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# The Shadow Economy, Institutional Quality and Public Debt: Evidence from Emerging and Developing Asian Economies

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### ABSTRACT

*Shadow economy is a major determinant of the economy since this informal sector has an intimate link with sources of government revenue. In addition, good governance can make significant contributions to public debt management by controlling borrowing cost. This research aims to assess the effect of the shadow economy and institutional quality on public debt of 19 emerging and developing economies in Asia during the period from 2002 to 2017. The research analyzed the data derived from the World Bank and the International Monetary Fund. Pooled-OLS, fixed effects and GMM regression methods are employed to measure the relationship between the shadow economy, institutional quality and public debt. The findings of this research show that both shadow economy and rule of law have a positive and statistically significant relationship with public debt. Indeed, increasing the size of the shadow economy and enhancing the rule of law result in a higher level of public debt while improving control of corruption has a negative relationship with public debt. The research could make substantial contributions to the economies in emerging and developing Asian countries. Based on the findings, policy makers in these countries can seek effective solutions for raising institutional quality, and minimizing the size of shadow economy in order to manage public debt.*

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### INTRODUCTION

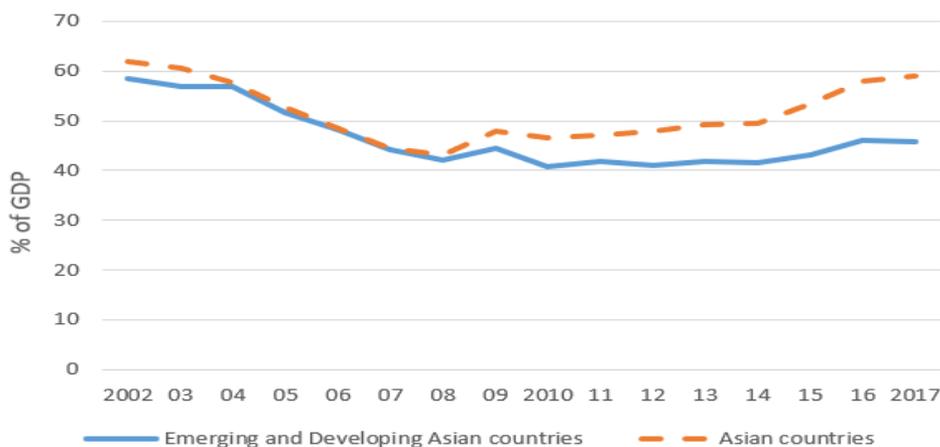
Public debt has recently become an interesting topic among economists and policy makers since European public debt crisis arose in Greece in 2010. US debt crisis during the period 2008 – 2015 is also a piece of empirical evidence. In fact, public debt performs a primary role in the budget of each country and can bring both advantages and disadvantages. Inefficient debt management can cause public debt crisis, which could lead to devastating consequences. Therefore, examining decisive factors affecting public debt in order to introduce macroeconomic policies has always been a major challenge to researchers worldwide.

In recent decades, due to continual changes in society and economy, researchers have begun to pay more attention to general factors with greater impact on public debt, especially the shadow econ-

omy (Elgin & Uras 2013; González-Fernández et al., 2018; Prinz & Beck, 2012; Yereli et al., 2007; Krivokapic, 2020; Simovic, 2020). The findings from these studies show that the existence of shadow economy is responsible for a range of problems such as a decrease in tax and government revenues, an increase in public debt, financial instability, and a rise in national bankruptcy. However, previous studies did not thoroughly explore this topic in groups of countries with similar geographical and cultural characteristics, especially emerging and developing Asian economies.

The Institute of International Finance states that the ratio of the world's debt-to-GDP by government soared from 88.3% to over 105.4% between 2019 and 2020. This ratio in emerging markets also increased dramatically from 52.4% to 63.5% over the same period. However, in comparison to the debt ratio of developed countries which rose from 109,7% to 130,4%, the debt ratio in emerging markets is overshadowed. Based on the range of debt ratio in low-income countries of the World Bank and the IMF, the present value of total public debt-to-GDP at 70% is considered the threshold for high debt-carrying capacity. The threshold is categorized as medium or low debt-carrying capacity when this present value is 55% and 35% respectively. In regard to public debt in emerging and developing Asian economies, figure 1 describes the public debt ratio over the period 2002-2017 compared to the whole Asian countries. Generally, the size of public debt in emerging and developing countries of Asia was always lower than Asian countries as a whole. The biggest difference between them (13.09%) was recorded in 2017.

