



The Influence of the Informal Economy on the Growth Rate of Real GDP within the Association of Southeast Asian Nations

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ABSTRACT

The assessment of the informal economy's impact on economic growth in the Association of Southeast Asian Nations (ASEAN) member states was carried out using three different static panel data models: pooled Ordinary Least Squares (OLS), random effects, and fixed effects models. This comprehensive study covered a period of 27 years and included ten countries, yielding a total of 270 observations. The estimated coefficient for the informal economy in the random effects model was 0.0780, while in the fixed effects model it was 0.1747, both of which were statistically significant at the 5% level. These results indicated that an increase in the formal economy would contribute positively to real GDP growth in the ASEAN member states. Additionally, both panel data models revealed that the inflation rate significantly affected real GDP, although the estimated coefficients were negative, with values of -0.0723 for the RE model and -0.0995 for the FE model, both significant at the 1% level. Conversely, the research did not find a significant relationship between population growth rate and real GDP. Notably, there was no significant correlation between any of the variables and real GDP when analyzed under the OLS model.

Keywords: Informal Economy, Real GDP Growth Rate, Pooled OLS Model, Random Effect Model, Fixed Effect Model

JEL Classifications: E26, F38, G21, O41

1. INTRODUCTION

The origins of the Association of Southeast Asian Nations (ASEAN) can be traced back to 1967, when five founding nations—Indonesia, Malaysia, the Philippines, Singapore, and Thailand—came together to sign the Bangkok Declaration. The principal aim of this initiative was to promote regional collaboration, stability, and peace, particularly in the aftermath of the challenging post-colonial period. While the initial focus was on political and security issues, ASEAN quickly broadened its agenda to encompass economic and social cooperation as well (Kim, 2023). During the 1970s and 1980s, ASEAN played a significant role in enhancing regional security, particularly in response to the communist threat prevalent during the Cold War era. The organization served as a vital forum for dialogue, encouraging harmonious relations among the countries of Southeast Asia. In 1992, the member states of ASEAN initiated the ASEAN Free

Trade Area (AFTA), with the objective of lowering tariffs and boosting regional trade, thereby marking a transition towards greater economic integration (Park, 2024). The Asian financial crisis of 1997 posed significant challenges to ASEAN's resilience; however, the organization effectively addressed these challenges by enhancing economic collaboration and launching initiatives such as ASEAN Plus Three, which incorporates China, Japan, and South Korea. Throughout the 2000s, ASEAN broadened its international influence by forming free trade agreements with multiple nations and establishing the ASEAN Economic Community (AEC) in 2015, which seeks to develop a unified market and production base. Presently, ASEAN plays a vital role in both regional and global matters, advocating for peace, stability, and sustainable economic development (Chia, 2014).

The shadow economy, commonly known as the informal economy, is a component present in all economic systems and is classified

as part of the unobservable economy. It encompasses various economic activities that are not captured by existing statistical observation techniques or other data collection methods utilized by governmental and societal institutions. Distinct from other areas of the unobservable economy, the shadow economy operates beyond the boundaries of legal regulations, generating goods and services that are permissible under the law. This sets it apart from the criminal economy, which aims to exploit illegal avenues for income generation and resource allocation (Bashlakova and Bashlakov, 2021). The informal economy is present not only in developing nations but also in advanced economies, including those in Europe (Kelmanson et al., 2019). The interplay between the informal economy and economic growth has garnered considerable attention within economic research (Hasanzade, 2020). Certain scholars contend that the informal economy has a detrimental effect on economic growth. An empirical study carried out in the Economic Community of West African States (ECOWAS) revealed a notable influence of the shadow economy on economic growth (Camara, 2022).

The aim of this research is to examine the extent to which the informal economy influences economic growth within the Association of Southeast Asian Nations, which comprises Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. The study is structured into five distinct sections: an introduction, a literature review, a methodology section, an analysis of empirical results, and a conclusion.

