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# Labor Productivity, Real Wages in Services and Growth in the Philippine IT-BPM Sector

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## ABSTRACT

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The expansion of the Information Technology and Business Process Management (IT-BPM) industry in the Philippines has been acknowledged as an important contributor to the country's growth performance. This study explores its specific impact on labor productivity and real wages in the services sector. Preliminary estimates based on Autoregressive Distributed Lag (ARDL)–Error Correction Model (ECM) using annual data from 2007 to 2020 reveal that growth in the industry can have important implications on labor market outcomes. First, growth in the output of the IT-BPM industry increases labor productivity and real wages in the services sector. Second, labor productivity is a positive determinant of real wages. Third, greater foreign direct investments in IT-BPM have the potential to increase real wages in the services sector. Finally, increases in the number of graduates of Information and Communication Technology (ICT)/Business Process Outsourcing (BPO)-related courses have a positive impact on labor productivity and real wages in the services sector. 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.

JEL Classification Numbers : J24, J30, L84

Keywords : labor productivity, real wages,  
services sector

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## 1. Introduction

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 or MNEs 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.

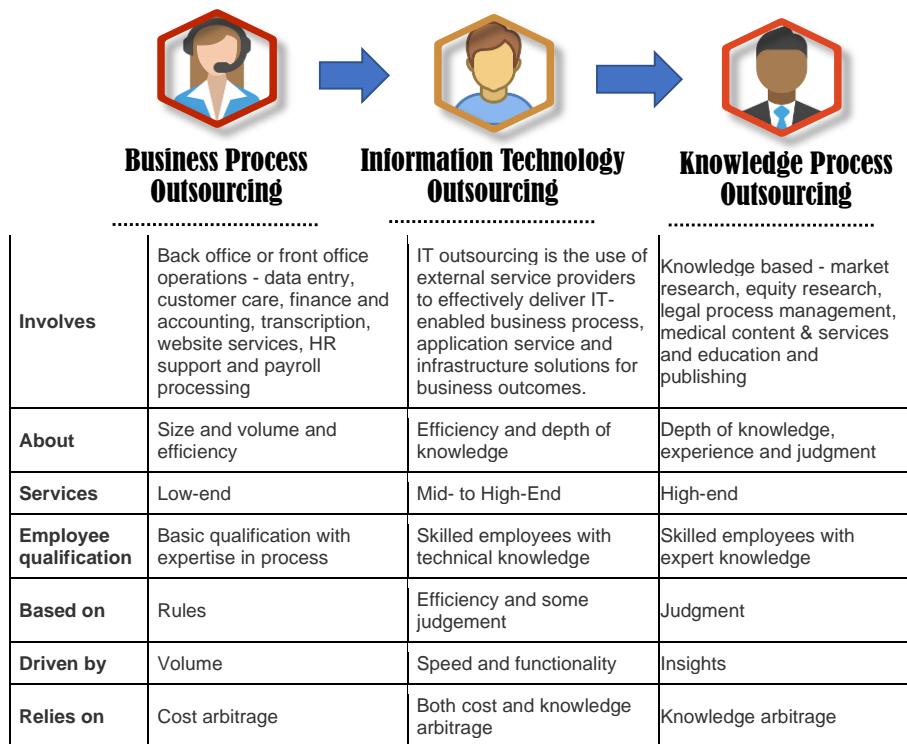
BPO operations encompass call centers or voice services and higher value non-voice BPO functions. Voice services cover most call center operations outsourced into the Philippines, which involve either calling the customer located abroad (outbound accounts) or receiving calls from the client (inbound accounts). These are activities that tend to focus on direct customer care.<sup>1</sup> The Philippines has unique comparative advantages from 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.

Diagram 1 below 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 apparel 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—this 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 usually a tertiary degree of education. This is where BPO firms, Information Technology Outsourcing (ITO) firms, and Knowledge Process Outsourcing (KPO) firms fall under.

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<sup>1</sup> Fermo and Xing (2021)

Diagram 1.



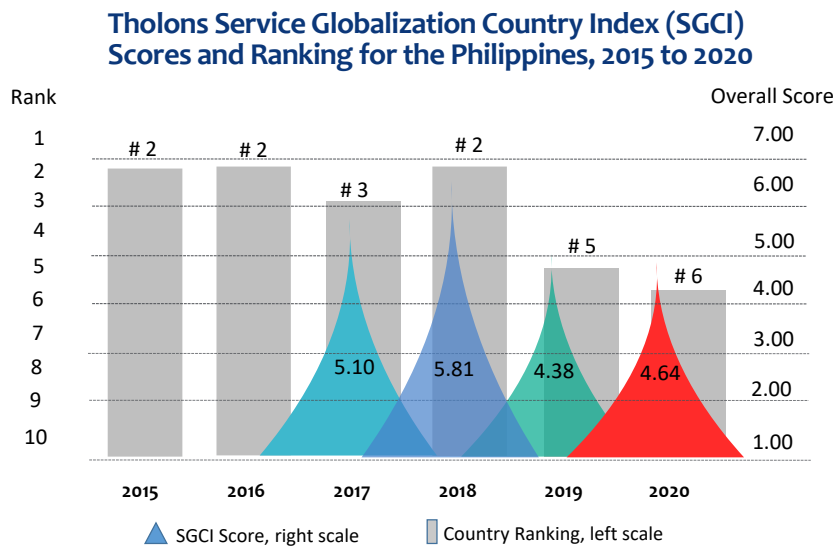
Adapted from: <https://www.managedoutsource.com/what-is-kpo-how-is-it-different-from-bpo.htm> as cited in Fermo and Xing (2021)

The sector’s competitiveness in BPO services is clearly manifested on how the Philippines has been faring well 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.

Based on A.T. Kearney’s Global Services Location Index (GSLI), the Philippines ranked consistently as Top 7 among 50 countries from 2014 to 2017. The 2017 report also named the country as an “industry leader” for its financial attractiveness, people skills and availability, and business environment. In the 2015 Tholons Services Globalization Country Index, the Philippines ranked second next to India in the Top 50 Digital Nations in the World list, with the country maintaining about the same ranking for four consecutive years.<sup>2</sup> In 2019 and 2020, however, developed economies overtook developing countries in the Top 10 rankings. The 2020 index, in particular, included a much higher emphasis on digital innovation attributes and added an assessment of how the various cities and countries have managed and are winning over the global crisis during the pandemic.

<sup>2</sup> *Ibid.*

Chart 1.



Source: Tholons Service Globalization Country Reports, various years.

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 Knowledge-Process Outsourcing or KPOs (See Diagram 1). In response to current global trends and the challenges brought on by increased automation, the Philippine IT-BPM industry has begun 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).

Data from the Bangko Sentral ng Pilipinas (BSP) in 2013, its last Survey on BPOs before this was subsequently turned over to the Philippine Statistics Authority (PSA), registered a total of 1,098 respondent firms. Meanwhile, as of August 2021, the Philippine Economic Zone Authority (PEZA) reported a total of 1,403 IT-BPM firms housed in its various EPZs. Historically, contact centers had the biggest share in terms of the number of companies in the IT BPM industry as a whole. By 2013, Other BPOs subsector, which include KPO firms, increased its share further in the industry followed by Software development. As of August 2021, Other BPOs remained as the subsector with the highest number of companies and which had the biggest increase: from 417 companies in 2013 to 594 companies as of August 2021.

