Unveiling the Profile of Low-Wage Workers in Indonesia

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Abstract

The low-wage workers play a vital role in supporting in Indonesia's economy but remain highly vulnerable and are often excluded from social protection policies. This study aims to profile low-wage workers and provide insights for policymakers to improve social protection measures. The research utilizes repeated cross-sectional microdata from the National Labor Force Survey (*Survei Angkatan Kerja Nasional*/Sakernas) between August 2018 and August 2023, a logistic regression model with marginal effects was applied to identify key characteristics of low-wage workers. The findings show that the primary characteristics of low-wage workers are low education levels and working fewer than 20 hours per week. This group is predominantly female, unmarried or divorced, and from younger generations (Gen Z). They are often employed in the informal sector, lacking specific skills, and are mostly working in agriculture. The COVID-19 pandemic worsened their vulnerabilities, amplifying economic risks that persist post-pandemic. The policy implications include expanding educational opportunities to enhance workers' employability, followed by implementing skill training and job placement programs. Additionally, extending minimum wage coverage to both formal and informal sectors, along with offering flexible work arrangements and subsidized childcare, particularly for women, can further support these workers. Furthermore, extending social protection to include social security and healthcare, with incentives for employer contributions, is essential. During crises, policies prioritizing healthcare access, income support, and job protection are crucial for ensuring the economic security of low-wage workers and reducing inequalities.

Keywords: economic justice, informal workers, less educated, low-wage workers, social protection.

1. Introduction

The primary objective behind the establishment of the Indonesian state is to ensure the welfare of its citizens, as enshrined in the Preamble of the 1945 Constitution, which highlights the importance of protecting the nation and advancing public welfare. This principle is further reinforced by the constitution, which guarantees every citizen the right to work and earn a decent living. Employment, as a means of securing income, is crucial for individuals to meet their basic needs and achieve well-being. This connection between work and welfare is also reflected in Law No. 13/2003 on Manpower, specifically Article 88, which ensures that workers are entitled to income that guarantees a decent standard of living. Moreover, Law No. 6/2023, which implements Government Regulation in Lieu of Law No. 2/2022 on Job Creation, reaffirms this right, emphasizing the government's commitment to providing workers with a livelihood that respects their dignity. These legal frameworks highlight the state's responsibility to create conditions where every citizen has access to decent work and can achieve economic security and social justice (Tjakrawerdaja et al., 2021).

In line with these legal principles, one of the government's efforts to improve workers' welfare is the implementation of the minimum wage policy This policy aims to ensure that workers receive fair wages, thus contributing to reducing inequality. Studies show that increasing the minimum wage can reduce food insecurity among households of formal sector workers (Hasanah et al., 2024), improve productivity in companies (Hamzah et al., 2021), and contribute to a reduction in income inequality (Noviana, 2020). However, the policy has also raised concerns about its unintended consequences. For instance, it has been found to reduce formal sector employment and increase unemployment in the informal sector, with minimal spillover effects on neighbouring districts (Siregar, 2020, 2022). Furthermore, the policy disproportionately impacts women, especially those with lower education levels, making it harder for them to secure better-paying jobs or invest in education (Abdul, 2024; Pritadrajati, 2021). Additionally, while the policy increases real wages, it can also reduce hours worked, indicating a trade-off between higher wages and reduced labor input (Agusalim et al., 2025).

Despite the existence of various regulations on minimum wage policy, debates about its effectiveness continue to arise. These discussions often stem from concerns that not all workers are receiving the prescribed minimum wage, and that the set amount may not be sufficient to improve workers' welfare, frequently leading to public demonstrations. Recent studies have consistently identified low-wage workers as those earning below the regionally mandated minimum wage (Redmond & McGuinness, 2022, 2023; Wong, 2019; Godoey & Reich, 2021; Zipperer, 2022; Jardim et al., 2022; Yang & Gunderson, 2020; Bossler & Gerner, 2020). This article defines low-wage workers as those earning less than the Provincial Minimum Wage (PMW) set by the government..

Data published by BPS-Statistics Indonesia shows that many workers in Indonesia still earn below the minimum wage. Figure 1 illustrates the number and proportion of low-wage workers from 2018 to 2023, with significant fluctuations largely driven by the COVID-19 pandemic. Before