**Figure 1.** The public debt ratio over the period 2002 - 2017 in Asia



Source: Authors' calculation

In particular, the threshold of public debt in emerging and developing countries fluctuated between 40% and 58% of GDP while this threshold of the whole Asian countries was in the range of 43% to 62%. However, both groups tended to follow the same shifting trend. Furthermore, these countries achieved positive results in declining the ratio of public debt during the period 2002-2010 then experienced an increasing tendency to 2017.

Besides the shadow economy, Cooray et al. (2017) revealed that not many studies have been conducted to discover the correlation between institutional quality and government debt. Among these studies, Tarek & Ahmed (2017) employed dimensions of governance to estimate the role of governance quality in government debt expansion in the Middle East and North Africa (MENA) countries. Similarly, Presbitero (2008) confirmed the major role of institutional quality in debt expansion in low and middle-income countries. Woo (2003) and Mishchuk et al. (2020) also proved that fiscal stance has a close link with institutional quality as well as political and social stability.

In the context of the growing shadow economy in Asian countries, particularly in emerging and developing economies, and based on upgraded data on the size of shadow economy from the IMF, the objec-

tive of this research is to examine the correlation between the shadow economy and public debt in 19 emerging and developing Asian economies in the period 2002 – 2017. The empirical model also includes indicators of institutional quality such as control of corruption, political stability and absence of violence, government effectiveness, and rule of law besides other control variables.

Accordingly, this research contributes empirical results to the literature in relation to the shadow economy, institutional quality and public debt in particular emerging and developing Asian economies. The results show that countries with the large size of shadow economy suffer from a reduction in government revenue, a growth in public debt, and a considerable impact on adjusting financial policies in the future. However, the level of public debt in emerging and developing Asian economies can be reduced by improving control of corruption. Hence the results of this research not only indicate the determinants of public debt but also provide evidence confirming that the volume of shadow economy and control of corruption are considered decisive and important factors which affect the public debt of emerging and developing Asian countries.

The research is structured as follows: the next section is the literature reviewing previous research on the relationship between the shadow economy, institutional quality and public debt. The third section presents research methodology for examining the data and research model. Section 4 mentions the estimated results from the research model. The final section is the conclusion and policy suggestions based on the research findings.

## **1. LITERATURE REVIEW**

### **1.1 The Shadow economy and public debt**

In recent decades shadow economy has attracted a lot of interest from researchers. According to Schneider (2005), the relationship between the shadow economy and public debt can be assessed by both public expenditure and public revenue. A larger size of the shadow economy could lead to a lower tax revenue of a country. Considering the downside of shadow economy only - tax evasion, the development of shadow economy will result in a decrease in tax revenue which is the main source of government revenue. Hence the negative impact of the shadow economy on government revenue could be responsible for a reduction in fiscal sponsorship in public expenditure. In addition, this decrease in tax revenue also places the government under pressure on generating revenues. This results in a rise in tax in formal economy in order to compensate for the loss in tax revenue from the shadow economy.

Unfortunately, the implementation of this policy could be ineffective since rising tax can push some businesses to leave the formal economy and join the informal one as proved by Ihrig & Moe (2001), Amara & Quintin (2006). Consequently, the government may not be able to collect its tax and public debt may increase. Further, the large size of shadow economy in some countries could make economic indicators inaccurate when these indicators are used to develop financial policies (Schneider & Enste, 2000), thus leading to an inappropriate spending plan and an increase in public debt (Yereli et al., 2007).