The industry’s current level of maturity is showing movement into higher value-added services particularly into ITOs and KPO segments—in terms of employment share, the number of new entrants, the share to total revenues, and public-private efforts under the National Reskilling and Upskilling Program. These are all indicative that the industry has begun to go up the value chain, managing entire businesses 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, covering more and more complex work including taking responsibility for the outcomes of the services provided.

Given that the main comparative advantages of IT-BPMs in the country are in terms of human capital (low labor cost, highly skilled workforce, English proficiency and culture compatibility and adaptability), does the sector's growth have any impact on labor productivity in IT-BPMs and on real wages in the Services sector as a whole? This is the research question we wish to tackle in this study. This feature and the potential contribution of the IT-BPM sector is a topic that has not been examined in depth in the case of the Philippines and, hence, this study fills that gap. In order to establish both the long run and short run relationships between the growth in the IT-BPM sector, labor productivity measures, and indicators for real wages in services, we utilize an Autoregressive Distributed Lag (ARDL) – Error Correction Model (ECM), using annual data from 2007 to 2020. Section 2 covers a review of related literature that establishes the theoretical framework which forms the basis for the expected signs of the coefficients, as well as a review of the empirical literature which gives us a look into the case of other countries and the various methodologies used and results obtained. Section 3 discusses the relevant stylized facts on the IT-BPM sector whereas Section 4 defines the data used and sets out the empirical framework for the study. Section 5 discusses and interprets the ARDL results obtained. Section 6 briefly discusses emerging global issues and challenges being faced by IT-BPMs, while Section 7 concludes.

## 2. Review of related literature

### 2.1 Theoretical Framework

The literature provides several mechanisms to explain the linkages between real wages and productivity, and how these may be affected by international trade and investment.

#### 2.1.1 Real wages and labor productivity

The theoretical literature argues that there is a positive link between real wages and labor productivity. Traditional theory suggests that productivity determines real wages. This is based on the marginal productivity theory developed by Phillips Henry Wicksteed and John Bates Clark at the end of the 19th century (Britannica, 2016). Under this theory, a firm would be willing to pay a productive worker up to what he adds to the firm's output. In other words, workers are paid what they are economically worth—highly productive workers are highly paid, and less productive ones are less highly paid (Gho, 1999).

According to different wage determination theories, however, the evolution of wages is not only influenced by labor productivity but also by other factors, for instance,

unemployment and worker's reservation wage (Blanchard and Katz, 1999; Bell et. al., 2002). Blanchard and Katz (1999) proposed the following specification:

$$(w_t - p_t^e) = \beta y_t + \alpha r_t + \phi u_t + \varepsilon_t \quad (1)$$

where  $w_t$  is the nominal wage rate,  $p_t^e$  is the expected price level at time  $t$ ,  $y_t$  is labor productivity,  $r_t$  is the reservation wage and  $u_t$  is the unemployment rate. The coefficient of the productivity term is expected to be positive, as suggested by the marginal productivity theory. The coefficient of the unemployment term is expected to be negative. When the labor market is tight, the supply of workers is not sufficient to meet the available jobs. Hence, wages are bid up. The coefficient of the reservation wage, the level of wage at which the worker is indifferent between being employed or unemployed, is expected to be positive.

However, other theories argue that the causality goes from real wages to productivity. There are two basic arguments for this relationship.

First is the efficiency wage theory. According to this theory, a firm that pays market-clearing wages will find its workers providing minimum effort, but a firm that pays wages above market-clearing levels could induce workers to increase their efficiency or productivity. While this may seem as an additional cost to the firm, it is expected to be recouped through increased worker retention and higher labor productivity, that is, the wage increases can pay for themselves (Levine, 1992).

To explain the efficiency wage theory, Shapiro and Stiglitz (1984) show that higher real wages increase the cost of job loss or dismissal for workers. Thus, workers exert an effort level which involves no shirking. Meanwhile, Akerlof (1982) argues that the labor contract is a "gift exchange" where a firm is willing to give a "gift" of paying above market-clearing wage and, in return, workers are expected to give a "gift" of taking on more responsibilities and initiative, and of being loyal to the firm. Related to this, Dal Bó et al. (2012) show that higher wages attract more able applicants, who presumably are more productive.

Krugman (2015) explains the presence of efficiency wages in a simple model:

$$d\Pi = V(L * E(w)) - wL \quad (2)$$

where  $\Pi$  is the profit of the firm,  $V$  is the value of sales (net of purchased inputs),  $E$  is worker's productivity, which is assumed to be an increasing function of wage ( $w$ ), and  $L$  is employment. Differentiating (2) with respect to  $w$  yields:

$$\frac{d\Pi}{dw} = \frac{\partial V}{\partial E} \frac{\partial E}{\partial w} - L \quad (3)$$

In the absence of efficiency wages, increasing wages has a clear negative effect on profits, that is  $\frac{d\pi}{dw} = -L$ . However, based on the assumption that worker effort is increasing in wages,  $\frac{\partial E}{\partial w} > 0$ , and that higher worker productivity increases sales  $\frac{\partial V}{\partial E} > 0$ , then  $\frac{d\pi}{dw} > 0$ .

The second argument explains the relationship between real wages and productivity in the context of labor-capital substitution (Wakeford, 2004). Under this framework, an increase in real wages will put upward pressure on labor costs, causing firms to substitute capital for labor. This substitution will then raise marginal productivity of labor.

### 2.1.2 Productivity and international trade and investment

The literature has also pointed to the role of international trade and investment in productivity growth. Export-led growth models stress that exports are a key factor in promoting productivity growth. Several explanations for the causal link between exports and productivity have been put forth (Bhagwati, 1978; Kunst and Marin, 1989).

First, a country concentrates its investments in the most efficient sectors of the economy—those in which it has a comparative advantage. Stronger specialization in these sectors is seen to increase productivity. Second, higher export growth allows a country to gain from economies of scale as the inclusion of the international market to the domestic market permits larger scale operations than does the domestic market alone. 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 productivity of the economy via externalities of exports on other sectors.<sup>3</sup>

Other theories suggest that more productive firms self-select into export markets (Wagner, 2005; Bernard and Jensen 1999; Hallward-Driemeier, et al., 2002). The reason for this is that there exist 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 skill to manage foreign networks. These costs provide an entry barrier that less successful or less productive firms cannot overcome. Furthermore, 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, the impact of foreign direct investment (FDI) on labor productivity can occur through several channels (Blomstrom and Kokko (1998), Fosfuri et al. (2001)), Mahmood and Chaudhary, 2012). First, studies contend that the presence of foreign firms can cause labor productivity in the domestic economy to increase primarily through direct

<sup>3</sup> This could be in the form of knowledge spillovers (for example, more efficient management styles, better forms of organization, labor training, and knowledge about technology and international markets).



technology transfers. Foreign firms usually 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 investors 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 investors buy intermediate goods from local firms. Foreign investors may be willing to share local suppliers some knowledge in order for the latter to meet their requirements. Fourth, positive externalities may also occur when domestic labor hired by foreign firms later on transfer to local firms. Knowledge learned by local employees may then be transferred to the latter.

Moreover, as FDI is likely to bring superior technology to the domestic economy, it has a tendency to shift labor demand away from less skilled to more skilled labor.<sup>4</sup> Since skilled labor have higher wages, this shift increases the average wage. If labor supply in general and supply of skilled labor in particular are constrained, equilibrium wages are likely to rise on average and the skill premium is likely to increase (Hale and Xu, 2016).