the pandemic, the number rose from 65.15 million (52.54%) in 2018 to 68.29 million (53.98%) in 2019. During the pandemic, the number surged to 80.46 million (62.64%) in 2020, peaking at 84.25 million (64.29%) in 2021, as many companies reduced wages or laid off workers (Utomo & Raspati, 2021). Although recovery began in 2022, with a decrease to 78.69 million (58.16%), the number increased again to 82.60 million (59.06%) in 2023, reflecting the long-term impact of the pandemic. The rise in low-wage workers post-pandemic highlights how many lost formal jobs and shifted to informal employment, which offered fewer protections. Cubrich (2020) and Kirksey et al. (2021) noted that low-wage workers not only face economic pressures but also psychological challenges, including fatigue and poor mental health, worsened by unstable work conditions and limited access to healthcare.
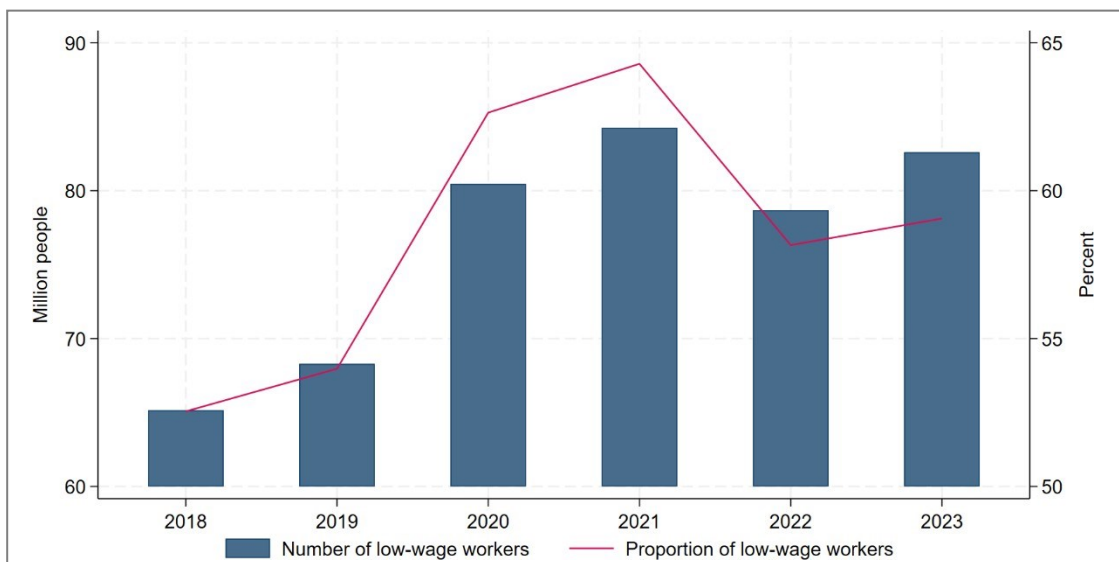
Figure 1. Trends in the Number and Proportion of Low-Wage Workers in Indonesia
Source: BPS-Statistics Indonesia, 2018-2023 (processed)

Low-wage workers, while crucial to sustaining the economy, are often the most vulnerable to social and economic injustices. This group contribute significantly by providing essential services and products but face severe challenges such as economic insecurity, limited legal protection, and restricted access to healthcare. Beck et al. (2019) highlight that many of these workers are caught in a cycle of unstable employment with irregular hours and low wages, intensifying their economic pressures. This vulnerability worsened during the COVID-19 pandemic, which exacerbated their social and economic hardships (Cubrich, 2020; Gallagher et al., 2021).

The research gap concerning low-wage workers in Indonesia arises from the limited empirical studies that specifically analyze their sociodemographic profile and the forms of protection they receive. Existing literature often lacks a comprehensive mapping of key characteristics such as age, gender, education level, marital status, and the distribution between the formal and informal sectors. Additionally, social security aspects remain underexplored in

academic discussions (Fadhilah & Damayanti, 2024). Many low-wage workers face economic uncertainty and limited access to essential services, including healthcare and social security. This underscores the need for a more inclusive and equitable social protection system to prevent further marginalization of this group.

This study aims to fill these gaps by providing a detailed profile of low-wage workers in Indonesia, focusing on their sociodemographic characteristics and available protection mechanisms. The research contributes theoretically by deepening the understanding of low-wage workers' challenges, especially regarding social security and access to services. Methodologically, it employs logistic regression with marginal effects, an effective approach for analyzing the factors influencing the likelihood of being a low-wage worker. Logistic regression is ideal for binary outcomes, such as determining if a worker's income is below the minimum wage threshold, while marginal effects offer clear insights into how sociodemographic changes impact the probability of being a low-wage worker. This approach enhances the interpretability and accuracy of the findings, providing actionable insights for policymakers to design more effective and equitable social protection policies.

2. Research Method

This study employs a quantitative approach using secondary data primarily obtained from BPS-Statistics Indonesia and the Ministry of Manpower of the Republic of Indonesia. The data used in this research consist of repeated cross-sectional microdata from Sakernas, covering annual data from August 2018 to August 2023. These data provide valuable insights into changes and trends over the specified period. To analyze the data and perform inferential analysis, this study uses Stata 18 software. Stata is particularly useful for conducting various statistical analyses. Table 1 presents the variables used in this study.

Table 1. Research Variables

No.	Variable	Symbol	Category
	Dependent variable		
1	Worker type	*WT*	0 = Non-low-wage (≥ PMW) (reference)
			1 = Low-wage (< PMW)
	Independent variables		
2	Weekly hours worked	*HOURS*	≤ 20 hours (reference), 21–40 hours, > 40 hours
3	Gender	*GENDER*	Female (reference), Male
4	Marital status	*MS*	Others (reference), Married
5	Generation	*GEN*	Gen. Z (reference), Gen. Y, Gen. X, Boomers, Silent, Greatest
6	Education level	*EDU*	Basic (reference), intermediate, high
7	Region	*REGION*	Rural (reference), Urban
8	Employment status	*FORMAL*	Informal (reference), formal
9	Worker skill	*SKILL*	Unskilled (reference), Skilled
10	Economic sector	*SECTOR*	Agriculture (reference), Industry, Services