2. LITERATURE REVIEW

The shadow economy, often known as the informal economy, comprises economic activities that operate outside the scope of government oversight and are either completely unaccounted for or only partially included in the official economic statistics. This sector encompasses both legal and illegal operations (Schneider and Enste, 2000). For policymakers, it is crucial to understand the impact of the informal economy on economic growth, as it significantly influences national development, contributes to income inequality, and affects public sector revenues. As a result, various methodologies have been developed to evaluate the size and consequences of the shadow economy, including the use of surveys, model-based estimations, and specific indicators.

Many studies have employed various methods and indicators to measure the size and effects of the shadow economy. Scheider and Williams (2013) provided an in-depth analysis of the techniques used to assess the informal economy, including indirect methods like examining tax discrepancies and models based on electricity usage. Expanding on this, Medina and Schneider (2018) created updated datasets that reflect the global state of informal economies, revealing long-term patterns and broader consequences. Similarly, Dell'Anno et al. (2017) focused on the Tanzanian informal economy from 2003 to 2015, using an econometric approach with a multiple indicators multiple causes (MIMIC) model, which allowed for the statistical analysis of various causes and indicators of the informal economy. Their findings showed that in the early years, the informal economy accounted for between 52% and 61%

of official GDP, with a decrease observed between 2013 and 2015. The study also identified inflation, unemployment, and government spending as major factors shaping the informal economy. Johnson et al. (1998) laid the foundation for understanding the causes and consequences of the shadow economy in different countries, emphasizing that factors like corruption, tax burdens, and weak institutions play a significant role in its size. Likewise, Loayza and Rigolini (2011) explored the connection between informality and economic performance, suggesting that informality might not only reflect economic failure but could also be a survival strategy in environments with fragile labor markets and institutions. Chen (2005) argued that informal employment is often tied to a lack of social protection and gender inequalities, particularly in developing countries, highlighting the socio-economic impacts of the informal economy.

Zaman and Golchin (2015) argued that examining the impact of the informal economy on economic growth using a single indicator could lead to inaccurate conclusions. Therefore, their study used three key variables: the informal economy measured in euros per capita, the informal economy as a percentage of GDP, and each EU member state's informal economy as a share of the total shadow economy of the 28 EU countries. This approach aimed to analyze the informal economy's influence on Romania's economic growth from 1992 to 2012. The findings highlighted the significant role of the informal economy in shaping Romania's growth path and showed a long-term, cointegrated relationship between the formal and informal sectors. Expanding on this, Goel et al. (2017) broadened the analysis to explore the informal economy's impact on U.S. economic growth over a span of 100 years, from 1870 to 2014. They used the standard neoclassical growth model and added two more indicators: Investment in physical capital (INV) and human capital investment (EDU). Their results indicated that before World War II, the informal economy had a negative effect on U.S. economic growth, while after the war, it seemed to contribute positively, signaling a major shift in the relationship between the informal economy and economic growth.

The varying findings on the shadow economy have led to different views on its impact on the formal economy. Some researchers suggest that a growing informal economy could actually strengthen the formal economy, especially during times of economic distress. This is because businesses in the informal sector can lower their costs by avoiding high taxes and strict regulations, which enhances their competitiveness (Schneider and Enste, 2000). Supporting this idea, Porta and Shleifer (2014) contend that informality can act as a safety net for economic participants during periods of uncertainty, although the long-term consequences of this trend may differ. A recent study by Agiropoulos et al. (2024) examined the impact of the informal economy on the economic stability of the European Union, finding a positive link between the informal sector and economic growth, particularly in times of crisis or when official markets face difficulties.

