EKO-REGIONAL: JURNAL PEMBANGUNAN EKONOMI WILAYAH
Volume 19, Issue 1, March 2024, pp. 42 – 53
http://jp.feb.unsoed.ac.id/index.php/eko-regional/article/view/3653
DOI: https://doi.org/10.32424/1.erjpe.2022.17.2.3653

Investigating the Effects of Minimum Wage and Non-Compliance on Formal Employment: Evidence in Java Island

By:
Mutiara Gita Fadhilah*), Arie Damayanti
Department of Economic Science, University of Indonesia
*)Corresponding Author: mutiara.gf@gmail.com

Submission: May 05, 2023; Accepted: March 14, 2024

ABSTRACT: There is an ongoing debate in the field of minimum wage literature, with different theories predicting varying impacts on employment. According to neoclassical theory, when the minimum wage increases and becomes binding, employment decreases. However, the monopsony labor market theory predicts that minimum wage can increase employment. Empirical examination in Indonesia has yielded mixed results, depending on the data and empirical model specification. Our study used panel data of regencies/cities in Java Island between 2017 to 2021 period and the fixed effect estimation method. We found that the minimum wage can increase employment in the formal sector, but the effect diminishes as non-compliance increases. This suggests that the benefit of a minimum wage in protecting workers depends on enforcement and that weak enforcement and setting a minimum wage too high may cause more non-compliance, which could harm formal employment.

Keywords: Minimum wage, Compliance, Employment

ABSTRAK: *Terdapat perdebatan yang sedang berlangsung di bidang literatur mengenai upah minimum. Hal ini terjadi karena teori-teori yang ada memperkirakan dampak yang dapat berbeda terhadap lapangan kerja. Menurut teori neoklasik, lapangan kerja dapat menurun ketika upah minimum meningkat dan mengikat. Namun teori pasar tenaga kerja monopsoni memperkirakan bahwa kenaikan upah minimum dapat meningkatkan lapangan kerja. Studi empiris di Indonesia memberikan hasil yang beragam, bergantung pada data dan spesifikasi model empiris yang digunakan. Penelitian kami menggunakan data panel di tingkat kabupaten/kota di Pulau Jawa selama periode 2017-2021 dengan metode estimasi fixed effect. Kami menemukan bahwa kenaikan upah minimum dapat meningkatkan lapangan kerja di sektor formal, namun dampaknya akan berkurang seiring dengan meningkatnya ketidakpatuhan. Hal ini menunjukkan bahwa dampak upah minimum dalam perlindungan tenaga kerja bergantung pada penegakkan hukum. Penegakkan hukum yang lemah dan nilai upah minimum yang terlalu tinggi dapat menyebabkan munculnya ketidakpatuhan, sehingga berdampak negatif terhadap tenaga kerja di sektor formal*

Kata Kunci: *Upah Minimum, Kepatuhan, Lapangan Kerja*

INTRODUCTION

It is widely accepted that minimum wage is an essential policy that protects workers from unfair compensation and guarantees them a minimum living wage (ILO, 2021). This policy plays a crucial role in achieving Sustainable Development Goals 8 (Decent Work and Economic Growth) and 10 (Reduced Inequalities) by increasing the income of low-income earners, which helps to narrow the wage inequality gap (UN, 2015).

However, the impact of minimum wage on employment remains disputed as different theories predict varying outcomes. The neoclassical theory posits that employment decreases when the minimum wage increases and the rate is binding. On the other hand, the monopsony labor market theory argues that a minimum wage can increase employment. Some previous studies have found a negative effect of minimum wage on employment in developed and developing countries. These studies have suggested that an increase in the minimum wage may result in job losses among certain workers because employers cannot afford to pay higher wages (Neumark et al., 2014;Gindling & Terrell, 2007). Conversely, other studies have claimed that they did not find such an effect (Mansoor & O'Neill, 2021;Dube, 2019; Dinkelman & Ranchhod, 2012), while several studies have found a positive effect on formal (Magruder, 2013).

Developing countries often experience high non-compliance rates with their minimum wage policies, unlike developed countries. In most developing countries, a large proportion of workers earn less than the minimum wage (Rani et al., 2013), which complicates the analysis of the minimum wage effect(Neumark & Wascher, 2007). Indonesia is expected to have high minimum wage non-compliance rates due to low enforcement and a large informal sector (Pratomo, 2011). Compliance with the minimum wage is still a problem in Indonesia even within the formal sector. Magruder (2013) suggested, using data from the 1990s, that at least 30% of full-time wage workers in Indonesia were paid a subminimum wage. Recent data covering the years 2018-2020 indicates that, on average, workers in Indonesia are receiving wages higher than the minimum wage. However, certain groups, such as the 15-24 year-olds and those working in sales and business services, are still being paid below the minimum wage (BPS, 2022).

