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## Article

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# Shadow Economy and Economic Growth: The Role of Institutional Quality

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## ABSTRACT

This paper focuses on analyzing the impact of the shadow economy on economic growth in ASEAN countries. In particular, the authors examine the role of institutional quality in the effects of the shadow economy on economic growth, which means that this study is different from previous studies. The data sample was collected in 10 ASEAN countries (Brunei Darussalam, Indonesia, Cambodia, Lao PDR, Myanmar, Malaysia, the Philippines, Singapore, Thailand, and Vietnam) from 2002 to 2019. Regarding the analytical method, the authors used a combination of threshold effects and the system - GMM (Generalized Method of Moments) method. The estimation results show a threshold value of institutional quality ( $\lambda = 21.23\%$ ). Accordingly, shadow economy negatively affects economic growth. This shows that improving institutional quality can help ASEAN countries limit the negative impact of the shadow economy on economic growth. In addition, the authors also find a positive effect of the control variables, such as government expenditure, foreign direct investment, and population growth, on economic growth. These research results are empirical evidence in ASEAN countries; thus, the findings in this study have important implications for ASEAN countries and other countries with similar characteristics.

## KEY WORDS:

ASEAN, economic growth, institutional quality, shadow economy, system – GMM.

**JEL Classification:** E02, O11, O47, P51.

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## 1. Introduction

Sustainable economic growth and development are long-term goals every country aims for. However, the expansion and development of the shadow economic sector have been a major obstacle to achieving this goal. According to the Organization for Economic Cooperation and Development (OECD) handbook, a shadow economy is understood as legal, economic activities carried out illegally to avoid state control and supervision or to

evade taxes. Therefore, the investigation into the shadow economy's influence on different aspects is taken into account in many countries, especially in developing countries, and one aspect of great interest is economic growth. Although the research results on the impact of the shadow economy on economic growth are controversial, the reality has proven that the adverse effects seem to outweigh its positive impact. Many empirical studies show that the large size of the shadow economic sector will often lead to adverse effects such as a decrease in

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tax revenues, a decrease in the quantity and quality of public works, and the deterioration of economic and social institutions (Yasmin & Rauf, 2004; Schneider & Hametner, 2014; Romualdas et al., 2020; Khuong et al., 2020; Mayssa et al., 2021). In addition, it also promotes unfair competition and lack of transparency in the market, increasing risks for businesses that voluntarily comply with tax obligations and government regulations, thereby reducing economic growth.

Empirical studies show that the size of the shadow economy varies across countries or groups of countries. Schneider (2005) estimated the size of the shadow economy during the period 1999-2000 in 110 countries and found that 41%, 38% and 17% are the average size of the shadow economy in developing countries, in transition economies and in OECD developed countries, respectively. A recent data show that the size of the shadow economic sector tends to fluctuate dramatically from 15% to 40% in developing countries (Hoang, 2020). According to the statistics of the Association of Chartered Certified Accountants (ACCA) in 2020, the share of shadow economy accounts for only 7.5% of GDP in developed countries, while in some countries with emerging economies such as Russia, Ukraine or developing countries like Brazil and Pakistan, the proportion of shadow economy accounts for 39-45% of GDP. Other studies have also found that in countries with lower income levels, the size of the shadow economy tends to be larger (Schneider & Buehn, 2007; Medina & Schneider, 2017). In developing countries, the expanding shadow economy affects government tax revenues, directly affecting the capacity to provide public services and develop infrastructure (Torgler & Schneider, 2009). Weak infrastructure slows down the speed and efficiency of investment, directly affects the allocation of resources, and hinders economic growth. However, the reality shows that the size of the shadow economy and its impact on economic growth differ in developing countries. This has led researchers to question why, despite being developing countries with a high level of the shadow economy, some countries still have impressive growth while others have limited growth. Various studies have demonstrated that there are many factors affecting the size

and level of shadow economy such as tax burden, trade openness, level of economic integration, financial development, FDI inflows, level of corruption, institutional quality, unemployment rate, technology, and so on (Dreher et al., 2009; Goel et al., 2019). Depending on the economic, cultural, and social characteristics of each country, these factors have different levels of influence.