Other researchers argue that the informal economy hinders formal economic growth by reducing tax revenues and limiting the government's ability to invest in essential areas like infrastructure and human capital, both of which are crucial for economic

progress. Torgler and Schneider (2009) highlighted that activities within the informal economy can present significant long-term risks to economic stability, particularly in developed countries where these activities are often linked to tax evasion and illegal practices. Schneider (2007) further suggested that nations with weak governance and poor institutions foster an environment where the informal economy thrives, which in turn suppresses innovation and productivity, lowering the overall effectiveness of informal economic activities. Dreher and Schneider (2010) supported this argument, showing that shadow economies are frequently associated with corruption, amplifying their negative effects on governance and economic growth. Nguyen and Su (2021) noted that economic uncertainty, often worsened by ineffective governance, can push businesses into the informal sector as they attempt to avoid the risks posed by instability in the formal market. North et al. (2009) expanded on this by emphasizing the important role a country's institutional framework plays in shaping the prevalence of informal economic activities.

Schneider (2013) noted that countries with lower tax rates and fewer regulatory constraints typically experience smaller shadow economies, which helps promote formal economic growth and improve compliance. On the other hand, nations with strict regulations and high tax rates often face a large informal economy, which disrupts competition and reduces tax revenues. As a result, the strength of a country's institutions plays a key role in determining how the informal economy impacts economic growth. Schneider and Williams (2013) further observed that the informal economy is more prevalent in developing countries, driven by factors such as weak institutional frameworks, heavy regulatory burdens, and poor enforcement, in contrast to the smaller informal economies in developed nations with stronger institutions. Assidi et al. (2024) emphasized that improved governance can reduce the negative effects of the informal economy and support sustainable development. Additionally, Schneider and Enste (2000) and Fuest and Schneider (2012) agreed that businesses often turn to the informal economy due to high taxes and social security contributions, along with rising state regulations and labor market restrictions, such as mandatory reductions in working hours. Alfano et al. (2024) also argued that rising income inequality, combined with weak institutional structures, contributes to the growth of informal economic activities.

The importance of financial inclusion has increasingly been recognized as a key factor in reducing the size of the informal economy. Research by Beck et al. (2007) emphasized that financial development has the potential to reduce inequality and, in turn, decrease informal economic activities. In a more recent study, Younas et al. (2022) used the two-step Arellano-Bond differenced Generalized Method of Moments (GMM) to explore the link between financial inclusion and economic growth. Their results showed a significant positive relationship between financial inclusion and economic growth in developing countries, while also indicating that the informal economy tends to have a negative impact. Elgin and Oztunali (2012) argued that although financial inclusion can reduce informality, its success depends on the stability of the macroeconomic environment. Further studies have also confirmed that financial inclusion

plays a vital role in promoting economic growth while helping to reduce the prevalence of the informal economy (Onwuka and Ayeni, 2003; Elsharif, 2019; Hasan et al., 2024). However, Elsharif (2019) suggested that there is no significant connection between financial inclusion and the informal economy, proposing that both factors could potentially contribute to increased financial instability.

Numerous elements, such as income disparity, the age dependency ratio, and the credit provided to governmental and state-owned entities, have been recognized as having a significant positive relationship with the informal economy. In contrast, factors like income levels, unemployment rates, secondary school enrollment, and trade openness demonstrate a considerable negative relationship with the informal economy. Recent research by Hallunovi and Vangel (2023), along with Rashman et al. (2023), has explored the relationship between financial development, country risk, and the informal economy. Their results suggest that strong and stable financial markets can effectively reduce the size of the informal economy, particularly in emerging markets that face higher country risks. Furthermore, a study by Ajide and Dada (2024) has investigated the effects of globalization on the informal economy, indicating that increased globalization typically results in a decrease in its size. Likewise, Dreher et al. (2008) argued that globalization improves market efficiency and competition, which in turn discourages informal economic activities.

There is substantial evidence indicating that the informal economy can have both positive and negative effects on economic growth, with its overall impact depending on specific circumstances. Factors such as the strength of institutions, governance, the level of globalization, financial inclusion, and economic stability are crucial in determining whether the informal economy will foster or hinder growth. As a result, ongoing research into these complex dynamics is vital for policymakers seeking to harness the benefits of the informal economy while minimizing its adverse effects.

