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## The Dynamics of Social Protection Gaps in Indonesia's Transforming Labor Market: Gig Workers and Formal Employees

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### Abstract

Indonesia's expanding gig economy has reshaped the labor market, offering flexibility while deepening social protection disparities. This study examines the gap in social protection coverage between formal employees and gig workers-online and local-within Indonesia's employment landscape. Using microdata from August 2018, 2021, and 2023 National Labor Force Surveys (Sakernas), the analysis focuses on the service sector, where gig work is concentrated. A binary logistic regression with marginal effects was used to estimate the probability of workers' participation in Indonesia's social security programs. Findings revealed persistent, significant disparities: Online gig workers were 33% less likely and local gig workers 23% less likely to be covered than formal employees. These inequalities widened during and after the COVID-19 pandemic, especially in health and occupational accident insurance. Further analysis showed that disparities were more pronounced among male and urban workers. These results underscore structural vulnerabilities in Indonesia's dual labor system and highlight the need for inclusive, adaptive social protection reforms. Recommendations include integrating gig workers into national social security schemes through shared contributions, strengthening digital and social protection literacy, and establishing a legal framework that recognizes platform-based employment as part of Indonesia's labor market.

**Keywords:** employment injury security, gig workers, health insurance, labor transformation, social protection gaps.

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## 1. Introduction

The global labor market is transforming, generating new dynamics in employment relations, including the rapid expansion of the gig economy. While this offers workers flexibility, it also introduces new vulnerabilities in social protection. The gig economy has emerged as a significant global trend, prompting a re-evaluation of traditional labor laws and social protection frameworks. Anan (2024) and Alturkey (2024) emphasize the cross-national challenge of reforming labor laws to ensure gig workers receive protection equivalent to formal employees without undermining work flexibility, as observed in the UK, Saudi Arabia, and other contexts. Meanwhile, the International Labour Organization (ILO), through its “Decent Work Agenda,” underscores the importance of universal social protection, particularly for informal and gig workers, who are often excluded from formal social security systems (Yan et al., 2022).

However, technological advancements and digital work patterns have further complicated the governance of the gig economy. Mohan and Vasumathi (2024) explored how algorithms and digital systems shape performance evaluation and worker management, potentially hindering the protection of labor rights. Pant and Majumder (2022) identify similar challenges in the Indian context, where the flexibility offered by gig work paradoxically created new pressures on social and employment stability. In line with this, Uddin (2022) stresses the importance of maintaining work-life balance among gig workers, as platform-based work frequently blurs the boundary between professional and personal time. Collectively, these studies highlight that despite new economic opportunities, the gig economy necessitates a fundamental reassessment of legislative and social frameworks to ensure fairer worker protection in the digital era.

A similar trend has occurred in Indonesia, where the expansion of the gig economy, particularly in the service sector, has transformed the national labor market. Data from BPS-Statistics Indonesia indicate that the proportion of gig workers has increased substantially between 2018 and 2023. The number of online gig workers rose from approximately 60.27 thousand to 177.31 thousand, while local gig workers surged from 1.27 million to nearly 4.79 million individuals. Combined, these groups expanded their share from 6.14 percent to 18.66 percent of total employment in the selected service sectors. In contrast, the proportion of non-gig informal workers declined from 46.80 percent to 39.76 percent, and the share of formal employees fell from 47.06 percent to 41.58 percent (see Table 1). This shift indicates a gradual substitution of both formal and traditional informal jobs with more flexible, platform-based work. These trends indicate a structural transformation of Indonesia’s labor market, as digitalization and the rise of service-oriented industries blur the divide between formal and informal employment. The expansion of gig work generates new income opportunities but simultaneously widens inequality in access to stable jobs and social protection.

**Table 1.** Number and Share of Workers by Employment Status, 2018–2023

Employment Status	Indicator	2018	2021	2023
Formal	Workers ('000 persons)	10,178.62	9,798.49	11,079.70
	Share (%)	47.06	41.85	41.58
Informal: Online Gig	Workers ('000 persons)	60.27	110.06	177.31
	Share (%)	0.28	0.47	0.67
Informal: Local Gig	Workers ('000 persons)	1,266.99	2,963.73	4,794.31
	Share (%)	5.86	12.66	17.99
Informal: Non-Gig	Workers ('000 persons)	10,123.50	10,540.87	10,592.65
	Share (%)	46.80	45.02	39.76
<b>Total</b>	<b>Workers ('000 persons)</b>	<b>21,629.38</b>	<b>23,413.14</b>	<b>26,643.95</b>

Note: The classification of workers is limited to selected service sectors to ensure comparability across employment types. The analysis covers five sectors: (1) transportation and storage, (2) accommodation and food services, (3) information and communication, (4) business activities, and (5) other services.

Source: BPS-Statistics Indonesia, 2018, 2021, 2023 (processed)

The growing number of gig workers, however, has posed serious challenges for the social protection system. The data reveal a striking disparity between formal and gig workers in their participation in Indonesia's national social security programs administered by the Social Security Agency (*Badan Penyelenggara Jaminan Sosial* or BPJS), which consists of BPJS for health and BPJS for employment. In 2023, only 0.71 percent of online gig workers and 1.78 percent of local gig workers were covered by health insurance, far below the 36.10 percent coverage among formal employees. Similarly, coverage for occupational accidents and death security among gig workers remains very low—approximately 2–3 percent—compared to more than 30 percent among formal employees (see Table 2). These disparities reveal a systemic gap in access to social protection in Indonesia, exacerbating the economic vulnerability of informal and non-standard labor groups.

**Table 2.** Share of Workers Covered by Social Protection Programs by Employment Status

Social Protection	Employment Status	2018	2021	2023
Health Insurance	Formal	32.99	36.78	36.10
	Informal: Online Gig	0.00	0.70	0.71
	Informal: Local Gig	2.96	4.02	1.78
	Informal: Non-Gig	1.06	2.00	1.99
Employment Injury Security	Formal	27.40	30.79	32.90
	Informal: Online Gig	0.00	0.70	0.00
	Informal: Local Gig	6.84	4.28	2.54
Death Security	Informal: Non-Gig	0.88	2.25	1.47
	Formal	18.09	19.55	21.64
	Informal: Online Gig	0.00	0.70	0.00
Any Social Protection	Informal: Local Gig	4.57	1.92	1.02
	Informal: Non-Gig	0.56	0.90	0.53
	Formal	34.81	38.75	38.70
Any Social Protection	Informal: Online Gig	0.00	0.70	0.71
	Informal: Local Gig	9.56	5.40	3.53
	Informal: Non-Gig	1.39	2.97	2.69

Note: The classification of workers is limited to selected service sectors to ensure comparability across employment types. The analysis covers five sectors: (1) transportation and storage, (2) accommodation and food services, (3) information and communication, (4) business activities, and (5) other services.