There is mixed empirical evidence on the impact of minimum wages on employment in Indonesia. Some studies suggest that there is no effect on employment (Hohberg & Lay, 2015), while others have found the positive effect in the formal sectors (Magruder, 2013). However, some studies suggest a negative effect (Pratomo, 2011;Yamada, 2016; Siregar, 2022). It is worth noting that the effect of minimum wage on employment may vary depending on the firm size as well (Del Carpio et al., 2015). Interestingly, previous studies did not explicitly account for non-compliance when estimating the effect of minimum wage on employment in Indonesia.

This study aims to estimate the impact of the regency/city-level minimum wage increase on formal employment in Java Island between 2017 and 2021. Different from the previous studies in Indonesia, this study explicitly takes into account the varying non-compliance rates across regencies/cities and how they interact with the minimum wage. To achieve the objective, the study first analyzed the non-compliance rates at the regency/city level in Java Island between 2017 and 2021. Then the study examines the impact of the minimum wage on employment in the formal sector when non-compliance is considered. Java Island is chosen for this study because it has a high concentration of workers and a relatively high variation in the minimum wage between regencies/cities. There are 39.3 million workers, or 61.8% of the total number of workers in Indonesia, were found in Java (BPS, 2019). Moreover, in 2019, the standard deviation of the minimum wages in Java regencies/cities reached 925 thousand rupiahs. The study exploits the data at the regency/city level in Java, which has a higher degree of variation in minimum wage and non-compliance than similar studies using province-level data. The availability and the continuity of survey data at the regency/city level determined the research period.

METHODS

To estimate the impact of minimum wage on formal employment, this study uses an aggregate-level equation similar to a study conducted by Mansoor & O'Neill (2021) study. This study uses the aggregated model rather than the individual level because of the unavailability of panel data of individuals in the existing survey and the determination of minimum wages in Indonesia mainly based on region.

$$\ln EMP_{it} = \beta_0 + \beta_1 \ln MW_{it} + \beta_2 NC_{it} + \beta_3 \ln MW_{it} * NC_{it} + \boldsymbol{\beta}_4 \boldsymbol{Z}'_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

where EMP_{it} measures the number of people working in the formal sector, defined in this study as working individuals with the primary occupation status as wage workers, in regency/city *i* at time *t*. The formal sector definition used in this study follows the guidelines of BPS (2021). According to these guidelines, individuals who work in the formal sector are those whose job status is "employee", and they do not include casual workers in agriculture, casual workers in non-agriculture, or family workers. The variable MW_{it} represents the statutory minimum wage in regency/city *i* at time *t.* We transformed the minimum wage into real terms by adjusting it for inflation using the regency/city-level consumption price index (CPI) whenever available or the province-level CPI. It is important to note that the regency/city minimum wage is not mandatory, unlike the provincial minimum wage, which must be issued by the local government. Therefore, if the regency/city minimum wage is unavailable for a particular year, we used the provincial minimum wage instead. Our choice of minimum wage variables in this study is based on Pratomo's (2011) suggestion that the real minimum wage is a more appropriate measure for Indonesia than other proposed measures in the literature.

We include a non-compliance measure NC_{it} among the explanatory variables. The formula used to generate this non-compliance variable is based on the one proposed by Bhorat et al. (2013) which was also used in Mansoor & O'Neill (2021).

$$NC_{\alpha} = \frac{1}{N} \sum_{j=1}^{N} I(MW_j > w_j) \left(\frac{MW_j - w_j}{MW_j} \right)^{\alpha}$$

Where MW_j is the monthly regency/city minimum wage for individual *j*, and w_j is the monthly wage earned by individual *j.* Here, $I(.)$ is an indicator function that assigns a value of 1 if the condition set in the parentheses is met and 0 if it is not. The values of α (alpha) measure the degree of "aversion" to minimum wage violations. If alpha equals 0, the formula generates the proportion of workers earning below the minimum wage. If alpha equals 1, the formula considers the average gap between the minimum wage and the actual wage received by the individual, or the depth of wage violation. If alpha equals 2, the formula becomes more sensitive to violation by squaring the gap between the wage received and the minimum wage. To analyze non-compliances in detail, three metrics NC_0, NC_1 and NC_2 will be calculated. Additionally, an interaction term between the real minimum wage and non-compliance will be added to the equation to account for the possibility that the effect of one variable (say, the minimum wage) depends on the value of the other variable (say, the non-compliance) and vice versa.