3. METHODOLOGY AND DATA

This research utilizes a thorough methodological framework to examine the impact of the expanding informal economy on economic growth within the ASEAN member countries. The empirical analysis integrates three static panel data models, which consist of pooled ordinary least squares (OLS), fixed effects (FE), and random effects (RE) models.

3.1. Pooled OLS Model

$$GDP_{it} = \theta_0 + \theta_1 IE_{it} + \theta_2 INF_{it} + \theta_3 PG_{it} + \varepsilon_{it} \quad (1)$$

The GDP variable represents the growth rate of the real gross domestic product of the ASEAN member states and serves as the dependent variable. Although the main objective of this study is to examine the impact of the informal economy (IE), the so-called shadow economy, on economic growth, two control variables, namely the inflation rate (INF) and the population growth rate (PG), are also included in the panel data models. Model (1) represents a pooled OLS model, where θ_j , $j = 0, 1, \dots, 3$

are the coefficients to be estimated and i stands for each individual ASEAN member country. The study includes 10 states of ASEAN countries, denoted by $i = 1, 2, 3, \dots, 10$. The period of the study, represented by the subscript letter t in the model for observed and unobserved variables, covers the years from 1994 to 2020, which corresponds to 27 years, $t = 1994, 1995, 1996, \dots, 2020$. In addition, the residual term is denoted as ε .

3.2. Fixed Effects Model

$$GDP_{it} = \theta_0 + \theta_1 IE_{it} + \theta_2 INF_{it} + \theta_3 PG_{it} + v_{it} \quad (2)$$

Panel data serves as a valuable tool for addressing certain types of omitted variable bias. In instances where these omitted variables remain constant over time, it becomes possible to formulate a model that integrates a composite error term, denoted as v_{it} , which encapsulates the unobserved variables within one component. This composite error is defined as a white noise process, characterized by an independent and identically distributed (i.i.d) sequence that has a mean of zero and finite variance. If the term μ_i is correlated with the independent variables, utilizing the OLS estimation method will result in biased outcomes, commonly known as endogeneity bias, since is part of the error term (Baltagi, 2020; Wooldridge, 2020).

$$v_{it} = \mu_i + \varepsilon_{it} \quad (3)$$

3.3. Random Effects Model

The analysis commences with the application of a consistent foundational framework that includes a composite error term, referred to as μ_i . Within the FE model, it is posited that μ_i is associated with the independent variables. In the absence of any correlation, the OLS method would remain applicable, even in the presence of potential serial correlation within the composite error. To effectively estimate the model, it is essential to modify it accordingly, and the generalized least squares method is employed to address the challenges posed by serially correlated composite errors, thereby facilitating accurate inferences. By leveraging quasi-demeaned data, a RE model can be constructed through a synthesis of OLS and FE, resulting in a weighted average representation.

$$GDP_{it} - \hat{\lambda} \overline{GDP}_i = \theta_0 (1 - \hat{\lambda}) + \theta_1 (IE_{it} - \hat{\lambda} \overline{IE}_i) + \theta_2 (INF_{it} - \hat{\lambda} \overline{INF}_i) + \theta_3 (PG_{it} - \hat{\lambda} \overline{PG}_i) + (v_{it} - \hat{\lambda} \overline{v}_i) \quad (4)$$

Where,

$$v_{it} = (1 - \hat{\lambda}) \mu_i + (\varepsilon_{it} - \hat{\lambda} \overline{\varepsilon}_i) \quad (5)$$

is *i.i.d.*

$$\lambda = 1 - \left[\frac{\sigma_\varepsilon}{\sqrt{(\sigma_\varepsilon^2 + T\sigma_\mu^2)}} \right] \quad (6)$$

If λ is set to 1, the model exclusively employs the FE estimator. Conversely, when λ is set to 0, the model relies solely on the OLS estimator. This indicates that the degree to which the model aligns with the FE estimator is closely tied to the variance of the unobserved effects; a lower variance results in a greater alignment with the OLS estimator. As a result, the RE estimator is determined by the product of λ and the error term, which is constrained within the interval of (0,1) (Baltagi, 2020; Wooldridge, 2020).