Source: BPS-Statistics Indonesia, 2018, 2021, 2023 (processed)

Despite expanding research on the gig economy, a significant gap remains in the literature concerning social protection programs for gig workers, particularly their integration into national social security systems. Most previous studies have focused on formal employees and traditional labor markets, leaving gig workers, commonly classified as independent contractors, largely excluded from mandatory social insurance schemes. This exclusion limits their access to basic protection such as health insurance, workers' compensation, and death benefits. The issue is structural rather than administrative. Zhang and Liu (2025) argue that voluntary social security schemes fail to protect gig workers because they are incompatible with the flexible nature of gig work. Similarly, Adillah and Purnawan (2020) emphasize the need for legal reform in Indonesia to ensure that gig workers are integrated into the national social security system on an equal footing with formal employees. Becker et al. (2024) add that the current administrative design of social insurance is ill-suited to nontraditional employment relationships, while Ghorpade et al. (2024) observe that social insurance models in several Southeast Asian countries remain inadequate to accommodate platform-based labor patterns.

From a theoretical perspective, the persistence of social protection gaps across employment statuses can be explained through the lens of dual labor market theory and labor-market segmentation. The dual labor market theory distinguishes between a protected primary segment and a precarious secondary segment, in which access to social protection is structurally determined by employment status rather than by labor market participation. In employment-based welfare regimes, contributory social insurance is typically anchored to standard employment relationships, systematically positioning gig workers in the secondary segment with limited or voluntary access to protection (Tkachenko et al., 2024; Yang, 2025). Labor market segmentation theory further emphasizes that this exclusion is institutionalized through regulatory design, as benefit eligibility rules and employer obligations are tailored to formal contracts, thereby preventing social protection from diffusing across employment status boundaries (Telychko & Rekun, 2024; Singh & Singh, 2024).

In the Indonesian context, this theoretical framework helps explain why social protection gaps persist despite the rapid expansion of gig work. Indonesia's social protection system remains closely tied to formal employment, while gig workers are commonly classified as "partners" or independent contractors, creating legal ambiguity and reinforcing exclusion from mandatory schemes (Muhyiddin et al., 2024; Shafira et al., 2024). Empirical evidence highlights that reliance on voluntary enrollment and non-portable benefits fails to compensate for the absence of employer-sponsored coverage, resulting in fragmented and uneven protection across regions and sectors. Comparative insights from other employment-based systems similarly show that voluntarist approaches tend to underperform in extending protection to nonstandard workers, unless complemented by portable or universal mechanisms (Zhang & Liu, 2025; Shepherd, 2025). These patterns suggest that social protection gaps in Indonesia are structural rather than incidental.

Furthermore, the COVID-19 pandemic has exacerbated these disparities by intensifying labor market disruptions (Auliya & Agusalim, 2022; Putri & Agusalim, 2023). The pandemic has increased financial uncertainty and highlighted long-standing inequalities in access to social protection. Research shows that despite facing high economic and health risks, gig workers continue to lack adequate protection (Reynolds & Kincaid, 2022; Auguste et al., 2023). Martínez-Martínez et al. (2024) find that informal and gig workers in Latin America are among the most vulnerable groups, with limited access to social assistance. In Indonesia, this condition is worsened by the ambiguous legal status of gig workers and the weak regulation of digital platforms (Indra & Nawangsari, 2025). Hidayat and Herman (2024) note that many micro, small, and medium enterprises (MSMEs), which often overlap with gig activities, remain unregistered with BPJS due to low awareness and the absence of mandatory mechanisms. These findings align with Razavi (2022), who highlights the systemic exclusion of informal workers from adequate social protection.

Existing research on social protection in Indonesia has largely focused on the coverage gaps facing informal workers and the determinants of BPJS participation. Still, it offers only limited insight into how these gaps play out specifically between formal and gig workers, or how they evolve. Studies using national and local data consistently show that informal workers have much lower participation in employment social security than formal workers, with formal workers many times more likely to be enrolled in BPJS Ketenagakerjaan (Diana and Syarvina, 2022; Ngadi et al., 2025; Septiani et al., 2025). Research highlights income, education, residence, and employment stability as key predictors of participation, and documents that low-income, low-educated, female, and rural informal workers are least protected (Ngadi et al., 2025; Septiani et al., 2025). Other work emphasizes barriers such as limited awareness, regulatory shortcomings, and unstable earnings that undermine workers' ability and willingness to pay social insurance premiums (Muttaqien et al., 2021; Rusdijjati et al., 2020). These strands build a strong picture of exclusion among informal workers in general.

However, this literature remains largely separate. Quantitative studies on BPJS participation focus on informal workers as a broad category without isolating gig workers or directly contrasting them with formal employees over time (Ngadi et al., 2025; Septiani et al., 2025). Gig-economy research, in turn, seldom compares gig and formal workers' effective BPJS coverage using the same empirical framework, and rarely traces participation before, during, and after the pandemic or disaggregates by gender and region (Indra and Nawangsari, 2025; Ngadi et al., 2025; Septiani et al., 2025).

Grounded in this understanding, this study examines how employment status shapes disparities in access to social protection in Indonesia's transforming labor market. This study aims to identify and analyze the social protection gap between gig workers and formal employees in Indonesia, with a specific focus on their participation in BPJS programs, namely health insurance and employment social security schemes. The specific objectives of this study are threefold. First, it aims to examine the factors influencing participation levels among gig workers

and formal employees in the national social security system and identify the extent of participation disparities between the two groups. Second, it aims to assess how the participation gap between gig workers and formal employees in social security programs has evolved, particularly whether it widened or narrowed before, during, and after the COVID-19 pandemic. Third, it explores the heterogeneity of participation disparities across gender and regional dimensions between gig workers and formal employees.

This study offers two primary contributions. Scientifically, it provides an in-depth, empirical understanding of the social protection disparities between gig workers and formal employees in Indonesia, meticulously elucidating how labor market transformations, particularly during the COVID-19 pandemic, have impacted these inequalities. For policy, its findings are expected to serve as a crucial foundation for developing more inclusive and responsive labor policies that specifically address the social protection needs of gig workers, who currently remain largely excluded from the national social security framework.

## 2. Research Method

This study employed a quantitative approach using secondary data obtained from Statistics Indonesia (BPS) and the Ministry of Manpower of the Republic of Indonesia. The analysis draws on repeated cross-sectional microdata from the National Labor Force Survey (Sakernas), covering three annual observation periods in August 2018, 2021, and 2023. Additionally, provincial minimum wage data from the Ministry of Manpower was used to create a binary income variable. The selected periods allowed us to identify changes in workers' participation in social security programs before, during, and after the COVID-19 pandemic. The data processing and analyses were conducted using Stata version 18. Table 3 presents the variables used in this study. The dependent variable, namely social protection, comprises four indicators: any social protection, health insurance, employment injury security, and death security. These categories were selected because they were consistently included in the Sakernas questionnaire for both formal and informal workers.