We included a set of control variables Z_{it} to capture the labor demand and supply conditions in a particular regency/city at a particular time. These variables help us understand the labor market's condition and how it can impact employment in the formal sector. We referred to previous research by Siregar (2022), Mansoor & O'Neill (2021), Lemos (2005), and Lemos (2004) to identify several control variables. These variables include the total population of the labor force, the proportion of the labor force with higher education (high school or more); the proportion of workers in the manufacturing, water-electricity-gas, and construction sectors, economic growth, and inflation. We also include regency/city-fixed effects and time-specific effects to reduce potential biases arising from

specific characteristics in a particular regency/city and at a certain point in time. Table 1 provides a summary of all the variables used in this study.

We used the fixed effects estimation (FE) method to estimate equation (1). This method assumes that the unobserved heterogeneity at the regency/city level is correlated with the independent variables in any given period. According to Wooldridge (2016), the estimation results using the FE method are unbiased under the strict exogeneity assumption. To ensure the exogeneity assumption, we added control variables to prevent omitted variable bias. We collected employment data from the National Labor Force Survey and obtained statutory regency/city minimum wage data from various sources. Combining these sources helped us create balanced panel data at the regency/city level for the years 2017-2021.

Table 1. Definition of Variables

Variable	Definition
Dependent Variable	
Employment (EMP)	Number of workers in the formal sector (i.e. wage workers), expressed in natural logarithm
Variable of Interest	
Real minimum wage (MW)	Monthly statutory regency/city minimum wages (Rp/month) deflated by the Consumer Price Index (CPI), expressed in natural logarithm
Non-compliance (NC)	Non-compliance index (NC_0) calculated using equation (2)
The interaction term between real minimum wage and non-compliance	
Control variables (Z)	
Total labor force	Number of labor force population, expressed in natural logarithm
Labor force with high-school education	The proportion of the labor force population with a high school degree
Labor force with tertiary educ	The proportion of the labor force population with a diploma degree or more Gross Regional Domestic Product (GRDP) in secondary sector
Size of secondary sector	Gross Regional Domestic Product (GRDP) in the manufacturing, water-electricity-gas, and construction sectors
Economic growth	Annual percentage change of regency/city-level GRDP at constant prices
Inflation	Annual percentage change of CPI applicable for the respective regency/city. We use the regency/city-level CPI when available or the nearest regency/city-level CPI when the regency/city-level CPI is not available

RESULTS AND DISCUSSIONS

Regency/city Minimum Wage Non-compliance

Table 2 shows the percentage of wage workers in Java Island who received wages below the minimum wage between 2017 and 2021. The calculations were based on both the provincial and regency/city minimum wage rates. According to government regulations, the regency/city-level minimum wage needs to be higher than the provincial level so that the non-compliance rate is expected to be higher when the regency/city-level minimum wage is used. When considering the provincial-level minimum wage, about 34-44% of wage workers in Java Island did not receive the minimum wage they were entitled to. The non-compliance rate increased significantly to 58-71% when the regency/city-level

minimum wage was considered. These figures indicate that minimum wage compliance is a significant issue in Indonesia, particularly for the regency/city-level minimum wage. During the Covid-19 pandemic, the non-compliance rate soared. Before the pandemic, over 35% of wage workers in Java Island received wages lower than the provincial-level minimum wage, while the non-compliance rate increased to 60% when the regency/city-level minimum wage was considered. During the pandemic, figures jumped to 43% (under provincial minimum wages) and 71% (under regency/city minimum wages).

This chapter contains the results of research both presented in the form of body writing, tables, and pictures. This section also contains a discussion of the results of the analysis, which contains an interpretation of the research results obtained and discussion associated with the results that have been reported. Avoid excessive use of graph if it can be presented in a short body writing. Number the pictures and tables in order. All images and tables presented should be placed in the body writing. Images in graphical form can be created using computer whose results are printed using either laser or quality inkjet printer.

Table 2. The proportion of wage workers earning below minimum wage (NC_0) in Java Island (%), 2017-2021

Year	Below the provincial-level minimum wage	Below the regency/city-level minimum wage
2017	34.90	60.57
2018	34.54	58.35
2019	35.68	60.47
2020	43.49	69.54
2021	43.92	71.41

Sources: Authors' calculation using Sakernas and administrative data

Table 3 displays the depth (NC_1) and square depth (NC_2) of non-compliance with the regency/city-level minimum wage among wage workers in Java Island. There was a slight decrease in these indices between 2017 and 2019, but they significantly increased during the pandemic. To determine the percentage by which violated workers received less than the minimum wage on average, Bhorat et al. (2013) suggest dividing the depth of violated wage by the proportion of violated workers (NC_1/NC_0). As indicated in Column 3 of Table 3, workers in Java Island who did not receive the minimum wage had an average salary of 37-38% lower than the regency/city-level minimum wage. This percentage increased to 40% during the Covid-19 pandemic. In simpler terms, these workers received only 60-63% of the relevant regency/city-level minimum wage during this period of analysis.