3.4. Data Collection and Analysis

The study covers the timeframe from 1994 to 2020 and analyzes ten member states of ASEAN using a cross-sectional methodology, resulting in 270 observations. Data for this research are sourced from the World Bank's database, which includes the World Development Indicator (WDI) and information on the informal economy. The empirical analysis begins with the presentation of summary statistics for all variables pertinent to the study. Additionally, it explores the potential for multicollinearity among the independent variables. This examination aims to evaluate both the strength and direction of the relationships between the real GDP growth rate and the independent variables, which include the informal economy, inflation rate, and population growth rate. The research investigates the influence of the informal economy on economic growth by utilizing static panel data models. In the context of these static models, methodologies such as Pooled OLS, FE, and RE are applied. Additionally, a range of statistical tests, including the Breusch-Pagan Lagrangian Multiplier test, the Chow test, and the Hausman test, are performed to identify the most suitable model specification.

4. EMPIRICAL RESULTS

The study encompasses a total of 270 observations spanning from 1994 to 2020 across the ten ASEAN member states. The average real GDP growth rate during this period is recorded at 5.11%, while the informal economy stands at 30.69. Additionally, the average inflation rate is noted to be 7.07%, and the population growth rate averages 1.52%. Within this region, the economic growth rate has experienced a minimum of -34.81% and a maximum of 14.52%. The informal economy has shown a minimum value of 10.62 and a maximum of 68.45. Furthermore, the inflation rate has varied significantly, with a minimum of -22.09% and a maximum of 127.97%. Lastly, the population growth rate has ranged from a minimum of -1.47% to a maximum of 5.32% on an annual basis (Table 1).

It is essential to verify that the independent variables do not exhibit high or perfect correlation, a phenomenon referred to as multicollinearity. This can be evaluated by analyzing the correlation matrix provided in Table 2. The analysis indicates that there is no evidence of multicollinearity among the independent variables being examined. Specifically, the correlation between the informal economy and the inflation rate is 0.13, the correlation between the informal economy and the population growth rate is -0.04, and the correlation between the population growth rate and the inflation rate is 0.05.

This study employed not only the pooled OLS panel data model but also the fixed effects model. In analyzing the results from the fixed effects model, it is crucial to determine whether the

Table 1: Summary statistics

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
GDP	270	5.11	4.64	-34.81	14.52
IE	270	30.69	13.54	10.62	68.45
INF	270	7.07	12.90	-22.09	127.97
PG	270	1.52	0.73	-1.47	5.32

Source: Estimated by authors

Table 2: Correlation matrix

Variable	IE	INF	PG
IE	1		
INF	0.1327	1	
PG	-0.0422	0.0479	1

variance of the model's residual term remains constant, a condition referred to as homoskedasticity. If the variance is not constant, a situation known as heteroskedasticity arises, which undermines the reliability of the statistical tests used for hypothesis testing. To assess the constancy of the residual variance, the modified Wald test for group-wise heteroskedasticity was utilized. The computed Chi-square value was 394.24, with a probability (P) value falling below the 5% significance threshold, leading to the rejection of the null hypothesis of homoskedasticity and indicating the presence of heteroskedasticity. To address this concern, the fixed effects model was executed with robust standard errors.

To determine the suitability of pooled OLS versus fixed effect models, the Chow test is employed under the assumption of the F-statistic. The findings of this test, as illustrated in Table test, indicate that the fixed effect model is more suitable than the pooled OLS model, as the null hypothesis asserting the superiority of the pooled OLS model is rejected at the 1% significance level (Table 3).