**Table 3.** Research Variables

No.	Variable	Symbol	Category
A	Dependent variable		
1	Social protection	<i>SPROTECT</i>	Yes, no (reference)
B	Independent variable		
2	Employment status	<i>EMSTAT</i>	Online gig, local gig, non-gig, formal (reference)
C	Control variable (CV)		
3	Gender	<i>GENDER</i>	Male, female (reference)
4	Marital status	<i>MS</i>	Married, others (reference)
5	Generation	<i>GEN</i>	Z (reference), Y, X, Baby Boomers +
6	Education	<i>EDUC</i>	Basic (reference), intermediate, high
7	Region	<i>REGION</i>	Urban, rural (reference)
8	Internet Usage		Yes, no (reference)

No.	Variable	Symbol	Category
9	Income	<i>INCOME</i>	≥ Provincial minimum wage, < provincial minimum wage (reference)
10	Hours worked	<i>HOURS</i>	≤ 20 hours (reference), 21-40 hours, > 40 hours
11	Sector	<i>SECTOR</i>	Transportation and storage, accommodation and food services, information and communication, business activities, other services (reference)
12	Job position	<i>JOBPOS</i>	Professionals, technicians, and related workers, managers and administrative personnel, clerical and related workers, sales workers, service workers, agricultural, forestry, and fisheries workers, production workers and machine operators (reference), others

In this study, the scope of the analysis was limited to selected service sectors to ensure comparability across employment statuses. The five sectors analyzed included transportation and storage, accommodation and food services, information and communication, business activities, and other services, as gig workers are predominantly concentrated in these industries. Gig workers are defined as informal self-employed individuals or casual non-agricultural workers who use the internet in their main job (Sargeant, 2017). Online and local gig workers are differentiated based on their economic sectors and occupational positions. Online gig workers are defined as individuals employed in the information and communication technology and business activities sectors, holding positions such as professionals, technicians, and related workers, as well as clerical and related workers. Conversely, local gig workers are those engaged in the transportation and storage, accommodation and food services, and other services sectors, with occupations such as sales workers, service workers, and other related categories. Non-gig workers, on the other hand, are defined as informal workers who do not fall under either online or local gig classifications.

Notably, Sakernas did not provide a direct identifier for gig workers, necessitating an operational definition based on employment status, sectoral classification, occupational category, and internet usage. While this proxy-based approach is commonly applied, it carries inherent limitations in fully capturing the diverse nature of gig work. This proxy-based approach is commonly used in empirical studies of gig work that rely on nationally representative labor force surveys, particularly in developing countries, where platform-based employment is not explicitly captured (Harun et al., 2020; Faisal et al., 2019; Kässi & Lehdonvirta, 2018). Although this classification may not fully encompass all forms of gig work, it offers a transparent and consistent approach for distinguishing between online and local gig workers within the constraints of the available data.

The empirical model in this study analyzes the probability of workers' participation in Indonesia's social protection programs using a logit regression approach, modified from Ng et al. (2024). This approach enables the estimation of the relationship between employment status and the likelihood that an individual will obtain at least one form of social security coverage. Equation (1) presents the model specifications.

$$\ln\left(\frac{P(SPROTECT_{ipt=1})}{1-P(SPROTECT_{ipt=1})}\right) = \alpha + \beta EMSTAT_{ipt} + CV'_{ipt}\delta + \gamma_t + \theta_p + \varepsilon_{ipt} \quad (1)$$

In Equation (1),  $P(SPROTECT_{ipt} = 1)$  represents the probability that individual  $i$ , residing in province  $p$  in year  $t$ , has access to at least one form of social protection, including health insurance, employment injury security, or death security. The dependent variable in this model is binary, where a value of 1 indicates that the worker possesses social protection ( $SPROTECT_{ipt} = 1$ ) and 0 otherwise. The log-odds term,  $\ln\left(\frac{P(SPROTECT_{ipt=1})}{1-P(SPROTECT_{ipt=1})}\right)$ , expresses the ratio between the probability that a worker has social protection and the probability that they do not. The key independent variable in this model is employment status ( $EMSTAT$ ), which is categorized into four groups: formal employees, online gig workers, local gig workers, and non-gig informal workers, with formal employees serving as the reference category. The vector  $CV$  includes a set of control variables comprising gender ( $GENDER$ ), marital status ( $MS$ ), generation ( $GEN$ ), education level ( $EDUC$ ), region of residence ( $REGION$ ), internet usage ( $INTERNET$ ), income ( $INCOME$ ), hours worked ( $HOURS$ ), economic sector ( $SECTOR$ ), and job position ( $JOBPOS$ ). The model also incorporates time fixed effects ( $\gamma_t$ ) to control for period-specific variations and province fixed effects ( $\theta_p$ ) to account for interregional economic and institutional differences. The random error term ( $\varepsilon$ ) captures unobserved factors that may influence a worker's likelihood of obtaining social protection. This specification allows the model to capture both temporal dynamics and regional heterogeneity in social protection participation.

After estimating the logit model in Equation (1), the analysis computes marginal effects to obtain a clearer, more interpretable measure of how each independent variable affects the probability of having social protection. This approach converts log-odds coefficients into changes in actual probability, thereby facilitating substantive interpretations (Mize et al., 2019). Using marginal effects, this study estimates the magnitude of changes in the likelihood of social protection coverage associated with variations in employment status and other explanatory variables.

Potential model biases were addressed through tests for multicollinearity among independent variables, and robust standard errors were used to minimize heteroskedasticity and ensure reliable variance estimation. Model adequacy and robustness were evaluated using several statistical indicators, including Wald chi-square, Pseudo  $R^2$ , Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and the Area Under the Curve (AUC) (Agusalim et al., 2025a, 2025b).

### 3. Results and Discussion

#### 3.1. Descriptive Analysis

The descriptive analysis presented in Table 4 indicates that workers' participation in social protection programs in Indonesia remains relatively low, even across the four selected service

sectors: (1) transportation and storage, (2) accommodation and food services, (3) information and communication, and (4) business activities. 'Any social protection' variable refers to the ownership of at least one of the three types of social security: health insurance, employment injury security, or death security. Overall, only about one-third of workers have access to any form of social protection, with formal employees (36.89 percent) exhibiting significantly higher participation than both online workers (3.37 percent) and local gig workers (4.75 percent).

