

## Gig Economy, Informal Wages, and Graduate Mismatch: Evidence from High Unemployment Provinces in Indonesia (2015-2023)

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### ABSTRAK

Ekspansi pesat gig ekonomi telah mengubah pasar tenaga kerja di negara-negara berkembang, menawarkan peluang kerja yang fleksibel di tengah pengangguran yang terus berlanjut. Namun, efektivitasnya dalam mengurangi pengangguran masih diperdebatkan, terutama di daerah dengan tingkat pengangguran tinggi dan jumlah pekerja berpendidikan yang meningkat. Studi ini meneliti dampak gig ekonomi terhadap pengangguran terbuka di enam provinsi Indonesia dengan tingkat pengangguran tertinggi, yaitu Banten, Jawa Barat, Jakarta, Riau, Papua, dan Aceh selama periode 2015-2023. Dengan menggunakan regresi data panel dengan Model Fixed Effect Model, studi ini menganalisis pengaruh pekerja lepas sebagai proksi untuk partisipasi gig ekonomi, upah rata-rata sektor informal, dan proporsi lulusan universitas terhadap tingkat pengangguran terbuka. Hasil menunjukkan bahwa pekerja lepas memiliki pengaruh positif dan signifikan terhadap pengangguran, menunjukkan bahwa gig ekonomi cenderung bersifat sementara dan tidak cukup untuk menyediakan pekerjaan yang berkelanjutan. Sebaliknya, upah sektor informal yang lebih tinggi secara signifikan mengurangi pengangguran, menyoroti pentingnya peningkatan kualitas pendapatan di sektor informal. Sementara itu, proporsi lulusan universitas memiliki pengaruh positif tetapi tidak signifikan, mencerminkan mismatch antara pendidikan dan pekerjaan yang terus berlanjut di pasar tenaga kerja. Secara keseluruhan, temuan menunjukkan bahwa gig ekonomi belum berfungsi sebagai mekanisme yang efektif untuk mengurangi pengangguran, sementara peningkatan upah di sektor informal memainkan peran penting dalam menurunkan pengangguran, dan kontribusi lulusan universitas tetap terbatas karena ketidaksesuaian keterampilan. Hasil ini menunjukkan perlunya kebijakan pasar tenaga kerja yang lebih integratif yang tidak hanya memperluas peluang kerja tetapi juga meningkatkan kualitas pekerjaan dan memperkuat keselarasan antara pendidikan dan permintaan industri.

**Kata kunci:** Ekonomi gig; Pengangguran; Upah sektor informal; Ketidakesuaian pendidikan dan pekerjaan; Indonesia

### ABSTRACT

*The rapid expansion of the gig economy has transformed labor markets in developing countries, offering flexible employment opportunities amid persistent unemployment. However, its effectiveness in reducing unemployment remains debatable, particularly in regions with high unemployment rates and increasing numbers of educated workers. This study examines the impact of the gig economy on open unemployment in six Indonesian provinces with the highest unemployment rates Banten, West Java, Jakarta, Riau, Papua, and Aceh over the period 2015-2023. Using panel data regression with a Fixed Effect Model, this study analyzes the influence of freelance workers as a proxy for gig economy participation, average informal sector wages, and the proportion of university graduates on the open unemployment rate. The results show that freelance employment has a positive and significant effect on unemployment, indicating*

that gig economy jobs tend to be temporary and insufficient to provide sustainable employment. In contrast, higher informal sector wages significantly reduce unemployment, highlighting the importance of improving income quality in the informal sector. Meanwhile, the proportion of university graduates has a positive but insignificant effect, reflecting persistent education–job mismatches in the labor market. Overall, the findings indicate that the gig economy has not functioned as an effective mechanism for reducing unemployment, while improvements in informal sector wages play a crucial role in lowering unemployment, and the contribution of university graduates remains limited due to skill mismatches. These results suggest the need for more integrative labor market policies that not only expand employment opportunities but also improve job quality and strengthen the alignment between education and industry demand

