

The Price Effect of Minimum Wage: Evidence from the Philippines



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1. Introduction

Minimum wage is the lowest pay that employers can offer their workers for the work that they perform or for the services that they render. Equivalently, it is the lowest wage at which workers are allowed to sell their labor. Minimum wage is legally mandated and it is often fixed to cover the basic needs of a worker and his or her family given current economic and social conditions (ILO, 1992). Minimum wage was initially implemented to ensure that workers, particularly women and young, lesser-skilled laborers receive just compensation. Over time, the intention of minimum wage shifted from safeguarding workers' welfare through fair pay to a more encompassing objective of helping low-income households out of poverty.

While it is generally agreed that the goals of minimum wage are socially desirable, there are differing views and conclusions on its impact on employment and prices and on its effectiveness as a tool for poverty alleviation. Standard economic theory predicts that increases in minimum wage can lead to lower employment and higher prices. Such effects of the minimum wage have important consequences for the welfare of households, mainly low-income households which the minimum wage is trying to protect.

The literature on minimum wage in the Philippines is limited and it is mostly on the employment effects. There are no known studies on the price effects of minimum wage in the country. This study tries to bridge the research gap on minimum wage in the Philippines and contribute to a better understanding of how increases in minimum wage affect prices. Since minimum wages are set at the regional level in the Philippines, the analysis in this study is undertaken at both the regional and national levels. The paper is organized as follows: the next section provides a brief survey of the related literature; Section 3 discusses minimum wage implementation in the Philippines; Section 4 presents the methodology adopted in this paper and the empirical results; Section 5 derives some policy implications for the conduct of monetary policy; and the last section concludes.

2. Employment and price effects of minimum wage

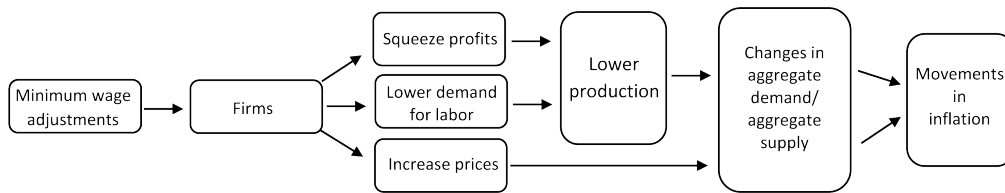
In standard competitive markets, prices are assumed to be given. Thus, if there is an increase in the minimum wage, firms will either squeeze their profits or reduce employment to cope with the higher cost of production (Figure 1). Intense competition in the market, however, drives firms' profit margins to the narrowest possible. Firms, particularly the small, low-waged ones, will have difficulty absorbing the higher production costs through lower profits. Hence, to minimize costs, firms often reduce employment with an increase in the minimum wage.

The price-taking assumption of the standard competitive model is reasonable if firms covered by the minimum wage increase compete with firms that are not subject to the minimum wage (Lemos, 2004). If all firms, however, experience the increase in minimum wage, economic theory suggests that at least a part of the increase in cost will be passed on to consumers as higher prices (Figure 1). The share of the increase in price that consumers will bear will depend on factors such as demand elasticity, the convexity of demand, the elasticity of marginal cost with respect to output and the degree of market competition (Aaronson, 2001).

Sellekaerts (1981) outlined the channels through which the effects of minimum wage are transmitted to prices and employment. Increases in the minimum wage will directly

affect those who are in between the old and new minimum wage while there are indirect spillover effects for those who are above (and below) the new minimum wage. Higher minimum wage leads to an increase in production costs which firms address either by passing on to consumers in the form of higher prices or by adjusting their level of input and output (i.e., lower employment, lower production levels). The resulting new employment and wage produce a new equilibrium income, aggregate demand, and, consequently, output levels. Over time, inflation and unemployment rate consistent with the equilibrium will again affect wages and prices.

Figure 1
Transmission of Minimum Wage Effects on Employment and Prices¹



The empirical evidence on the price effects of the minimum wage remains relatively scarce. Lemos (2006) notes that, while there were over three hundred studies on the employment effects of the minimum wage in 1995 (Card and Krueger, 1995), there were none on its profit effects and only three on its price effects (Wessels, 1980; Katz and Krueger, 1992; Spriggs and Klein, 1994). The comprehensive review of some 30 or so academic papers on the price effects of the minimum wage that Lemos (2006) undertook yielded an observation that a 10 percent increase in the US minimum wage raises food prices by no more than 4 percent and the overall price level by no more than 0.4 percent. Neumark and Wascher (2008) agreed with the assessment of Lemos that the price effects of minimum wage are likely to be small. They noted that minimum wage labor accounts for a relatively small share of production costs and it has limited spillover effects to the wages of other workers. Meanwhile, Aaronson, French and MacDonald (2007) looked into the impact of increases in the minimum wage on restaurant prices.

The restaurant industry is a particular sector of interest due to the fact that it employs a large share of minimum wage workers. These authors found that a 10 percent increase in the minimum wage increases prices by 0.7 percent, lower than the upper bound estimated by Lemos for food inflation.