This disparity is also evident across individual characteristics: male workers, those with higher education, urban residents, individuals earning above the minimum wage, and those employed in modern sectors, such as information and communication, have the highest levels of coverage. In contrast, workers with primary education, residing in rural areas, and engaged in traditional service sectors display substantially lower participation rates. Nevertheless, the trend from 2018 to 2023 shows a gradual increase in social security participation across the four sectors, suggesting improved access. However, the gap between gig workers and formal employees remains significant.

**Table 4.** Descriptive Statistics of the Observation

Variable	Any Social Protection		Total
	Yes	No	
Employment Status			
Formal	36.89	63.11	53,583
Informal: Online gig	3.37	96.63	89
Informal: Local gig	4.75	95.25	2,483
Informal: Non-gig	2.77	97.23	4,296
Gender			
Male	39.47	60.53	39,528
Female	21.07	78.93	20,923
Marital Status			
Married	36.16	63.84	37,045
Others	28.26	71.74	23,406
Generation			
Z	26.56	73.44	12,228
Y	38.53	61.47	24,645
X	32.81	67.19	19,374
Baby Boomers +	21.62	78.38	4,204
Education			
Basic	13.46	86.54	23,980
Intermediate	39.47	60.53	27,846
High	67.13	32.87	8,625
Region			
Urban	36.56	63.44	43,945
Rural	23.88	76.12	16,506
Internet Usage			
Yes	42.63	57.37	37,232
No	17.82	82.18	23,219
Income			
≥ Provincial minimum wage	59.59	40.41	22,217
< Provincial minimum wage	17.71	82.29	38,234
Hours Worked			
≤ 20 hours	12.87	87.13	5,565
21-40 hours	34.87	65.13	17,061
> 40 hours	35.27	64.73	37,825
Sector			
Transportation and storage	40.33	59.67	17,071

Variable	Any Social Protection		Total
	Yes	No	
Accommodation and food services	28.82	71.18	12,739
Information and communication	58.70	41.30	3,755
Business activities	53.00	47.00	8,488
Other services	14.94	85.06	18,398
<b>Job Position</b>			
Professionals, technicians, and related workers	56.14	43.86	5,354
Managers and administrative personnel	74.31	25.69	545
Clerical and related workers	61.66	38.34	6,721
Sales workers	22.82	77.18	3,331
Service workers	14.69	85.31	16,790
Agricultural, forestry, and fisheries workers	18.00	82.00	50
Production workers and machine operators	29.85	70.15	24,607
Others	61.35	38.65	3,053
<b>Year</b>			
2018	24.12	75.88	20,986
2021	36.95	63.05	17,273
2023	38.59	61.41	22,192
Observation	20,008	40,443	60,451

Source: BPS-Statistics Indonesia, 2018, 2021, 2023 (processed)

Following the descriptive statistics, Table 5 presents the correlation results among the variables used in the logit regression model, ensuring no multicollinearity for our subsequent analysis. Overall, the correlation coefficients among the independent variables are relatively low and well below the commonly accepted threshold of 0.8, which is typically used to detect multicollinearity (Kim, 2019). No pair of variables exhibits a high or near-perfect correlation, whether among demographic variables such as gender, marital status, and generation or among economic variables such as income, hours worked, and job position.

**Table 5.** Correlation of Research Variables

Variable	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Any social protection	-0.22	0.19	0.08	-0.01	0.39	0.12	0.26	-0.43	0.10	-0.19	-0.14
(2) Health insurance	-0.22	0.17	0.08	-0.01	0.39	0.12	0.25	-0.43	0.10	-0.17	-0.16
(3) Employment injury security	-0.20	0.19	0.08	-0.01	0.35	0.11	0.24	-0.41	0.10	-0.20	-0.12
(4) Death security	-0.15	0.15	0.10	0.02	0.31	0.09	0.19	-0.37	0.05	-0.14	-0.13
(5) Employment status	1.00	0.04	0.04	0.09	-0.20	-0.10	-0.18	0.13	-0.20	0.11	0.12
(6) Gender		1.00	0.12	0.00	0.07	-0.05	0.10	-0.23	0.08	-0.32	0.21
(7) Marital status			1.00	0.46	-0.09	-0.02	-0.07	-0.13	-0.04	0.01	0.08
(8) Generation				1.00	-0.20	0.05	-0.26	-0.05	-0.10	0.17	0.06
(9) Education					1.00	0.15	0.36	-0.31	0.01	-0.12	-0.37
(10) Region						1.00	0.09	-0.10	0.05	0.04	-0.09
(11) Internet usage							1.00	-0.18	0.04	-0.14	-0.17
(12) Income								1.00	-0.16	0.19	0.12
(13) Hours worked									1.00	-0.20	0.11
(14) Sector										1.00	-0.15
(15) Job position											1.00

Source: Author's calculation

### 3.2. Prediction of Social Protection Gaps Between Gig Workers and Formal Employees

This analysis uses marginal effects from the logit regression model to explain social protection disparities in Indonesia's labor market. As shown in Table 6, four model specifications were compared using several statistical criteria, including the Wald chi-square statistic, Pseudo R<sup>2</sup>, AIC, BIC, and AUC. The evaluation results indicate that the model incorporating both time and provincial fixed effects performs best, demonstrating stronger explanatory power (higher

Wald chi-square and Pseudo R<sup>2</sup> values) and greater efficiency (lower AIC and BIC values). The consistently high AUC value further confirms the robust predictive accuracy (Agusalim et al., 2025c, 2025d). Based on these combined indicators, Model 4 was designated as the main model, as it provided the best balance between efficiency and predictive capability in capturing both temporal and regional variations. Consequently, Model 4 serves as the foundation for subsequent analyses in this study.

The estimation results from Model 4 revealed persistent and statistically significant disparities in access to social protection between gig workers and formal employees. As shown in Table 6, online gig workers exhibit the largest negative marginal effect (−0.33), indicating that their probability of obtaining at least one form of social protection is approximately 33 percent lower than that of formal employees. This finding aligns with Zhang and Liu (2025), who argued that self-employed and casual workers are structurally excluded from mandatory protection schemes, reinforcing that Indonesia's system similarly positions gig workers in an unprotected segment. Local gig workers and non-gig informal workers show similar patterns, with probabilities around 24 and 23 percent lower, respectively. These results highlight employment status as a key determinant of access to social protection in Indonesia, where a labor market structure centered on formal employment relations leaves gig workers in a relatively unprotected position.

Beyond employment status, this study's findings are consistent with empirical research that emphasizes the importance of demographic, economic, and sectoral factors in shaping workers' participation in Indonesia's social security programs. Characteristics such as gender, education, place of residence, and income significantly affected the likelihood of participation. As noted by Miti et al. (2021a), higher education enhances awareness and understanding of the benefits of social insurance, which is consistent with this study's finding that male, highly educated, and urban workers are more likely to be enrolled in social protection programs. From a sectoral perspective, Ghorpade et al. (2024) demonstrate variation in participation across industries, with workers in information, business, and transportation sectors exhibiting higher participation than those in lower-wage sectors such as services and sales—mirroring this study's results. Furthermore, Luthfi and Hanri (2023) highlight that regional economic inequality also constrains access to social protection, reflecting the complexity of Indonesia's social security system, which requires further strengthening to ensure greater inclusivity across all worker groups.

