Assessing the unemployment rate as a mediator between SMEs and economic growth

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Abstract

Economic growth and unemployment reduction in developing countries can be strengthened by improving the business quality of SMEs. As SMEs dominate Indonesia's industrial structure, this study examines their relationship with economic growth, with unemployment rates as a moderating variable, in West Java, Central Java, and East Java from 2015 to 2022. Using Structural Equation Modeling (SEM) on 96 observations, the findings reveal that the number of SME business units has a significant negative impact on the unemployment rate, whereas total assets have a positive impact. A higher asset value enhances the capacity for modernization and digitalization, which, in turn, reduces labor absorption and potentially increases unemployment. Additionally, a decline in the unemployment rate positively influences economic growth, which is consistent with Okun's Law, though with a relatively low magnitude. These findings highlight the need for government policies to facilitate SME business development by improving production standards, expanding access to business capital, and enhancing market reach. This approach aligns with the *UMKM Naik Kelas* (SME Scale-Up) program, which aims to promote sustainable SME growth and economic resilience.

Keywords: *Economic growth, SEM, SMEs, Unemployment*

JEL Classification: E13, E24, M21

INTRODUCTION

Small and Medium Enterprises (SMEs) are a crucial component of economic growth and employment in Indonesia. Currently, regulations governing SMEs in Indonesia are outlined in Government Regulation No. 7 of 2021 on the Facilitation, Protection, and Empowerment of Cooperatives and Micro, Small, and Medium Enterprises. The role and contributions of SMEs have been widely discussed in the literature. For instance, Katua (2014) highlighted that SMEs serve as key drivers of economic growth, poverty reduction, and employment opportunities across various countries. Similarly, Douglas et al. (2018) argued that SMEs play a significant role in labor absorption, export activities, government revenue generation, and overall

economic value addition. Additionally, SMEs contribute to the equitable distribution of economic development benefits (Absah et al., 2022).

As a developing country, Indonesia has a national industrial structure heavily dominated by micro, small, and medium-sized enterprises (MSMEs). In fact, more than 95% of businesses in Indonesia fall under the MSME category, with micro businesses representing over 90% of all business units. Consequently, SMEs account for less than 5% of the total business units. Given this structure, the government has implemented the MSME Upgrading Program to enhance the sector's contribution to economic growth and to reduce unemployment in the long term. Moreover, the primary centers for MSME development in Indonesia are the provinces of West Java, Central Java, and East Java. This study focuses on these three provinces, given their significance as MSME hubs and their relatively high levels of unemployment and poverty. These conditions have indirect implications for slowing national economic growth and hinder the process of scaling up MSMEs.

Several studies have demonstrated the substantial economic contributions of SMEs (Nunes et al., 2013; Mujahid et al., 2019; Al-Afeef, 2020). Nunes et al. (2013) found that SMEs positively impact economic growth in Portugal through increased labor productivity, although they tend to have higher debt and liquidity levels and lower tangible assets. Similarly, Mujahid et al. (2019) emphasized the vital role of SMEs in job creation, poverty reduction, and economic growth, identifying a direct and significant relationship between SME output and economic growth in Pakistan from 1980 to 2017. Likewise, Al-Afeef (2020) found that SMEs significantly influenced unemployment and GDP in Jordan between 2009 and 2018, noting that increased SME funding led to GDP growth.

This study aims to examine the relationship between SME business indicators and economic growth, with the unemployment rate serving as a mediating variable in three provinces on Java Island from 2015 to 2022. The study makes several key contributions. First, the modeling of SME linkages to economic growth using unemployment rates as a moderating variable has been largely underexplored in the literature. The relationship between unemployment and economic growth aligns with Okun's Law. Second, this study focuses on SMEs in Central Java, West Java, and East Java—three provinces that serve as national SME hubs. In 2022, economic growth in these provinces ranged from 5.31% to 5.45%, yet the unemployment rate remained relatively high, with West Java at 8.31%, Central Java at 5.57%, and East Java at 5.49%. Third, the study employs the Structural Equation Modeling (SEM) method to analyze SME contributions during President Joko Widodo's administration. This approach has been rarely applied to the study of SME linkages with Indonesia's macroeconomic indicators. Fourth, the study's findings provide valuable insights for policymakers, highlighting the need to support and facilitate the *UMKM Naik Kelas* (SME Scale-Up) program as a strategic policy instrument for reducing unemployment and enhancing national economic growth.