Using monthly data from six US metropolitan areas for the period 1978 – 2016, MacDonald and Nilsson (2016) analyzed the effects of minimum wage hikes on output prices; specifically, they used food away from home CPI. They observed that the impact of minimum wage hikes on output prices is substantially smaller than in previous studies. While the commonly accepted elasticity of prices to minimum wage changes is 0.07, MacDonald and Nilsson (2016) found a value that is roughly half at 0.036. This value falls far short of what would be expected if low-wage labor markets are perfectly competitive. Moreover, they observed that small minimum wage hikes do not lead to higher prices but they might actually lead to lower prices. Meanwhile, large minimum wage hikes have clear positive effects on output prices. This finding is consistent with the claim that low-

¹ The transmission channels described in Figure 1 pertain to those that involve firms. However, it should be noted that households are likewise affected by adjustments in the minimum wage. In an economy, households provide the labor that enables firms to produce goods and services. Firms, in turn, provide individuals with wages/compensation in exchange for their labor.

wage labor markets are monopsonistically competitive.² If such labor markets are indeed monopsonistically competitive, then small increases in minimum wages might lead to increased employment.

Most of the empirical work on the price effects of minimum wage is for the US. There is a paucity of studies on the impact of the minimum wage on prices for developing countries. This study found only five (5) existing research work on the price effects of the minimum wage for developing countries – two (2) for Brazil, two (2) for Costa Rica and one (1) for Vietnam.

Brazil experiences large and frequent minimum wage increases and a large fraction of its labor force under this legislation. Lemos (2004) estimated that a 10 percent increase in the minimum wage raises overall prices in Brazil by 0.8 percent after five months of adjustment (a two-month window around the increase). She further differentiated between the effect of a rise in the minimum wage on the prices of goods consumed by the poor and by the rich. The results she generated show that a 10 percent increase in the minimum wage raises prices paid by the poor (rich) by 0.12 percent (0.04 percent) in the month of increase, by 0.27 percent (0.16 percent) after six months, and by 0.17 percent (0.15 percent) after 12 months. This implies that poor consumers in Brazil experience inflation rates three times higher than rich consumers in the month of increase. The differential in the inflation rates faced by the two groups of consumers diminishes over time and narrows to almost the same rate after a year of adjustment. For Costa Rica, Gindling and Lemos (2006) found little evidence of minimum wage effects. However, the study was subject to data limitations, including use of yearly data due to the unavailability of monthly data and lack of a longer data series that have important bearing on the results derived. Moreover, the authors acknowledged that they did not do robustness checks for industries most affected by minimum wage increases which could have led to a lower estimate of the price effect of minimum wage in these sectors. In Vietnam, Nguyen (2012) found that minimum wage increases did not result in higher overall inflation and food inflation. He cited two possible explanations for the insignificant impact of the minimum wage increases on inflation in the country. First, the number of laborers affected by minimum wage increases is small (i.e., around 10 percent); and second, intense market competition constrains firms affected by the minimum wage increase from passing the additional cost to their consumers through price increases.

In the Philippines, empirical studies on the minimum wage often focus on estimating its employment effects (Lanzona, 2014; Canales, 2014, Esguerra and Jandoc, 2009). Results from these studies point to a statistically significant negative effect of increases in the minimum wage on employment. Moreover, Orbeta and Pacqueo (2014) observed that minimum wages have substantial adverse effects on household economic welfare as reflected in the income and poverty status of these households.

There are no known studies on the price effects of minimum wage in the Philippines. However, assessing the effect of minimum wage on prices in the Philippines is important to having a better understanding of the impact of this policy on the welfare of Filipino households, particularly low-income households. While a rise in minimum wage contributes to higher income for minimum-wage-earning households, if it consequently leads to higher prices, the net effect for these households may be negative. This study aims to address this research gap and to contribute to policy formulation with insights

² Joan Robinson (*The Economics of Imperfect Competition*, 1933) is credited with the word monopsony though she credits it, in turn, to B.L.Hallward, a classical scholar at Cambridge. Monopsony is used to describe the decision problem facing an individual employer in a labor market with frictions and where employers set wages. Under a monopsonistically competitive labor market, the actions of other employers (notably their choice of wages) in the market will affect the supply of labor to an individual firm (Manning, 2003).

on how increases in minimum wages affect prices in the Philippines. The next section describes the minimum-wage-setting process in the Philippines.

3. Minimum wage in the Philippines

Minimum wages were first implemented in the Philippines on 4 August 1951 through the enactment of Republic Act No. 602, or the Minimum Wage Law. This legislation imposed a wage floor of P4.00 for the non-agricultural sectors of the National Capital Region (NCR) and areas outside NCR and P2.50 for the agricultural sector (i.e., plantation and non-plantation). The subsequent amendments to the Minimum Wage Law as well as a number of Presidential Decrees, Wage Orders, and Executive Orders granted increases to the basic minimum wage to reflect rising prices and costs of living (Annex 1).