**Table 6.** Marginal Effects Results Predicting Social Protection Gaps Between Gig Workers and Formal Employees

Variable	Model 1	Model 2	Model 3	Model 4
Informal: Online gig	-0.33 *** (0.01)	-0.33 *** (0.01)	-0.33 *** (0.01)	-0.33 *** (0.01)
Informal: Local gig	-0.25 *** (0.01)	-0.25 *** (0.01)	-0.24 *** (0.01)	-0.24 *** (0.01)
Informal: Non-gig	-0.24 *** (0.01)	-0.24 *** (0.01)	-0.23 *** (0.01)	-0.23 *** (0.01)
Gender: Male	0.05 *** (0.00)	0.05 *** (0.00)	0.05 *** (0.00)	0.05 *** (0.00)

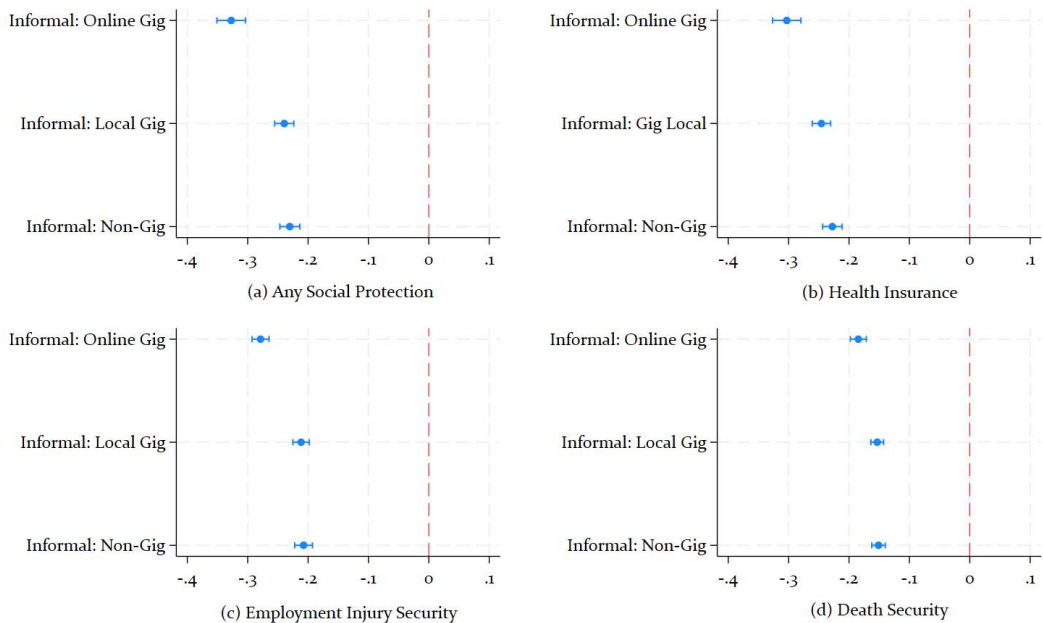
Variable	Model 1	Model 2	Model 3	Model 4
Marital status: Married	0.03 *** (0.00)	0.03 *** (0.00)	0.03 *** (0.00)	0.03 *** (0.00)
Generation: Y	0.04 *** (0.00)	0.05 *** (0.00)	0.04 *** (0.00)	0.04 *** (0.00)
Generation: X	0.05 *** (0.01)	0.06 *** (0.01)	0.05 *** (0.01)	0.05 *** (0.01)
Generation: Boomers +	0.04 *** (0.01)	0.04 *** (0.01)	0.03 *** (0.01)	0.04 *** (0.01)
Education: Intermediate	0.14 *** (0.00)	0.14 *** (0.00)	0.13 *** (0.00)	0.13 *** (0.00)
Education: High	0.24 *** (0.01)	0.24 *** (0.01)	0.22 *** (0.01)	0.22 *** (0.01)
Region: Urban	0.04 *** (0.00)	0.04 *** (0.00)	0.03 *** (0.00)	0.03 *** (0.00)
Internet usage: Yes	0.09 *** (0.00)	0.06 *** (0.00)	0.08 *** (0.00)	0.06 *** (0.00)
Income: ≥ Provincial minimum wage	0.21 *** (0.00)	0.21 *** (0.00)	0.22 *** (0.00)	0.22 *** (0.00)
Hours Worked: 21=40 jam	0.08 *** (0.01)	0.08 *** (0.01)	0.08 *** (0.01)	0.08 *** (0.01)
Hours Worked: > 40 jam	0.08 *** (0.01)	0.08 *** (0.01)	0.08 *** (0.01)	0.08 *** (0.01)
Sector: Transportation and storage	0.12 *** (0.01)	0.12 *** (0.01)	0.12 *** (0.01)	0.12 *** (0.01)
Sector: Accommodation and food services	0.07 *** (0.00)	0.07 *** (0.00)	0.06 *** (0.00)	0.06 *** (0.00)
Sector: Information and communication	0.13 *** (0.01)	0.14 *** (0.01)	0.14 *** (0.01)	0.14 *** (0.01)
Sector: Business activities	0.12 *** (0.01)	0.11 *** (0.01)	0.11 *** (0.01)	0.11 *** (0.01)
Job position: Professionals, technicians, and related workers	0.05 *** (0.01)	0.05 *** (0.01)	0.04 *** (0.01)	0.05 *** (0.01)
Job position: Managers and administrative personnel	0.13 *** (0.02)	0.13 *** (0.02)	0.12 *** (0.02)	0.12 *** (0.02)
Job position: Clerical and related workers	0.10 *** (0.01)	0.10 *** (0.01)	0.09 *** (0.01)	0.10 *** (0.01)
Job position: Sales workers	-0.08 *** (0.01)	-0.08 *** (0.01)	-0.08 *** (0.01)	-0.07 *** (0.01)
Job position: Service workers	-0.04 *** (0.00)	-0.04 *** (0.00)	-0.04 *** (0.00)	-0.04 *** (0.00)
Job position: Agricultural, forestry, and fisheries workers	-0.04 (0.06)	-0.02 (0.06)	-0.06 (0.06)	-0.04 (0.06)
Job position: Others	0.16 *** (0.01)	0.15 *** (0.01)	0.15 *** (0.01)	0.14 *** (0.01)
Time fixed effects	No	Yes	No	Yes
Provincial fixed effects	No	No	Yes	Yes
No. of observations	60,451	60,451	60,451	60,451
Wald chi <sup>2</sup>	13,171	13,197	13,536	13,572
Prob > chi <sup>2</sup>	0.00	0.00	0.00	0.00
Pseudo R <sup>2</sup>	0.30	0.31	0.32	0.32
AIC	53,465	53,364	52,206	52,085
BIC	53,708	53,625	52,747	52,644
AUC	0.85	0.85	0.86	0.86