In this study, we focus on examining the role of institutional quality as an influencing factor on the shadow economy and investigate whether the specific institutional characteristics of each country are the determinants of the difference in the size and impact level of the shadow economy on growth. Moreover, we also try to identify the institutional threshold value. The influence of institutions on the economic environment has long been recognized by researchers; however, the correlation between institutions and the shadow economy is a relatively new topic. Although much research has been done on this topic recently, most studies analyze a handful of developed or developing countries or a group of countries without focusing on ASEAN countries. This is because most of the studies on this topic use the data set on the shadow economy of Medina & Schneider (2017); Schneider (2005) including developing countries, transition economies and OECD developed countries (Dreher et al., 2009; Schneider, 2010; Torgler & Schneider, 2009). A few recent studies also assess the effect of institutional quality on the shadow economy in Asian countries such as the study of Dang et al. (2022); Huynh et al. (2020); however, no study on this topic has been conducted in ASEAN countries.

Furthermore, institutions' direction and sign of impact on the shadow economy are also controversial. Most of the ASEAN countries are developing economies, facing obstacles in terms of the political system, low quality of human resources, lack of transparency, ineffective enforcement of regulations, etc. (Arayssi, 2020). A country with weak institutions, low government efficiency, unreasonable policies and regulations, and high levels of corruption creates opportunities for shadow economic activities to develop, thereby resulting in negative effects on the economy. Therefore, the improvement in institutions, the progress of government ef-

iciency, reasonable control of corruption, etc., may be the leading cause of the difference in the level and size of the shadow economy in these countries, which indirectly impacts economic growth. We expect the article to be empirical evidence proving the decisive role of institutions on the size of the shadow economy and its influence on economic growth. By determining the institutional threshold value, we establish a basis for the governments of ASEAN countries to adjust policies to improve institutional quality, the quality of public services, and the effectiveness of corruption control, etc., which contributes to limiting the impact of the shadow economy on growth.

## 2. Literature Review

The shadow economy makes it impossible to accurately estimate data on national accounts, causing an underestimation of the economic potential of countries. According to Smith (1985), the shadow economy is an informal economy. This view is also agreed by Johnson & Kaufmann (1998). Dell'Anno (2007) considers the shadow economy to be an unobservable economy. According to the study by Schneider (2007, 2010), who built the scale of the shadow economy for the International Monetary Fund (IMF), claimed that the shadow economy is economic activities in which they deny social responsibilities related to laborers such as non-compliance with regulations on insurance, compensation, and legitimate rights of laborers. Or the shadow economy is economic activities that cannot be tracked and whose income is not declared to the tax authorities (Alm & Embaye, 2013). Overall, it can be seen that there is currently no widely recognized definition of the shadow economy. However, what the authors analyze in this study is based on most of the previous studies, in line with international practice and the current shadow economic data published by the IMF. The authors state that the shadow economy is an unobserved economic activity that includes both legal and illegal production activities; the data related to shadow economic activities have not been statistically described; the activities of the shadow economy are not currently included in nominal GDP; accordingly, the annual economic growth rate has not yet reflected the fluctuations of the shadow economy in countries

over the years.

A country's competitiveness depends on its economic development. Many factors affect national economic growth, including those that promote and inhibit economic development. Accordingly, a shadow economy is considered a hindrance to national economic development and growth, reducing that country's competitiveness. Many studies have explored the impact of the shadow economy on economic growth, especially in developing countries. However, the research results have not shown uniformity. Many studies have found the harmful effects of the shadow economy and its undesirable consequences on the economy; others have also discovered the positive impact of the shadow economy on economic growth.