During its early years, the tripartite meetings between the national government, labor sector representatives, and employers aimed at forming an indexed minimum wage package that included benefits. However, later years saw the wage-setting process become a “bilateral monopoly bargaining process” on the wage package (Orbeta and Pacqueo, 2014). Monopolists and organized labor groups benefited from the derived rents while workers who were not part of the bargaining process were left unemployed or employed in marginal occupations (Lanzona, 2014).

In July 1989, the Philippine Congress enacted into law Republic Act No. 6727, also known as the Wage Rationalization Act. This Act instituted a new mechanism for minimum wage determination through the establishment of the National Wages and Productivity Commission (NWPC) and the Regional Tripartite Wages and Productivity Boards (RTWPBs) in the 17 regions of the country. The minimum-wage-setting mechanism in the country shifted from the national to the regional level to account for existing disparities in the cost of living and other socio-economic factors as well as the national economic and social development plans.

There are ten (10) criteria for minimum wage fixing as prescribed in R.A. No. 6727 and one (1) under the Rules of Procedures for Minimum Wage Fixing. These can be categorized in four major groups (Table 1). The set criteria are intended to maintain the minimum standards of living necessary for the health, efficiency, and general well-being of employees as defined in the country’s economic and social development program (Bersales, 2014). Each region weighs the various criteria differently when fixing the minimum wage. Minimum wage adjustments are initiated either through petitions or the RTWPBs’ own initiative (i.e.,

Table 1
Criteria for Minimum Wage Fixing Under R.A. No. 6727

<p>1. Welfare of workers and their families</p> <ul style="list-style-type: none"> • Demand for living wage • Wage adjustment vis-à-vis CPI • Cost of living and changes therein • Needs of workers and their families • Improvements in standards of living
<p>2. Capacity to pay of employers/industry</p> <ul style="list-style-type: none"> • Fair return on capital invested and capacity to pay of employers • Productivity
<p>3. Comparable wages and incomes</p> <ul style="list-style-type: none"> • Prevailing wage levels
<p>4. Requirements of economic and social development</p> <ul style="list-style-type: none"> • Need to induce industries to invest in the countryside • Effects on employment generation and family income • Equitable distribution of income and wealth along the imperatives of economic and social development

Source: National Wage and Productivity Commission (NWPC)

motu proprio). These are usually undertaken once every year unless there are supervening circumstances such as high inflation. Since 1990, nearly 59 percent of the wage orders issued were through the initiatives of the RWPTBs, the rest were issued by virtue of petition/s for wage increase filed with the Boards.³ NCR is often the first to file a petition for a minimum wage increase and other regions follow.

Minimum wages for both the agricultural and non-agricultural sectors are highest in NCR and lowest in Region I (for non-agricultural sector) and Region VIII (for agricultural sector) (Table 2). In real terms, minimum wage rates in NCR remain the highest while those of ARMM the lowest.⁴ The difference in minimum wages and in the rate of wage increases across regions is reflective of the changes in the cost of living in these areas as well as on other socio-economic factors like investment growth and employment generation.

Since its implementation, the minimum wage remains as one of the most fiercely debated issues in the Philippines. Sicat (2009) regarded the minimum wage as the second most problematic among labor policies after restrictions on worker termination. Statistics from NWPC show that, as of December 2017, 85.2 percent or 51,437 of the 60,372 establishments inspected comply with the mandated minimum wages. In NCR, compliance was at 87.1 percent or 16,281 of 18,692 establishments inspected. In AONCR, compliance rate was highest in Regions I and VI at 89.5 percent and 89.4 percent, respectively. It was lowest in Region VIII at 77.3 percent.

Table 2
Summary of Current Regional Daily Minimum Wage Rates
Non-Agriculture, Agriculture as of July 2018 (in pesos)

Region	Wage Order No./ Date of Effectivity	Non-Agriculture	Agriculture	
			Plantation	Non-Plantation
NCR	WO 21/October 5, 2017	P475.00 – 512.00	P475.00	P475.00
CAR	WO 18/June 5, 2017	270.00 – 300.00	270.00 – 300.00	270.00 – 300.00
I	WO 19/January 25, 2018	256.000 – 310.00	265.00	256.00
II	WO 18/September 25, 2017	340.00	320.00	320.00
III	WO 20/May 1, 2017	329.00 – 380.00	314.00 – 350.00	302.00 – 334.00
IV-A	WO 18/April 28, 2018	317.00 – 400.00	303.00 – 372.00	303.00 – 352.00
IV-B	WO 08/September 24, 2017	247.00 – 290.00	247.00 – 290.00	247.00 – 290.00
V	WO 18/June 2, 2017	280.00 – 290.00	280.00 – 290.00	280.00 – 290.00
VI	WO 23/June 12, 2018	295.00 – 365.00	295.00	295.00
VII	WO 20/March 10, 2017	308.00 – 366.00	288.00 – 348.00	288.00 – 348.00
VIII	WO 20/June 25, 2018	305.00	275.00	275.00
IX	WO 19/October 1, 2016	296.00	283.00	283.00
X	WO 19/July 16, 2017	316.00 – 338.00	304.00 – 326.00	304.00 – 326.00
XI	WO 19/December 16, 2016	340.00	335.00	335.00
XII	WO 20/May 11, 2018	311.00	290.00	290.00
CARAGA	WO 15/December 8, 2017	305.00	305.00	305.00
ARMM	WO 17/June 15, 2018	280.00	270.00	270.00

Source: NWPC

³ As of June 2018. Source: <http://www.nwpc.dole.gov.ph/pages/statistics/current.html>.