This study has employed the random effect model alongside the pooled OLS and fixed effect models to derive empirical results. Before proceeding with hypothesis testing and interpreting the findings, it is essential to evaluate the suitability of the model used. The Breusch and Pagan Lagrangian multiplier test for random effects indicates a calculated Chi-square value of 84.34, leading to a strong rejection of the null hypothesis that random effects are insignificant, as the P-value is below the 1% significance level. Consequently, it can be concluded that the random effect model is more appropriate than the pooled OLS model.

The Hausman test indicates that the P-value of the computed Chi-square statistic is below the 5% significance threshold, suggesting that the fixed effect model is more suitable than the random effect model. In the context of the Chow test, the fixed effect model is preferred over the pooled OLS model. Additionally, the Breusch and Pagan Lagrangian multiplier test reveals that the random effect model is more appropriate when comparing it to the pooled OLS model. However, when contrasting the random and fixed effect models, the Hausman test again favors the fixed effect model. Therefore, it can be concluded that the fixed effect model is the most suitable choice. The empirical results from the three models are detailed in Table 4.

The findings from the pooled OLS model suggest that the informal economy, inflation rate, and population growth rate

do not significantly influence the real economic growth rate, as evidenced by the t-test for individual slope coefficients and the F-test for simultaneous testing. Conversely, results derived from the fixed effect model reveal that the estimated slope coefficient for the informal economy is 0.175, indicating a positive relationship, with a P-value below the 1% significance level. This suggests that an expansion of the informal or shadow economy could enhance economic growth in the ASEAN countries. Additionally, the analysis indicates that an increase in the inflation rate negatively affects economic growth, as reflected by a slope coefficient of -0.099, which is statistically significant at the 1% level. However, the population growth rate does not exhibit a statistically significant effect on real economic growth. Furthermore, the simultaneous test utilizing the F-statistic leads to the rejection of the null hypothesis, which posits that all independent variables do not jointly explain economic growth, at the 1% significance level, as the P-value is greater than the threshold.

The empirical results derived from the random effects model indicate that the estimated coefficient for the informal economy is 0.078, which is statistically significant at the 5% level, thereby contributing to economic growth. Conversely, a negative correlation between the inflation rate and economic growth is observed, with a slope coefficient of -0.072, which is statistically significant at the 1% level. In contrast, the population growth rate does not exhibit a significant effect on economic growth. The Wald Chi-square test, yielding a value of 13.47 with a P-value below the 1% significance threshold, suggests that all independent variables collectively influence economic growth within the ASEAN context. Furthermore, the findings from both fixed and random effects models are consistent, revealing that the informal economy and inflation rate have significant positive and negative impacts on economic growth, respectively. However, no significant relationship between the population growth rate and economic growth is evident across all three panel data models, including pooled OLS, random effects, and fixed effects models.

The interplay between population growth and economic development has garnered extensive scholarly attention. Empirical evidence suggests that the rate of population growth significantly influences economic growth, yielding both advantageous and detrimental effects. A key mechanism through which population growth contributes to economic advancement is the expansion of the labor force. An increasing population results in a larger pool of workers, which enhances productivity and propels economic progress. This augmented workforce can generate higher output levels, elevate consumption, and escalate the demand for various goods and services, thereby fostering economic expansion. Nonetheless, the effects of population growth are not invariably beneficial; rapid increases in population can exert pressure on resources and infrastructure, potentially constraining economic

Table 3: Model selection tests

Breusch and pagan lagrangian multiplier test (OLS vs. RE)	Chibar2 (01)=84.34	Prob>chibar2=0.0000
Chow test (OLS vs. FE)	F (3, 257)=8.29	Prob>F = 0.0000
Hausman test (RE vs. FE)	χ^2 (5)=8.44	Prob> χ^2 =0.0377