Note: Model 1 serves as the baseline, Model 2 adds time fixed effects, Model 3 includes provincial fixed effects, and Model 4 represents the main model specification that incorporates both time and provincial fixed effects. Robust standard errors are reported in parentheses. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

The estimation results for Model 4, shown in Table 6 and visualized in Figure 1, illustrate the marginal effects of each employment category on the likelihood of obtaining social protection. Panel (a) presents the results for any social protection indicator, while Panels (b) to (d) show the

results for health insurance, employment injury security, and death security. The findings indicate that both online and local gig workers have significantly negative marginal effects across all forms of social protection compared to formal employees. The largest negative effect is seen in online gig workers, who are the least likely to access social protection, followed by local gig workers and non-gig informal workers.

These findings are consistent with extensive empirical evidence showing that both online and local gig workers face structural barriers to accessing social protection compared to formal employees. Ramachandran and Kulandai (2024) find that in developing countries such as India, gig workers struggle to participate in social security programs due to weak labor protection systems, in contrast to developed economies with stronger regulatory frameworks. This reflects a similar situation in Indonesia, where demographic and sectoral factors strongly influence social protection disparities. Furthermore, Ran and Zhao (2023) identified that gig workers in China lack adequate protection against occupational accident risks, reinforcing the finding that Indonesian gig workers experience comparable vulnerabilities in employment injury schemes. Similarly, Khan et al. (2023) show that self-employed individuals, including gig workers, are generally excluded from protection systems based on formal employment relationships, revealing a pattern of structural exclusion. Additionally, a study by Wang et al. (2023) on California's AB5 legislation highlights that changes in the legal classification of gig workers have not fully resolved the systemic barriers to accessing social insurance.



**Figure 1.** Social Protection Gaps Across Program Types

Source: BPS-Statistics Indonesia, 2018, 2021, 2023 (processed)

### 3.3. Temporal Dynamics of Social Protection Gaps During the COVID-19 Period

Model 4 in Table 6 was extended by adding interaction terms between employment status and the observation year to capture how the influence of employment status on access to social protection changed over the study period. Figure 2 presents the temporal dynamics of social protection disparities between gig and formal employees in Indonesia from 2018 to 2023, covering the pre-pandemic, pandemic, and post-pandemic phases. The results showed that all gig worker groups experienced a decline in access to social protection over time. Online gig workers consistently exhibited the most negative marginal effects across all types of social insurance, including general social protection, health insurance, employment injury security, and death security. This pattern indicates that online gig workers are the most vulnerable group.

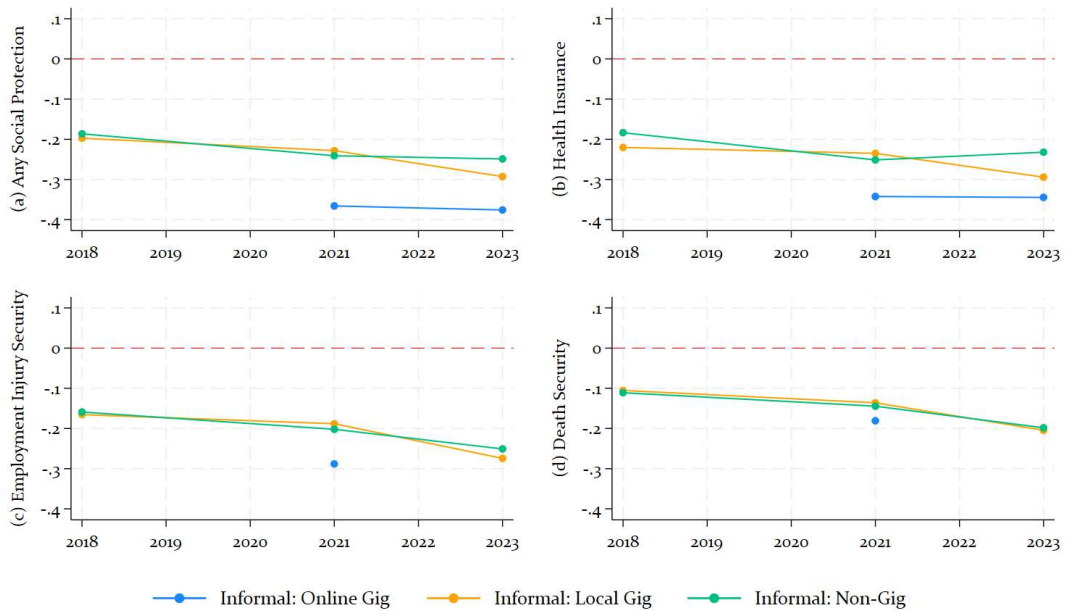
During and after the pandemic, the gap in access to social protection widened sharply, particularly in terms of health insurance and employment injury security. This trend reflects gig workers' limited access to government assistance and social insurance programs, which are typically linked to formal employment relationships. Rather than narrowing existing inequalities, the post-pandemic recovery period appears to have reproduced pre-existing patterns of exclusion, suggesting that recent labor market transformations have not been accompanied by greater inclusivity in Indonesia's social protection system.

From the perspective of dual labor market theory and labor market segmentation, labor markets are structurally divided into a protected primary segment and a precarious secondary segment. In Indonesia, the primary segment is characterized by formal employment, stable contracts, and institutionalized access to social insurance. Simultaneously, gig and platform-based workers are concentrated in the secondary segment, where employment relationships are informal, flexible, and weakly regulated. This segmentation is reinforced by the design of Indonesia's social protection architecture, which continues to link eligibility for most social insurance schemes to formal employment status, systematically excluding workers who fall outside standard contractual arrangements (Agusalim, 2025d; Romin, 2026).

Within this segmented labor market structure, platform-based work arrangements further entrench secondary labor market conditions by shifting employment-related risks, such as income volatility, occupational hazards, and health shocks from firms to individual workers. While platforms benefit from flexible labor utilization, workers bear the responsibility for managing risks that are typically socialized within the primary labor market. At the same time, gig workers' access to social insurance remains largely dependent on individual and voluntary contributions. This mechanism aligns with the secondary segment's lack of institutional support and bargaining power. Comparative evidence from Europe and Southeast Asia shows that when employment status is ambiguous and risk is individualized, social protection systems struggle to deliver effective coverage for nonstandard workers, reinforcing segmentation rather than facilitating mobility toward the primary sector (Bultmann and Meershoek, 2022; Maglunsod, 2025; Poirier et al., 2022).