⁴ To get real minimum wage, nominal minimum wages are deflated by the corresponding regional consumer price index (2006 = 100) in the same quarter to take into account the impact of price changes.

Based on the 2017 Labor Force Survey, 18.0 percent of service sector workers, 37.0 percent of industry sector workers and 42.0 percent of agricultural sector workers receive daily wages that are within the minimum wage. The proportions of workers in the industry and service sectors receiving daily wages above the minimum wage are significantly higher compared to the agricultural sector. For the industry and service sectors, the share of workers with daily earnings above the minimum wage is at 38.0 percent and 47.0 percent, respectively, while for the agricultural sector it is at 21.0 percent.

Nonetheless, calls for increasing the minimum wage are often met with resistance by firms, particularly the smaller ones, that argue that labor in the Philippines is already very costly compared with other countries. Minimum wages in the Philippines are relatively higher than those of Cambodia and Vietnam with the minimum wage in NCR being higher than the minimum wage in Malaysia (Table 3). High labor costs can result in lower competitiveness for the Philippines against other economies.⁵

Table 3
Comparative Wages in Selected Countries
(in US dollars)

Country/City	Daily minimum wage	Monthly minimum wage	Wage Setting at the Provincial/Regional Level
Philippines			
NCR	8.88 – 9.57	266.47 – 287.23	✓
Region III	6.15 – 7.11	184.57 – 213.18	
Region IV-A	5.67 – 7.48	169.98 – 224.40	
Region VII	5.76 – 6.84	172.79 – 205.32	
Region XI	6.36	190.74	
Thailand	9.31 – 9.98	279.44 – 299.40	✓
Malaysia	7.59 – 8.25	227.75 – 247.55	✓
Vietnam ^{1/}	4.84 – 5.46	145.08 – 163.87	✓
Cambodia	5.67	170.00	
Indonesia ^{2/}	3.11 – 7.81	93.41 – 234.32	✓
Lao PDR	3.60	107.89	
Myanmar	2.56	97.77	

1/ For Regions I and II.

2/ Daily minimum wage is highest in Jakarta (US\$7.81) and lowest in Yogyakarta (US\$3.11).

Source: NWPC (data as of 29 June 2018)

In 2012, the Philippines adopted the two-tiered wage system (TTWS), an approach to minimum wage setting which aims to improve the coverage of minimum wages, promote worker and enterprise productivity, and address the perceived adverse effects of minimum wage policies (NWPC, 2012).⁶ The first tier is the mandated regional minimum wage rate set by RTWPBs while the second tier is the non-mandatory component that grants workers with productivity bonuses and incentives based on the agreement between employers and workers. RTWPBs issue advisories to guide enterprises or industries in their design of

⁵ If there is an increase in wage without any corresponding increase in productivity, this will tend to cause a loss in competitiveness. Higher wages result in higher production costs which firms can either pass on to their consumers through higher prices or absorb through lower profit margins. If firms increase their prices, the price of their goods would be relatively higher compared to the goods produced by other firms or, in an international setting, by other economies. The loss in competitiveness will depend on the proportion of wage costs to the total production costs. If the country's major industries are labor intensive, such as agriculture or manufacturing, then an increase in wages will have a relatively larger impact on competitiveness.

⁶ NWPC Guidelines No. 2, Series of 2012.

productivity-based incentives, productivity-enhancing programs, and profit-or gain-sharing schemes. Employers and workers can negotiate on their additional pay or incentives based on these advisories.

An important feature of TTWS is the use of the poverty threshold in the first tier as an indicator in the wage-setting process. As such, the minimum wage is regarded as a social safety net as it protects the most vulnerable sectors. Meanwhile, the productivity-based pay, the second-tier, is considered as an appropriate mechanism to recognize the contribution of workers' productivity to the growth and competitiveness of businesses and enterprises. According to the Department of Labor and Employment (DOLE), the reforms in the minimum wage system that were implemented through TTWS resulted in the efficient and non-adversarial consensual decision-making process in the RTWPBs.

4. Causal relation between prices and minimum wage: summary of results

Given that minimum wages in the Philippines are set at the regional level, the study analyzes the relationship between prices and minimum wages at both the national and regional levels.