Many statistical studies reveal that the negative impact of the shadow economy on economic growth is shown through the index of per capita income. Expressly, the analyses of Schneider & Buehn (2007); Medina & Schneider (2017) indicated that the countries with a high level of economic development, such as Austria, Denmark, the Netherlands, Finland, Sweden, or Germany, have a smaller shadow economy size than low-income countries. Similarly, several other studies also found evidence of the negative impacts of the shadow economic sector on economic growth, such as reducing tax revenues, reducing GDP, and causing many social problems (Yasmin & Rauf, 2004; Schneider & Hametner, 2014; Romualdas et al., 2020; Khuong et al., 2020; Mayssa et al., 2021; Nguyen, M. L. T et al., 2022). In contrast, Islam & Alam (2019) and Oresajo (2020) found a significantly positive relationship between the shadow economy and economic growth.

The shadow economy does not always cause adverse effects; in some cases, if well controlled, it is sometimes an additional component for developing the official economic sector. Several studies have demonstrated this when they find both positive and negative effects of the shadow economy on growth. Goel et al. (2019) found the shadow economy's negative impact on US growth in the period before the second world war, but this study also discovered its positive of Wu & Schneider (2019) found a U-shaped relationship between the size of the shadow economy and the level of economic development when studying 158 countries from 1996 to 2015. It proves that when

the economy is underdeveloped with low GDP per capita, the size of the shadow economy harms economic growth, but when GDP per capita exceeds a certain threshold, the shadow economy has a positive effect on growth.

Recently, when examining the impact of the shadow economy on sustainable economic growth, Hoinaru et al. (2020) found that the economic development in high-income countries is more significantly and negatively affected by the shadow economy than that in low-income countries. Moreover, for low-income countries, the authors also show evidence of the shadow economy's positive impact on sustainable economic growth.

However, it is a fact that the level and size of shadow economies between countries in the world or the same region are significantly different. Studies have found that institutions are one of the critical factors for this difference. A country with low institutional quality is often associated with poor public governance performance, high level of corruption, lax legal corridors, the burden of regulations, and administrative procedures, creating problems of instability and information asymmetry, causing individuals and economic organizations to face more risks and benefit less from the protection of the law. Depending on the law of each country, an activity may be considered illegal in one country (not measured in GDP) but legal (measured in GDP) in another country. This leads to more participation in the shadow economy, causing the size and level of the shadow economy in these countries to increase.

The research results of Johnson et al. (1998); Schneider & Enste (2000); Fugazza & Jacques (2004); Razmi et al. (2013); Batrancea et al. (2017); Dada et al. (2021) have demonstrated this. On the contrary, a country with good institutional quality will contribute to reducing information asymmetry, and minimizing risks in economic activities, thereby creating motivation for economic organizations to participate more actively in the formal sector. Therefore, when institutional quality is improved with greater transparency and a stricter legal system, it will contribute to limiting corruption, improving management efficiency and the rule of law, thus promoting organizations and individuals to participate more in formal economic activities and

reducing the size of the shadow economy. This has been confirmed by the research results (Dreher et al., 2009; Falahati, 2020; Porta et al., 1998; Torgler & Schneider, 2009; Tran Pham, 2023).

However, the specific influence of institutional quality on the shadow economy varies across different aspects, with some aspects such as control of corruption, political stability, and absence of violence having a negative relationship with the shadow economy (Maulida, 2018). Recently, Wibowo & Indrayanti (2020) also assessed the impact of each component of the institutional index (World Governance Index - WGI) on the shadow economy. The research results unveil that voice and accountability, political stability, governance effectiveness, and control of corruption have a significant negative impact on the shadow economy. In contrast, the quality of law positively impacts the size of the shadow economy.

There is much debate about the impact of both institutions and the shadow economy on growth, but little research has examined how their interaction might affect economic growth. Several studies have found evidence of the significant impact of institutional quality on the correlation between economic growth and the shadow economy. Specifically, the survey by Elgin & Oztunali (2014) shows that higher GDP per capita is associated with a smaller shadow economy in countries with good institutions, whereas the opposite occurs in countries with low institutional quality.