**Keywords:** Gig economy; Unemployment; Informal sector wages; Education job mismatch; indonesia

## INTRODUCTION

The transformation of global labor structures over the past decade has been marked by the rapid expansion of the gig economy a work model characterized by flexibility, short-term contractual arrangements, and digital technology facilitation. This phenomenon has accelerated in tandem with increased internet penetration, the proliferation of digital platforms, and a growing preference among younger workers for flexible employment over traditional formal work arrangements. In Indonesia, the gig economy has expanded rapidly since 2015, driven by the growth of digital platforms such as ride-hailing services, e-commerce, and digital creative industries. These sectors have absorbed a significant share of the labor force, particularly in urban areas, and are often viewed as an alternative solution to limited formal employment opportunities. However, an important question remains whether this increase in labor absorption has significantly reduced unemployment or merely shifted workers into more precarious forms of employment. Many gig economy jobs are characterized by income instability, lack of social protection, and flexible but uncertain working hours, which may indicate the presence of underemployment rather than full employment. This condition

suggests that the expansion of the gig economy may not fully address structural unemployment, but instead reflects a transformation in the nature of work toward more informal and vulnerable arrangements.

Nevertheless, a fundamental challenge faced by Indonesia is the persistently high rate of open unemployment (TPT). According to Statistics Indonesia [1],



Figure 1. Growth of University Graduates in High-Unemployment Provinces in Indonesia (2015-2023)

Figure 1 shows a steady increase in the proportion of university graduates across six provinces with the highest unemployment rates in Indonesia during 2015-2023. Jakarta consistently records the highest share, followed by Banten and Aceh, while Papua remains the lowest despite gradual growth. This trend reflects improving educational attainment; however, it is not

accompanied by a corresponding decline in unemployment, indicating a persistent mismatch between education and labor market demand.

On the other hand, a paradox emerges within the context of higher education. The proportion of Indonesian citizens whose highest educational attainment is a university degree has increased significantly from 8.5% in 2015 to 10.4% in 2023 [1]. This upward trend is also evident in the six provinces with the highest open unemployment rates. For instance, Banten rose from approximately 9.1% in 2015 to 12.7% in 2023, while West Java increased from 8.5% to 11.2% over the same period. Jakarta has consistently held the highest share of university graduates, rising from 18.6% to 22.1%. Riau experienced growth from 7.3% to 10.1%, and Aceh relatively high among provinces outside Java grew from 8.9% to 12.4%. Meanwhile, Papua remains at a comparatively low level, although it too saw an increase from 4.2% to 6.3%.

Ironically, the increase in the number of university graduates has not been accompanied by a corresponding decline in unemployment. In fact, several provinces that have experienced substantial growth in the number of graduates continue to rank among those with the highest open unemployment rates nationally. This indicates the presence of a skills mismatch namely, a misalignment between the quality and fields of graduate competencies and the actual demands of the labor market. The limited absorptive capacity of the formal sector has prompted many university graduates to turn to the gig economy as an alternative. They opt for digital-based freelance work, either as a temporary solution or as a

long-term career choice. While the gig economy holds potential as a safety valve for labor absorption, it also presents new challenges. One such issue is the relatively low average income among informal workers, which in

2023 stood at approximately Rp2.17 million per month significantly lower than the average income of formal workers, which reached Rp3.54 million [1].

To date, research on the gig economy in Indonesia has predominantly focused on aspects such as work flexibility, worker welfare, and the digitalization of micro-enterprises. Studies that specifically examine the relationship between the gig economy and unemployment rates based on the educational attainment of university graduates remain limited. Accordingly, this study offers a novel contribution by analyzing the influence of the number of freelance workers the average income of informal workers, and the proportion of university graduates on the open unemployment rate across six provinces with the highest unemployment levels during the period 2015-2023.

The findings of this study are expected to provide empirical evidence on the extent to which the gig economy can contribute to reducing unemployment, particularly among the highly educated workforce. Furthermore, the results aim to serve as strategic input for the formulation of digital labor market policies in Indonesia.

### **Gig Economy and Employment**

The gig economy refers to a flexible work system based on short-term contracts or freelance arrangements, largely facilitated by digital platforms [2]. This form of employment has expanded rapidly in

developing countries, driven by technological advancement and changing labor preferences [3]. In Indonesia, the gig economy is commonly associated with online transportation services, digital platforms, and various forms of freelance work [4].