The relationship between unemployment and economic growth has been widely explored in the literature (Soylu et al., 2018; Iloabuchi, 2019; Dankumo et al., 2019; Siddikee et al., 2022). For instance, Soylu et al. (2018) found that a 1% increase in GDP in Eastern European countries between 1992 and 2014 corresponded to a 0.08% decline in the unemployment rate, consistent with Okun's Law but with a relatively low magnitude. Similarly, studies have documented a negative relationship between unemployment and economic growth in Nigeria from 1999 to 2017 (Iloabuchi, 2019), Nigeria from 1996 to 2017 (Dankumo et al., 2019), Indonesia from 2010 to 2016

(Alrakhman et al., 2022), and across 14 Asian countries (Siddikee et al., 2022).

The findings of this study indicate that an increase in the number of SME businesses significantly contributes to reducing unemployment rates in West Java, Central Java, and East Java from 2015 to 2022. Consequently, the government is encouraged to strengthen the *UMKM Naik Kelas* program to support SME growth. Moreover, a 0.42% increase in economic growth is associated with a 1% reduction in the unemployment rate, in line with Okun's Law at a relatively low magnitude. Empirical studies suggest that developing countries tend to exhibit lower Okun's Law coefficient levels (Pizzo, 2020; Ibourk & Elaynaoui, 2024). From another perspective, Banerji et al. (2015) argued that a 1% increase in the average employment or value-added share of SMEs leads to a 0.01 reduction in Okun's coefficient in European countries. This phenomenon ultimately enhances the procyclicality of unemployment.

This paper is structured as follows: The first section introduces the study, outlining the empirical gap, objectives, and contributions. The second section describes the methodology, including the use of secondary data and Structural Equation Modeling (SEM). The third section presents the results and discussion, while the final section provides the conclusion.

METHODS

This study utilizes secondary data published by the Central Bureau of Statistics and the Office of Cooperatives & MSMEs in the provinces of Central Java, West Java, and East Java. The study covers the period from 2015 to 2022. The study interpolates annual data into a quarterly format to ensure an adequate number of observations. Several previous studies have suggested that annual data can be interpolated into quarterly data without requiring imputation (Masiya, 2010; Franses, 2020). As a result, the total number of observations in this study is 96. Additionally, the selected period coincides with President Joko Widodo's administration, encompassing the pre-pandemic, pandemic, and post-pandemic periods. These three provinces were chosen as the study sample due to their status as the regions with the largest number of SMEs in Indonesia.

The secondary data consists of SME business indicators (number of business units, number of workers, and total assets), unemployment rates, and economic growth in the three provinces. The operational definitions and descriptive statistics for these variables are presented in Table 1.

Table 1. Variables and descriptive statistics

Variable	Definition	Mean	Minimum	Maximum
Number of SMEs (Firm)	The total number of SME units recorded quarterly.	108822	16662	241534
Number of Worker (Worker)	The total workforce employed by SMEs is recorded quarterly.	381419	184182	767171
Total Asset (Asset)	Total SME assets are recorded quarterly (in billion rupiah).	14327	3475	45251
Unemployment Rate (UER)	The unemployment rate in each province is recorded quarterly (%).	1.55	0.88	2.67
Economic Growth (EG)	The economic growth rate in each province is recorded quarterly (%).	1.06	-0.74	1.69

The statistical description of SME business indicators reveals that the average

number of firms exceeds 100,000 units. This substantial industrial potential can be further developed and supported by local governments to reduce unemployment and promote sustainable economic growth. The large number of SME firms is also reflected in the number of workers employed and the total business assets recorded. Meanwhile, the average unemployment rate (1.55%) is higher than the average economic growth rate (1.06%). However, the difference between these two macroeconomic indicators is not substantial, suggesting that a reduction in the unemployment rate can accompany economic growth.