In many studies, control of corruption is considered an institutional factor that determines the impact level of shadow economy on economic growth. Many studies have found evidence for the association between the high level of corruption and the size of shadow economy and its impact on economic growth. Borlea et al. (2017) state that the more corruption increases, the larger shadow economy size is and the negative effects on economic growth have risen.

In other words, a country with weak institutions and ineffective control of corruption can be the cause of promoting the size of the shadow economy, increasing the negative impact on economic growth. This finding is consistent with the studies (Bakevidence & Boujelbene, 2020; Baklouti & Boujelbene, 2020; Mayssa et al., 2021). In a recent study, Assidi & Nourira (2023) not only found that enhancing governance

quality is an effective policy tool to reduce the scale of the informal economy and thereby reap the benefits of economic, social, and environmental sustainability but also identified threshold values for each aspect of institutional quality. Specifically, values below the threshold negatively impact economic growth, while values above the threshold positively impact economic growth. Especially for the ASEAN region, the study of Nguyen et al. (2022) not only finds the negative impact of the shadow economy and the positive impact of corruption control on economic growth but also reveals that improving the level of corruption control can help limit the negative impact of shadow economy on economic growth.

Through the review of the above studies, it is easy to see that there is no research examining the interaction impact of institutions and the shadow economy on economic growth, especially determining the institutional threshold in ASEAN countries. It can be seen that the existing researches shows a significant gap. In fact, most ASEAN countries are developing countries characterized by institutional loopholes, high levels of corruption together, with political risks. In addition to the challenge of political stability and improving government efficiency, these countries also have to fulfill the important objective of economic development. Therefore, the adjustment of policies and the improvement in institutional quality to limit the negative impacts of the shadow economy and achieve the goal of economic growth have been paid great attention to. This study focuses on assessing the effects of the shadow economy on economic growth, examining the role of institutions in ASEAN countries, and determining the institutional threshold value. The determination of the institutional threshold value will be the basis for ASEAN countries to issue policies and set specific goals to improve institutional quality and limit the shadow economy's negative impacts on economic growth.

### 3. Estimation Method And Data

#### 3.1. Linear Model

The existing literature suggests that shadow economy (SE) can have a significant impact on economic growth (LogGDP) through the following model:

$$\text{LogGDP}_{it} = \alpha + \beta \text{SE}_{it} + \delta \text{CV}_{it} + \varepsilon_{it} \quad (1)$$

Baklouti and Boujelbene (2018) argued that economic growth can be significantly affected by the interaction between the shadow economy and corruption, in which corruption is an essential component of institutional quality (INS). Based on this idea, the authors develop the model (1) into a linear interaction model as follows:

$$\text{LogGDP}_{it} = \alpha + \beta_1 \text{SE}_{it} + \beta_2 \text{SE}_{it} \times \text{INS}_{it} + \beta_3 \text{INS}_{it} + \delta \text{CV}_{it} + \varepsilon_{it} \quad (2)$$

Where LogGDP is determined through the logarithm of GDP per capita. SE is determined by the ratio of shadow economy size to official GDP. INS is a composite index representing institutional quality, selected based on 6 component indicators of the World Bank's Worldwide Governance Indicators (WGI). The six component indicators of WGI include Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. INS is identified through Principal Component Analysis (PCA), which has the advantage of combining a set of variables into a single representative variable (Jolliffe, 2002). The PCA method was also used in the study (Ullah & Khan, 2017). With the measurement of INS through the above composite index, instead of just examining INS through corruption like previous studies, this study is expected to find many differences compared to previous studies. The measurement of INS variable by PCA method is described in detail in Table 1:

Table 1 shows that the INS composite index is formed from 2 main components of Comp1 and Comp2, with the proportions of 81.91% and 18.09%, respectively. Moreover, Table 1 also presents the proportions of 6 component indicators in each of the main components of Comp1 and Comp2.

The control variables (CV) in the model include government expenditure (GE), foreign direct investment (FDI), and population growth (POP).