The research objective is addressed using marginal effects analysis derived from a logistic regression model, which is well-suited for examining binary outcomes, such as whether an individual's wage falls below the minimum wage threshold. This approach allows for clear insights into how sociodemographic factors influence the likelihood of earning a low wage. The first step involves formulating the logistic regression equation, as presented in Equation (1), which is adapted and modified from the study by Maroto and Pettinicchio (2023):

$$ln\left(\frac{P(WT_{ipt}=1)}{1-P(WT_{ipt}=1)}\right) = \beta_0 + \beta_1 HOURS_{ipt} + \beta_2 GENDER_{ipt} + \beta_3 MS_{ipt} + \beta_4 GEN_{ipt} +$$
$$\beta_5 EDU_{ipt} + \beta_6 REGION_{ipt} + \beta_7 FORMAL_{ipt} + \beta_8 SKILL_{ipt} +$$
$$\beta_9 SECTOR_{ipt} + \gamma_t + \delta_p + \varepsilon_{ipt} \tag{1}$$

In Equation (1), $P(WT_{ipt} = 1)$ represents the probability that an individual i, in province p, at time t, has low wages. The dependent variable in this model is the type of worker, which is divided into two categories: low-wage workers who earn below the PMW, and non-low-wage workers who earn at or above PMW. $ln\left(\frac{P(WTipt=1)}{1-P(WT_{ipt}=1)}\right)$ is the log-odds, which is the logarithm of the ratio between the likelihood of being a low-wage worker and the likelihood of not being one. The independent variables used are a set of dummy variables that encompass various aspects, with the reference category assigned a value of 0. The variable weekly hours worked ($HOURS$) uses workers with ≤20 hours of work per week as the reference, compared to categories of 21–40 hours and >40 hours. For the variable gender ($GENDER$), female is used as the reference, while male is the other category. The marital status variable (MS) sets unmarried or divorced status as the reference, compared to married workers. For the generation variable (GEN), Generation Z is the reference, compared to other generations such as Y, X, Boomers, Silent, and Greatest. In the education level variable (EDU), basic education is used as the reference, with intermediate and higher education as other categories. Rural areas are used as the reference for the region variable ($REGION$), compared to workers in urban areas. Employment status ($FORMAL$) sets informal employment as the reference, compared to the formal sector. The worker skills variable ($SKILL$) uses unskilled workers as the reference, compared to skilled workers. In the economic sector variable ($SECTOR$), agriculture is the reference, while industry and services are the other categories. Additionally, there are year fixed effects (γ_t) to control for differences across years, and province fixed effects (δ_p) to control for variations across provinces that may affect workers' wages.

After performing the logistic regression, the next step is to evaluate the impact of changes in each independent variable using marginal effects analysis. This analysis reveals the extent of change in the probability of low-wage workers as a result of a one-unit change in the independent variable, calculated as the first derivative of the probability with respect to that variable (Mize et al., 2019). Equation (2) illustrates the general formula for calculating the marginal effect.

$$ME_{X_{ipt}} = \frac{\partial P(WT_{ipt} = 1)}{\partial X_{ipt}} \tag{2}$$

In Equation (2), $ME_{X_{ipt}}$ represents the marginal effect of the independent variable X_{ipt}, which refers to the change in the probability of being a low-wage worker in response to a one-unit change in independent variable. The notation $(WT_{ipt} = 1)$ indicates that individual i, residing in province p in year t, is classified as a low-wage worker. The first derivative $\frac{\partial P(WTipt=1)}{\partial X_{ipt}}$ measures the extent to which this probability changes as a result of variation in the value of the independent variable.

Bias estimation was addressed by conducting multicollinearity tests among the independent variables, while heteroscedasticity issues were mitigated by running the regression with robust standard errors. After estimation, model fit and robustness were assessed using Wald chi-square, Pseudo R^2, AUC, as well as the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) to ensure the reliability and validity of the results.

3. Results and Discussion

This section presents a descriptive overview of the sample, marginal effects analysis predicting low-wage workers across different subgroups (full sample, gender, region, and COVID-19 period), and policy recommendations.

3.1. Descriptive Analysis

Table 2 presents the average sample data used in this study to analyze the profile of low-wage workers in Indonesia. The majority of workers in Indonesia fall into the low-wage category, with a higher proportion of women and rural workers among the total observation of 1,810,186 individuals. In contrast, high-wage workers are more commonly found among men and urban workers. Studies conducted by Bargain and Kwenda (2011) and Ikeije and Islam (2020) also identified a high proportion of low-wage workers in countries such as Brazil, Mexico, South Africa, and Nigeria. During the COVID-19 period, there was an increase in the proportion of workers earning below the minimum wage, particularly during the peak of the pandemic, although this situation showed improvement post-pandemic. This is supported by the findings of Gallagher et al. (2021), which highlight that the COVID-19 pandemic further exposed the vulnerabilities of low-wage workers. Additionally, this study performed a correlation test, which showed no correlation exceeding 0.8, indicating no strong evidence of multicollinearity issues (Egessa et al., 2021).