## *2.2 Empirical Literature*

Multiple empirical approaches have been utilized in the literature to analyze the impact of sector participation in the Global Value Chains for both production and services.

### *2.2.1 GVCs and productivity*

Pattnayak and Chadha (2019) use a fixed effects model using data for the period 2001 to 2016 to show, among other things, that the age of an Indian IT firm is positively and significantly related to GVC participation, invoking the argument of Balik and Gort (1993) that experience gained over time may lead to increased productive efficiency.<sup>5</sup>

Meanwhile, Urata and Baek (2019) employed ordinary least squares and two-stage least squares on manufacturing sector data of 47 countries for the period 1995 to 2011 to establish the benefits of GVC participation on total factor productivity growth. Urata and Baek (2019) also pointed to Kummritz (2016), who established increased labor productivity as a result of GVC participation.

Asada (2020) shows that for Vietnam, 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, Asada (2020) did not arrive at a conclusive

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<sup>4</sup> Superior technology brought by foreign firms requires more skilled labor (skill-complementary technology).

<sup>5</sup> The particular work of Balik and Gort (1993) cited by Pattnayak and Chadha (2019) could not be ascertained from the latter's work, but an educated guess is included in the References section of this Discussion Paper based on a related citation by Ilaboya and Ohiokha (2016).

relationship for the short run, citing how firms established through FDI need time to be fully set up before production can commence.

### 2.2.2 GVCs and wages

The direction of the impact on wages by GVC participation, however, seems to be more complex. Paweenawat (2019) analyzes 32 industries in Thailand to show that those that had “higher engagement in GVCs have higher wages for workers” (p. 27). Further, Paweenawat (2019) follows an interesting two-stage regression approach by first relying on a “worker-level regression” (p. 14), in order to produce a dependent variable for an “industry-level” (p. 14) regression. Paweenawat (2019) also provides excellent referrals to other empirical studies showing higher wages from GVC participation. For example, Baldwin and Yan (2014) utilize propensity-score matching and difference-in-difference methodologies (Paweenawat, 2019), showing that for 2002 to 2006, Canadian manufacturing firms with significant GVC participation “paid higher wages” (Baldwin and Yan, 2014, p. 12).

In comparison, Parteka and Wolszczak-Derlacz (2018) employ linear approaches to arrive at more nuanced findings for selected EU countries and the U.S., one of which was an overall inverse though weak relationship between GVC participation of an industry and corresponding wage levels. When running the analysis on subgroups, however, Parteka and Wolszczak-Derlacz (2018) highlight that “closer GVC ties drive down the wages of Western European workers (regardless of task type) but exert an upward push on the earnings of American workers in the more demanding occupations” (pp. 523-526).

## 3. Stylized Facts

We share here a few stylized facts that are relevant in the study of the IT-BPM sector.

**3.1 Outsourcing is not a new concept for the Philippines.** EPZs have been in the country since the early 1970s, and at that time the Philippines found its competitive edge in electronics and electrical machinery and semiconductor assembly<sup>6</sup> – the second box in GVC categories discussed in the previous section. From only 16 public and private economic zones between 1969 to 1994, there are currently 551 operational and proclaimed EPZs in the country as of August 2021, and out of that number, 311 or 56 percent are Information Technology (IT) centers, and 15 percent are IT parks. Apart from the opportunity to establish a business at one of the premier economic centers, Philippine Economic Zone Authority (PEZA)-registered companies, including IT-BPM firms, are provided with several fiscal and non-fiscal incentives.

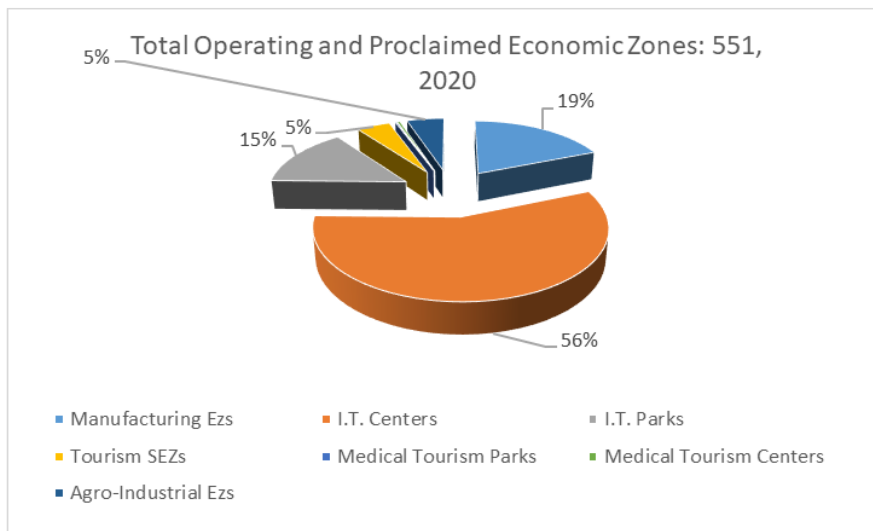
Meanwhile, in terms of wage indicators, a study conducted by the Ecumenical Institute for Labor Education and Research (EILER) in 2009 revealed that 60 percent of BPO

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<sup>6</sup> Fermo and Xing (2021)

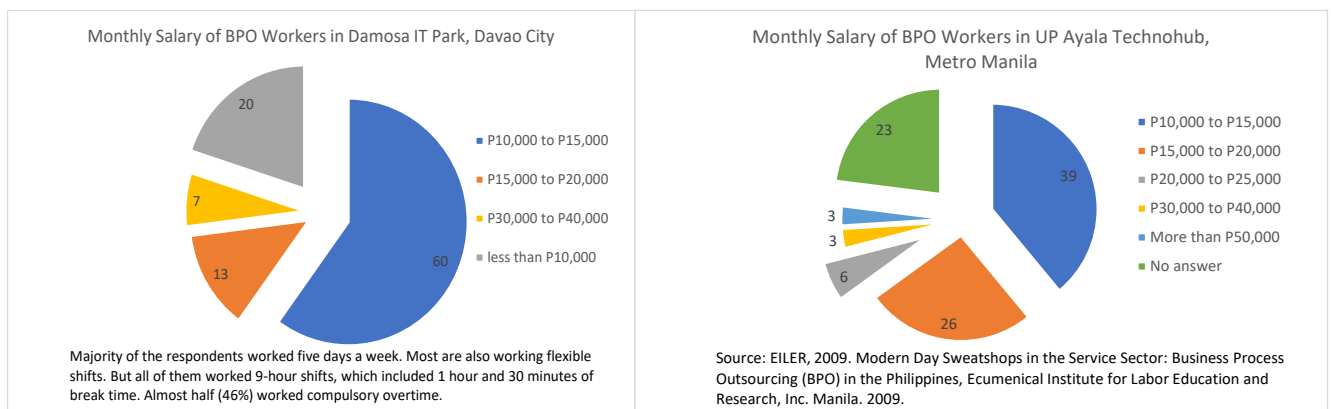
workers in Davao City’s Damosa IT Park had an average salary per month of between Php10,000 to Php15,000. In the UP Ayala Technohub, located in Quezon City, 39 percent were earning between Php10,000 to Php15,000 per month, whereas 26 percent were earning from Php15,000 to Php20,000. Using the average exchange rate of Php47.64/US\$1 in 2009, Php15,000 is equivalent to about US\$315 per month. As of 2018, the IT and Business Process Association of the Philippines (IBPAP) reported that the average annual salary for IT and BPO workers in the Philippines is US\$17,270 per year, or about US\$1,440 per month. By comparison, the average graduate starting salary in Australia in 2018 was US\$64,455 annually, while in the US it is roughly US\$46,800 per annum.<sup>7</sup> Glassdoor, Inc., a recruiting site based in the US, reported that the hourly wage for a call center agent in the Philippines is around \$2.60, while the hourly wage of a call center agent in the US is at \$17.00.