In this section, the authors used the system – GMM proposed to estimate model (2) (Arellano & Bond, 1991). This method has the advantage of overcoming the violated regression hypothesis and controlling the latent endogeneity in the research model (Doytch & Uctum, 2011). Endogeneity may arise when explanatory variables are correlated with error term, which are

called endogenous variables. The system—GMM estimation process will use a matrix of instrumental variables correlated with the endogenous variables. However, these instrumental variables are not correlated with the model's errors (Hajamini & Falahi, 2018). Thus, the latent endogeneity issue in the model will be controlled, ensuring reliability and, particularly, robustness of the estimation results. Moreover, the system-GMM method was utilized in the study (Baklouti & Boujelbene, 2018).

3.2. Nonlinear Model

Alfada (2019) assumed that corruption can have a nonlinear impact on economic growth, and corruption is one of the important criteria of institutional quality. Accordingly, institutional quality can change the impact level of the shadow economy on economic growth. In other words, if there is a threshold value of institutional quality, the authors can analyze the impact of the shadow economy on economic growth in the regions before and after the threshold value of institutional quality. This problem can also be revealed after estimating model (2). Therefore, the authors develop the model (1) into the following model:

$$\text{LogGDP}_it = \alpha + \beta_1 \text{SE}_{it} I(\text{INS}_{it} \leq \lambda_1) + \dots + \beta_j \text{SE}_{it} I(\text{INS}_{it} > \lambda_j) + \delta \text{CV}_{it} + \varepsilon_{it} \quad (3)$$

Where:  $\lambda$  is the value of institutional quality thresh-

old.  $j$  is the number of institutional quality thresholds.  $I(.)$  is an indicator function of the variable of institutional quality threshold. Based on model (3), we can estimate the threshold value of institutional quality ( $\lambda_j$ ). Furthermore, we aim to estimate the impact of the shadow economy on economic growth in regions before and after the threshold value ( $\lambda_j$ ), and the coefficient  $\beta$  represents this impact.

For the analytical method, the authors use threshold effects for panel data proposed (Hansen, 1999), then developed into the Fixed-Effect Panel Threshold method (Wang, 2015). Accordingly, the authors test the existence of the threshold value of the shadow economy. However, the nature of threshold effects proposed (Hansen, 1999) and developed by Wang (2015) is based on the Fixed Effect thresholding regression for balanced panel data; consequently, this method has limitations when estimating the research model, especially the limitation in controlling the latent endogeneity in the research model. To overcome this limitation, the authors combine it with the system - GMM method to estimate the model (3). This approach allows the authors to determine the threshold value of institutional quality in the research model while ensuring the reliability and robustness of estimation results regarding the impact of shadow economy on economic growth in regions before and after this threshold value.

Table 1  
Description of the Measurement of the Institutional Quality Variable (INS)

INS			
Comp1 (Proportion: 81.91%)		Comp2 (Proportion: 18.09%)	
Component indicator	Proportion	Component indicator	Proportion
Voice and Accountability	7.69%	Voice and Accountability	56.79%
Political Stability and		Political Stability and Ab-	
Absence of Violence/Ter-	10.60%	sence of Violence/Terror-	41.55%
rорism		ism	
Government Effectiveness	20.31%	Government Effectiveness	0.30%
Regulatory Quality	20.38%	Regulatory Quality	0.53%
Rule of Law	20.66%	Rule of Law	0.21%
Control of Corruption	20.36%	Control of Corruption	0.62%
Total	100%	Total	100%



**Table 2***Description of Variables in the Research Model*

Variable	Code	Measurement
Economic growth	LogGDP	The logarithm of GDP per capita
Shadow economy	SE	The ratio of shadow economy size to official GDP
Institutional quality	INS	INS is a composite index showing the institutional quality of each country. INS has a value between 0 (lowest) to 100 (highest).
Government expenditure	GE	General government final consumption expenditure (% of GDP)
Foreign direct investment	FDI	Foreign direct investment, net inflows (% of GDP)
Population growth	POP	Population growth (annual %)

*Source: Authors collected and processed from Stata*

The combination of threshold estimation and system-GMM has been addressed in several experimental studies, including cases where the sample size (N) is smaller than the time dimension (T), as in the study by Hajamini and Falahi (2018).