More recently, a large number of studies have been conducted to examine the influence of shadow economy on economic growth as well as the determinants of public debt. A major study by Yereli et al. (2007) used time series regression to assess the association between the shadow economy and public debt in Turkey during the period 1991-2004. This study indicates that the expansion of shadow economy leads to a decrease in tax revenue, an increase in public debt, and a reduction in public debt sustainability. Similarly, González-Fernández et al. (2018) estimate the impact of shadow economy and corruption on public debt in an autonomous community in Spain in the period 2000-2012 and prove that the larger size of shadow economy results in the higher level of public debt.

However, not many studies measure the effect of shadow economy on the size of public debt in different groups of economies, especially those in Asia. As an example of this, Elgin and Uras (2013) explore the effect of shadow economy on public debt, interest rate, financial stability, and bankruptcy statistics in the period 2002-2010 in 152 countries. This research shows that the shadow economy causes a rise in public debt and its interest rate, and instability in financial market.

## 1.2 Institutional quality and public debt

Besides the shadow economy, institutional quality is also considered a decisive factor in the size of public debt. Tarek & Ahmed (2017) prove that political stability reduces the size of public debt in MENA countries in the period 1996 – 2015 while La Porta et al. (1999) and Tkacova et al. (2018) believe that high expenditure on maintaining political stability is responsible for public debt. Similarly, Imaginário & Guedes (2020) confirm the positive relationship of public debt with government effectiveness and rule of law. However, there has not been a general consensus on the relationship between rule of law and public debt. Briceño and Perote (2020) highlight that when the institutional quality is better as a result of good rule of law, financial policies are observed strictly. Consequently, this leads to a reduction in government debt. On the contrary, the expense of compliance challenges this negative relationship with public debt. In many cases, this relationship is positive. As an illustration of this, in a study into 25 low-income economies Imaginário and Guedes (2020) emphasize that there is a positive connection between rule of law and public debt.

Moreover, control of corruption is also a major indicator for measuring the institutional quality. This indicator not only impacts on economic growth (Jiang & Nie, 2014; Huang, 2016) but also causes ineffective government spending and thus leading to an increase in public debt (Briceño & Perote, 2020; Rothstein & Teorell, 2008). In fact, the results of empirical research on the relationship between corruption and public debt are not consistent. On the one hand, Briceño & Perote (2020) prove that ineffective corruption control is believed the major cause of the poor management of government debt, and a rise in government expenditure and public debt. On the other hand, economists following the romantic viewpoint in governance argue that there is a positive relationship between the quality control of corruption and public debt. Their findings found that an increase of 1% in control of corruption leads to a rise of 0.3% in government debt in MENA countries (Tarek & Ahmed, 2013; Tarek & Ahmed, 2017) or 0.2% in the Eurozone (Briceño & Perote, 2020; Navickas et al., 2020).

In one of the earliest studies into the effect of public governance on public debt, Roubini and Sachs (1989) considered the example of France during the beginning of the Fifth Republic period to analyze if political characteristics change the level of public debt. By dividing this into two periods (1946 to 1958 and 1958 to 1959) according to different government status, the researchers postulated that the low level of institutional quality in the first period firmly attached to higher level of government debts. In the second period 1958 -1959, the new president established efficient regulations which reduced the deficit.

These points of views provided initial proofs of the negative relationship between the quality of public governance and public debt which was also found by De Haan and Sturm (1997) and Woo (2003). From this theory foundation, various empirical research supported this conjunction. However, there has not been a consistent conception of institutional quality. In the World Development Report 2002, the World Bank released the level of institutional quality definition considered too broad. This definition includes laws, the mechanism of enforcement, and governmental department. In a narrower conception, governance indicators are considered measuring instrument in executing the power to manage and develop the economy and society of a nation. In this paper, the author used the Worldwide Governance Indicators (WGI) dataset to measure the institutional quality developed by the project of the World Bank and applied in research widely. Based on this source, governance could be defined as the country's traditions and institutions which are exercised by ruling politicians (Kaufmann et al., 2011). The indicators of governance considered in this paper are control of corruption (CC) and rule of law (RL) with scale from 0 to 5 which shows the level of institutional from the lowest to the highest.

Obviously, while a huge number of studies have been conducted to explore the power of governance indicators in expanding public debt level in specific countries and country groups, there is a lack of critical investigation into this correlation in groups of emerging and developing Asian economies which experienced significant changes in institutional environment when they upgraded regime of the state.