Table 3. The depths of non-compliance rates in Java Island (%), 2017-2021

Year	NC_1	NC_2	NC_1/NC_0
2017	23.05	13.17	38.05
2018	21.67	12.02	37.14
2019	22.61	12.68	37.39
2020	28.50	16.72	40.99
2021	28.94	16.96	40.52

Sources: Authors' own calculation using Sakernas and administrative data

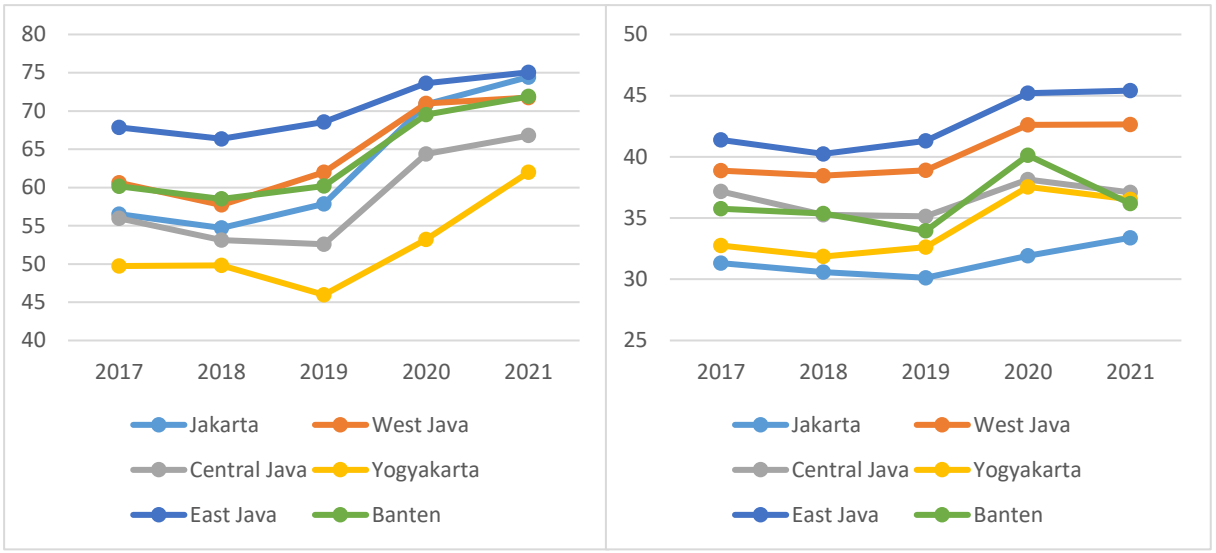
Table 4 provides the regency/city minimum wage non-compliance for some socio-demographic sub-groups. Female wage workers are 9-12% more likely to experience this non-compliance than male wage workers. Not only do females experience more wage violations, but they also experience more severe ones. On average, females who are violated receive wages that are 44-47% less than the relevant regency/city minimum wage, while males receive wages that are 33-36% less. According to (ILO, 2022), young workers are at higher risk of receiving low wages due to limited work experience

and networks. Consistent with this assertion, our data shows a violation incidence rate of 72-83% in the younger subgroup, compared to 54-68% in the older one. However, the depth of violation in the young group is slightly lower (35-40% below the minimum) than in the older group (37-41% below the minimum). As expected, workers with lower levels of education are also at a higher risk of receiving subminimum wages than those with higher levels of education. The incidence rate for low-educated workers is 76-86%, with an average wage of 47% below the minimum.

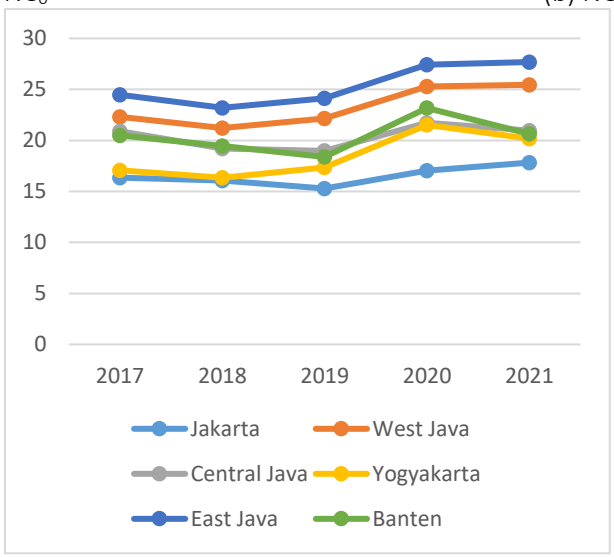
Table 4. The non-compliance rate in sub-group of wage workers in Java Island (%), 2017-2021