### 3.3. Data

In this study, the authors analyze the sample data of 10 ASEAN countries, including Brunei Darussalam, Indonesia, Cambodia, Lao PDR, Myanmar, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. The World Bank's WGI has released annual data since 2002. Hence the authors collect the data sample during the period 2002–2019. The data on the shadow economy is managed by the authors from the source of the International Monetary Fund (IMF). However, the IMF's data on the shadow economy were only released in 2017. Thus, the authors forecast the data on the shadow economy in the next 2 years for other variables in the research model, the data on this variable is forecasted by the Box-Jenkins method proposed by Box and Jenkins (1976). The authors collect data from the World Bank.

## 4. Empirical Analysis

### 4.1. Basic Statistics

Table 3 shows that Singapore's LogGDP reached its highest value in 2018 (LogGDP reached a value of 11.10, equivalent to 66,188.78 USD), and the low-

est value belonged to Myanmar in 2002 (LogGDP reached a value of 4.96, equal to 142.08 USD). The average LogGDP of the 10 countries in the sample reached a value of 8.12 (equivalent to 10,134.50 USD). Regarding SE, the mean for the 10 countries in the sample is 30.94%. Accordingly, Singapore had the lowest SE (9.40%) in 2012, and Cambodia had the highest value of SE (54.10%) in 2002.

The authors used the Levin-Lin-Chu (LLC) test proposed by Levin et al. (2002) to determine the stationarity of the variables in the research model. Accordingly, all variables are tested at the original order - I(0) and the first difference - I(1).

The stationarity test results in Table 4 show that the variables in the research model are stationary at the original order, I(0). Therefore, the authors proceed to use these variables to estimate the research model.

The correlation analysis results show that SE is negatively correlated with LogGDP. Meanwhile, the remaining variables in the research model are positively correlated with LogGDP. In addition, multicollinearity in the research model is not a severe issue because independent and control variables have a relatively low correlation; furthermore, the test results show that the Variance Inflation Factor (VIF) value of 1.61 is relatively low

### 4.2. Results of the Linear Model

The authors use the system – GMM to estimate



**Table 3**  
*Description of the Data Sample*

Variable	Obs	Mean	Standard Deviation	Min	Max
LogGDP	180	8.12	1.49	4.96	11.10
SE	180	30.94	12.44	9.40	54.10
INS	180	42.82	23.33	3.20	90.01
GE	180	11.85	5.15	3.46	27.17
FDI	180	5.51	6.00	-1.32	28.60
POP	180	1.32	0.65	-1.47	5.32

Source: Authors collected and processed from Stata

**Table 4**  
*Stationarity Test Results*

Variable	I(0)	I(1)
LogGDP	-6.20*** (0.00)	-3.09*** (0.00)
SE	-3.07*** (0.00)	-7.17*** (0.00)
INS	-2.67*** (0.00)	-4.46*** (0.00)
GE	-1.56* (0.06)	-5.37*** (0.00)
FDI	-4.50*** (0.00)	-7.80*** (0.00)
POP	-3.39*** (0.00)	-7.05*** (0.00)

Note: \* and \*\*\* indicate significance at 10% and 1%, respectively.

**Table 5**  
*Correlation Analysis Results*

Variable	LogGDP	SE	INS	GE	FDI	POP
LogGDP	1.00					
SE	-0.52*** (0.00)	1.00				
INS	0.93*** (0.00)	-0.55*** (0.00)	1.00			
GE	0.43*** (0.00)	0.16** (0.04)	0.24*** (0.00)	1.00		
FDI	0.40*** (0.00)	-0.42*** (0.00)	0.44*** (0.00)	-0.27*** (0.00)	1.00	
POP	0.14* (0.06)	-0.22*** (0.00)	0.23*** (0.00)	-0.22*** (0.00)	0.16** (0.03)	1.00

Mean VIF = 1.61

Note: \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

the linear impact of the shadow economy on economic growth through model (2), and this result is presented in Table 6.