The COVID-19 pandemic served as a critical stress test, exposing and intensifying segmented labor-market dynamics. Although emergency measures and temporary adjustments to social protection systems have been introduced in several countries, these interventions often fail to address the underlying structural divide between formal and non-formal workers (Qian, 2020; Hagemeyer, 2023). Similarly, in Indonesia, the post-pandemic recovery period did not translate into sustained improvements in social protection coverage for gig workers, as eligibility criteria and contribution models remained anchored in formal employment. Consequently, rather than narrowing the labor market divide, the recovery phase reinforced the segmentation between primary and secondary labor markets, underscoring the need for reforms that decouple social protection from employment status and promote more inclusive and universal forms of social security (Agusmidah et al., 2025; Zaim, 2025).

These findings are consistent with a growing body of empirical research highlighting the heightened vulnerability of gig workers during the pandemic. Miti et al. (2021b) reveal that the pandemic underscored the existence of a “missing middle” referring to workers who are ineligible for social assistance yet unable to participate in contributory social insurance schemes. This situation demonstrates the persistent exclusion of gig workers from formal social protection systems, which have continued into the post-pandemic recovery phase. Similarly, Dluhopolska and Khita (2022) argue that labor protection and financial support policies implemented during the pandemic were ineffective in reaching informal and gig workers due to their nonstandard employment relationships. This vulnerability is further supported by Oteng et al. (2024), who found that gig workers experienced income instability and limited health coverage during the pandemic, reinforcing the evidence of weak social policy adaptation in developing countries, including Indonesia. Kaufmann et al. (2021) also emphasize the physical and psychological strain experienced by essential workers during the pandemic, a condition comparable to that of gig workers who faced heavy workloads without adequate social protection. In addition, Ray (2024) shows that gig workers in India faced worsening economic insecurity during the COVID-19 lockdown and that the resulting social protection gap showed little improvement after the pandemic.

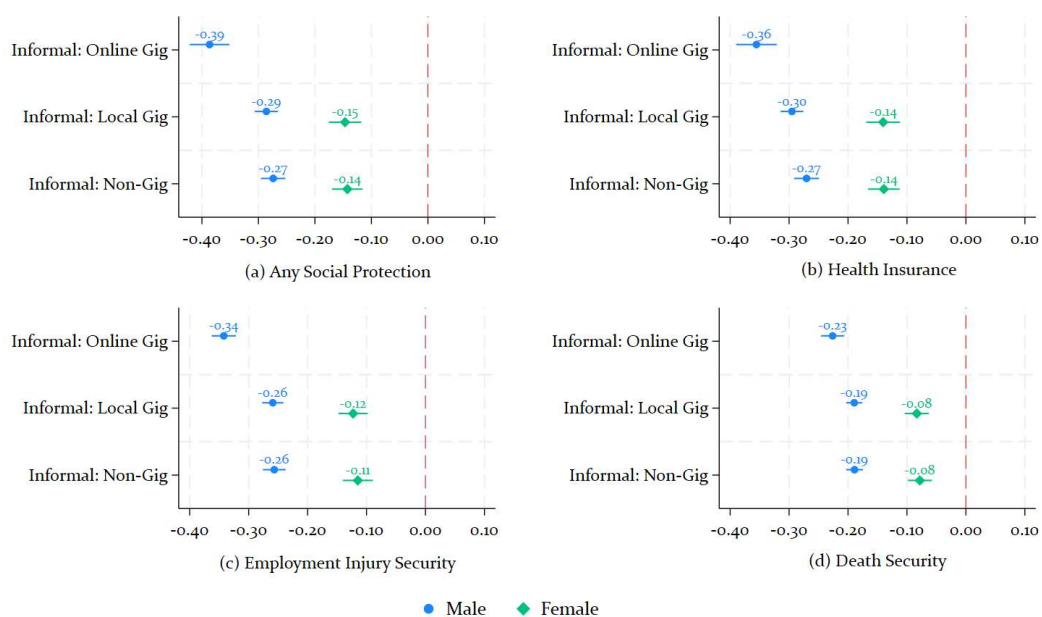


**Figure 2.** Temporal Dynamics of Social Protection Gaps Across Program Types

Source: BPS-Statistics Indonesia, 2018, 2021, 2023 (processed)

### 3.4. Heterogeneity of Social Protection Gaps by Gender and Region

Model 4 in Table 6 was estimated separately by gender to identify differences in the magnitude of social protection disparities between male and female informal sector workers. The estimation results show that the social protection gap between gig workers and formal employees is wider for men than for women. This finding suggests that male gig workers are less likely to access social security programs than their formal sector counterparts. In contrast, the smaller gap observed among female workers may reflect their concentration in occupations with relatively lower social risks or roles that offer greater flexibility. This result is illustrated in Figure 3, where the negative marginal effects are deeper for men across all social protection schemes, particularly for health insurance and employment injury security. These findings indicate that gender differences play a significant role in determining access to social security within the informal sector and that Indonesia’s labor market structure remains biased against nonstandard forms of employment.



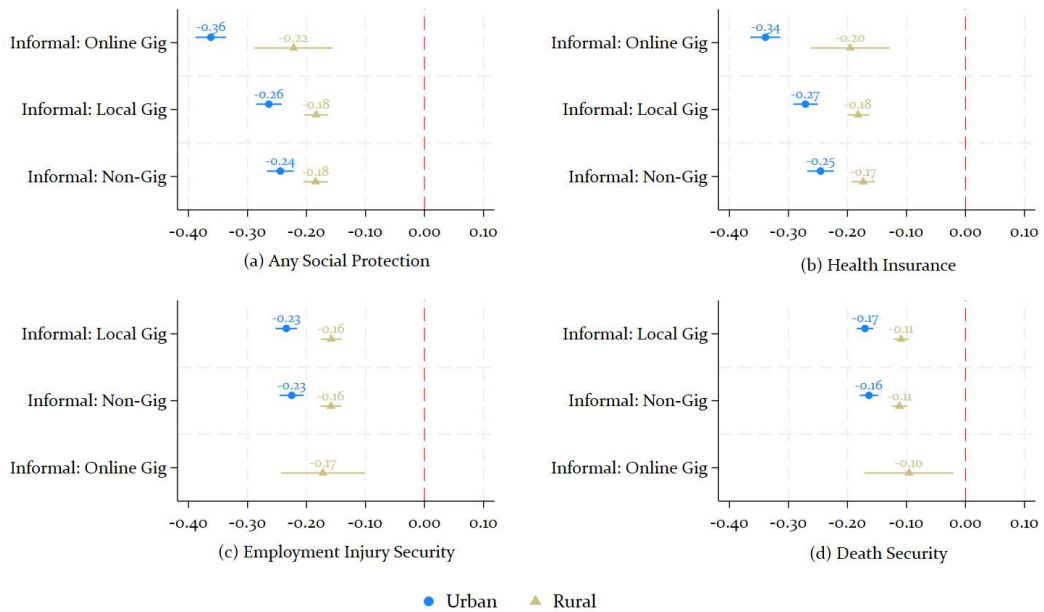
**Figure 3.** Heterogeneity of Social Protection Gaps by Gender Across Program Types