Table 2. Descriptive Statistics of Workers by Category (Percentage)

Variable	Full Sample	Gender		Region		COVID-19 Period		
		Male	Female	Urban	Rural	Before	During	After
Worker type								
< PMW	65.69	60.91	74.15	57.67	73.84	60.62	69.71	65.98
≥ PMW	34.31	39.09	25.85	42.33	26.16	39.38	30.29	34.02
Weekly hours worked								
≤ 20 hours	12.73	9.56	18.37	10.14	15.38	9.18	17.20	11.35

Variable	Full Sample	Gender		Region		COVID-19 Period		
		Male	Female	Urban	Rural	Before	During	After
21-40 hours	37.39	35.00	41.63	34.41	40.42	35.86	38.38	37.69
> 40 hours	49.88	55.45	40.01	55.46	44.20	54.96	44.42	50.95
Gender								
Male	63.91	100.00	0.00	61.90	65.96	64.02	63.97	63.77
Female	36.09	0.00	100.00	38.10	34.04	35.98	36.03	36.23
Marital status								
Married	72.24	75.85	65.84	70.52	73.98	72.49	72.29	71.97
Others	27.76	24.15	34.16	29.48	26.02	27.51	27.71	28.03
Generation								
Z	10.98	10.79	11.30	11.39	10.56	7.47	10.63	14.23
Y	38.27	38.62	37.66	37.94	38.62	37.38	37.94	39.33
X	37.25	37.39	36.99	38.05	36.43	39.10	37.78	35.19
Baby boomers	12.83	12.60	13.25	12.14	13.54	15.14	12.98	10.78
Silent	0.66	0.59	0.78	0.48	0.84	0.89	0.66	0.47
Greatest	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Education level								
Basic	51.13	53.06	47.71	40.66	61.77	52.72	51.16	49.79
Intermediate	31.91	34.57	27.19	38.00	25.71	30.59	31.76	33.14
High	16.96	12.37	25.10	21.33	12.52	16.69	17.08	17.08
Region								
Urban	50.41	48.82	53.23	100.00	0.00	50.96	48.32	51.99
Rural	49.59	51.18	46.77	0.00	100.00	49.04	51.68	48.01
Employment status								
Formal	52.48	51.87	53.56	61.39	43.42	54.66	51.70	51.43
Informal	47.52	48.13	46.44	38.61	56.58	45.34	48.30	48.57
Worker Skill level								
Skilled	34.94	34.62	35.50	23.25	46.82	34.13	34.96	35.60
Unskilled	65.06	65.38	64.50	76.75	53.18	65.87	65.04	64.40
Economic sector								
Agriculture	23.22	27.31	15.97	9.41	37.26	22.04	23.51	23.92
Industry	23.51	27.45	16.54	24.85	22.16	24.23	23.45	22.98
Services	53.27	45.23	67.49	65.74	40.58	53.74	53.04	53.10
Year								
2018	11.40	11.36	11.46	11.98	10.81	38.49	0.00	0.00
2019	18.22	18.30	18.07	17.96	18.48	61.51	0.00	0.00
2020	17.25	17.33	17.09	16.70	17.81	0.00	49.76	0.00
2021	17.42	17.36	17.51	16.53	18.32	0.00	50.24	0.00
2022	17.56	17.61	17.48	17.08	18.05	0.00	0.00	49.16
2023	18.16	18.03	18.39	19.76	16.54	0.00	0.00	50.84
No. of observations	1,810,186	1,156,944	653,242	912,576	897,610	536,094	627,435	646,657

Source: National Labor Force Survey, 2018-2023 (processed)

Additionally, Table 3 presents the results of the correlation test, which showed no correlation exceeding 0.8, indicating no strong evidence of multicollinearity issues (Egessa et al., 2021). The weak to moderate relationships between variables such as worker type, working hours, gender, marital status, generation, education level, region, employment status, worker skills, and industry sector indicate significant associations, but not strong enough to affect the stability of the regression model. A positive correlation was found between education level and employment status as well as industry sector, indicating a tendency for more educated workers to be in the

formal and service sectors. On the other hand, negative correlations, such as between worker skills and certain industry sectors, suggest an inverse relationship. Overall, the correlations between variables show acceptable relationships within the model, making it suitable for logistic regression analysis without significant multicollinearity risks.

Table 3. Correlation of Research Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Worker type (1)	1.000									
Weekly hours worked (2)	-0.193	1.000								
Gender (3)	-0.134	0.167	1.000							
Marital status (4)	-0.118	-0.005	0.107	1.000						
Generation (5)	0.006	-0.117	-0.005	0.272	1.000					
Education level (6)	-0.296	-0.045	-0.116	-0.031	-0.218	1.000				
Region (7)	-0.170	0.118	-0.042	-0.039	-0.018	0.199	1.000			
Employment status (8)	-0.269	0.126	-0.016	-0.060	-0.257	0.432	0.180	1.000		
Worker skill (9)	0.069	-0.247	-0.009	0.057	0.132	0.083	-0.247	-0.091	1.000	
Economic sector (10)	-0.162	0.069	-0.197	-0.045	-0.146	0.422	0.323	0.326	-0.524	1.000

Source: Author's calculation

3.2. Marginal Effects Results

3.2.1. Marginal effects results predicting low-wage workers (full sample)

Based on the performance evaluation of statistics, the model in column four of Table 4, which includes time and province fixed effects, has proven to be the best model based on the high values of Wald chi², Pseudo R², and AUC (Díaz-Serrano and Nilsson, 2020; White, 2023). Furthermore, the AIC and BIC indicators are the lowest compared to the other columns (Mahapatro, 2019; Hidalgo-Pérez & Molinari, 2022). This is because the inclusion of provincial effects in the logit model helps control for unobserved heterogeneity, such as differences in labor market conditions and economic policies across provinces. Additionally, the inclusion of time effects allows for capturing trends in the labor market over time, reflecting changes in economic conditions and policies that influence job dynamics and wages.