4.1 Prices and minimum wage at an aggregate level

To assess the impact of minimum wage on prices at an aggregated level, an inflation equation with the following specification is used:

$$RCPI_t = \alpha + \beta_1 RCPI_{t-1} + \beta_2 MWAGE_{t-1} + \beta_3 RGDP + \beta_4 PROD + \beta_5 WAGESAL + e_t \quad (1)$$

where: $RCPI_t$ is regional consumer price index (CPI), $MWAGE$ is the non-agriculture regional minimum wage, $RGDP$ is the regional Gross Domestic Product (GDP), $PROD$ is regional productivity and $WAGESAL$ is the proportion of wage and salary workers to total workers in the regions.⁷ All data used are annual time series over the period 1997 to 2016 expressed in log form and covering the 17 administrative regions of the Philippines. Estimation was done using a panel Generalized Method of Moments (GMM) to deal with the simultaneity bias that arises due to the correlations of the errors of RCPI with the errors of the explanatory variables.

Table 4 presents the results of the panel GMM estimation. Across regions and on average, the lagged value of RCPI was found to be highly significant in explaining the variation in current RCPI while the lagged values of MWAGE and WAGESAL were observed to be marginally significant. Based on Table 4, a one-percentage-point increase in the regional minimum wage, on average, will increase regional CPI by 0.10 percentage point. Thus, increases in the minimum wage result in relatively small increases in the regional prices. Meanwhile, a one-percentage-point increase in the proportion of wage and salary workers likewise results in an increase in regional CPI by 0.07 percentage point. RGDP and the productivity measure were found to be statistically insignificant in the determination of regional CPI.

7 Sources of data: Philippine Statistics Authority (PSA) and NWPC.

Table 4
Regression Results: Using Regional CPI

Variables	Coefficient		Standard error	P > /z/
RCPI _{t-1}	β_1	0.78	0.086	0.000***
MWAGE _{t-1}	β_2	0.10	0.050	0.052**
RGDP	β_3	0.09	0.082	0.259
PROD	β_4	-0.06	0.061	0.311
WAGESAL	β_5	0.07	0.037	0.066*

*** Significant at the 0.01 probability level
 ** Significant at the 0.05 probability level
 * Significant at the 0.10 probability level
 Notes: Instruments used include RCPI_{t-1}, MWAGE_{t-1}, RGDP_{t-1}, PROD_{t-1}, WAGESAL_{t-1}
 J-stat = 12.619 (p=0.126)

To obtain a disaggregated picture of the potential impact of minimum wage adjustments on regional inflation, Equation 1 was estimated using food CPI and non-food CPI instead of total CPI. Tables 5 and 6 show the results. In Table 5, the lagged value of regional food CPI (*RFCPI*_{t-1}) was found to be highly significant in explaining the current value of regional food CPI (*RFCPI*). However, the lagged value of minimum wage was observed to be statistically insignificant as were the other variables in the equation.

Table 5
Regression Results: Using Regional CPI

Variables	Coefficient		Standard error	P > /z/
RCPI _{t-1}	β_1	0.95	0.170	0.000*
MWAGE _{t-1}	β_2	0.04	0.069	0.517
RGDP	β_3	0.10	0.207	0.615
PROD	β_4	-0.17	0.133	0.204
WAGESAL	β_5	-0.05	0.108	0.664

*Significant at the 0.01 probability level
 Notes: Instruments used include RCPI_{t-1}, MWAGE_{t-1}, RGDP_{t-1}, PROD_{t-1}, WAGESAL_{t-1}
 J-stat = 7.849 (p=0.097)

Table 6 presents the results from using regional non-food CPI (*RNFCPI*) in Equation 1. Similar to the results obtained from using RFCPI, the lagged values of RNFCPI were highly significant in explaining the variation in the current value of the regional non-food CPI. *MWAGE* was likewise found to be highly significant in determining movements in the regional non-food CPI. Meanwhile, *RGDP* and productivity were observed to be moderately significant.⁸

⁸ Given that the p-value associated with the J-stat for this regression is $p > 0.05$, the H_0 : instruments are valid cannot be rejected. A rejection of the null hypothesis implies that the instruments are not satisfying the orthogonality required for their use. This may either be because they are not truly exogenous or because they are being incorrectly excluded from the regression (Baum, Schaffer and Stillman, 2003). Thus, caution should be exercised in interpreting the resulting estimates.