## 2. DATA AND METHODOLOGY

### 2.1 Data and Variables

The data applied in the empirical model in this paper were collected from World Development Indicators (WDI) from the World Bank and the International Monetary Fund (IMF) in the period 2002 - 2017. The list of emerging and developing countries in Asia includes Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Kiribati, Lao P.D.R., Malaysia, Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand, and Vietnam.

Public debt (PD) is calculated as the percentage of GDP. The shadow economy (SE) also represents the percentage of GDP and this factor was measured by the project of Medina and Schneider (2019). Regarding governance indicator, this research used four indicators of institutional quality factor which are comprised of control of corruption (CC), political stability and absence of violence (PS), government effectiveness (GE), and rule of law (RL). These indicators were estimated with the range from 0 (weak) to 5 (strong). Besides, control variables such as inflation and tax revenue are also included in the empirical model.

### 2.2 Research Model

This research estimates the nexus of the shadow economy, institutional quality, and public debt of 19 countries in emerging and developing Asian economies. The empirical model in this paper is proposed as follows:

$$PD_{i,t} = \beta_0 + \beta_1 SE_{i,t} + \beta_2 IQ_{i,t} + \beta_3 Z_{i,t} + \epsilon_{i,t} \quad (1)$$

Where,  $i$  and  $t$  represent the country  $i$  at year  $t$ ;  $PD_{i,t}$  is a dependent variable representing public debt; the main explanatory variables  $SE_{i,t}$ ,  $IQ_{i,t}$  indicate the shadow economy, and institutional quality respectively;  $IQ_{i,t}$  comprises control of corruption (CC), political stability and absence of violence (PS), government effectiveness (GE), and rule of law (RL);  $Z_{i,t}$  represents control variables including Inflation (IF) and Tax revenue (TR);  $\epsilon_{i,t}$  is the error term.

$$PD_{i,t} = \beta_0 + PD_{i,t-1} + \beta_1 SE_{i,t} + \beta_2 IQ_{i,t} + \beta_3 Z_{i,t} + \epsilon_{i,t} \quad (2)$$

In which,  $PD_{i,t-1}$  refers to the lagged public debt ( $PD_{i,t}$ )

## 3. RESULTS AND DISCUSSION

### 3.1 Descriptive statistics and correlation

Table 1 shows the descriptive statistics for variables. In the period 2002 - 2007, the average rate of public debt/GDP in emerging and developing Asian economies was 46.52%. This rate is relatively high and the highest rate is almost 184%. However, this can be explained by the fact that most countries in this area are developing ones so the positive feature is that these countries have a great demand for loans in order to invest in development plans. The average size of shadow economy accounts for 30% of GDP, with the range from 11% to 54.1%. Accordingly, policy makers should focus on reducing the size of shadow economy so as to achieve other macroeconomic goals. The institutional quality of emerging and developing Asian economies is represented by control of corruption (CC), political stability and absence of violence (PS), government effectiveness (GE), and rule of law (RL). These indicators have an average level from around 1.91 to 2.25 which indicates that the quality of public governance in emerging and developing Asian economies is at average level. Additionally, tax revenue and inflation in these countries have an average rate of about 12.7% and 5.6% of GDP respectively.

**Table 1.** Data summary description

<i>Variable</i>	<i>Measure</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Public Debt	%GDP	302	46.521	24.017	7.426	183.940
Shadow Economy	%GDP	304	30.308	10.740	11.00	54.10
Control of Corruption		304	1.987	0.557	0.837	4.068
Political Stability & Absence of Violence	ranges from 0 (weak) to 5 (strong)	304	1.913	0.871	0.021	3.783
Government Effectiveness		304	2.257	0.574	0.585	3.767
Rule of Law		304	2.096	0.520	0.747	3.128
Tax Revenue	%GDP	283	12.656	4.583	2.001	28.710
Inflation	%GDP	289	5.622	6.101	-18.108	57.075

Source: Own calculation based on own research.