Chart 2.



Source: Philippine Economic Zone Authority

Chart 3.



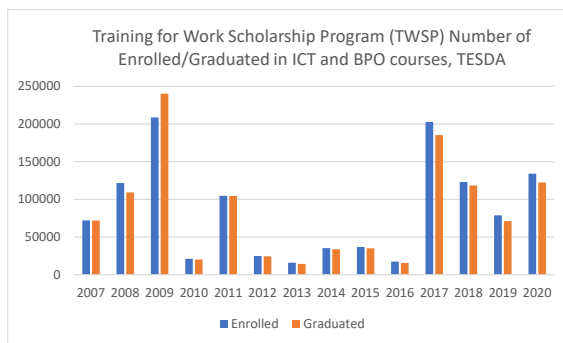
<sup>7</sup> Ibid.

### 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.

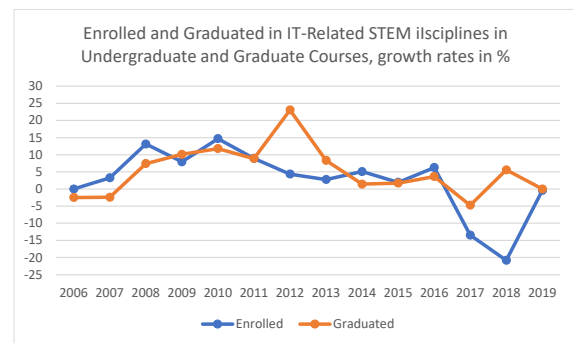
Evidence from India suggests that opening up sectors like telecommunications, finance and insurance, as well as services exports from the BPO sector, increased educational attainment in India.<sup>8</sup> Looking at indicators on the number of Technical and Vocational Education and Training (TVET) enrollments and graduates particularly in ICT and BPO fields, we see spurts in 2009 and 2011 and then in 2017, but some waning two years after. In 2020, virtual modes or online training may have helped sustain enrollment and the number of graduates. In terms of growth rates in enrollment and graduates in Science, Technology, Engineering and Math (STEM) disciplines, however, there has been substantial waning beginning in 2017.

Chart 4.

#### Education in STEM, CHED and Skills Training in ICT and BPOs, TESDA



Source: TVET Statistics, TESDA website



Source: PIDS, CHED

The latest offerings of free ICT-related courses in Technical Education and Skills Development Authority (TESDA) centers are also reflective of the objective to move into more complex, higher-skilled segments of the IT-BPM industry, in addition to the regular offering of English Language Proficiency classes, Medical Transcription, and Contact Center Services courses and the like. There are also BPO companies (such as Sitel) that have either put up their own “academy” or partnered with academic institutions whereby senior high school students are taking up new full courses that teach and test the skills required for smooth integration and successful employment into Call Center services and BPO firms in general.

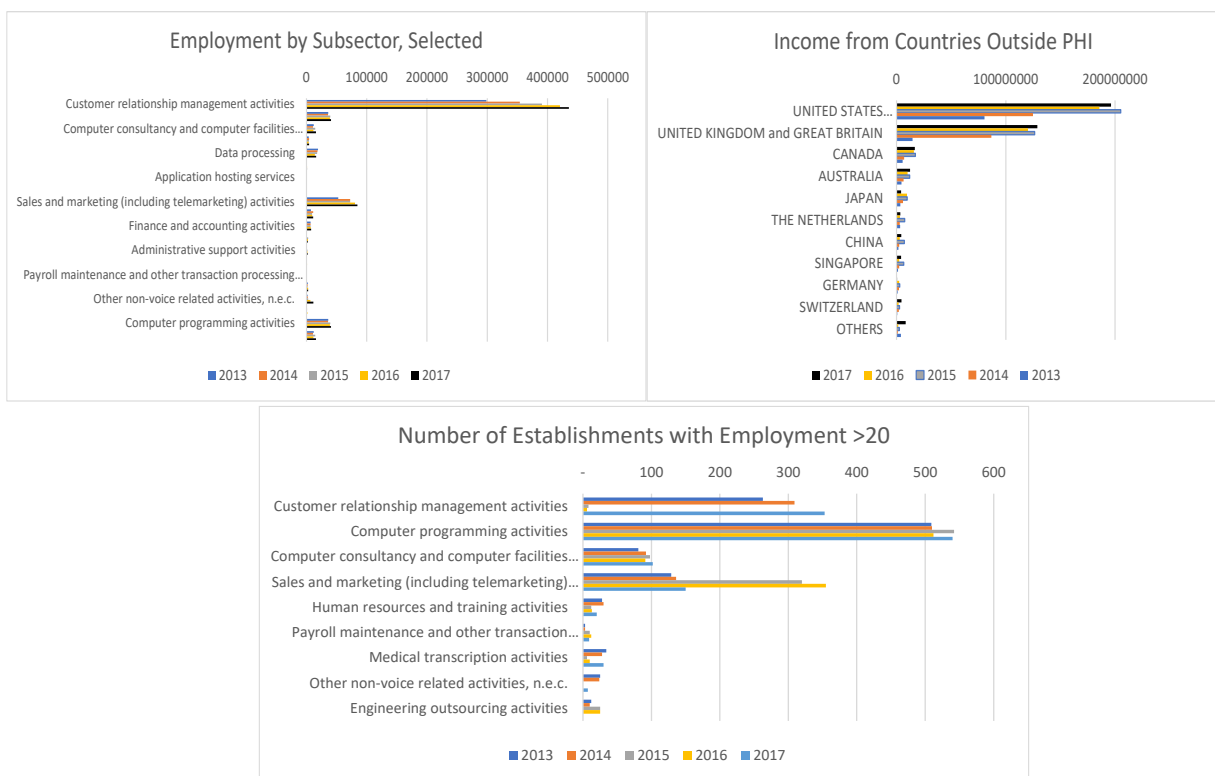
**3.3 Sales revenues and employment has been growing steadily in the Philippine IT-BPM industry.** Based on data from the BSP—and the IBPAP, the IT-BPM sector exhibited double-digit positive annual growth rates in sales revenues from 2004 to 2016. Beginning 2017, we see a waning in the growth, but this picked up somewhat in 2018 and 2019. The level of sales revenues for 2018 and 2019 is about 7.0 percent of Philippine Nominal GDP in US\$ terms—not far when compared to the annual share of overseas remittances to GDP for the same year, which was about 10.0 percent. Forecasts from the Everest Group indicate that the IT-BPM’s share could well reach about 8.5 percent in 2022. Meanwhile, total IT-

<sup>8</sup> Nano et al. (2021), Jensen (2012), Shastry (2012)

BPM employment grew from 94,000 in 2005 to an estimated 1.3 million in 2019, and this could be traced 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.<sup>9</sup>

Based on PSA survey data for IT-BPM establishments with 20 and above employees from 2013 to 2017, Customer relationship management activities continue to account for the bulk of employment with a share of about 65 percent and employing about 450,000 Filipinos in 2017, followed by Sales and marketing activities and Computer programming and computer consultancy activities. Income of the sector from outside the Philippines is mainly from the United States, accounting for about 67 percent, followed by the UK and Great Britain. In terms of the number of establishments in the PSA surveys, computer programming activities dominate the sector, followed by customer relationship management activities and sales and marketing activities (which surged in 2015 and 2016).