Table 6
Regression Results: Using Regional Non-Food CPI

Variables	Coefficient		Standard error	P > /z/
RCPI _{t-1}	β_1	0.79	0.035	0.000***
MWAGE _{t-1}	β_2	0.08	0.029	0.010***
RGDP	β_3	0.10	0.044	0.024**
PROD	β_4	-0.07	0.041	0.078*
WAGESAL	β_5	-0.02	0.021	0.424

*** Significant at the 0.01 probability level

** Significant at the 0.05 probability level

* Significant at the 0.10 probability level

Notes: Instruments used include RCPI_{t-1}, MWAGE_{t-1}, RGDP_{t-1}, PROD_{t-1}, WAGESAL_{t-1}

J-stat = 7.849 (p=0.097)

The difference of the potential impact of minimum wage adjustments on the regional food CPI and non-food CPI is worth noting. Empirical results show that changes in the minimum wage do not translate to higher food prices but can cause increases in non-food prices. A possible explanation for this observation relates to the economic sector that produces the food and non-food products. Food products in the CPI basket (e.g., rice, corn, meat, fish) are produced by the agricultural sector while the non-food products in the CPI basket (e.g., housing, electricity, gas, transport, clothing, health, education) are delivered by the service and industry sectors. In 2017, the service sector employed 56.3 percent of the country's total workers (estimated at 40.3 million), followed by the agricultural sector at 25.4 percent, and the industry sector at 18.3 percent.⁹ Thus, adjustments in the minimum wage can have larger effects on the service and industry sectors compared to the agricultural sector, including their price pass-through to consumers.

4.2 Prices and minimum wage at the regional level

At the regional level, the Granger causality test is employed to see whether past changes in minimum wage can help determine the current value of CPI, food CPI, and non-food CPI (and vice versa).¹⁰ Table 7 presents the appropriate lag lengths for each time series as determined by the Akaike information criterion (AIC).

Table 7
Autoregressive Order and Akaike Information Criterion (AIC)
Statistic for Selected Variables

Regions	Variable	Autoregressive Order	AIC Statistic
NCR	MWage/CPI	4	-19.45
	MWage/Food CPI	4	-16.55
	MWage/NFoodCPI	1	-16.32

9 Based on the 2012 Input Output table derived by the PSA, the share of employees' compensation to the industry's total input is at 29.5 percent for the agriculture sector, 9.1 percent for the industry sector and 21.2 percent for the services sector. The services sector accounts for the largest share to the economy's total input at 51.4 percent, followed by the industry sector at 38.7 percent and the agriculture sector at 9.9 percent.

10 A variable X is said to Granger cause Y if the current values of Y can be better predicted using past values of X than if only the past values of Y are used. The test for causality in the Granger sense is commonly based on the equation:

$$Y_t = \sum_{i=1}^t \alpha_i Y_{t-i} + \sum_{j=1}^t \beta_j X_{t-j} + \mu_t$$

where: α s and β s are parameters and μ_t are independent, serially uncorrelated random variables with zero means and finite variances for all $t = 1, 2, \dots, T$. If X does not Granger cause Y, then the lagged values of X should not appear in the equation, i.e., $\beta_1 = \beta_2 = \dots = \beta_t = 0$.

Table 7 continuation

CAR	MWage/CPI	4	-18.40
	MWage/Food CPI	3	-16.22
	MWage/NFoodCPI	1	-17.28
REGION 1	MWage/CPI	3	-18.22
	MWage/Food CPI	4	-17.12
	MWage/NFoodCPI	3	-16.99
REGION 2	MWage/CPI	4	-16.67
	MWage/Food CPI	3	-14.53
	MWage/NFoodCPI	2	-15.45
REGION 3	MWage/CPI	1	-16.15
	MWage/Food CPI	1	-14.53
	MWage/NFoodCPI	2	-15.45
REGION4A	MWage/CPI	3	-17.19
	MWage/Food CPI	4	-16.92
	MWage/NFoodCPI	2	-16.82
REGION4B	MWage/CPI	4	-17.43
	MWage/Food CPI	4	-16.32
	MWage/NFoodCPI	3	-16.57
REGION 5	MWage/CPI	3	-17.43
	MWage/Food CPI	3	-15.67
	MWage/NFoodCPI	1	-16.33
REGION 6	MWage/CPI	3	-16.52
	MWage/Food CPI	4	-16.85
	MWage/NFoodCPI	1	-16.80
REGION 7	MWage/CPI	3	-18.25
	MWage/Food CPI	3	-17.39
	MWage/NFoodCPI	4	-19.59
REGION 8	MWage/CPI	4	-16.60
	MWage/Food CPI	4	-16.08
	MWage/NFoodCPI	3	-17.33
REGION 9	MWage/CPI	3	-17.19
	MWage/Food CPI	4	-18.26
	MWage/NFoodCPI	3	-16.91
REGION 10	MWage/CPI	4	-17.62
	MWage/Food CPI	4	-17.55
	MWage/NFoodCPI	1	-17.72
REGION 11	MWage/CPI	1	-16.08
	MWage/Food CPI	2	-14.89
	MWage/NFoodCPI	4	-20.00
REGION 12	MWage/CPI	3	-16.97
	MWage/Food CPI	4	-19.25
	MWage/NFoodCPI	3	-15.77
CARAGA	MWage/CPI	2	-16.35
	MWage/Food CPI	2	-15.60
	MWage/NFoodCPI	2	-17.57
ARMM	MWage/CPI	3	-16.05
	MWage/Food CPI	3	-15.02
	MWage/NFoodCPI	2	-13.90

Given the lag lengths presented in Table 7, Granger causality tests were performed for the time series considered. Results are shown in Table 8 with causal variables read from left to right while dependent variables are read from top to bottom. Asterisks signify a rejection of the null hypothesis of no causality. With the exception of Regions 3, 6, 7 and CARAGA, minimum wage was found to Granger cause a measure of CPI (i.e., total CPI, food CPI and non-food CPI) at the regional level. However, it is only in seven (7) regions (i.e., NCR, Regions 1, 4B, 6, 7, 10 and CARAGA) that minimum wage Granger causes all measures of CPI. Meanwhile, CPI, FCPI and NFCPI were observed to Granger cause minimum wage in all regions.