The estimation results of the system - GMM method show that model (2) is statistically significant. At the same time, both the Sargan test and the Arellano-Bond test are suitable (Table 6). Accordingly, SE has a negative impact (-0.03) on LogGDP. This means that when the size of the shadow economy increases by 1%, it will cause GDP to decrease by 0.03%. In other words, the larger the size of the shadow economy, the lower the national income tends to be.

The increased size of the shadow economy means more informal economic activities, which not only leads to a decrease in government revenues (due to a decrease in tax revenues) but also makes the business environment lack transparency and unfair competition, resulting in socio-economic instability and a decrease in economic growth. This result is consistent with the studies (Khuong et al., 2020; Mayssa et al., 2021; Medina & Schneider, 2017; Schneider & Buehn, 2007; Schneider & Hametner,

2014; Yasmin & Rauf, 2004).

Regarding INS, the authors find this variable's positive effect (0.03) on LogGDP. That means that a 1% improvement in institutional quality will boost GDP by 0.03%. In particular, the authors find a positive impact ( $0.07 \times 10^{-2}$ ) of the interaction variable SE $\times$ INS on LogGDP. This is the interesting finding of this study. The reason is that although the SE variable had a negative impact on LogGDP, the combination of SE and INS (specifically the interaction variable SE $\times$ INS) had a significant positive impact on LogGDP. This result also shows that the variable INS may play an important role in changing the impact of SE on LogGDP.

Institutions not only directly influence promoting economic growth but also indirectly affect growth by restraining the negative impacts of the shadow economy. This is not too difficult to explain. Improved institutional quality means better governmental control of corruption, more logical legal system construction, and more proper implementation of policies and regulations, resulting in increased public governance efficiency. In addition,

**Table 6**  
*Estimation Results of the Linear Model*

LogGDP	Coef.	P> z
Constant	5.59***	0.00
SE	-0.03***	0.00
INS	0.03***	0.00
SE $\times$ INS	$0.07 \times 10^{-2}$ ***	0.00
GE	0.11***	0.00
FDI	0.07***	0.00
POP	0.11***	0.01
Significance level	7491.32*** (0.00)	
Arellano-Bond test AR(1)	-1.72* (0.09)	
AR(2)	-0.42 (0.67)	
Sargan test	10.87 (0.21)	

Note: \* and \*\*\* indicate significance at 10% and 1%, respectively.

reasonable control of corruption also contributes to information transparency. It improves the fair competition of the market, thereby encouraging organizations and individuals to participate in official economic activities, reducing the size of the shadow economy and its negative impacts. This finding is consistent with research results (Baklouti & Boujelbene, 2018; Elgin & Oztunalandi, 2014; ).

Overall, it can be seen that improving institutional quality can limit the negative impact of SE on LogGDP. In other words, the effects of SE on LogGDP can vary depending on the institutional quality of each country. This is an exciting issue, but it has not almost been appropriately addressed in previous studies. To solve this problem, the authors test the threshold value of INS through model (3). Thereby analyzing the impact of SE on LogGDP in the regions before and after the threshold value of INS. In addition, the authors also find a positive effect of the control variables of GE, FDI, and POP on LogGDP.

4.3. Results of the Nonlinear Model

The authors used threshold effects to test the existence of the threshold value of institutional quality, and the test results are shown in Table 7.