This study demonstrates that low-wage workers share several common characteristics. First, they tend to work 20 hours or less per week (Denning et al., 2022). Second, the majority are women (Maroto & Pettinicchio, 2023). Third, they are either unmarried or divorced (Amankwah et al., 2022). Fourth, they belong to the younger generation (Gen Z) (Maroto & Pettinicchio, 2023). Fifth, low education levels are a predominant characteristic of most low-wage workers (Oka & Yamada, 2023). Sixth, they are often employed in rural areas (Xu et al., 2023; Li, 2023). Seventh, the informal sector is their primary workplace (Setyanti et al., 2024). Eighth, low-wage workers typically possess limited skills (Kuo et al., 2022). Ninth, the majority work in the agricultural sector (Sseruyange & Bulte, 2020). Tenth, they were more vulnerable during the pandemic and have yet to fully recover in the post-pandemic period (Cubrich et al., 2022). These findings reinforce that the characteristics of low-wage workers are consistent with various previous studies.

Table 4. Marginal Effects Results Predicting Low-Wage Workers (Full Sample)

Variable	(1)	(2)	(3)	(4)
21-40 hours	-0.1396***(0.001)	-0.1352***(0.001)	-0.1380***(0.001)	-0.1332***(0.001)
> 40 hours	-0.2381***(0.001)	-0.2302***(0.001)	-0.2303***(0.001)	-0.2219***(0.001)
Male	-0.1353***(0.001)	-0.1359***(0.001)	-0.1381***(0.001)	-0.1387***(0.001)
Married	-0.0892***(0.001)	-0.0911***(0.001)	-0.0852***(0.001)	-0.0869***(0.001)
Gen. Y	-0.0586***(0.001)	-0.0533***(0.001)	-0.0643***(0.001)	-0.0595***(0.001)
Gen. X	-0.1293***(0.001)	-0.1229***(0.001)	-0.1336***(0.001)	-0.1277***(0.001)
Baby Boomers Gen.	-0.0910***(0.001)	-0.0816***(0.001)	-0.0899***(0.001)	-0.0812***(0.001)
Silent Gen.	-0.0071(0.006)	0.0052(0.006)	-0.0018(0.006)	0.0099(0.005)
Greatest Gen.	-0.0033(0.040)	0.0064(0.039)	-0.0101(0.038)	-0.0011(0.037)
Intermediate education	-0.1190***(0.001)	-0.1196***(0.001)	-0.1351***(0.001)	-0.1358***(0.001)
High education	-0.3346***(0.001)	-0.3367***(0.001)	-0.3622***(0.001)	-0.3643***(0.001)
Urban	-0.0694***(0.001)	-0.0692***(0.001)	-0.0398***(0.001)	-0.0393***(0.001)
Formal	-0.1197***(0.001)	-0.1178***(0.001)	-0.1162***(0.001)	-0.1146***(0.001)
Skilled	-0.0200***(0.001)	-0.0183***(0.001)	-0.0219***(0.001)	-0.0201***(0.001)
Industry	-0.1606***(0.001)	-0.1592***(0.001)	-0.1272***(0.001)	-0.1257***(0.001)
Services	-0.0744***(0.001)	-0.0725***(0.001)	-0.0599***(0.001)	-0.0579***(0.001)
Time fixed effects	No	Yes	No	Yes
Provincial fixed effects	No	No	Yes	Yes
No. of observations	1,810,186	1,810,186	1,810,186	1,810,186
Wald chi²	299,426	303,458	325,922	329,905
Prob > chi²	0.0000	0.0000	0.0000	0.0000
Pseudo R²	0.1798	0.1826	0.2153	0.2185
AIC	1,909,764	1,903,120	1,827,047	1,819,761
BIC	-418,305	-424,889	-500,615	-507,840
AUC	0.7779	0.7799	0.8023	0.8043

Note: Column (1) without time and province fixed effects, column (2) with time fixed effects, column (3) with province fixed effects, column (4) the main model specification with both time and provincial fixed effects. Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

The estimation results in column 4 of Table 4 can be visualized as shown in Figure 2, which displays the average marginal effects on the probability of being a low-wage worker in Indonesia. Among the factors analyzed, higher education and longer hours worked show the strongest negative effects, significantly reducing the likelihood of being a low-wage worker. This indicates that individuals with higher education and those working longer hours are less likely to be employed in low-wage jobs. Additionally, working in the formal sector and in skilled occupations also shows a significant negative effect, meaning that workers in these sectors are less likely to be low-wage workers. In contrast, working in the service sector increases the likelihood of being a low-wage worker, as this sector involves many low-skill, informal jobs, such as those in restaurants, hospitality, and retail, which typically offer lower wages. On the other hand, the industrial sector, which is more structured and offers more opportunities for skill development, tends to produce fewer low-wage workers.
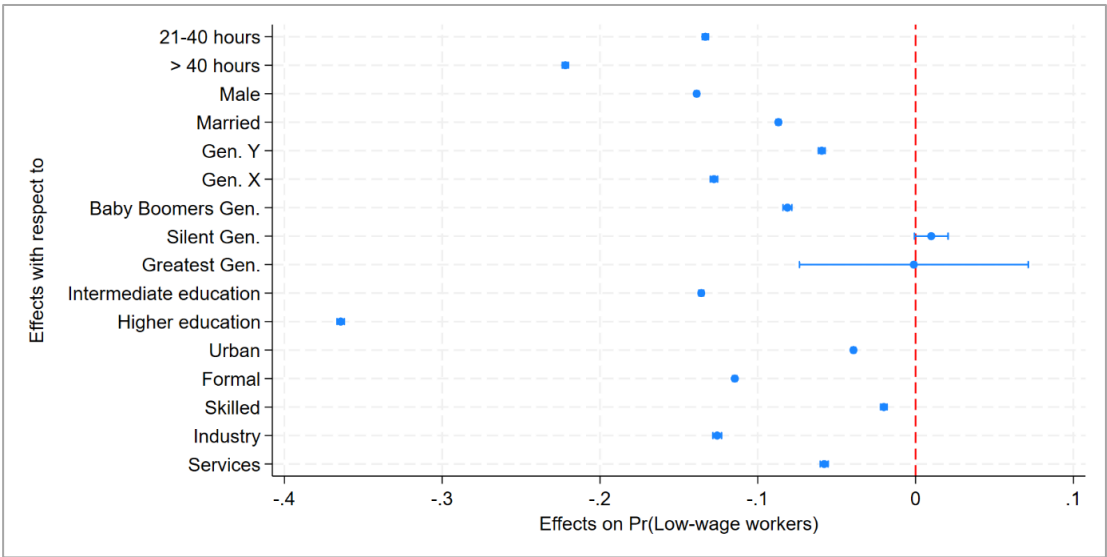
Figure 2. Average Marginal Effects on the Probability of Low-Wage Workers in Indonesia