The contribution of SMEs to economic growth can be analyzed through key business indicators, including the number of business units, workforce size, and total assets. Several studies have examined the interactions between SMEs, unemployment rates, and economic growth, including Al-Haddad et al. (2019), Mujahid et al. (2019), Al-Afeef (2020), and Adan & Hussain (2021). Meanwhile, the relationship between unemployment rates and economic growth is often explained by Okun's Law.

Okun's Law describes the inverse relationship between output growth (GDP) and unemployment reduction. This concept was first introduced by Okun in 1962 and later refined by Prachowny (1993). The conventional ratio suggested by Okun's Law states that a 3% increase in output corresponds to a 1% decline in the unemployment rate. However, empirical findings indicate variations in this coefficient across different economies. Pizzo (2020) found that developing countries generally exhibit lower Okun's Law coefficients than developed nations, which can be attributed to differences in economic structures and the effectiveness of social safety net programs. Similarly, Ibourk & Elaynaoui (2024) identified relatively low Okun's Law coefficients across 39 African countries. Conversely, Zerbo (2023) provided empirical evidence from ten developing countries between 2013 and 2018, demonstrating that economic growth was accompanied by a decline in unemployment rates in accordance with Okun's Law.

The relationship between SME indicators and economic growth, with the unemployment rate as a mediating variable, can be effectively analyzed using the Structural Equation Modeling (SEM) method. SEM is a statistical approach that integrates factor analysis, regression, and path analysis. According to Huber (2019), SEM consists of observed and latent variables and is capable of identifying direct, indirect, and total effects among variables. A fundamental representation of SEM is the path diagram, as shown in Figure 1, which provides a structural framework that can be estimated using STATA 15.

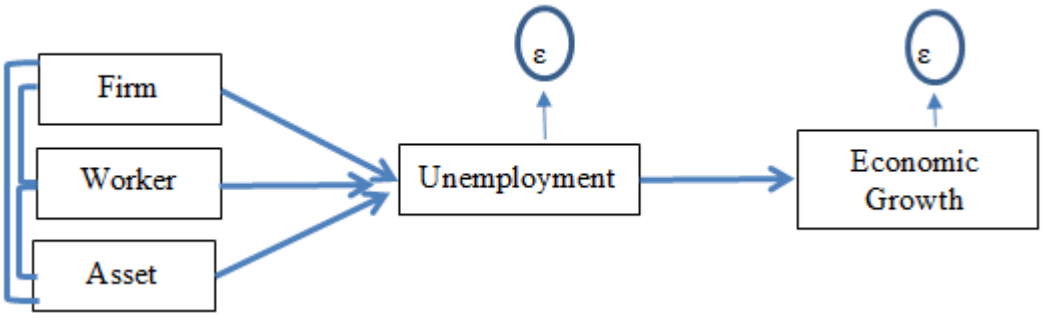


Figure 1. SEM framework estimation

Figure 1 illustrates key concepts in structural equation modeling, including path diagrams, covariance, exogenous variables, and endogenous variables. The path diagram represents the interaction framework among variables, such as SMEs,

unemployment, and economic growth, depicted using straight arrows. Covariance refers to the degree of covariation among variables, represented by curved arrows. The exogenous variables in this study are the number of firms, workforce size, and SME assets, while the endogenous variables are the unemployment rate and economic growth.

The SEM framework can also be expressed through the following equations:

$$EG_{it} = \beta EG_{it} + \Gamma_1 FIRM_{it} + \Gamma_2 WORKER_{it} + \Gamma_3 ASSET_{it} + \alpha + \zeta \quad \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$UER_{it} = \beta UER_{it} + \Gamma_1 FIRM_{it} + \Gamma_2 WORKER_{it} + \Gamma_3 ASSET_{it} + \alpha + \zeta \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

EG equals economic growth, while UER is the unemployment rate. β and Γ are the coefficient variables, while α denotes the intercept. Meanwhile, the variance and covariance of the error terms are Var, Cov (ζ). The number of observations is presented by "i" (three provinces include West Java, Central Java, and East Java) and "t" (the period from 2015:q1 – 2022:q4).