Table 8
Granger Causality Results (p-values) based on Akaike Lag Length Criterion^{a/}

Dependent variable ^{b/}	Causal Variables ^{c/}					
	MWAGE	CPI	MWAGE	FOOD CPI	MWAGE	NONFOOD CPI
NCR MWAGE CPI FOOD CPI NONFOOD CPI	0.000***	0.000***	0.091*	0.000***	0.196	0.021**
CAR MWAGE CPI FOOD CPI NONFOOD CPI	0.001***	0.009***	0.001***	0.249	0.029**	0.014***
REGION 1 MWAGE CPI FOOD CPI NONFOOD CPI	0.005***	0.086*	0.000***	0.029**	0.002***	0.000***
REGION 2 MWAGE CPI FOOD CPI NONFOOD CPI	0.008***	0.067*	0.000***	0.233	0.088*	0.346
REGION 3 MWAGE CPI FOOD CPI NONFOOD CPI	0.882	0.576	0.505	0.609	0.583	0.032**
REGION 4A MWAGE CPI FOOD CPI NONFOOD CPI	0.000***	0.744	0.000***	0.094*	0.009***	0.031**
REGION 4B MWAGE CPI FOOD CPI NONFOOD CPI	0.002***	0.034**	0.001***	0.001***	0.111	0.000***
REGION 5 MWAGE CPI FOOD CPI NONFOOD CPI	0.022**	0.632	0.039**	0.120	0.261	0.104*
REGION 6 MWAGE CPI FOOD CPI NONFOOD CPI	0.289	0.001***	0.302	0.000***	0.148	0.065*

Table 8 continuation

REGION 7 MWAGE CPI FOOD CPI NONFOOD CPI	0.120	0.010***	0.155	0.000***	0.260	0.000***
REGION 8 MWAGE CPI FOOD CPI NONFOOD CPI	0.055*	0.008***	0.098*	0.000***	0.118	0.636
REGION 9 MWAGE CPI FOOD CPI NONFOOD CPI	0.071*	0.111	0.000***	0.211	0.405	0.098*
REGION 10 MWAGE CPI FOOD CPI NONFOOD CPI	0.000***	0.004***	0.000***	0.000***	0.819	0.000***
REGION 11 MWAGE CPI FOOD CPI NONFOOD CPI	0.718	0.002***	0.000***	0.927	0.000***	0.000***
REGION 12 MWAGE CPI FOOD CPI NONFOOD CPI	0.000***	0.210	0.000***	0.000***	0.114	0.351
CARAGA MWAGE CPI FOOD CPI NONFOOD CPI	0.852	0.000***	0.345	0.000***	0.114	0.000***
ARMM MWAGE CPI FOOD CPI NONFOOD CPI	0.000***	0.006***	0.000***	0.007***	0.612	0.505

a/ The lag lengths used for the Granger causality tests are given in Table 7.

b/ Causal variables are read from left to right and the dependent variables are read from top to bottom.

c/ Asterisks represent rejection of the null hypothesis of no causality for significance level α , where *** = 0.01; ** = 0.05; and * = 0.10.

Past changes in CPI, food CPI, and nonfood CPI were found to help determine the current value of minimum wages. This observation is in keeping with the findings of Reyes (1998) and Bersales (2011). In their study, Reyes (1998) and Bersales (2011) reviewed the implementation of the minimum-wage-fixing process. They examined the factors listed by NWPC and determined which are used for setting the minimum wage. Based on their results, a key determinant of minimum wage across regions is CPI. However, Reyes (1998) observes that wage adjustments were generally based on changes in CPI, mainly because it is the variable available on a monthly basis. Nonetheless, increases in consumer prices, particularly of basic food commodities like rice and oil, often lead to petitions for higher minimum wage.

A possible extension to this study is to look at the impact of minimum wage increases on the bottom 30 percent of the population. This would provide a better picture of how changes in minimum wage affects the sector of society that it intends to safeguard and alleviate from poverty.

