of basic data: The World Bank

reported that 73.9 percent of their surveyed Filipino households in 2019 used the internet for social media and 63.6 percent used it for email or research purposes.[24]

Along with the constraint in internet access, the Google search data may only represent individuals who are knowledgeable in navigating the web. Google search is likely capturing individuals who are looking for jobs that are posted on the internet. Thus, the information content in Google search data related to unemployment may be biased toward certain higher skilled professions and not representative of the complete unemployment situation in the country.

Moreover, as pointed out by D'Amuri and Marcucci (2012), Google search data capture all job searches by both unemployed and employed individuals. Together, these biases could reduce the effectiveness of Google search data as a leading indicator for unemployment rate.

It is also important to point out that Google search terms useful for nowcasting the unemployment rate could be evolving across time periods. For example, during the pandemic, the search queries might have changed. A new set of job-related search keywords such as "covid," "ayuda," "skeletal workforce," "unemployment benefits," and "work from home" have emerged, with search volumes increasing substantially during the pandemic.[25] These breakout words are candidates for possible Google search indicators as they could potentially help capture fluctuations in the unemployment rate, given that these are the terms more frequently used by internet users. However, the relatively short time series data for these search terms limit the ability of the authors to incorporate these search queries in the regression analysis.

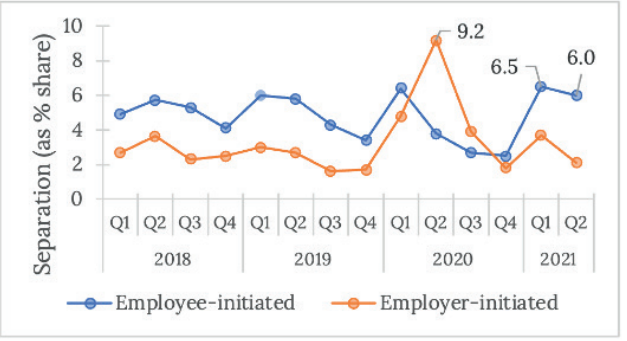
In addition, useful search terms for modeling and nowcasting could also change based on factors leading to separation from employment. Data from the PSA's Labor Turnover Survey show that during the peak of the COVID-19 pandemic (in 2020 Q2), there was a substantial employer-initiated separation of employees (9.2 percent) in the services sector (Fig. 2).[26] Interestingly, one year after the start of the pandemic, the rate of employee-initiated separation dominated in the first half of 2021 at 6.0 to 6.5 percent compared to employer-initiated separation at 2.1 to 3.7 percent.

[24] Data from the PSA-FLEMMS 2019 can be accessed at www.psa.gov.ph/content/functional-literacy-rate-filipinos-exposure-different-forms-mass-media-ranges-926-percent.

[25] Please refer to the Annex for a list of breakout words.

[26] From the LFS technical note, separation refers to termination of employment due to (a) layoffs or terminations initiated by employers due to economic (e.g., lack of market, financial losses, reorganization, or end of contract) or non-economic reasons, and (b) quitting or termination initiated by the employees (e.g., resignation due to having been hired by another company, or to work abroad).

Figure 2. The employer- or employee-initiated separation



Source: PSA's Labor Turnover Survey

6. Conclusions

The COVID-19 pandemic underscored the importance of timely and high-frequency data for surveillance and policy formulation. Big data can supplement traditional data in near real-time, granular monitoring of economic and financial trends as well as in nowcasting/forecasting key indicators. This chapter presented the potential usefulness and limitations of big data, particularly internet search data, in nowcasting the Philippine unemployment rate.