Table 2 shows the preliminary correlation among variables in which the value of correlation coefficient of shadow economy (SE), institutional quality (CC, PS, GE, RL) and inflation indicator has a positive relationship with public debt (PD), while tax revenue (TR) has an adverse effect on public debt (PD).

**Table 2.** Correlation matrix

	<i>PD</i>	<i>SE</i>	<i>CC</i>	<i>PS</i>	<i>GE</i>	<i>RL</i>	<i>TR</i>	<i>IF</i>
PD	1							
SE	0.065	1						
CC	0.197	-0.192	1					
PS	0.060	-0.449	0.489	1				
GE	0.017	-0.164	0.811	0.418	1			
RL	0.149	-0.181	0.871	0.439	0.8811	1		
TR	-0.239	-0.311	0.156	0.421	0.181	0.217	1	
IF	0.426	0.126	-0.190	-0.183	-0.276	-0.254	-0.201	1

Source: Own calculation based on own research.

### 3.2 Empirical results

In this study, Pooled-OLS, fixed effects (FEM) and GMM methods are applied to estimate the empirical model and the results are shown in the table 3. Generally, the results are different according to the methods employed to assess the empirical model.

First of all, the results from Pooled - OLS regression in column 1 show that while the indicators of institutional quality have a statistically significant relationship with public debt, there is no statistically significant correlation between the size of shadow economy (SE) and public debt (PD). However, the OLS regression has some problems such as unobservable factors and heterogeneity across countries and thus leading to bias results. Therefore, fixed effects estimation is employed and Hausman test has confirmed the appropriate model at P-value <0.001.

In column 2, fixed effects (FEM) regression provides opposite results to OLS regression. The shadow economy (SE) has a positive and statistically significant correlation with public debt while there is no relationship between most indicators of institutional quality and public debt (PD). Only control of corruption (CC) indicator shows an adverse and statistically significant nexus. Accordingly, fixed effects (FEM) estimation provides evidence for a positive and statistically significant nexus of shadow economy and public debt. Indeed, the results show that countries with larger size of the shadow economy are likely to have higher level of public debt. Hence the shadow economy is responsible for the level of public debt. Additionally, control of corruption (CC) indicator has an adverse direct nexus with the volume of public debt of emerging and developing Asian economies. In this regard, in order to decrease public debt, besides reducing the size of shadow economy, the results propose that improving control of corruption could reduce the size of public debt. This supports the evidence in prior studies (Egger & Winner, 2005; Depken & Lafountain, 2006) and disagrees with the outcome of Briceño & Perote (2020).

**Table 3.** Multivariate analysis of market participation

	<i>Dependent variable: Public Debt</i>		
	Pooled-OLS (1)	Fix effects (2)	GMM (3)
<b>PD<sub>t-1</sub></b>			0.244*** (0.109)
SE	0.147 (0.125)	0.749*** (0.301)	0.321*** (0.421)
CC	-0.099** (0.047)	-0.174*** (0.066)	-0.113* (0.063)
PS	0.031* (0.018)	-0.026 (0.027)	0.028 (0.035)
GE	-0.184*** (0.049)	0.101 (0.065)	-0.029 (0.063)
RL	0.204*** (0.074)	0.034 (0.072)	0.090** (0.079)
IF	0.015*** (0.004)	0.006*** (0.001)	0.005*** (0.001)
TR	0.387*** (0.322)	-0.294*** (0.337)	-0.633* (0.621)
Number of observations	283	283	248
<b>R<sup>2</sup></b>	0.315	0.304	
Hausman test		0.001	
Arellano–Bond Test for 2nd order (P-value)			0.635
Sargan Test excluding group (P-value)			0.936
Difference test of exogenous			0.882

Note: \*, \*\* and \*\*\* denote 10%, 5% and 1% levels of significance, respectively. Standard errors are presented in the parentheses. *Source: Authors' estimation.*