RESULTS AND DISCUSSION

Results

Equations (1) and (2) were estimated using the Structural Equation Modeling (SEM) approach to examine the relationship between SME indicators, unemployment rates, and economic growth. The findings indicate that the number of SME units has a negative and significant impact on the unemployment rate at the 5% significance level (Table 2). Specifically, an increase in the number of SME units by one firm leads to a 0.009% decrease in the unemployment rate. This result supports the need to implement programs such as *UMKM Naik Kelas* to enhance SME growth and labor absorption.

Table 2. SEM estimation

Variables	Coefficient	z-test	Prob.
Structural			
Uer			
Cons	1.1813	12.34	0.000
Firm	-0.009	-2.19	0.028
Worker	-0.002	-0.68	0.494
Asset	0.001	15.37	0.000
Eg			
Cons	1.7105	8.44	0.000
Uer	-0.4174	-3.36	0.001
Observation	96		
var(uer)	0.0704		
var(eg)	0.3771		
var(firm)	0.0054		
var(worker)	5.4900		
var(asset)	1.5900		
cov(firm,worker)	4.8500	4.51	0.000
cov(firm,asset)	1.8400	2.07	0.038
cov(worker,asset)	-8.7300	-0.59	0.555

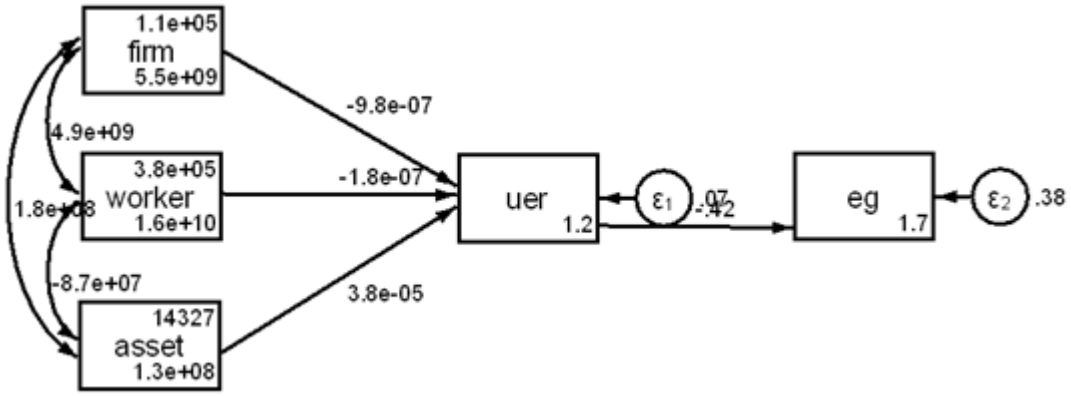
Conversely, SME total assets exhibit a positive and significant effect on the unemployment rate at the 1% level. An increase in SME assets by IDR 1 billion is associated with a 0.001% increase in the unemployment rate. This phenomenon may be attributed to the modernization of business processes, including digitalization in

production and marketing, which can enhance SME asset value but simultaneously reduce employment opportunities. The transition to digital business models often leads to automation, which may limit job creation, particularly for low-skilled workers who struggle to adapt to modernized SME operations. Nonetheless, Ciurea et al. (2021) argue that SMEs play a crucial role in job creation and economic growth through digital transformation.

Furthermore, the findings indicate that the number of SME workers does not significantly affect the unemployment rate. This suggests that SME employees have not yet established themselves as professional and competitive workers, meaning SMEs have not been effectively positioned as a primary means of absorbing unemployed individuals. This conclusion is consistent with Yanto & Zakiah (2024), who found that individuals often turn to SME employment as a last resort when traditional job opportunities are unavailable.

Another key finding is the relationship between the unemployment rate and economic growth in the three provinces of Java. The unemployment rate has a significant and negative impact on economic growth at the 1% level, aligning with Okun's Law, albeit at a relatively low magnitude. Specifically, a 1% increase in the unemployment rate corresponds to a 0.42% decrease in economic growth.