Similar to other existing empirical studies, this chapter delved into Google econometrics in order to see whether Google Trends can help predict unemployment rate. The results indicate that the constructed composite Google search index is a statistically significant determinant of the unemployment rate. Its inclusion in a simple AR model modestly improves the goodness of fit and in-sample forecast evaluation. Notably, the improvements are more pronounced, while remaining quite modest, for the out-of-sample forecast evaluation. The out-of-sample period corresponds to a crisis period (COVID-19 pandemic). These findings are robust across different specifications used in this chapter. These results are also consistent with the findings of other studies that showed small and rather episodic improvements when using internet search data in their nowcasting models (D'Amuri & Marcucci, 2012; Matsumo et al., 2013; Tuhkuri, 2016; and Woloszko, 2020).

The observed moderate improvement in the nowcasting performance of the Google-augmented model may be attributed to the still relatively low internet penetration in the Philippines. Moreover, the internet search data may have inherent biases, such as inadequate representation. Individuals using the internet to find jobs available online are perhaps those seeking relatively higher-skilled jobs and may not reflect the full spectrum of job-seekers. Google Trends also include searches done both by the unemployed and employed. The keywords used for Google searches could be also evolving based on particular time periods.

Despite its limitations, the trend toward digitalization suggests that internet search data are a useful source of supplementary data for monitoring and nowcasting unemployment trends. Going forward, other big data sources such as online job portals should be explored for labor demand analysis and prediction as well as granular information on labor market mismatches.

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Annex

Table A1. Breakout words

	Keyword	Search volume relative to "job"		Rel. change (in percent)
		Pre-pandemic	Pandemic	
1	covid	0.00	32.39	> 500.00
2	ayuda	0.00	1.54	> 500.00
3	Entitlement	0.00	0.18	> 500.00
4	skeletal workforce	0.00	0.11	> 500.00
5	omicron	0.02	1.50	> 500.00
6	Unemployment benefits	0.00	0.04	> 500.00
7	Government agency	0.06	0.61	> 500.00
8	Workforce	0.10	1.00	> 500.00
9	Virtual assistant	0.13	1.14	> 500.00
10	police clearance	0.42	2.07	389.68
11	work from home	0.47	2.18	366.05
12	Freelancer	0.07	0.29	291.57
13	Philippine Coast Guard	0.08	0.25	197.63
14	Experience	5.52	13.75	148.97
15	sss	17.93	43.68	143.63
16	Administrative assistant	0.02	0.04	107.82
17	Salary	9.29	18.68	100.95
18	Work	27.31	43.54	59.44
19	trabaho	1.79	2.79	55.69
20	employer	1.41	2.18	54.96
21	Worker	2.35	3.43	45.88
22	agent	7.09	10.21	43.97
23	Retirement	1.39	1.96	41.40
24	LinkedIn	3.34	4.64	39.04

Sources: Google Trends; authors' estimates

15 | Conclusion: Economic Policy and Employment Growth

Dante B. Canlas
UP School of Economics

15

15 | Conclusion: Economic Policy and Employment Growth

Dante B. Canlas[1]

This book and its various chapters sought to improve understanding of the impact of the COVID-19 pandemic on the labor market and to identify public policies that would mitigate its unwanted effects. The pandemic-induced recession caused significant deterioration in the standard of living of individuals and households, necessitating government interventions intended to recover foregone human welfare.

All authors are professional economists engaged in analytical research and policy studies. They were recruited and selected based on their expertise in macroeconomics, labor, money, and finance from economics departments of universities and government think tanks. Primarily, these professionals inquired about how people and enterprises reacted to the pandemic and how the interactions of these agents in the labor market caused movements in employment, unemployment, and labor force participation. They also looked at the changes in labor productivity, wages, and hours of work, and the consequences of these movements both in the macroeconomy and in specific sectors such as information technology. The authors then proceeded to policy design and implementation. As policy practitioners, they recognize the pitfalls of policymaking in government once the economic process meets the political process; the two are not necessarily in sync with each other. From experience, it is seen that the first-best policy often yields to the second best, which can be frustrating.