Sub-group	2017	2018	2019	2020	2021
Male					
NC_0	55.80	54.04	55.92	66.17	68.21
NC_1	18.48	17.48	18.20	24.42	24.86
NC_2	9.57	8.72	9.16	13.25	13.38
NC_1/NC_0	33.13	32.34	32.55	36.90	36.45
Female					
NC_0	69.01	66.23	68.63	75.50	76.84
NC_1	31.11	29.33	30.52	35.72	35.84
NC_2	19.54	18.03	18.99	22.84	23.02
NC_1/NC_0	45.09	44.28	44.48	47.31	46.65
Old (> 25 years old)					
NC_0	56.33	54.86	56.66	66.21	68.09
NC_1	21.71	20.66	21.51	27.18	27.67
NC_2	12.51	11.63	12.18	16.05	16.32
NC_1/NC_0	38.53	37.66	37.97	41.06	40.64
Young					
NC_0	74.69	70.64	72.51	81.39	83.17
NC_1	27.51	25.22	26.08	33.20	33.43
NC_2	15.37	13.37	14.24	19.06	19.23
NC_1/NC_0	36.83	35.71	35.97	40.79	40.19
High Education					
NC_0	49.69	47.63	50.75	60.99	63.84
NC_1	16.36	15.42	16.51	21.93	22.78
NC_2	9.08	8.25	8.96	12.32	12.75
NC_1/NC_0	32.92	32.36	32.53	35.96	35.68
Low Education					
NC_0	78.37	76.13	76.78	85.26	86.41
NC_1	33.99	32.05	32.86	40.58	41.14
NC_2	19.86	18.27	18.92	24.80	25.30
NC_1/NC_0	43.37	42.10	42.79	47.60	47.61

Sources: Authors' calculation using Sakernas and administrative data



(a) NC_0 (b) NC_1/NC_0



(c) NC_2/NC_0

Figure 1. Plots of the non-compliance rates by provinces in Java Island (%), 2017-2021
Sources: Authors' calculation using Sakernas and administrative data

The graph in Figure 1 shows the time series plots of non-compliance rates in the provinces of Java Island between 2017 and 2021. The incidence measure displayed in Figure 1(a) reveals that East Java, West Java, and Banten provinces had the highest non-compliance rates. During this period, non-compliance rates in all provinces on Java Island exceeded 50%, except for Yogyakarta province between 2017 and 2019. Moreover, all provinces on Java Island experienced an increase in non-compliance rates during the Covid-19 pandemic period, ranging from 61% to 75%. The graphs of violation depth shown in Figures 1(b) and 1(c) generally indicate the same trend as the incidence measure before and during the pandemic, with Jakarta having the lowest depth of violation (30-33% below the minimum) and East Java having the highest depth of violation (40-45% below the minimum).

We also provide an overview of non-compliance incidence rates across regencies/cities of Java Island. Figure 2 depicts that the non-compliance incidence rate has generally increased across most regencies/cities during the period of analysis. In the years 2017-2019, the incidence rate ranged between 51-65%, with a few regencies/cities in East Java exhibiting more than 80% non-compliance. Since the onset of the Covid-19 pandemic, the incidence rate has seen a sudden increase, ranging between 66-80%. Furthermore, the number of regencies/cities with non-compliance incidence rates above 80% has also increased.