Source: BPS-Statistics Indonesia, 2018-2023 (processed)

3.2.2. Marginal effects results by gender and region

Using the model in column four of Table 4, which includes fixed effects for time and province, marginal effects analysis was conducted by grouping the sample based on gender and region, as shown in Table 5. The results show that women are more vulnerable to being low-wage workers due to a combination of structural and social factors. First, women are often concentrated in female-dominated occupations and industries that typically offer lower wages (Akdoğan-Gedik & Günel, 2021; Akbar, 2022). Second, even in similar roles, women tend to earn less than men due to discrimination (Khan & Majid, 2020; Hamjediers, 2020). Third, disproportionate domestic and caregiving responsibilities limit women's ability to work longer hours or pursue higher-paying opportunities (Wijayanto & Sari, 2019; Antonie et al., 2020). Fourth, the lack of support for work-life balance and job flexibility exacerbates women's involvement in low-wage work (Redmond & McGuinness, 2019). Fifth, skill development gaps contribute to women being more likely to hold low-wage jobs that require fewer skills (Sugiharti & Kurnia, 2018; Li et al., 2024). Sixth, women are more likely to work in the informal sector or insecure jobs, such as part-time or contract positions, which typically offer lower wages and fewer benefits. Seventh, the intersection of gender with factors like race, ethnicity, and immigration status further intensifies women's vulnerability to low-wage work (Yuniashri et al., 2023).

Regionally, rural workers are more likely to be low-wage workers compared to their urban counterparts due to several structural and social factors. First, limited job opportunities in rural areas, where the economy is mainly driven by agriculture and low-skill service industries, forces many workers to accept low-wage jobs (Ashari et al., 2022). Second, the education and skills gap between rural and urban workers exacerbates this issue, as rural workers typically have lower

education levels and fewer opportunities for skill development, limiting their earning potential (Robles-Ortiz et al., 2023). Third, the wage gap between urban and rural areas deepens income inequality, with urban workers earning significantly more (Velthuis et al., 2019). Fourth, many rural workers are employed in informal or precarious jobs, such as part-time or contract work, which offer lower wages and fewer benefits (Gutierrez et al., 2019). Lastly, development policies that prioritize urban areas further disadvantage rural workers, restricting their access to better employment opportunities and reinforcing their vulnerability to low-wage conditions (Pratomo, 2014).

Table 5. Marginal Effects Results by Gender and Region

Variable	Gender		Region	
	Male	Female	Urban	Rural
21-40 hours	-0.1221***(0.001)	-0.1348***(0.001)	-0.1777***(0.002)	-0.0944***(0.001)
> 40 hours	-0.2245***(0.001)	-0.2019***(0.001)	-0.2490***(0.002)	-0.2061***(0.001)
Male	-	-	-0.1440***(0.001)	-0.1390***(0.001)
Married	-0.1253***(0.001)	-0.0448***(0.001)	-0.0874***(0.001)	-0.0875***(0.001)
Gen. Y	-0.0689***(0.002)	-0.0356***(0.001)	-0.0695***(0.002)	-0.0508***(0.001)
Gen. X	-0.1168***(0.002)	-0.1339***(0.002)	-0.1350***(0.002)	-0.1184***(0.002)
Baby Boomers Gen.	-0.0471***(0.002)	-0.1378***(0.002)	-0.0942***(0.002)	-0.0676***(0.002)
Silent Gen.	0.0517***(0.007)	-0.0572***(0.009)	-0.0008***(0.009)	0.0180***(0.006)
Greatest Gen.	0.0497***(0.048)	-0.0739***(0.055)	-0.0717***(0.056)	0.0759***(0.044)
Intermediate education	-0.1362***(0.001)	-0.1477***(0.001)	-0.1727***(0.001)	-0.0975***(0.001)
High education	-0.3348***(0.002)	-0.3920***(0.002)	-0.4050***(0.001)	-0.2985***(0.002)
Urban	-0.0312***(0.001)	-0.0547***(0.001)	-	-
Formal	-0.1272***(0.001)	-0.0976***(0.001)	-0.1154***(0.001)	-0.1166***(0.001)
Skilled	-0.0166***(0.001)	-0.0088***(0.001)	-0.0401***(0.002)	-0.0051***(0.001)
Industry	-0.1321***(0.002)	-0.1086***(0.002)	-0.1862***(0.002)	-0.0908***(0.002)
Services	-0.0620***(0.002)	-0.0524***(0.002)	-0.1059***(0.002)	-0.0439***(0.002)
Time fixed effects	Yes	Yes	Yes	Yes
Provincial fixed effects	Yes	Yes	Yes	Yes
No. of observations	1,156,944	653,242	912,576	897,610
Wald chi²	208,933	115,963	170,838	141,938
Prob > chi²	0.0000	0.0000	0.0000	0.0000
Pseudo R²	0.1992	0.2492	0.2121	0.2011