Moreover, the covariance between SME-related variables provides valuable insights into their interrelationships. The covariance between the number of SME business units and the number of workers is significant and positive at the 1% level, suggesting that an increase in the number of SMEs stimulates greater labor absorption. Similarly, the relationship between the number of SME units and total assets is significant and positive at the 5% level, indicating that a rise in the number of business units contributes to an increase in SME asset value. In contrast, the covariance between the number of SME workers and total assets does not exhibit statistical significance, implying no direct relationship between the size of the SME workforce and total assets. Diagrammatically, these covariance relationships are represented by curved arrows in Figure 2, which illustrate the relationships between SME indicators and economic growth, with the unemployment rate as a moderating variable, using a path diagram. The study's findings indicate that a larger number of SMEs reduces the unemployment rate, while higher economic growth further contributes to lower unemployment levels.



Note: The straight line indicates the direct impact, whilst the curved line signifies the variance and covariance values between variables.

Figure 2. SEM building estimation

Figure 2 can be analyzed in terms of direct, indirect, and total effects. The direct

effects indicate that the number of SME units has a significant negative impact on the unemployment rate at the 5% level. In comparison, SME total assets have a significant positive effect on the unemployment rate at the 1% level. Furthermore, the unemployment rate negatively impacts economic growth at the 1% level, which is in line with Okun's Law. The indirect effects show that SME total assets have a significant negative impact on economic growth at the 1% level, meaning that an increase in SME assets does not necessarily lead to higher economic growth. This condition suggests that automation and digitalization, which enhance asset value, do not always translate into increased employment or economic expansion. The total effects reveal that the number of SME units significantly reduces the unemployment rate at the 5% level, while SME total assets increase unemployment at the 1% level. Additionally, the unemployment rate and total assets of SMEs both have a significant negative effect on economic growth at the 1% level.

The validity of the SEM model was assessed using multiple goodness-of-fit measures, including the Likelihood Ratio Chi-Squared Test, Akaike's Information Criterion (AIC), Schwartz's Bayesian Information Criterion (BIC), and the Coefficient of Determination (R^2). The p-value of the Likelihood Ratio Chi-Squared Test is 0.052, which is greater than 0.05, confirming that the SEM model provides a good fit. The values of Akaike's Information Criterion and Schwartz's Bayesian Information Criterion are 7,195.38 and 7,218.45, respectively. Moreover, the coefficient of determination (R^2) is 0.73, indicating a relatively high level of model validity. Since the R^2 value is close to 1, the SEM estimation demonstrates a strong goodness-of-fit. These findings confirm that the SEM estimation effectively captures the relationships between SME indicators, unemployment, and economic growth, providing robust empirical evidence for the study's hypotheses.

Discussion

The literature has widely discussed the significant contribution of SMEs to economic growth. However, SMEs continue to face challenges in improving business management and development. For instance, Amoah et al. (2022) argued that the Ghanaian economy has benefited from SME development, particularly in terms of economic growth and employment. However, they identified business innovation as a major constraint to SME expansion. Similarly, Kongolo (2019) highlighted the critical role of SMEs in supporting the South African economy but noted that several challenges persist, including deficiencies in managerial skills, limited access to credit and capital, inadequate technological adoption, restricted production capacity, and constrained market access. In a more specific context, Hardi & Puspitowati (2022) emphasized that SME growth is closely linked to improvements in business management quality, particularly in branding and marketing strategies, customer service, and the efficiency of product delivery.

The findings of this study provide positive evidence that SME indicators have a significant direct impact on unemployment and an indirect influence on economic growth. Aladin et al. (2021) asserted that SMEs play a crucial role in economic development, which is why European governments regulate SME growth in a structured and sustainable manner. Similarly, Al-Haddad et al. (2019) found that the number of SMEs is significantly correlated with unemployment rates in Pakistan, suggesting that consistent and continuous SME development can serve as a key policy instrument for reducing unemployment. A similar pattern is observed in Indonesia, where an increasing number of SME business units has contributed to economic growth from

1999 to 2019. However, Rohadin & Yanah (2019) pointed out that between 2003 and 2018, the contribution of SMEs to Indonesia's economy, particularly in terms of state revenue, remained relatively insignificant. This is largely due to the dominance of micro-enterprises, which do not significantly impact tax revenue.

The contribution of SMEs to reducing the unemployment rate is further supported by the findings presented in Table 2 and Figure 1. Schreyer (1996) argued that SMEs serve as an important instrument for job creation in many countries. However, their ability to absorb new labor is often constrained by limited production capacity and slow business development. The role of SMEs in reducing unemployment has also been observed in Saudi Arabia, as highlighted by Al Ajlouni et al. (2014). However, one of the key challenges faced by SMEs in recruiting labor on a large scale is the relatively low wage levels they offer.