However, to strengthen policy prescriptions in the practice of their profession, the authors get to share their belief in the importance of constructing tractable models that yield testable propositions easily understood by the general public. They assemble data helpful in confirming or rejecting their hypotheses. In their descriptive approaches, they marshal either cross-section or time-series data and try to extract empirical regularities. Alternatively, they construct regression models that, once estimated, support or reject their hypotheses. The authors then prescribe policies or design the policies themselves, geared toward achieving desirable economic and social impacts and outcomes.

In 2020, an event with a profound impact on people's wellbeing occurred. The outbreak of the COVID-19 pandemic caused recessions on a global scale and spikes in unemployment, which stemmed from business lockdowns, social distancing, and mobility restrictions. The latter measures disrupted production and consumption plans of firms and households, respectively, resulting in undesirable business fluctuations and knocking entire economies off of their normal, sometimes extraordinary, growth paths.

In the Philippines, gross domestic product (GDP) adjusted for inflation declined by 9.5 percent in 2020, the deepest annual contraction in the country's post-World War II economic history. The economy started to recover the following year, but not strongly enough to enable a return to its pre-pandemic growth path, in which real GDP averaged about 6.3 percent annually in the previous decade. The output shock caused massive layoffs and quits, raising the unemployment rate to 19.7 percent in the April quarterly round of the Labor Force Surveys (LFS) in 2020.

[1] Professor Emeritus, UP School of Economics, and editor-in-chief of this book, authoring the first chapter as well as this last one.

The economic and social repercussions of the COVID-19 pandemic motivated the Bangko Sentral ng Pilipinas Research Academy (BRAc) to initiate the preparation of a volume with the labor-market implications of the pandemic as the unifying theme. Scholars and researchers at the UP School of Economics (UPSE), Ateneo de Manila University Economics Department (ADMU-ED), Philippine Institute for Development Studies (PIDS), and BRAc were invited to write. All chapters were independently written, with the authors fully responsible for the content and organization of their chapters. The usual disclaimer applies: the authors, not the institutions they are affiliated with, are solely responsible for the opinions and recommendations in the various chapters.

The writers are all aware of the BSP Charter as amended. In 1993, the BSP was established as an independent monetary authority. In the most recent charter amendment, the BSP is authorized to conduct "money, banking, and credit policies supportive of price stability, balanced and sustained growth of output, and employment." It has adopted inflation targeting (IT) as a monetary-policy rule in pursuit of its charter objectives, and reserves the right to use other monetary-policy rules, such as monetary-aggregate targeting, in combination with IT. It is widely observed that, when the economy is mired in a high rate of unemployment, the BSP can step up and use tools at its disposal to extricate the economy from its unwanted state. The BSP, however, is also conscious about the limits of a monetary stimulus; it is guided by movements in labor productivity, real wages, employment, and unemployment in calibrating the dose of any monetary stimulus.

1. Key lessons learned

Important lessons learned from the various chapters are highlighted below. There is no attempt here to exhaustively summarize the findings and recommendations of the authors. Key findings from the individual chapters are distilled. For a look at the details, the readers are referred to the individual chapters.

1.1 Labor productivity declined in the aftermath of the pandemic

At the aggregate level, labor productivity, defined as the ratio of the national output to employment, is associated with the standard of living. People with high productivity live comfortably, while those with low productivity live miserably. The usual prescription is for people to raise their productivity in order to raise their incomes and, correspondingly, their living standards.

In general, the authors saw a decline in labor productivity in the aftermath of the pandemic. National output declined at a higher rate than employment. Productivity is rooted in the accumulation of human

The pandemic-induced recession caused significant deterioration in the standard of living of individuals and households, necessitating government interventions intended to recover foregone human welfare.

capital, two important elements of which are health and education. Health and nutrition reduce morbidity and mortality on the job, resulting in higher productivity. Education, on the other hand, increases the efficiency units that workers bring to the labor market. Once investments in education are impaired by poor health, loss of productivity in the long run is inevitable. COVID-19 caused household spending in health and education to decline, causing a fall in productivity (see Chapters 2, 7, 8, and 9). In the aggregate, public health spending also dropped, again resulting in decreased productivity (see Chapter 9).