Note: Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

3.2.3. Marginal effects results by COVID-19 period

The COVID-19 pandemic has significantly impacted the factors influencing the risk of becoming a low-wage worker, with notable differences observed between the pre-pandemic, during-pandemic, and post-pandemic periods (see Table 6). Prior to the pandemic, the risk of being a low-wage worker remained relatively stable, reflecting a typical labor market. However, the pandemic triggered a sharp increase in this risk due to economic disruptions that heightened the vulnerability of various worker groups. Although there has been some post-pandemic recovery, the risk remains elevated compared to pre-pandemic levels, highlighting the lasting effects of the crisis and ongoing challenges. Four key factors contributed to the increased vulnerability of low-wage workers during the pandemic and continue to affect them post-

pandemic. First, there was heightened job insecurity and vulnerability. Low-wage workers faced limited access to healthcare, job uncertainty, and unsafe working conditions (Cubrich et al., 2022). The pandemic not only exacerbated existing inequalities but also introduced new dimensions of vulnerability for low-wage workers (Loustaunau et al., 2021).

Second, the economic impact of the pandemic disproportionately affected low-wage workers, especially in sectors like healthcare, retail, and food services. Many experienced job losses, reduced hours worked, and financial instability (Cubrich, 2020; Ravenelle & Kowalski, 2023). Third, migrant and informal workers, who are predominantly in low-wage jobs, faced additional challenges during the pandemic. These included limited access to healthcare services and social support, which further heightened their vulnerability (Dutta, 2020; Quandt et al., 2021).

Fourth, the post-pandemic economic recovery has been uneven, with low-wage workers facing a higher risk of long-term impacts. There are concerns that the pandemic will exacerbate labor market inequalities in the long run, leading to an increase in low-wage jobs with minimal job security. This trend creates a reliance on unstable employment with limited opportunities for career advancement (Cubrich et al., 2022; Ravenelle & Kowalski, 2023). The combined health, economic, and social impacts of the pandemic have underscored the structural vulnerabilities that low-wage workers face, both during and after the crisis..

Table 6. Marginal Effects Results by COVID-19 Period

Variable	Before COVID-19	During COVID-19	After COVID-19
21-40 hours	-0.1718***(0.0022)	-0.1090***(0.0014)	-0.1501***(0.0018)
> 40 hours	-0.2761***(0.0022)	-0.1845***(0.0014)	-0.2366***(0.0018)
Male	-0.1512***(0.0012)	-0.1198***(0.0010)	-0.1457***(0.0011)
Married	-0.0972***(0.0015)	-0.0815***(0.0013)	-0.0792***(0.0013)
Gen. Y	-0.0608***(0.0024)	-0.0555***(0.0018)	-0.0666***(0.0017)
Gen. X	-0.1386***(0.0025)	-0.1314***(0.0019)	-0.1182***(0.0018)
Baby Boomers Gen.	-0.1059***(0.0029)	-0.0954***(0.0024)	-0.0390***(0.0024)
Silent Gen.	0.0060(0.0088)	-0.0146(0.0095)	0.0368***(0.0109)
Greatest Gen.	0.0129(0.0601)	-0.0163(0.0566)	-0.0336(0.0912)
Intermediate education	-0.1578***(0.0015)	-0.1328***(0.0012)	-0.1206***(0.0013)
High education	-0.3704***(0.0022)	-0.3703***(0.0020)	-0.3476***(0.0020)
Urban	-0.0452***(0.0013)	-0.0278***(0.0011)	-0.0460***(0.0011)
Formal	-0.0899***(0.0014)	-0.1342***(0.0012)	-0.1129***(0.0012)
Skilled	-0.0096***(0.0020)	-0.0296***(0.0017)	-0.0187***(0.0017)
Industry	-0.1311***(0.0027)	-0.1273***(0.0022)	-0.1173***(0.0024)
Services	-0.0739***(0.0025)	-0.0548***(0.0021)	-0.0446***(0.0022)
Time fixed effects	Yes	Yes	Yes
Provincial fixed effects	Yes	Yes	Yes
No. of observations	536,094	627,435	646,657
Wald chi²	97,330	113,362	114,767
Prob > chi²	0.0000	0.0000	0.0000
Pseudo R²	0.2093	0.2271	0.2164

Note: The period before COVID-19 (2018-2019), during COVID-19 (2020-2021), and after COVID-19 (2022-2023). Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

3.3. Policy Recommendation

The The analysis of low-wage workers' determinants leads to several policy recommendations aimed at protecting this vulnerable group. These suggestions are based on the study's empirical findings and supported by previous research. At least six policies can improve the conditions of low-wage workers. First, education, skill training programs, and job placement initiatives are crucial. Education is vital, particularly for young workers or those lacking formal qualifications, to expand employment opportunities in more productive sectors. Well-designed job placement programs can bridge the gap between workers' skills and business sector needs (Auliya & Agusalim, 2022). Additionally, targeted financial support, such as training or educational subsidies, is essential (Lagoa & Suleman, 2016, Agusalim et al., 2022). Tailored training programs, such as technical training, digital literacy, or entrepreneurship, can improve workers' abilities and provide access to higher-paying jobs (Putri & Agusalim, 2023). Policies aimed at improving productivity through field-based training programs, like those for farmers, are also necessary (Mariyono et al., 2021). Informal skill certification schemes, such as Recognition of Prior Learning, can help informal sector workers gain official recognition for their skills and facilitate their transition to the formal sector (Hazin et al., 2025).