Chart 5. Annual Survey of PHI Business and Industry: IT-BPMs, 2013-2017



Source: Philippine Statistics Authority

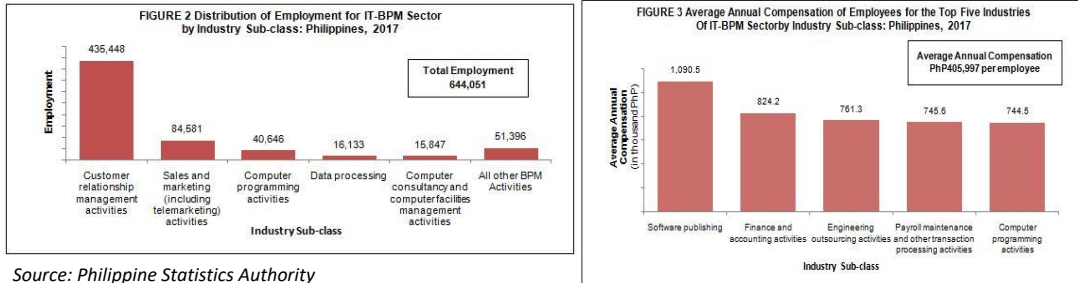
Meanwhile, annual average compensation was the highest in software publishing at about P1.0 million per year or at P90,875 per month, followed by Finance and Accounting, Engineering outsourcing, payroll and maintenance, and Computer programming (See Chart 6).

<sup>9</sup> Fermo and Xing (2021)

Chart 6.

### Distribution of Employment and Per Worker Compensation in IT-BPMs

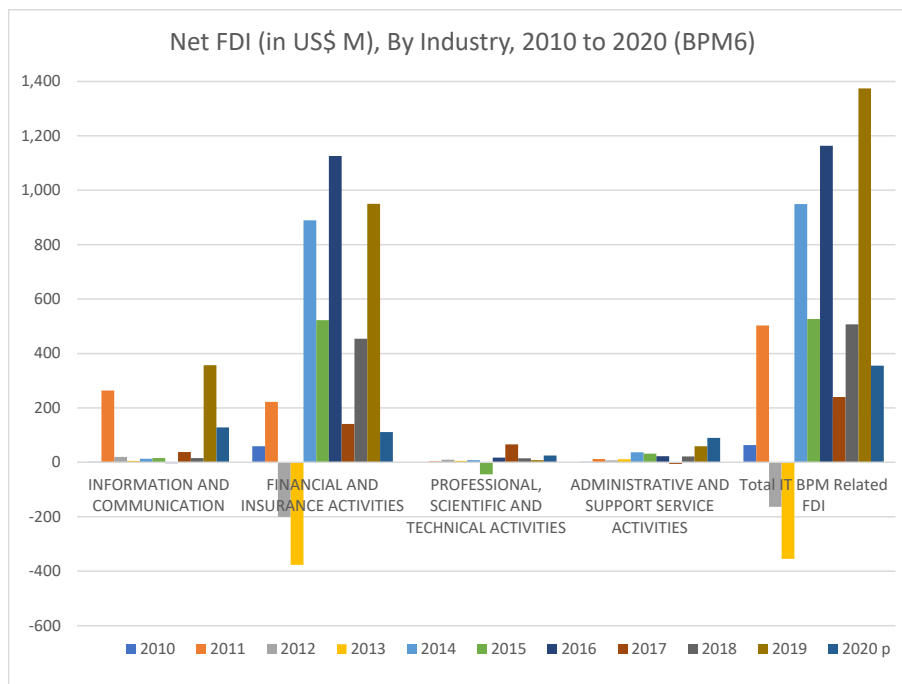
Latest data from the Annual Survey of Philippine Business and Industry (ASPBI), released in January 2020



Source: Philippine Statistics Authority

3.4 **The lion’s share of the FDI inflows in 2013 went into contact centers**, accounting for 48.1 percent, followed by Software development at 27.4 percent. The third top FDI destination subsector is Other BPOs, where KPOs and higher value-added services are subsumed. The top 3 sources of foreign equity by 2013 are Europe, the US, and Japan, in this order. More recently, net FDI in IT-BPM related industries (based on BPM6 data), has been erratic on a year-on-year basis, but surged generally into Financial and Insurance Activities; 2019 saw a surge into Information and Communication as well.<sup>10</sup>

Chart 7.

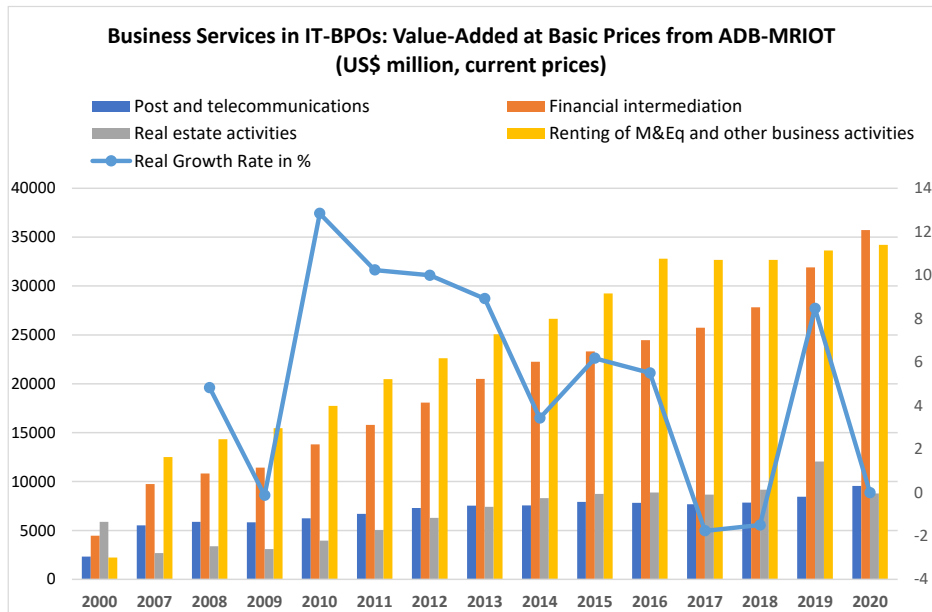


Source: BSP Balance of Payments Statistics (BPM6)

<sup>10</sup> Ibid.

3.5 From the ADB-Multi-Regional Input-Output Tables (MRIOT), Financial Intermediation and Renting of Machinery and Equipment and Other Business Activities account for the bulk in Value Added within the GVC framework of analysis. For the sector as a whole, real growth rate averaged about 5 percent over the period 2008-2020 (See Chart 8).

Chart 8.



## 4. Data Definitions and Empirical Methodology

4.1 The data that we will be using in the estimation are the following.

- BSP (2004 to 2013) annual data on Revenues, Employment, FDI, Exports, and Compensation, and IBPAP (2004 to 2021) annual data on Revenues and Employment (including forecasts from The Everest Group)
- PSA data (with subsectors) on No. of Establishments, Employment, Income from Outside the PHI of the IT-BPM Sector (from ASPBI), but annual data for 2013 to 2017 only. The Philippine Economic Zone Authority also provides information in terms of the number of IT-BPM establishments which have located in its Economic Zones.
- ADB's Multiregional Input-Output Tables for "corrected" Value Added data based on GVC Analysis (annual data from 2007 to 2020). ADB augmented the World Input-Output Tables (WIOTs) in order to facilitate analysis related to the Asia and the Pacific Region. Nineteen (19) Asian economies were added into the WIOTs for the years 2000, 2007 to 2020. This has facilitated the production and analysis of global value chain-related statistics for a total of 25 Asian economies.