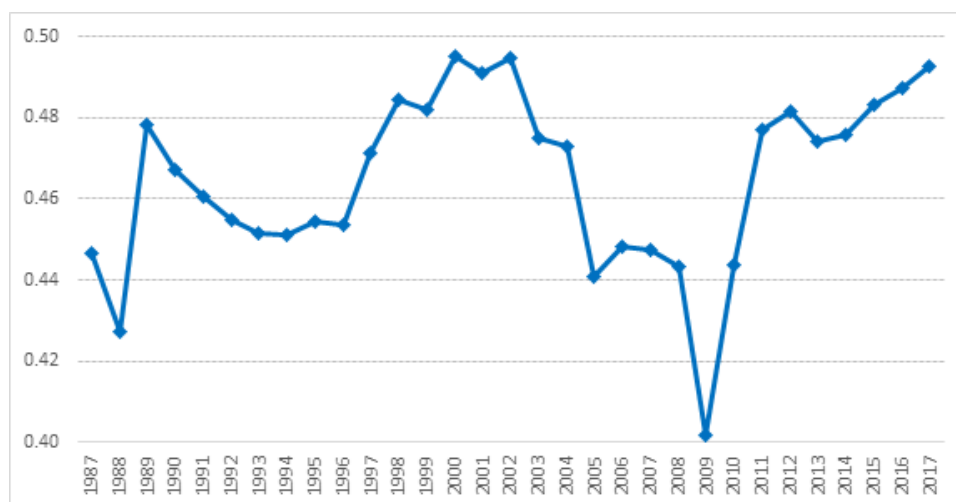
5. Policy implications

Central banks monitor wage adjustments to ascertain that they do not constitute second-round effects.¹¹ The push for wage increases following an increase in the price of individual goods or services (e.g., oil prices) could result in a wage-price spiral that could cause inflation to accelerate and inflation expectations to be disanchored. Thus, monetary authorities aim to prevent second-round effects through the use of monetary policy instruments.

Results from the empirical exercises indicate that minimum wage increases, on average, cause increases in the regional CPI. However, the estimated increase in regional CPI is observed to be relatively small and may not lead to inflationary pressures. Additionally, minimum wage adjustments are undertaken only once a year – unless there are supervening circumstances – and thus may not result in wage-push inflation.

Wage growth in the Philippines has been observed to be sluggish. Using data from the Labor Force Survey (LFS) and Family Income and Expenditure Survey (FIES), Hasan and Jandoc (2009) found that both wage data from these surveys indicate weak growth in wages and earnings for workers across different sectors/industries in the Philippines. A similar observation emerges when looking at the labor share of income in the Philippines, or the part of national income that is allocated to wages. Labor income share, on average, increased at a relatively slow pace over the past decades (Figure 2). Between 1987 and 2000, labor income share stood at 46 percent. This increased to 47 percent in the pre-Global Financial Crisis (GFC) period (2001 – 2007). In the post-GFC period (2010-2017), labor share of income stood at 48 percent.

Figure 2
Philippines Labor Share of Income 1987-2017¹²



11 Second-round effects are the reactions of market agents to first-round effects (i.e., increases or decreases in the prices of goods or services). The focus is often on the wage-setting process. For example, if there is an increase in the prices of commodities, workers may find that the real value of their wages (i.e., the purchasing power of their wages) has declined. To retain their purchasing power, workers will push for higher wages. The potential price-wage spiral that ensues will cause inflation to further accelerate.

12 Labor's share in output is often constructed as the ratio of total labor compensation to GDP at factor costs as recorded in the National Accounts of the Philippines (NAP). However, Gollin (2002) noted that the series generated using this methodology is most likely incorrect in that it does not consider the fact that an important part of labor income in developing countries is captured by the operating surplus for households (HHs) including non-profit institutions serving households (NPISH). The share of net operating surplus for HHs incl. NPISH represents income (i.e., wages and profits) of the self-employed and in the Philippines, it likewise reflects an estimate of the informal sector. Marginal cost was derived as the ratio of the share of compensation of employees in GDP to one minus the share of operating surplus for households (HHs) including non-profit institutions serving households (NPISH) and minus the share of indirect taxes and subsidies. This adjustment treats operating surplus for households (HHs) including non-profit institutions serving households (NPISH) as comprising the same mix of labor and profits as the overall economy.

6. Conclusion

Minimum wage is the lowest pay that employers can offer their workers for the work that they perform or for the services that they render. Equivalently, it is the lowest wage at which workers are allowed to sell their labor. Standard economic theory predicts that increases in minimum wage can lead to lower employment and higher prices. These effects of the minimum wage have important consequences for the welfare of households, mainly low-income households, which the minimum wage is trying to protect.

The literature on minimum wage in the Philippines is limited and it is mostly on its employment effects. This study looked at the potential impact of changes in minimum wage on prices. On one hand, results from the empirical exercises indicate that increases in the minimum wage, on average, have an impact on regional prices, although at a relatively small degree. Additionally, past changes in minimum wage were observed to help determine the current value of CPI, food CPI, and non-food CPI. On the other hand, changes in total CPI, food CPI, and non-food CPI affect changes in regional minimum wages. This implies a two-way relationship between minimum wage increases and price increases.

Given that the estimated increase in regional CPI is observed to be relatively small, this may not lead to inflationary pressures. Moreover, minimum wage adjustments are undertaken only once a year – unless there are supervening circumstances – and thus may not result in wage push inflation.

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