A historical perspective on SME contributions to economic growth and employment is provided by Hu (2010), who examined the role of SMEs in both developed and developing countries between 1960 and 1990. The study found that, during this period, SMEs in developed countries primarily fostered entrepreneurial activities and innovation. In contrast, in developing countries, SMEs were largely focused on employment generation rather than innovation-driven growth.

Further studies have explored the relationship between Okun's Law and various industrial and economic sectors, including those conducted by Goto & Bürgi (2021), Sari & Gryga (2023), Raifu (2023), Suparta (2023), and Kalu et al. (2024). Sari & Gryga (2023) specifically examined the contributions of SMEs to the economies of Ukraine and Indonesia between 2000 and 2014. Their findings indicate that, in Ukraine, micro and small enterprises (MSEs) are a crucial driver of economic growth. In contrast, in Indonesia, SMEs tend to place greater emphasis on improving workforce quality rather than solely focusing on economic expansion. Additionally, the study highlighted the importance of strategic selection of export-oriented products, which can enhance the competitiveness of SMEs in the global market. However, several business constraints were identified, contributing to a high-cost economy, and the study recommended that government interventions are necessary to address these challenges.

Between 2005 and 2021, banking credit and SME micro-credit became a burden on the unemployment rate in Nigeria (Kalu et al., 2024). This suggests that existing credit schemes may not have effectively supported SME growth and job creation, highlighting the need for a review of SME credit programs to improve business efficiency and enhance employment absorption.

A more detailed analysis of Okun's Law at the industry level was conducted by Goto & Bürgi (2021) for the United States, the United Kingdom, Switzerland, and Japan. Their findings indicate that the relationship between economic growth and unemployment at the industry level closely mirrors the patterns observed in the overall economy, reinforcing the idea that the unemployment rate is a key driving force in Okun's Law.

A similar study was carried out by Raifu (2023), who estimated Okun's Law at the industry level in Nigeria from 1981 to 2020. The findings reveal that, within Okun's Law framework, the service sector exerts the greatest influence on unemployment compared to other sectors such as industry, agriculture, and manufacturing.

Further investigation into Okun's Law at the industry level was conducted by Suparta (2023) in Indonesia between 2017 and 2022. The findings indicate that the agriculture and service sectors play a crucial role in reducing unemployment,

demonstrating a significant relationship within the Okun's Law framework. These results suggest that sectoral dynamics influence the degree to which economic growth translates into employment gains, reinforcing the need for targeted policies to maximize job creation in key industries.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The relationship between SMEs, unemployment rates, and economic growth has been widely discussed in the literature and remains a key concern for policymakers. However, the interaction between SMEs and economic growth, with unemployment rates as a moderating variable, has not been extensively studied in the provinces of West Java, Central Java, and East Java during the period 2015–2022. This study employed the Structural Equation Modeling (SEM) method to explore these interactions.

The findings indicate that the number of SME business units has a significant impact on reducing the unemployment rate in Indonesia. Specifically, the addition of one SME business unit results in a 0.009% decrease in the unemployment rate, supporting the *UMKM Naik Kelas* (SME Scale-Up) program as a strategic policy tool. Furthermore, the relationship between unemployment rates and economic growth is negative and significant at the 1% level, aligning with Okun's Law, though at a relatively low magnitude.

Recommendations

The study's findings suggest several policy implications. Firstly, expanding the number of SMEs should be aligned with the SMEs Scale-Up (*UMKM Naik Kelas*) strategy to reduce the unemployment rate further. This process can lead to an increase in the number of medium-scale enterprises while potentially decreasing the number of small-scale enterprises, reflecting SME growth and transformation. Secondly, the government should prioritize skill development programs for SME workers to enhance productivity and competitiveness. Thirdly, an industrialization strategy should be emphasized to stimulate economic growth while addressing unemployment. Lastly, future research should explore additional factors influencing the relationship between SMEs and economic growth, including institutional quality and policy frameworks.

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