Source: BPS-Statistics Indonesia, 2018, 2021, 2023 (processed)

This condition aligns with Vyas' (2020) analysis, which argues that gendered work experiences reflect broader structural inequalities. Male workers, particularly those in vulnerable occupations such as transportation and logistics, where men dominate, face greater obstacles in obtaining social protection. Conversely, the relatively smaller gap among female gig workers can be linked to their participation in sectors associated with lower social risk, as identified by Baldry et al. (2024). Sen (2025) also noted that female workers tend to choose gig jobs that offer higher flexibility to balance family responsibilities. While this flexibility may reduce the perceived urgency of formal social protection, it still leaves employees in precarious employment positions. In addition, Hu and Fu (2021) highlight that existing labor policies have not fully addressed gender-based needs, thereby prolonging the vulnerability of gig workers, particularly men. This explanation is reinforced by the findings of Rani and Furrer (2020), who show that algorithmic management systems on digital platforms often assign male workers to high-risk jobs with limited protection, a pattern also evident in Indonesia's labor market, where nonstandard employment remains structurally disadvantaged. Consistent with these observations, Morita et al. (2022) found that work-related injuries in the gig sector occur more frequently among men, confirming that social protection disparities are systemic and rooted in gender dynamics that shape access to social security across modern economies.

Figure 4 illustrates the heterogeneity of social protection disparities between urban and rural areas in Indonesia, analyzed across various types of social security programs. The findings show that gig workers in urban areas face a wider social protection gap than their rural counterparts. This pattern is reflected in the deeper negative marginal effects observed among urban workers, particularly in health insurance and employment injury security schemes. The results indicate

that urban gig workers are more vulnerable to social exclusion because the social protection system remains largely oriented toward formal employment. In contrast, the smaller gap observed in rural areas should not be interpreted as a sign of better protection. Instead, it reflects the generally low coverage of social security programs among all the worker groups in these regions. Overall, the results confirm that spatial inequality in access to social protection in Indonesia stems from structural differences in how informal workers, particularly gig workers, are integrated into the national social protection system, which remains insufficiently inclusive.



**Figure 4.** Heterogeneity of Social Protection Gaps by Region Across Program Types  
 Source: BPS-Statistics Indonesia, 2018, 2021, 2023 (processed)

Several key empirical findings explain the pronounced social protection gap in urban areas. Pratomo et al. (2023) show that residents in urban areas are more likely to be employed in formal jobs, which positively affects their access to social security programs. However, this condition simultaneously disadvantages gig workers who lack formal employment ties. Although they have the potential to earn higher incomes in cities, they remain outside the scope of social protection coverage. Lee and Ruggiero (2022) further note that urban labor markets are often more structured and biased toward formal employment, positioning gig workers on the periphery of the labor system and exposing them to systemic barriers to accessing social protection. In contrast, rural areas display low levels of social protection for all categories of workers, both formal and informal. Mindes (2024) explains that economic constraints in rural regions limit overall social security coverage. Gao et al. (2025) emphasize that structural barriers in both rural and urban labor markets in developing countries directly affect the quality of informal employment, where competition in urban areas tends to exacerbate inequalities in access to social protection.

### 3.5. Policy Implication

The findings of this study show that the social protection gap between gig workers and formal employees in Indonesia remains significant and has widened during the COVID-19 pandemic, particularly in access to health insurance and employment injury benefits. This indicates that Indonesia's social security system still prioritizes formal employment relationships and has not adapted to platform-based work. A paradigm shift is needed from employment-status-based protection to protection based on economic activity and occupational risk. The government should implement a shared contribution scheme between workers and digital platforms through automatic income deductions, similar to India's Code on Social Security, which extends basic social protection to platform workers (Dungdung & Sharma, 2024). This scheme would expand coverage without compromising the flexibility inherent in the gig economy.

Gender and regional disparities further exacerbate the gap in social protection. Male workers in urban transportation and logistics sectors, who face high occupational risks, receive limited protection. Policy responses should include platform-based insurance schemes with contributions proportional to working hours or transactions, similar to Spain's Riders' Law, which mandates platform companies to contribute to couriers' social security (Martin-Caballero, 2025). Additionally, integrating national data systems through a Gig Worker Registry linked to BPJS could monitor participation in real-time and improve evidence-based policy decisions.

Low social protection literacy and limited trust in public institutions remain significant barriers for gig workers. To address this, the government, BPJS, and platform companies should collaborate on digital education programs to raise awareness of social security rights and benefits, inspired by Malaysia's partnership between Grab and the national social security agency to establish the Self-Employment Social Security Scheme (Razak & Shukor, 2025). In the long term, developing an adaptive labor law framework that recognizes platform workers as a distinct category with fundamental rights to social protection, occupational safety, and freedom of association is essential to ensuring equitable growth in the digital economy.

## 4. Conclusion and Recommendations

This study reveals significant disparities in social protection between gig workers and formal employees in Indonesia, particularly in terms of health insurance and employment injury protection. Gig workers, both online and local, face much lower access to these benefits, indicating that Indonesia's social security system has yet to adapt to the increasing prevalence of flexible, platform-based employment. Factors such as education, income, and sector also shape workers' participation in social protection programs. Moreover, the COVID-19 pandemic has exacerbated these disparities, making gig workers some of the most economically and socially vulnerable groups in the labor market.

The study also highlights regional and gender-based differences in social protection coverage. Male workers in urban transportation and logistics face high occupational risks but limited social protection, while rural areas, though showing a smaller gap, still suffer from

generally low coverage. These findings point to the multidimensional nature of social protection inequality, influenced by employment status, demographics, and geography. The results call for the urgent need for comprehensive policy reforms that move toward risk-based coverage and better integrate gig workers into the national social security framework.

Despite these valuable insights, this study has limitations. The use of repeated cross-sectional data restricts the ability to track individual transitions and causal relationships, while the identification of gig workers through proxy variables may introduce measurement errors. Future research should address these limitations by using longitudinal or panel data and improving the identification of gig workers through the integration of survey data with platform-level or administrative records. The findings provide a solid foundation for shaping labor and social protection policies in Indonesia, particularly in addressing the gaps faced by gig workers in the evolving labor market.

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