In this study, the gig economy is proxied by the number of freelance workers, measured as the total number of individuals engaged in non-permanent or freelance employment in each province and year (persons). This indicator is used due to the limited availability of direct data on digital platform-based employment, and it reflects the extent of labor force participation in flexible and informal work arrangements.

#### **Open Unemployment Rate (TPT)**

Statistics Indonesia (BPS) defines the open unemployment rate (TPT) as the percentage of the labor force that is not employed but actively seeking work. A high TPT reflects the labor market's limited capacity to absorb new entrants into the workforce. Several provinces with elevated TPT levels such as Banten, West Java, Jakarta, Riau, Papua, and Aceh face structural challenges, including skill mismatches and low absorption rates within the formal employment sector [5].

#### **Freelance**

Freelancers serve as key actors within the gig economy. They contribute to labor market diversification and help create new employment opportunities, particularly through digital platforms [6]. However, research also indicates that the non-permanent nature of freelance work often entails income instability and limited access to social protection [7]. The rapid expansion of the gig economy has attracted increasing attention in the literature, particularly in relation to labor

flexibility and worker welfare [2]. In the Indonesian context, several studies have also highlighted the growing role of digital platforms and informal employment in shaping labor market dynamics [4]. However, existing studies have primarily focused on work flexibility and platform-based employment, with limited attention to the direct impact of the gig economy on unemployment, particularly in regions with persistently high unemployment rates. Moreover, empirical evidence that simultaneously incorporates informal sector wages and education-job mismatch remains scarce [8]. This study addresses these gaps by examining the effect of gig economy participation, informal wages, and the proportion of university graduates on open unemployment across six high-unemployment provinces in Indonesia during 2015-2023, thereby providing a more comprehensive understanding of labor market dynamics in the context of digital transformation.

#### **Average Income of Informal Workers**

Informal workers often earn lower wages compared to their formal counterparts.[9] emphasizes that the informal sector continues to serve as a safety net for the labor force in developing countries, despite its significantly lower income levels. In Indonesia, informal workers entering through the gig economy face challenges related to minimum wage compliance and welfare standards [10].

#### **Higher Education**

According to human capital theory [11], education enhances workers' skills and productivity. However, a paradox persists in the Indonesian context: while the number of university graduates continues to

rise, absorption into the formal employment sector remains limited. [8] highlight that the mismatch between educational outcomes and labor market demands has led many graduates to shift toward the informal sector or the gig economy.

#### Human Capital Theory (Becker, 1993)

Education enhances individual skills, productivity, and employment opportunities. However, a mismatch between the competencies of university graduates and the demands of industry may contribute to rising unemployment levels.[11]

#### Dual Labor Market Theory (Doeringer & Piore, 1971)

The labor market is segmented into a formal sector with strong protections and an informal sector characterized by vulnerability. The gig economy occupies an intersection between these two domains, blending elements of flexibility and digital facilitation with limited job security and social protection.

#### Job Matching Theory

A misalignment between workforce skills and employer demands contributes to prolonged periods of unemployment, including among university graduates.

## RESEARCH METHODS

### Data and Variables

This study is grounded in the relationship between the gig economy and the open unemployment rate (TPT) across six Indonesian provinces with the highest TPT levels namely Banten, West Java, Jakarta, Riau, Papua, and Aceh during the period 2015-2023. The number of freelance workers (X1) serves as a proxy for labor force participation in the gig economy. A higher number of freelancers

indicates greater potential for labor absorption, thereby contributing to a reduction in TPT. The average income of informal workers (X2) reflects the economic incentives for individuals to enter the informal sector; competitive wages may enhance the attractiveness of gig-based employment and help mitigate unemployment. The proportion of university graduates (X3) represents the quality of the labor force. However, limited formal job opportunities and skill mismatches may exacerbate unemployment if the number of graduates exceeds the availability of suitable employment. Accordingly, the open unemployment rate (Y) is influenced by the interaction between freelance labor participation (X1), informal sector wages (X2), and the share of university-educated workers (X3).