1.2 *Unemployment rate increased*

The public health-related policy response to contain the pandemic consisted of restrictive business lockdowns and social distancing, accompanied by testing, isolation, treatment, and, later, vaccination. The initial government response may be referred to as "Zero-COVID-19," an approach that choked production and caused declines in aggregate supply. In addition, consumption and aggregate demand withered with social distancing. Worker layoffs ensued, elevating open unemployment rates (see Chapters 4 and 5). A gradual reopening was adopted once the vaccination rate was scaled up, enabling an economic recovery to emerge and unemployment rates, including among young workers, to decline.

Long before the pandemic struck, youth unemployment had been consistently high (see Chapter 5). The phenomenon is attributed to the limited skills and work experience of young workers, narrowing the access of the youth to jobs. Given the youth's long spells of unemployment in the current period, the probability of their being unemployed in the future is high. They forego human capital acquired on the job. Youth unemployment worsened during the pandemic, raising the specter of scarring effects. Training and retraining for skill acquisition are recommended to prevent having a lost generation of workers.

1.3 *Wages and earnings fell*

Declining labor productivity is associated with a decline in wages and earnings (see Chapter 8). During the pandemic, an exception was seen in the information technology and business process outsourcing sector. Digitization continued to grow in many other service trades, supporting an increased demand for information technology workers (see Chapter 3).

Wages may be temporarily rigid, but as layoffs increased, wages dropped to zero. If laid-off workers were recalled, they were often employed at lower wage rates. Wage rigidity did not hold over a long period of time as laid-off workers sought employment in other sectors, including a return to agriculture where wages are lower than in non-agriculture (see Chapter 2).

However, some firms may resort to labor hoarding (see Chapter 2). A portion of their manpower is retained at the same wage rates amid declining demand for their products. Firms may hold on to their skilled workers even with the low demand for their products in case recovery takes place after a short period of time. This happens particularly if the firms had invested in training their workers. They may not want to compete for the pool of unemployed workers once demand for their products starts to rise again to avoid spending again for worker training. Labor hoarding thus turns out to be a rational response.

Firms may also ration hours of work to enable them to hoard a bigger portion of their manpower. As hours of work fall from

rationing, earnings drop (see Chapter 8). Rationing of work hours has an equivalent effect on earnings similar to a decrease in wages.

1.4 The pandemic hindered accumulation of human capital

Evidently, the COVID-19 pandemic has had a deleterious effect on the accumulation of human capital (see Chapters 7, 8, and 9). The latter consists mainly of investments in health and education, both of which are widely understood to increase long-run economic and employment growth. Human-capital investments entail costs in the present period; the stream of returns is captured over the working lives of people way into the future. Those who have invested much in human capital tend to have a higher earnings profile than those who invested less.

Financing of health and education is normally shouldered internally by households. In the absence of a loan market for education, particularly at the tertiary level, household access to college education, for example, is subject to a good deal of pressure. The drop in household earnings from the pandemic translates into a weaker capacity to invest in health and education. Meanwhile, a decline in real GDP has also weakened the capacity of the government to support investments in these twin sources of human capital. The fiscal stabilizers are unable to deliver the revenues needed as long as the economy is stuck in a low-growth path.

Amid chronic budget deficits and a huge public debt, the fiscal constraints call for a deficit reduction program. Moving forward, this must be a responsible deficit reduction program. Wasteful government spending must be identified and discontinued. Meanwhile, core Filipino values, such as health and education, must be protected.