The test results show that model (3) has a threshold value of institutional quality ( $\lambda$ ), and this value reaches 21.23. Based on this, the authors estimate the impact of SE on LogGDP in the regions before and after the value of  $\lambda$  through the system - GMM method and the estimation results are presented in Table 8 below:

Table 8 shows that the estimation results of model (3) through the system - GMM method are statisti-

cally significant. At the same time, the Sargan test and the Arellano-Bond test are suitable. The estimation results also indicate that the impact level of SE on LogGDP varies depending on the level of institutional quality. Specifically, before the threshold value  $\lambda$  ( $INS \leq 21.23\%$ ), SE has a negative impact (-0.07) on LogGDP. When exceeding the threshold value  $\lambda$  ( $INS > 21.23\%$ ), the negative effect of SE on LogGDP decreases considerably, reaching the value of -0.02.

The shadow economy negatively impacts economic growth in the region before or after the threshold, but before the threshold value, this impact is dramatically more significant than in the area after the entry. This suggests that improving institutional quality can limit the negative effect of SE on LogGDP. This is an exciting finding that no previous research has made.

Once again, this result confirms the role and importance of institutional quality in the correlation between the shadow economy and economic growth, especially in developing countries. As shown in the literature review, most of the ASEAN countries in the observed sample are developing countries with characteristics of institutional loopholes, high levels of corruption, and political risks. Determining the institutional threshold value is extremely important for these countries because it is the basis for the governments of ASEAN countries to develop and issue policies to improve institutional efficiency and quality and to reduce the size and negative impacts of the shadow economic sector, contributing to promoting sustainable growth. What is more, similar to model (2) results, the authors also find a positive impact of the control variables of GE, FDI, and POP on LogGDP in this model.

Table 7  
Test of Threshold Effects

Model	Threshold	Lower	Upper
$\lambda$	21.23%	21.01%	21.64%
Prob		0.09*	

Note: \* indicates significance at the 10% level.

**Table 6***Estimation Results of the Nonlinear Model*

<b>LogGDP</b>	<b>Coef.</b>	<b>P&gt; z </b>
Constant	5.64***	0.00
SE (INS ≤ 21.23%)	-0.07***	0.00
SE (INS > 21.23%)	-0.02***	0.00
GE	0.20***	0.00
FDI	0.12***	0.00
POP	0.35***	0.00
Significance level	1794.42*** (0.00)	
Arellano-Bond test	AR(1)	-1.72* (0.09)
	AR(2)	-0.86 (0.39)
Sargan test	18.17 (0.11)	

Note: \* and \*\*\* indicate significance at 10% and 1%, respectively.

## 5. Conclusion

In this study, the authors focus on examining the impact of the shadow economy on economic growth in 10 ASEAN countries from 2002 to 2019. In particular, the authors also consider the role of institutional quality in this impact, which is the difference between this study and previous studies. In combination with the use of threshold effects and the system - GMM method, the authors found the existence of the threshold value of institutional quality ( $\lambda = 21.23\%$ ). Accordingly, the shadow economy harms economic growth in the regions before and after the threshold value  $\lambda$ ; however, the level of this impact reduces significantly when institutional quality exceeds the threshold  $\lambda$ , which is an exciting finding of this study. Therefore, improving institutional quality can help limit the shadow economy's negative impact on ASEAN countries' economic growth. ASEAN countries should simultaneously implement policies to reform their institutions and minimize shadow economic activities to enhance the effectiveness of the policy combination. Specifically, countries need to perfect the legal system and tighten measures to control corruption to improve governance efficiency. For example, establishing and applying an

e-government system to control transactions and limit corruption; or enhance the Government's accountability through publicizing processes and procedures...Along with the improvement in institutional quality, ASEAN countries should continue to promote globalization and international integration in order to create a fair and effective competitive environment through trade policies attracting foreign capital flows. This is seen as a solution to narrow the gap between the formal economy and the shadow economy.

Overall, this paper has achieved great success when it comes to solving the research objectives. Nevertheless, this study still faces certain limitations, especially the limit on data. Thus, this study cannot test the impact of the shadow economy on economic growth in each country. Instead, the authors collect the data sample from 10 ASEAN countries to ensure the reliability of the estimation results of the research model.

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