GVC Analysis points to a case of double-counting in traditionally reported export earnings which underestimated bilateral trade deficits, especially in the case of the Philippines where its top exports are also its top "importers". In measuring the labor productivity of the Philippine IT-BPM sector, which is a participant in the GVC for business services, we computed for labor productivity in IT-BPMs using Value Added data from ADB MRIOT divided by employment in IT-BPM related sectors from the PSA.

Based on the industry classifications in the ADB MRIOT, what we are picking up as the IT-BPM-related sectors is the closest approximation to the IT-BPM sector's Value Added in the context of GVC analysis. These would include: Telecommunications, Financial Intermediation, and Real estate, renting and business activities, and Other renting and business activities. Note that this subsector classification is very similar to the industry classification used by the PSA's labor force survey as well as the national income accounts.

In order to provide an answer to the research question that is based on an objective, empirical approach, we use Autoregressive Distributed Lag (ARDL)-Error Correction (EC) technique as well as Granger Causality tests. The ability of ARDL to differentiate short-term from long-term relationships (Asada, 2020) was seen as appropriate for the research question at hand. Meanwhile, Granger causality establishes and confirms the direction of causality among the variables being estimated.

ARDLs are standard least squares regressions that include lags of both the dependent variable and explanatory variables as regressors (Greene, 2008). 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 (PS) (1998) and Pesaran, Shin and Smith (PSS) (2001). The ARDL model is used to estimate relationships between (economic) variables in a single-equation time series setup.

Meanwhile, the ARDL-EC model is useful for forecasting and disentangling long-run relationships from short-run dynamics. Given data limitations, one of the advantages of the ARDL test is that it is more robust and performs better for a small sample size of data, which is suitable for this research. Cointegration of nonstationary variables is equivalent to an error correction (EC) process; the ARDL model has a reparameterization in EC form (Engle and Granger, 1987; Hassler and Wolters, 2006).

ARDL( $p, q, \dots, q$ ) model:

$$y_t = c_0 + c_1 t + \sum_{i=1}^p \phi_i y_{t-i} + \sum_{i=0}^q \beta'_i \mathbf{x}_{t-i} + u_t,$$

$p \geq 1, q \geq 0$ , for simplicity assuming that the lag order  $q$  is the same for all variables in the  $K \times 1$  vector  $\mathbf{x}_t$ .



Alternative EC parameterization

$$\Delta y_t = c_0 + c_1 t - \alpha(y_{t-1} - \theta \mathbf{x}_{t-1}) + \sum_{i=1}^{p-1} \psi_{yi} \Delta y_{t-i} + \omega' \Delta \mathbf{x}_t + \sum_{i=1}^{q-1} \psi'_{xi} \Delta \mathbf{x}_{t-i} + u_t,$$

## 5. Presentation of Results

### 5.1 Granger Causality Tests

Table 1. Pairwise Granger Causality Tests

Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
GVCVALADD does not Granger Cause PRODYBPMCALGVC	11	5.42595	0.0451
PRODYBPMCALGVC does not Granger Cause GVCVALADD		0.59967	0.5789

Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
PRODYBPMCALGVC does not Granger Cause REALWAGNCR	11	0.56138	0.5977
REALWAGNCR does not Granger Cause PRODYBPMCALGVC		5.06150	0.0515

Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
REALWAGOUTNCR does not Granger Cause PRODYBPMCALGVC	11	4.99938	0.0527
PRODYBPMCALGVC does not Granger Cause REALWAGOUTNCR		0.34437	0.7218

Looking at the direction of causality, value-added in IT-BPM (GVCVALADD) Granger causes productivity (PRODYBPMCALGVC), and real wages in both NCR (REALWAGNCR) and outside NCR (REALWAGOUTNCR) Granger causes productivity.<sup>11</sup> Nonetheless, when the number of lags is changed, results become insignificant. Thus, a Toda-Yamamoto causality tests may be conducted to confirm the results.<sup>12</sup>

Part of the next steps into the estimation process is to do the estimation with exports as an additional variable. Granger causality alone is indicating that exports Granger causes both labor productivity and real wages, while initial ARDL Bounds test results

<sup>11</sup> 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).

<sup>12</sup> Toda-Yamamoto is more reliable because it is robust whether the variables are cointegrated or not cointegrated (Toda-Yamamoto, 1995).

indicate that there is a long run cointegrating relationship between exports, labor productivity, and real wages. However, when we proceeded to estimate the ARDL for the short run dynamics, we were not able to find a specification where exports growth is a significant variable. There is a need to study this further as it can be an issue on the short sample size, or perhaps there is a need for better labor productivity and exports data (extracted for IT-BPM specifically rather than merely lifted in a secondary manner from related datasets).

## 5.2 Results from the ARDL-EC Model

Table 2. ARDL Estimation Results

ARDL (Short-run dynamics; bounds test results); All variables in log except ER				
	Model 1.1	Model 1.2	Model 2.1	Model 2.2
<b>Cointegration present for these Variables as Dependent</b>	Labor Productivity		Value Added from MRIOT	
<b>Dependent Variable</b>	Labor Productivity (LP) <sup>1</sup>	Labor Productivity (LP) <sup>1</sup>	Real Wages in NCR(RealW)	Real Wages in NCR(RealW)
<b>Dynamic Regressors</b>	LP (-1)***	LP (-1)***	RealW(-2)	RealW(-2)
Coeff	-1.35	-0.38	-0.32	-0.40
t-stats	-9.48***	-1.84	-4.73*	-5.44*
	GVC Value Added in IT BPM sectors (GVC VA)	GVC VA	GVC VA	GVC VA
Coeff	0.69	0.27	1.78	-0.005
t-stats	6.38**	1.46	6.29*	-0.010
	GVC VA (-1)	GVC VA (-1)	GVC VA (-1)	GVC VA (-1)
Coeff	0.36	-1.57	-2.54	-1.487
t-stats	3.75*	-3.78	-6.95*	-4.03*
	GVC VA (-2)	GVC VA (-2)	GVC VA (-2)	GVC VA (-2)
Coeff	0.39	2.13	2.78**	3.435
t-stats	3.83*	6.25*	11.34	10.20**
	Exchange Rate (ER)	ER	Labor Productivity (LP) <sup>1</sup>	Labor Productivity (LP) <sup>2</sup>
Coeff	0.02	-0.018	2.05	2.478
t-stats	7.58***	-4.64*	6.24*	5.97*
	ER (-1)	ER (-1)	LP(-1)	LP(-1)
Coeff	-0.05	-0.041	0.60	-4.03
t-stats	-12.45***	-4.40	2.46	1.49
	ER (-2)	ER (-2)	LP (-2)	LP (-2)
Coeff	0.00	0.026	-3.66	-0.005
t-stats	2.59***	3.577	-13.34**	-12.64**
<b>Fixed Regressors</b>				
	FDI in Professional, Scientific and Technical	Enrolled in TWSP-ICT (ICT enrol)	Graduated in TWSP-ICT (ICT grad)	FDI in Information and Communication
Coeff	-0.00078	0.030	0.039432	0.000349
t-stats	-12.37***	5.60*	4.30*	3.62*
Adjusted Rsquared	1.000	0.999	0.99	0.99
Akaike Information Criterion	-9.485	-8.564	-6.50	-6.18