Second, minimum wage policies should be expanded to cover both formal and informal sector workers, ensuring fair wages and better living standards (Rani et al., 2013; Maroto & Pettinicchio, 2023). The minimum wage level should reflect a decent wage, considering regional cost-of-living differences, with periodic reviews to adjust for inflation and changes in living costs (Lubis et al., 2019; Pherng et al., 2022). Additionally, enforcement and compliance with minimum wage policies must be strengthened, especially in the informal sector, where oversight is often lacking. Effective legal enforcement mechanisms and penalties should be implemented to ensure compliance (Caraway et al., 2019).

Third, to support women in full-time work, flexible work arrangements should be implemented, including flexible hours, telecommuting, and compressed workweeks. These options help women manage both professional and domestic responsibilities, reduce stress, and promote a healthy work-life balance (Awang & Nadzri, 2023; Agusalim & Novianti, 2023). Additionally, government-subsidized childcare policies can reduce the economic and logistical burdens of childcare, encouraging women to enter full-time employment. Evidence from OECD countries shows that investment in subsidized childcare increases female labor force participation and drives economic growth (Adrangi & Jeszenszki, 2025). Organizational policies, such as extended maternity leave, on-site childcare, and return-to-work programs, are also key to enhancing job satisfaction and female labor force participation. These policies have been effective in countries like Saudi Arabia, where HR interventions have facilitated women's transition into male-dominated roles, fostering a more inclusive work environment (Asfahani et al., 2024). Furthermore, these policies help address the "double burden" by aligning work and personal life, as supported by social and labor regulations (Todorova & Radulovikj, 2020).

Fourth, social protection should be expanded to include access to social security, healthcare services, and other benefits. Programs that offer subsidies or incentives for employers to contribute to

social insurance are also essential (Park & Cho, 2019; Miti et al., 2020). This approach alleviates financial burdens, especially for small businesses and the informal sector, enabling them to provide social protection, such as health insurance or pension benefits, to their workers. Subsidies can help cover part of the social insurance contributions, while incentives might include tax reductions, exemptions from administrative fees, or access to special financing programs for employers committed to offering social protection. These initiatives not only promote compliance but also improve the overall welfare of the workforce.

Fifth, during crises like the COVID-19 pandemic, targeted policies are crucial to protect the health and economic security of low-wage workers, who are especially vulnerable to shocks. Key priorities should include access to healthcare services, temporary income support, and protection against unjust termination of employment. These measures are vital to prevent crises from worsening existing inequalities and to build a more resilient protection system for the future (Cubrich et al., 2022; Quandt et al., 2021; Agusalim et al., 2024).

4. Conclusion and Recommendations

The profile of low-wage workers reflects deep vulnerabilities in the labor market, revealing broader issues of structural inequality. Education plays a crucial role in preventing individuals from becoming low-wage workers, as it provides the skills and qualifications necessary for better-paying jobs. Workers with higher education levels are more likely to access stable, higher-wage employment opportunities, reducing their risk of being trapped in low-wage jobs. Similarly, workers with longer hours worked are less likely to be classified as low-wage workers. Longer hours worked generally reflect full-time employment in sectors that offer more stability and better pay, unlike part-time or precarious jobs often found in the low-wage sector. Other key characteristics of low-wage workers include employment in rural areas and the informal or agricultural sectors, all of which limit upward mobility and contribute to a cycle of poverty. These factors reflect structural inequality, where groups such as women and younger generations (Gen Z) face disproportionate barriers to better employment. The COVID-19 pandemic exacerbated these conditions, deepening economic risks that persist post-pandemic.

To protect low-wage workers, policies should prioritize education, skill training, and job placement programs to enhance workers' capabilities and access to better employment. Additionally, expanding minimum wage coverage to both formal and informal sectors, while considering regional cost-of-living differences, is crucial to ensure fair wages and improved living standards. Flexible work arrangements, including remote work and flexible hours, alongside subsidized childcare and family-friendly policies, support women's full-time employment and work-life balance. Expanding social protection to include social security and healthcare, with incentives for employers, will alleviate the financial burden on small businesses. During crises, policies must prioritize healthcare access, income support, and job protection to safeguard low-wage workers, reduce inequalities, and strengthen the social protection system.

This study has two main limitations. First, it relies on secondary data from Sakernas, which may not fully capture the diversity of the low-wage workforce, particularly those in informal or irregular employment. Second, the study does not consider cultural and religious factors, which could significantly influence employment patterns and workers' experiences. Factors such as social norms, gender roles, and religious values may shape the opportunities and challenges faced by low-wage workers. Future research should incorporate repeated cross-sectional data and qualitative studies to gain a more detailed understanding of temporal variations and cultural influences on low-wage workers, ultimately supporting the development of more effective and targeted policies.

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