Taxation is more complicated. The government tends to rely more on indirect taxes, for example, value-added tax (VAT), rather than on direct taxes such as personal income and corporate income taxes. Indirect taxes are regressive, that is, the burden of taxation falls more heavily on low-income families. This system cries out for reforms toward progressivity, that is, toward taxation that weighs more heavily on high-income groups, which have a greater ability to pay compared to low-income ones.

1.5 The pandemic shortened life expectancy

The severity of the 2020 COVID-19 pandemic has opened up interest in its effect on people's life expectancy, which is the expected length of a lifetime at birth. In the course of economic development, life expectancy in years rises. Several countries in Western Europe have conducted surveys to extract information on the matter. There has been a decline in life expectancy arising from the pandemic (see Chapters 6 and 7); the length of working life has become more uncertain as a result. People do not react neutrally—with a shorter lifetime, people are not likely to postpone current consumption for later. As a result, savings decline. Accordingly, investments decline, and the future productive capacity of the economy is weakened, thereby impeding economic development. The adverse implications of a decline in life expectancy are many, including that current consumption increases, thus cutting down savings and the propensity of households to invest in human capital. It is natural to reflect on the impact of declining life expectancy on social security (see Chapter 10). Many people may lose motivation to purchase social security if their lifetimes become more uncertain, weakening the Social Security System (SSS), the institution in charge for private workers.

1.6 *Monetary and fiscal policy must be well coordinated*

The pandemic has made the macroeconomic policy environment of a small open economy like the Philippines more difficult to navigate. Monetary and fiscal policies lie at the core of macroeconomic policy, which is designed for stable and sustained economic growth with a sound balance of payments (BOP).

Traditionally, fiscal policy dominated monetary policy. The latter was expected to accommodate the budget deficit of the national government. The arrangement, however, lent an inflationary bias to monetary policy. To curb this bias, the institutional arrangement moved toward a monetary authority independent of the fiscal authority. As a result, the former has been able to conduct monetary policy without consulting the latter. The BSP has also adopted inflation targeting as a monetary-policy rule with profound positive results (see Chapter 12).

Following the outbreak of the pandemic, a consensus among policymakers in government emerged about fiscal policy taking a leading role in containing the pandemic in the immediate period. Public-health spending and enhanced social safety nets for the truly disadvantaged increased significantly. As a consequence, the government budget deficit also increased significantly. Meanwhile, the private sector has always invested more than it saved. As a result, stable growth is hampered today by the twin deficits of budget and the current account in the BOP.

Fiscal and monetary policies must adjust. In government, deficit reduction is unavoidable. At the same time, the BSP has to raise interest rates to dampen private investment and inflation. These measures help reduce the current deficit. Fortunately, the income remittances of overseas Filipino workers, temporary and permanent, remained robust on account of altruism (see Chapter 11).

Fiscal and monetary policies, however, must continue to coordinate to heighten effectiveness (see Chapter 13). The specific objective of the BSP is to maintain its independence from the fiscal authority without compromising its price-stability objective, along with its goal of output and employment growth.

1.7 *Policy surveillance with big data needs enhancement*

Economic policy surveillance has benefited immensely from the information technology revolution, which has yielded big data (see Chapter 14). Data science has emerged, rendering feasible the use of alternative, high-frequency data to analyze trends and developments in the labor market and predicting, for instance, unemployment. The potentials for improving labor market forecasts using big data and data science beyond small samples are immense.

2. Policies toward employment growth

Public and individual health status suffered a setback in the aftermath of the COVID-19 pandemic. Life expectancy declined and working life became more uncertain. Savings and investments suffered, impeding stable, sustained, and broad-based economic growth. Increased investment in public health is a rational response in the immediate period. In this regard, it is vital to revisit the Universal Health Care Act (UHCA) and rendering the Act fully funded. Central to the UHCA is a well-financed PhilHealth, the health and medical insurance service of the Philippine government. Management must be professionalized and corruption therein rooted out.