Furthermore, GMM method applied panel data proposed by Arellano & Bond (1991) in order to control the endogenous problem and avoid biased coefficients of the estimation results. The results in column 3 once again prove that there is a positive relationship between the shadow economy and public debt. The coefficient of the shadow economy (SE) is 0.321 at significant p-value 0.01, which indicates that an increase of 1% in the size of shadow economy will result in an increase of 3.21% in public debt. In fact, an increase in the size of the shadow economy will first lead to a significant reduction in tax revenue, then a decrease in government income, and finally an increase in public debt. In the long run, public debt could impact and constrain the growth of economy. The limited source of government income can put pressure on the government to take out a loan so as to meet the demand for spending and investment. This could lead to an introduction and implementation of a policy on increasing tax to insure its loan repayment. However, according to Barro (1979), increasing tax is not an optimal policy, so that a large proportion of businesses in the formal economy may leave this section and join the shadow economy, thus increasing the size of this informal economy. This could be considered an inescapable circle which eventually causes a rise in public debt. The positive relationship between the shadow economy and public debt Asian countries is also confirmed by Yereli et al. (2007), González-Fernández et al. (2018), and Elgin et al. (2013).

Regarding institutional quality, column 3 also reports that control of corruption (CC) has a negative nexus with public debt. This result proposes that improving the level of control of corruption could reduce the volume of public debt in emerging and developing economies. The adverse impact of control of corruption on public debt was also found in the research by Briceño & Perote (2020) which explored the decisive factors in public debt in the Eurozone.

Besides control of corruption, rule of law (RL) also has a positive and statistically significant relationship with public debt and the coefficient is 0.09 at significant at p-value 0.05. Thus the results of this study support the view of Weingast (2009) that emerging and developing economies in Asia have been spending a lot of budget on building institutional quality systems, especially laws, to improve the governance. In this view, it is claimed that improving the quality of law leads to an increase in public debt. This

result supported and provided similar evidence to that from the research in 164 countries in the period 2002 – 2015 by Imaginário and Guedes (2020).

Interestingly, when GMM regression was employed, the results show that there is a statistically significant relationship between control of corruption as well as rule of law and public debt, whereas political stability and government effectiveness are not found to have an association with public debt.

Additionally, the Sargan test was done to determine the appropriateness of the instrumental variable in the GMM model and the Arellano - Bond AR test (2) on the difference series of errors was also used to detect the auto correlation of the error at order 1. The results are 0.936 and 0.635 respectively, confirming that the instrumental variable is exogenous. This result is suitable for applying the model and rejecting the hypothesis that the model has auto correlation.

Hence GMM method has overcome the limitations of the research model. The results indicate the impact of the shadow economy and institutional quality on the size of public debt in Asian countries. Specifically, increasing the size of the shadow economy can extend the size of public debt. The results are in line with economic theories and the results of previous research.

Regarding macro scale, the results provide policy makers with many practical implications by emphasizing that inflation and tax revenue have an impact on public debt. Particularly, the results prove that high inflation contributes to a rise in public debt while increasing tax revenue will reduce public debt. Accordingly, controlling inflation and increasing tax revenue leads to a decrease in public debt. Therefore, besides building a stable tax revenue and a reliable institutional quality, controlling inflation and reducing the size of the shadow economy will result in a decrease in public debt.

## CONCLUSION

This paper investigates the effect of the shadow economy and institutional quality on public debt in emerging and developing Asian economies in the period 2002 – 2017. Since these countries belong to the group of emerging and developing economies, their institutional quality has been in the period of construction and need to be enhanced considerably. As a result, the existence of the large size of both shadow economy and public debt is an inevitable consequence. The research used upgraded data from the World bank and the IMF and employed panel data regression methods including pooled OLS regression, fixed effects model (FEM), and GMM model.

The research has proved the impact of shadow economy on public debt. Specifically, an increase in the size of shadow economy leads to a rise in the level of public debt. In addition, improving rule of law is considered the cause of increasing public debt due to a growth in government expenditure on governance. Moreover, the results of this study also confirm the role of control of corruption (CC) and tax revenue (TR) in public debt. Particularly, improving control of corruption and tax revenue is a solution for decreasing the size of public debt of emerging and developing economies in Asia. These findings are consistent with those of previous research and have major policy implications. Indeed, emerging and developing Asian countries may prevent an increase in public debt by slowing the development of the shadow economy and enhancing the quality of public governance.

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