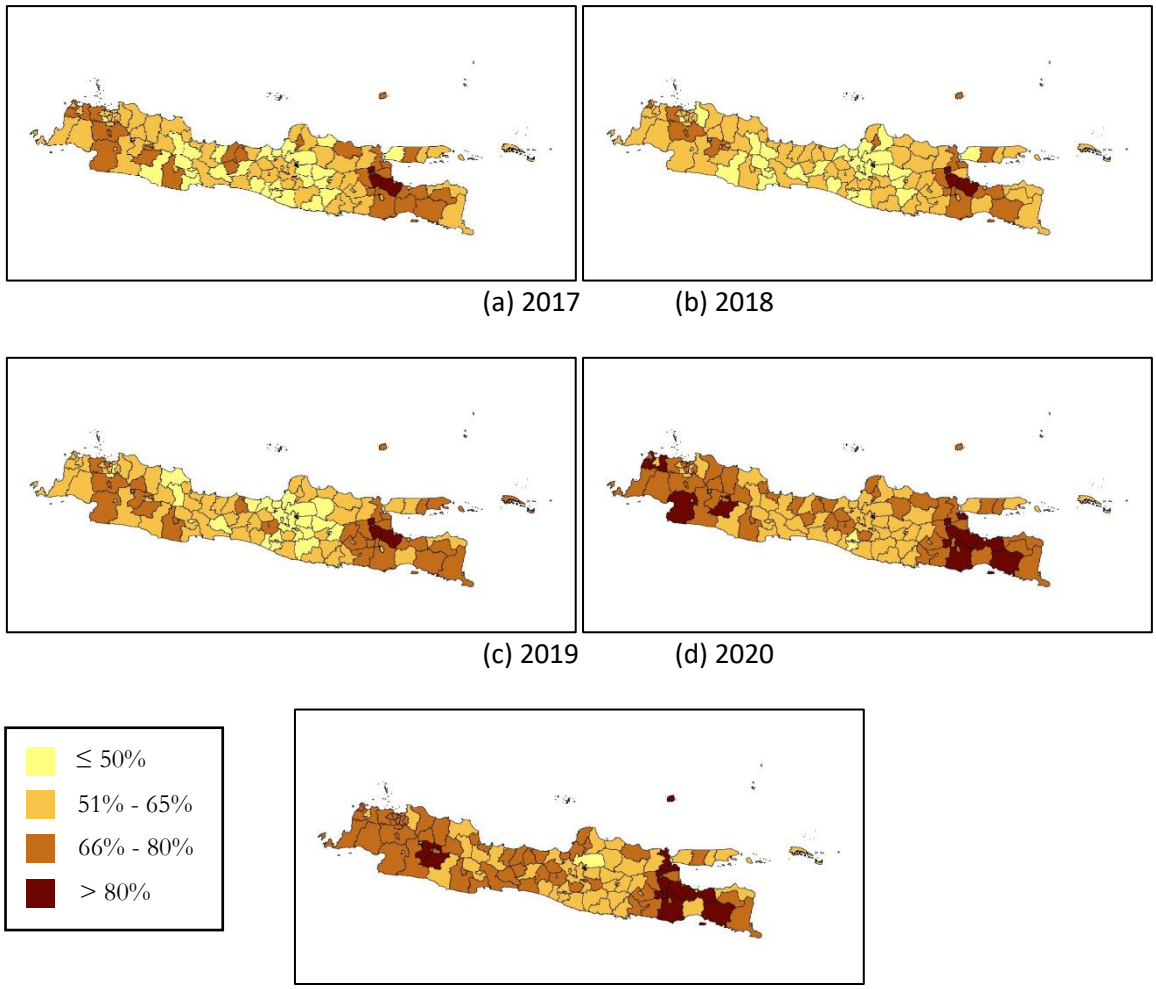


Figure 2. The non-compliance rates by regencies/cities in Java Island (%), 2017-2021
Sources: Authors' calculation using Sakernas and administrative data

The Effects of Minimum Wage and Non-compliance on Formal Employment

Table 5 presents the results of equation (1) estimation. The first column excludes non-compliance rates from the estimation, while the second and third columns include it, calculated as the incidence of wage violation, and its interaction with the minimum wage. The initial result, without controlling non-compliance, shows no significant effect of minimum wage on formal employment. However, after controlling the non-compliance and its interaction with the minimum wage, the effect of minimum wage on formal employment becomes significantly positive. This indicates that non-compliance plays a critical role in the estimation. Any estimation of the impact of minimum wage on labor market outcomes that neglects non-compliance may yield a biased result.

Table 5. The effects of minimum wage and non-compliance on formal employment (all)

	(1)		(2)		(3)	
Ln (MW)	0.267		0.256		0.474	**
	(0.152)		(0.153)		(0.167)	
NC			0.000		0.052	**
			(0.001)		(0.017)	
Ln (MW) x NC					-0.004	**
					(0.001)	
Ln (Total labor force)	0.612	**	0.614	**	0.671	**
	(0.086)		(0.086)		(0.087)	
Labor force with high-school educ	0.011	**	0.011	**	0.011	**
	(0.002)		(0.002)		(0.002)	
Labor force with tertiary educ	0.007	**	0.007	**	0.007	**
	(0.002)		(0.002)		(0.002)	
Size of secondary sector	0.008	**	0.008	**	0.008	**
	(0.001)		(0.001)		(0.001)	
Economic growth	0.003		0.003		0.003	
	(0.003)		(0.003)		(0.003)	
Inflation	0.014	*	0.015	*	0.013	*
	(0.006)		(0.006)		(0.006)	
R-squared	0.49		0.49		0.50	
Number of regions	119		119		119	
Number of years	5		5		5	
N	595		595		595	

Sources: Authors' calculation using Sakernas and administrative data

Notes: The results are based on a fixed effects model regression. The dependent variable is Ln (EMP). Year dummies are included. Standard errors in parentheses. ** p<0.01, * p<0.05

There are several theoretical reasons why an increase in minimum wage can lead to an increase in formal employment. One such reason is the monopsony model of the labor market, which posits that employers operate at a level where wages are still below the workers' marginal productivity. In this scenario, a minimum wage increase prompts profit-maximizing employers to hire more workers and offer them a higher wage, assuming the policy is fully complied. Another theory proposed by Magruder (2013) suggests that minimum wage increases boost the purchasing power of the local economy, which in turn stimulates demand for locally produced goods and services and encourages employers to hire more workers to meet the rising demand.