Evidence from preliminary ARDL estimation indicates that growth in the output of the IT-BPM sector is a positive determinant of labor productivity and of real wages (except in Model 2.2). Labor productivity is also a positive determinant of real wages. Based on the review of related literature in the earlier section, this is as expected from theory. The exchange rate has a positive contemporaneous effect in Model 1.1, but in lagged values

the results can be either positive or negative. This is an indication that despite a positive current period to current period relationship, the relationship between the two variables may not be robust over time, given that exchange rates are influenced by a host of external factors not captured in this estimation model. FDI in IT-BPM has a small positive effect on real wages, but a small negative effect on labor productivity. As discussed in the literature review, there are several channels by which FDI can influence real wages positively, especially in the long run. However, it is also plausible that FDI has a negative short-run impact on labor productivity and we discuss this in more detail in the subsequent section

5.3. Finally, another significant variable in the estimation are TESDA enrollees/graduates of ICT/BPO courses. As expected in the literature on the impact of education and training on wages and productivity, our results indicate that this variable has a positive impact on labor productivity and real wages.

5.4 We would like to take note of two main caveats as these results are preliminary. The study is still a work in progress, and there is a need to study and refine the estimation further:

- a. There is still a need to estimate the EC associated with the cointegrated relationship according to the ARDL bounds test as the next step in our estimation process, and look into exports of IT-BPM as an additional variable in the empirical exercise.
- b. There is a need to obtain better productivity measures. Current productivity estimates may be biased due to measurement issues. Simply defined, productivity is the amount of real output produced by a given set of real inputs. This implies that the quantity of output and inputs, as well as the prices used to deflate both components, must be captured accurately. This is difficult to do in practice given the inherent characteristics of services.

To this end, we have collaborated with Mr. Joseph Mariasingham of ADB, seeking assistance to obtain better labor productivity estimates extracted from the ADB MRIOT using a more granular subsector classification extracting output data within the GVC framework of analysis which would specifically account for all IT-BPM subsectors in the MRIOT tables. We have also submitted a request to the PSA for a longer time series and more disaggregated labor force participation data by industry. Upon receipt of the extracted information from ADB as well as the disaggregated labor force data from the PSA, all the necessary refinements in the estimation procedures and results for this discussion paper will be updated into the study accordingly.

5.5 On the negative impact of FDI on labor productivity

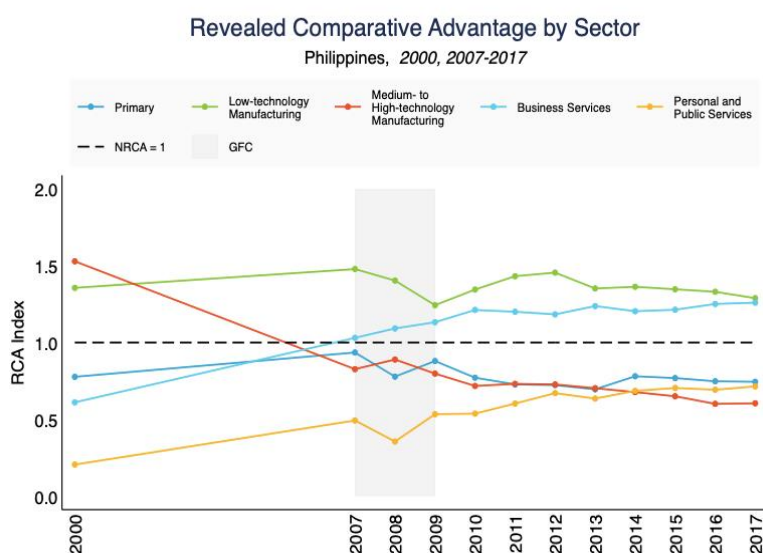
The negative coefficient for the FDI indicator as a determinant of labor productivity which we had obtained and noted in the previous section is a very interesting result as it goes against what is initially expected from theory. Nonetheless, there are, in fact, various

studies in the literature which indicate that in the short run such a negative relationship is plausible. One possibility is that foreign firms may be attracting skilled labor with the highest ability, leading to lower quality of skilled labor left for domestic firms. The results may be reflecting that the latter effect outweighs the former, at least in the short run. This result may be plausible given that the supply of skilled labor is very inelastic in the short and medium run (Hale and Xu, 2016).

### 5.6 On the Revealed Comparative Advantage estimates for IT-BPM related sectors from the ADB-MRIOT

Revealed comparative advantage (RCA), based on ADB-MRIOT, portray how much RCA has been lost by the Philippine electronics export sector (which falls under Medium to High-Technology Manufacturing). This was compensated for, in almost mirror-image, by RCA gains in ICT/Business services where IT-BPMs belong (Chart 9).

Chart 9.



Source: Authors' estimates based on WWZ (2018) using ADB-MRIO (2000, 2007-2017).

Source: Asian Development Bank

## 6. Current Global Issues and Challenges Facing IT-BPMs

The U.S. remains to be both a primary target market as well as a player in the GVC for business services. As such, firms in countries such as China, Malaysia, Thailand, and Indonesia continue to expand IT-BPM service offerings. Known players, however, should also expect to see increased competition from African and Latin American entrants.

Consumers of IT-BPM services will place a heavier emphasis on a provider's ability to embrace technological innovation, and less on potential cost savings from cheaper labor (Deloitte, 2014). Indeed, low wages are rapidly becoming less and less of a concern. To start

with, what were considered repetitive, low-skilled services in developed countries were provided by higher-skilled professionals in developing countries, with the relatively higher wages compared to other sectors in these countries being a major incentive. Median hourly earnings for ICT workers have been found to be 150 percent higher than for those in urban and non-ICT sectors. In general, firms in sectors that relied greatly on the internet and software also saw relatively higher wage increases regardless of skill level, in comparison to other parts of the economy (World Bank, 2016).<sup>13</sup>

Meanwhile, looking more closely into what appears to be a shift in global rankings for players in the GVCs for business services, the new entrants to the top 10 are developed countries who improved their scores in the index by double-digit terms. From the Tholons 2020 Index, the U.S., Canada and the UK, improved their rankings somewhere between 14 to 21 steps in the past three years. In addition, Singapore—an industrialized Asian nation—also improved by a total of 12 steps 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, they achieved this almost solely via improvements in innovation/ digital scores by almost the same increments. The key takeaway then is that for a leading IT-BPM economy like the Philippines to stay on top of the global digital outsourcing market, it needs to achieve large improvements in terms of digital innovation and transformation. By doing so, it can retain (or reclaim) competitiveness in higher value-added markets that are now the fast-moving subsectors of the global IT-BPM industry.

Just as in the case of Tholons' SGCI top 50 Digital Nations rankings, A.T. Kearney finds that digital capabilities are integral parts of decisions about offshoring operations locations, and this is the reason they have redefined the categories and scores in the surveys that they conduct beginning in 2019. As the industry had been disrupted by automation, the criteria for the ranking in their Global Services Location Index (GSLI) was revised. This was in order to reflect for the increasing importance of digital considerations in the decisions of companies particularly on the need for fewer employees who specialize in repetitive tasks and more employees with the creative capacity and business knowledge necessary to manage automation.