Once increased investments in public health materialize and strengthen household investments in education, labor productivity improvements are to be expected. As students, the learning process of individuals improves profoundly. Once these individuals assume their roles as workers, they are bound to be more efficient on the job. The labor market responds with increasing labor force participation, rising employment, and declining unemployment.

To improve labor productivity in the long run, public policy must reverse the observed return of the unemployed to low-productivity occupation in agriculture. Training and retraining of unemployed workers to acquire and master new technologies for high-productivity activities in industry and services are vital in a knowledge economy underpinned by rising labor productivity across sectors. New technologies continue to emerge resulting in innovations and employment growth. ■

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The authors

Subject matter experts from the institutions cited below authored the 13 papers featured in this book—all in the context of the COVID-19 pandemic as it affected the Philippines—with the first and last of the 15 chapters, written by UP School of Economics Professor Emeritus **Dante B. Canlas**, bookending these papers. Dr. Canlas is also editor-in-chief of the book.

Ateneo de Manila University
Geoffrey Ducanes, Associate Professor, on unemployment before and during the pandemic

BSP Department of Economic Research
Zeno Ronald R. Abenoja, Managing Director; **Jasmin E. Dacio**, Deputy Director; and **Mark Rex S. Romaraog**, Bank Officer V, on monetary policy formulation and the labor market during the pandemic

Zeno Ronald R. Abenoja with **Cherrie R. Mapa**, Supervising Bank Economist, and **Michael Lawrence G. Castañares**, Bank Economist II, on alternative data sources and labor market surveillance

BSP Research Academy (BRAc)
Laura Britt-Fermo, **Hazel Parcon-Santos**, and **Jose Eduardo P. Sto. Domingo** (deceased), all Senior Researchers, on the implications of the IT-BPM industry on labor market outcomes

Faith Christian Q. Cacnio, Senior Researcher; **Marites B. Oliva**, Bank Officer VI; **Neil Fidelle G. Lomibao**, Central Bank Associate; and **Irene Rose Imson**, Senior Research Specialist, on Filipino youth workers and the scarring effects of the pandemic

Maria Almasara Cyd N. Tuaño-Amador, former BSP Deputy Governor and BRAc Head; **Veronica B. Bayangos**, Principal Researcher; **Marie Edelweiss G. Romarate**, Bank Officer II; and **Carl Francis C. Maliwat**, Central Bank Associate, on spillovers and policy imperatives regarding remittances from overseas Filipinos during the pandemic

Joselito R. Basilio, Principal Researcher; and once again **Laura Britt-Fermo** and **Faith Christian Q. Cacnio**, on rethinking the frontier between monetary policy and fiscal policy in the post-pandemic era

Philippine Institute for Development Studies
Michael R.M. Abrigo and **Connie Bayudan-Dacuycuy**, both Senior Research Fellows; and **Aniceto C. Orbeta, Jr.**, President, on COVID-19-induced human capital shocks, lifetime labor productivity, and inequality

Margarita Debuque-Gonzales, Senior Research Fellow; **Ma. Christina F. Epetia**, Research Fellow; and **John Paul P. Corpus**, Supervising Research Specialist, on the effects of the pandemic on employment and wages

Charlotte Justine Diokno-Sicat, Research Fellow; **Valerie Gilbert T. Ulep**, Senior Research Fellow; **Ricxie B. Maddawin** and **Mark Gerald C. Ruiz**, both Research Analyst II; and **Robert Hector G. Palomar**, Senior Research Specialist, on public health policy and labor productivity

University of the Philippines (UP) School of Economics
Emmanuel F. Esguerra, Professorial Lecturer, and **Karl Robert L. Jandoc**, Associate Professor, on labor productivity, structural change, and COVID-19

Sarah Lynne Salvador Daway-Ducanes, Associate Professor, on the labor, macroeconomic, and welfare effects of reduced survival probabilities during the pandemic

Renato E. Reside, Jr., Associate Professor, on the impact of COVID-19 on the retirement system for private workers

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