Although the minimum wage coefficient shows a positive effect on formal employment, its coefficient of interaction with non-compliance is negative. In other words, the potential effect of minimum wage decreases with non-compliance. According to the estimated coefficients in column 3, if the real minimum wage is increased by 1%, the positive impact on formal employment decreases to 0.2% in regions with 80% non-compliance incidence, compared to 0.37% in areas with only 30% incidence. This result is still consistent with the monopsony labor market theory, which suggests that the positive effect of minimum wage on employment would occur as long as the minimum wage is set not too high, because our data also reveals a positive correlation between the minimum wage and the incidence of non-compliance (NC_0),

Non-compliance with minimum wage may occur due to various reasons, including inadequate enforcement or insufficient penalties. According to Yaniv (2004), strict enforcement with an appropriate penalty can increase the cost of hiring labor for non-compliant employers. This can lead to a leftward shift in the labor demand curve, resulting in lower employment levels. On the other hand, when there is a lack of credible enforcement and penalties for non-compliance with minimum wage laws, the labor demand curve remains unchanged. The positive non-compliance coefficients in columns 2 and 3 support this assertion, suggesting that formal employment tends to be higher when weaker enforcement, and hence higher non-compliance, is present. However, such an effect decreases

along with the minimum wage. Estimates in column 3 result in a *negative* marginal effect of non-compliance on formal employment when the real minimum wage has exceeded Rp1.84 million.
To investigate the impact of minimum wage on formal employment in different subgroups, we estimated equation 1 separately for males and females and younger and older age groups. Table 6 presents the results.

Table 6. The effects of minimum wage and non-compliance on formal employment (subgroups)

	(1) males		(2) females		(3) older		(4) younger	
Ln (MW)	0.281		0.795	**	0.168		1.703	**
	(0.206)		(0.228)		(0.189)		(0.352)	
NC	0.017		0.111	**	0.015		0.182	**
	(0.020)		(0.023)		(0.019)		(0.035)	
Ln (MW) x NC	-0.001		-0.008	**	-0.001		-0.013	**
	(0.001)		(0.002)		(0.001)		(0.002)	
Ln (Total labor force)	0.607	**	0.864	**	0.660	**	0.632	**
	(0.107)		(0.119)		(0.099)		(0.183)	
Labor force with high-school educ	0.011	**	0.011	**	0.011	**	0.01	**
	(0.002)		(0.002)		(0.002)		(0.004)	
Labor force with tertiary educ	0.004		0.011	**	0.008	**	0.001	
	(0.003)		(0.003)		(0.003)		(0.005)	
Size of secondary sector	0.011	**	0.002		0.007	**	0.009	**
	(0.001)		(0.001)		(0.001)		(0.002)	
Economic growth	0.001		0.007		0.002		0.005	
	(0.003)		(0.004)		(0.003)		(0.005)	
Inflation	0.016	*	0.008		0.012		0.013	
	(0.007)		(0.008)		(0.007)		(0.013)	
R-squared	0.45		0.35		0.38		0.37	
Number of observations	595		595		595		595	

Sources: Authors' calculation using Sakernas and administrative data

Notes: The results are based on a fixed effects model regression. The dependent variable is Ln (EMP) in the respected subgroups. Year dummies are included. Standard errors in parentheses. ** p<.01, * p<.05

The coefficients of the minimum wage, non-compliance, and the interaction between minimum wage and non-compliance in each subgroup were consistent with the total sample estimation. However, they were only significant in females and younger subgroups. In males and older subgroups, none of the coefficients of interest were significant. This suggests that the impact of minimum wage on formal employment may differ depending on gender and age.

Table 6 also shows that an increase in real minimum wage can promote formal employment among females and younger workers. However, the effects diminish with the level of non-compliance. On the other hand, non-compliance positively correlates with formal employment in these subgroups, but such correlations turn negative at a certain level of minimum wage. When the real minimum wage exceeds Rp1.068 million and Rp1.214 million in female and younger subgroups, respectively, an increase in non-compliance can reduce their formal employment

CONCLUSIONS

Minimum wage laws are not always enforced in Indonesia. However, previous studies have not considered non-compliance when examining the impact of minimum wage on formal employment. This study examines the effect of both the minimum wage and non-compliance rate on formal employment, focusing on wage employment at the regency/city level in Java Island, where there is a significant percentage of wage workers and relatively large minimum wage differences.