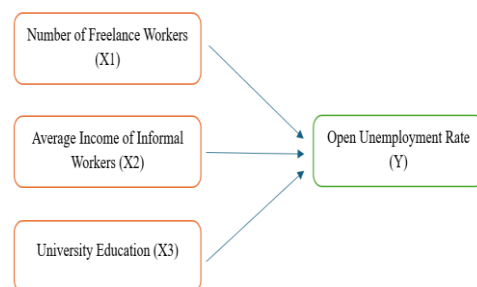


Figure 2, Empirical Model

### Hypothesis

Based on theoretical and empirical considerations, this study hypothesizes that gig economy participation, proxied by freelance employment, has a positive effect on the open unemployment rate, while informal sector wages have a negative effect. In contrast, the proportion of university graduates is expected to have a positive effect on unemployment due to the persistence of education job mismatch.

### Model Specification

This study employs a quantitative approach using panel

data regression analysis to examine the impact of the gig economy on the open unemployment rate (TPT) across six Indonesian provinces with the highest TPT levels namely Banten, West Java, Jakarta, Riau, Papua, and Aceh during the period 2015-2023. The data used are secondary in nature, sourced from official publications by Statistics Indonesia (BPS) and the Ministry of Manpower.

The research model is specified as follows:

$$TPT_{it} = \alpha + \beta_1 Freelance_{it} + \beta_2 Income_{it} + \beta_3 Univ_{it} + e_{it}$$

TPT <sub>it</sub>	= Open unemployment rate in province i at year t (%)
Freelance <sub>it</sub>	= Number of freelance workers in province (persons) i at year t
Income <sub>it</sub>	= Average income of informal workers in province i at year t
Univ <sub>it</sub>	= Proportion of university graduates in province (%) i at year t
α	= Constant
e <sub>it</sub>	= error term

The analysis is conducted through the selection of an

Table 1. Estimation Results of the Panel Regression Model

Variable	Coefficient	t-Statistic	Prob.
Constanta (C)	-55,986	-1,329	0,191
X1_Freelance	31,208	4,114	0,0002
X2_Income	-17,023	-3,323	0,0018
X3_Univ	0,048	0,183	0,856

R-squared	0.758860
Adjusted R-squared	0.715991
F-statistic	17.70169
Prob(F-statistic)	0.000000

appropriate panel data model namely common effect, fixed effect, or random effect. Subsequent testing involves the use of the t-test, F-test, and the coefficient of determination (R<sup>2</sup>) to evaluate both partial and simultaneous effects of the independent variables on the dependent variable.

## RESULTS AND DISCUSSION

### Statistic Deskriptif

Based on panel data from six provinces with the highest open unemployment rates (TPT) in Indonesia namely Banten, West Java, Jakarta, Riau, Papua, and Aceh during the period 2015-2023, the average TPT was recorded at 7.18%. The average number of freelance workers showed an upward trend throughout the study period, in line with the expansion of digital platforms in transportation, services, and commerce. Informal sector wages ranged between IDR 2 to 2.5 million per month, which is notably lower than formal sector wages. Meanwhile, the proportion of university graduates continued to increase, although this was not accompanied by optimal absorption into the formal labor market.

The study has passed the normality test, indicating that the residuals are normally distributed. Furthermore, the multicollinearity test confirms the absence of multicollinearity among the independent variables. The

heteroskedasticity test also shows no indication of heteroskedasticity within the model. Based on the results of the Chow test, Hausman test, and Lagrange Multiplier (LM) test, the most appropriate model for this analysis is the Fixed Effect Model (FEM).

The  $R^2$  value of 0.7588 indicates that 75.88% of the variation in the open unemployment rate (TPT) can be explained by the number of freelance workers, average informal sector wages, and the proportion of university graduates. The remaining 24.12% is influenced by other factors outside the scope of the model. The F-test yields a value of 17.701 with a significance level of  $p = 0.000$ , suggesting that the three independent variables jointly exert a statistically significant effect on TPT.

The regression results indicate that the number of freelance workers (X1) has a statistically significant positive effect on the open unemployment rate (TPT).