According to A.T. Kearney, the information technology outsourcing (ITO) and business process outsourcing (BPO) industry has faced significant disruption from digital transformation, and the strongest impact is from two adjacent forces—automation on the one hand and heightened cybersecurity concerns on the other. In 2017, the A.T. Kearney GSLI report alluded to anonymous data centers hosting cloud-based automation replacing human labor in ITO and BPO and transforming business models by challenging traditional employment patterns. Two years after the 2017 report was published, this shift is clearly taking place. Their 2019 report noted how low-cost countries are losing jobs due to increased automation in the sector and that new, more highly skilled jobs are being created in certain countries to manage the demands from automation. Countries are seeing their

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<sup>13</sup> As cited in Errighi, Khatiwada, and Bodwell (2007).

labor forces shifting rapidly and that fast-growing automation start-ups are driving this disruption.

Also based on A.T. Kearney's 2017 report, the analysis of the net impact of automation on the labor force must also include job creation that results from new technology. 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. The study 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 economy/onshore countries like the U.S. and the UK, for example. The net impact, therefore, of automation on a country's IT-BPM employment, depends on the complex mix of the jobs eliminated versus those that are reshored.

A.T. Kearney presented their estimated net impact of automation on BPO employment for four major players or representative economies, including the Philippines. The report continues that for an offshore country like the Philippines, its employment in IT-BPM is relatively more protected from losses compared to other providers, at least in the short-term, due to the concentration of its customer-service oriented activities. The very nature of customer service-based services is such that it has a lower probability or lower immediate potential for automation, at least over the next three to five years. Despite the lower estimated probability of job losses when compared to other major IT-BPM exporters such as India and Poland, however, A.T. Kearney projects 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. With the current lack of home-grown companies, the study also submitted that the Philippines, at its current level of skills and R&D, is not going to benefit much from these new high-skilled jobs created from automation. It therefore stands to face the estimated job losses over the short to medium term, unless the country and the industry are able to either upskill and reskill the workforce *en masse* now, unravel brand new export opportunities for its current segments, or both.

A third global survey we have examined for this study, termed as the Deloitte's Global Outsourcing Survey, takes the pulse of global outsourcing and insourcing by polling executives from leading organizations about their observations, expectations, and experiences. In 2014, Deloitte's survey results indicated several emerging technologies, including big data analytics and data science—along with advancements affecting the nature and complexity of service delivery—were shaping new and important outsourcing opportunities and challenges. The overall value proposition of managed service providers therefore needed to change, just as these technologies and advancements have evolved over time. To track developments in global outsourcing, Deloitte sought to survey leaders from organizations of all sizes and operational presence in the Americas, Europe, and Asia to gain a better understanding of the changes in the industry and prospects for the future.

The results of Deloitte's 2019 survey is clear: automation and cybersecurity are becoming increasingly important in outsourcing decisions.

Deloitte's 2019 survey also shows that organizations are now rapidly taking up disruptive outsourcing technologies such as cloud and robotic process automation (RPA). Most organizations—93 percent—are considering or adopting cloud solutions, and 72 percent are considering or adopting RPA solutions. Seventy percent of respondents believe that their service providers have a reasonable or advanced ability to implement disruptive solutions.

There are therefore 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. As Doug Plotkin, Deloitte Consulting LLP's Managing Director, emphasizes:

*"As with many initiatives, organizations are finding that delivering competitive advantage through disruptive outsourcing solutions is anything but simple; effort and expertise are needed to address potential data security and cyber risks, changing regulations, organizational resistance, skill gaps, and to help flatten fragmented processes. In this new world, place your bets on the brave and the good, and against the fearful and complacent."*

In order to address these challenges, R&D, state-of-the-art IT resources, and 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 was devised by Stan Shih, founder of Acer, and shows the level of value added in different phases of an industry or service value chain. Traditionally, the segment of a value chain that represents a higher value proposition are dominated by firms from advanced economies; while firms from developing and emerging economies tend to be "trapped" at the standardized or repetitive segments characterized with lower value-added. According to Isalm (2011), however, the unprecedented growth of ICT over the years has opened up possibilities for developing economies to move up the value chain.

Mudambi (2008) illustrates that the smile curve of value creation is such that 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 which, when plotted, form a U-shape similar to a smile.<sup>14</sup> The middle part of the value chain, which consists mainly of basic manufacturing and standardized or repetitive services, represent the low value-added segments of a

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<sup>14</sup> Ye, Meng and Wei (2015).

sector. Earlier on, the higher value-added activities were dominated by advanced economies, but with rapid changes in digital technology and innovation, the spillover effects particularly via FDI between developed and emerging economies have provided a way to “leapfrog” towards higher value-added segments. To relate this framework to the Philippine case, we take the example of call center services. Majority of call center services involve repetitive tasks and are, therefore, at the bottom of the curve of the value chain for business services, representing low value-added. But as the industry moves towards ITOs and KPOs, then it moves up the value chain curve towards either innovation and design, or towards after-sales and marketing—which involve higher-level skills and are of higher value-added than before.

## 7. Conclusion

There continues to be serious challenges ahead for the Philippines and the IT-BPM sector. However, there are also a wealth of opportunities that can be taken advantage of if leaders from the public and private sectors work together to equip the country’s talent pool with the skills necessary for shifting to higher-value jobs and services. IBPAP points out, and with this we agree, that there is a need to put policies 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, academe, and government. This is the very same strategy the Deloitte outlined in its 2019 report of survey results from global firms and companies. What it has termed as *Disruptive Outsourcing*, according to Deloitte (2019), is the new normal for IT-BPM outsourcing services in the world today. Indeed, although widespread digitalization had already been pushing the Philippines’s upskilling and reskilling agenda forward, the health crisis of 2020 has become an additional impetus. It is in this vein that eleven (11) national government agencies forged an agreement during a virtual launch on 25 June 2021 of the Philippine Skills Framework (PSF) under the under the Inclusive Innovation and Industrial Strategy (i3S).<sup>15</sup> The collaboration is aimed at enhancing and equipping the Philippine workforce with new digital skills to prepare them for the future of work.

Given the positive impact of IT-BPM output growth and of IT-BPM related education and training on labor productivity, the Philippine IT-BPM sector appears to have the opportunity to improve labor productivity further mainly via 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 via TVET within the next short term to medium term is a key policy prescription, and an urgent call, in almost all studies in the literature conducted by both international and domestic institutions. Based on the results of this study, improved and broader provision of trainings on ICT and BPO skills and basic education geared towards innovation, creativity, science and engineering, could lead to higher productivity which, in turn, could potentially help move up the sector in the global

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<sup>15</sup> DTI (2021). “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, namely (1) new industry clusters, (2) human capital development, (3) innovation and entrepreneurship, (4) micro, small, and medium enterprise (MSME) start-up development, and (5) ease of doing business.”



value chain in business services. These could help ensure and even progress the industry's competitiveness, and improve real wages, in the post-pandemic era.

This is good news for stakeholders such as the IBPAP, which is crafting a roadmap to carry the industry through to the year 2028<sup>16</sup>. This paper has offered various points for consideration that can enrich such plans by players, as well as inform policies pursued by the government. Given the right strategy, the IT-BPM sector can transcend the challenges and continue to be a force of growth for the Philippines.

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<sup>16</sup> New IBPAP President Mr. Jack Madrid noted in his closing remarks at the 13th International Innovation Summit last 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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