The study found that during the period analyzed, there was a high degree of non-compliance with the minimum wage in Java Island. The average non-compliance rate was around 60%, and workers who were not paid the minimum wage were receiving an average of 30% less than what they should have been paid. Women and younger workers were at higher risk of receiving less than the minimum wage.

The study's results contradict some previous studies in Indonesia that found a negative impact of minimum wage on employment. Instead, the study found that formal employment can increase with a higher value of the real minimum wage, but the effect decreases with non-compliance. Non-compliance was positively correlated with higher formal employment, but this effect could turn negative when the minimum wage exceeded a certain level. This result was particularly significant for women and younger workers. The result suggests that the benefit of a minimum wage in protecting workers depends on enforcement and that weak enforcement while setting a minimum wage too high may cause more non-compliance, which could harm formal employment.

There are some limitations to the study. Firstly, it only covers regencies/cities in Java Island, so further research could expand the coverage area to all of Indonesia. Secondly, working hours could be considered in measuring non-compliance and employment. Finally, dynamic models could be used to control the effect of the lagged dependent variable or variable of interest and the possible endogeneity of the variables of interest.

REFERENCES

Bhorat, H., Kanbur, R., & Mayet, N. (2013). A note on measuring the depth of minimum wage violation. *Labour*, *27*(2), 192–197.

BPS. (2019). *Keadaan Pekerja di Indonesia Agustus 2019*. BPS.

BPS. (2021). *Booklet SAKERNAS Agustus 2021*. BPS.

BPS. (2022). *Upah Buruh*. https://bps.go.id/subject/19/upah-buruh.html#subjekViewTab3

Del Carpio, X., Nguyen, H., & Pabon, L. (2015). Do minimum wages affect employment? Evidence from the manufacturing sector in Indonesia. *IZA Journal of Labor & Development*, *4*(17).

Dinkelman, T., & Ranchhod, V. (2012). Evidence on the impact of minimum wage laws in an informal sector: domestic workers in South Africa. *Journal of Development Economics*, *99*(1), 27–45.

Dube, A. (2019). *Impacts of minimum wages: review of the international evidence*.

Gindling, T. H., & Terrell, K. (2007). The effects of multiple minimum wages throughout the labor market: the case of costa rica. *Labour Economics*, 485–511.

Hohberg, M., & Lay, J. (2015). The impact of minimum wages on informal and formal labor market outcomes: evidence from Indonesia. *IZA Journal of Labor & Development*, *4*(14).

ILO. (2021). *Minimum Wages*. https://www.ilo.org/global/topics/wages/minimum-wages/definition/lang--en/index.htm

ILO. (2022). *How to Define a Minimum Wage?* https://www.ilo.org/global/topics/wages/minimum-wages/definition/lang--en/index.htm

Lemos, S. (2004). Minimum wage policy and employment effects: evidence from Brazil. *Economia*, *5*(1), 219–266.

Lemos, S. (2005). *How do alternative minimum wage variables compare* (05; 6). https://EconPapers.repec.org/RePEc:lec:leecon:05/6

Magruder, J. R. (2013). Can minimum wages cause a big push? evidence from Indonesia. *Journal of Development Economica*, *100*(1), 48–62.

Mansoor, K., & O'Neill, D. (2021). Minimum wage compliance and household welfare: an analysis of over 1500 minimum wages in India. *World Development*, *147*.

Neumark, D., Salas, J., & Wascher, M. (2014). Revisiting the minimum wage-employment debate: throwing out the baby with the bathwater? *ILR Review*, 606–648.

Neumark, D., & Wascher, W. L. (2007). Minimum wages and employment. *Foundations and Trends in Microeconomics*, *3*((1-2)), 1–182.

Pratomo, D. S. (2011). The effects of changes in minimum wage on employment in Indonesia: regional panel data analysis. *International Research Journal of Finance and Economics*, *62*.

Rani, U., Belser, P., Oelz, M., & Ranjbar, S. (2013). Minimum wage coverage and compliance in developing countries. *International Labour Review*, *152*((3-4)), 381–410.

Siregar, T. H. (2022). Investigating the effects of minimum wages on employment, unemployment and labour participation in Java: a dynamic spatial panel approach. *Bulletin of Indonesian Economic Studies*, *58*(2), 195–227.

UN. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. United Nations.

Wooldridge, J. M. (2016). *Introductory Econometrics* (Vol. 6). Cengage Learning.

Yamada, K. (2016). Tracing the impact of large minimum wage changes on household welfare in Indonesia. *European Economic Review*, *87*, 287–303.

Yaniv, G. (2004). Minimum wage compliance and the labor demand curve. *The Journal of Economic Education*, *35*(3), 290–294..