This finding suggests that an increase in freelance labor is correlated with a rise in unemployment, implying that the gig economy has not yet emerged as a sustainable long-term solution to unemployment challenges.

The average income of informal workers (X2) has a statistically significant negative effect on the open unemployment rate (TPT). This indicates that higher informal sector wages are associated with lower unemployment levels. The finding underscores the importance of improving the quality of informal employment so that it may serve as a viable alternative for labor force absorption, particularly in contexts where formal job creation remains limited.

University graduates (X3) exhibit a positive but statistically

insignificant effect on the open unemployment rate (TPT).

Although the number of university graduates continues to rise, this increase does not directly influence unemployment levels. The result suggests the presence of skill mismatches, where the qualifications of graduates do not align with the demands of the labor market, thereby limiting their absorption into productive employment.

Collectively, the three independent variables demonstrate a statistically significant influence on the open unemployment rate (TPT). This finding highlights that the gig economy, informal sector wages, and higher education are key factors shaping the dynamics of unemployment in Indonesia. Their combined impact suggests that labor market interventions must consider both structural and transitional employment pathways to effectively address unemployment challenges.

#### **Effect of Average Informal Sector Wages (X2) on Open Unemployment Rate (TPT)**

The regression results show that the average informal sector wage (X2) has a negative coefficient of -17.023 and is statistically significant at the 5% level. This indicates that an increase in informal wages contributes to a reduction in the open unemployment rate. Higher earnings in the informal sector enhance its attractiveness, enabling it to absorb a larger portion of the labor force that is not accommodated by the formal sector. This finding aligns with [9] who argues that the informal sector serves as a labor market safety valve in developing economies. It is further supported by [3] who demonstrate that digital platform expansion strengthens the competitiveness of

informal employment and facilitates the creation of new job opportunities.

**Effect of University Graduates (X3) on Open Unemployment Rate (TPT)**

The positive coefficient of 0.048, which is statistically insignificant ( $p = 0.856$ ), indicates that the increasing proportion of university graduates does not have a meaningful impact on the open unemployment rate. Although the number of graduates continues to rise, this trend does not necessarily translate into higher unemployment. One possible explanation is that a portion of graduates are absorbed into the informal sector or the gig economy, albeit in roles that may not align with their academic qualifications. This finding is consistent with [8] who highlight the presence of skill mismatches between university graduates and the demands of Indonesia's industrial labor market.

**Simultaneous Effect of Freelance Labor (X1), Informal Sector Wages (X2), and University Education (X3) on Open Unemployment Rate (TPT)**

The F-test results confirm that the three independent variables jointly exert a statistically significant influence on the open unemployment rate (TPT). This underscores the importance of analyzing the gig economy, informal sector wages, and higher education in an integrated framework. Labor market policies should not focus solely on expanding access to higher education, but must also aim to improve wage quality in the informal sector and ensure that the gig economy evolves into a more competitive and inclusive employment arena.[2] emphasizes, without adaptive labor regulations, the gig economy may exacerbate employment vulnerabilities rather

than resolve unemployment challenges.

**CONCLUSION**

This study demonstrates that the expansion of the gig economy in Indonesia has not yet functioned as a structural solution to unemployment, but rather reflects the persistence of vulnerable and temporary employment. While the gig economy contributes to labor absorption, its role remains limited in providing stable and sustainable job opportunities.

In contrast, the quality of informal employment, as reflected in higher wage levels, emerges as a more decisive factor in reducing unemployment. This finding highlights that improving income conditions in the informal sector is more effective than merely expanding flexible job opportunities.

Furthermore, the increasing proportion of university graduates does not automatically translate into better labor market outcomes, indicating a persistent mismatch between educational attainment and industry needs. This suggests that the challenge of unemployment in Indonesia is not solely related to job availability, but also to the alignment between skills and labor market demand.

These findings imply that labor market policies should move beyond simply promoting the gig economy and instead focus on improving job quality, strengthening wage standards in the informal sector, and enhancing the linkage between higher education and industry. A more integrated approach is required to ensure that employment growth is not only flexible, but also inclusive and sustainable.

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