Source: Estimated by authors

Table 4: Empirical results

Variable	Pooled OLS	RE	FE
IE	0.0184 (0.87)	0.0780** (2.32)	0.1747** (3.62)
INF	-0.0232 (-1.05)	-0.0723*** (-3.27)	-0.0995*** (-4.39)
PG	-0.3617 (-0.93)	-0.1362 (-0.32)	-0.2729 (-0.60)
Constant	5.2556*** (5.63) F (3, 266)=0.90 Prob>F = 0.4440	3.4293*** (2.73) Wald χ^2 (3)=13.47 Prob> χ^2 =0.0037	0.8621 (0.60) F (3, 257)=8.29 Prob>F = 0.0000
Observations	270	270	270
Groups	10	10	10
R-squared	0.0100	0.0804	0.0882

The asterisk ***, **, * indicate statically significant at the 1%, 5%, 10% level, respectively
t-statistics are in parentheses

growth prospects. High population density often results in overcrowding, substandard living conditions, and a decline in per capita income, which can jeopardize economic stability. Furthermore, a predominantly young population, although it enhances the labor force, necessitates substantial investments in education, healthcare, and various social services. These financial demands may restrict the potential for immediate economic benefits. Empirical research, including econometric modeling, indicates that the ideal population growth rate for fostering economic development is contingent upon a nation's level of advancement, infrastructure, and social policies. Consequently, while population growth has the potential to positively impact economic progress, its success is largely determined by a country's ability to effectively manage and leverage this growth.

5. CONCLUSION

The evaluation of the informal economy's influence on economic growth within the ASEAN member states has been conducted utilizing three static panel data models: pooled OLS, random effects, and fixed effects models. This analysis spans a period of 27 years across ten states, resulting in a total of 270 observations. The findings from the Chow test indicate that the fixed effects model is more appropriate than the pooled OLS model for this study. The Breusch and Pagan Lagrangian multiplier test for random effect has shown a preference for the random effect model over the pooled OLS model. However, the Hausman test indicates that the fixed effect model is more suitable when comparing it to the random effect model. Based on the results of the Chow, Breusch and Pagan Lagrangian multiplier, and Hausman tests, it can be concluded that the fixed effect model is the most appropriate choice for analyzing the influence of the informal economy on economic growth within ASEAN countries.

The findings derived from the fixed effect model indicate that the growth of the shadow economy is associated with

an increase in economic growth, although this growth rate is adversely affected by rising inflation. Interestingly, the rate of population growth did not demonstrate a significant effect on the real GDP growth rate, a conclusion that holds true not only for the fixed effect model but also for the pooled OLS and random effect models.

There are several specific reasons that elucidate the beneficial effects of the informal economy on economic growth within ASEAN nations. The informal economy plays a vital role in providing job opportunities, particularly for marginalized populations, thereby aiding in the alleviation of poverty and the reduction of inequality. Additionally, informal enterprises typically operate with lower overhead costs, which allows them to offer goods and services at more affordable prices, consequently boosting consumer demand. These businesses also foster innovation and adaptability, responding swiftly to changing market conditions. Furthermore, while the informal sector may not be regulated, it still generates tax revenue that can contribute to the funding of public services over time. By addressing deficiencies in the formal economy, the informal sector is essential for promoting economic growth in ASEAN countries.

This study utilized three static panel data models: pooled ordinary least squares (OLS), random effects, and fixed effects models. However, none of these models effectively examined the interconnections among all the variables of interest, which include the real GDP growth rate, informal economy, inflation rate, and population growth rate. To enhance the rigor of this research, it is strongly advised that future researchers conduct a more comprehensive analysis of the influence of the shadow economy on economic growth rates within the ASEAN region by employing the panel vector autoregressive model, commonly referred to as the panel VAR model. The most important features of the panel VAR model are the impulse response function (IRF) and the forecast error variance decomposition (FEVD).

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