

Chapter 8

Shadow Economy and Corruption in the ASEAN: Complement or Substitute?

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Abstract Very few empirical studies have been attempted to investigate the possible link between shadow economy and corruption for developing and transition economies, in particular, for the Association of Southeast Asian Nations (ASEAN). The lack of the studies can be explained by the fact that both “shadow economy” and “corruption” are ultimately unobservable. Using the MIMIC approach, this empirical study fills the gap. Data from the ASEAN (excluding the two high-income countries – Singapore and Brunei) for the period from 1995 to 2014 are utilised in this study. The findings from this study indicate that (i) there is a positive causal relationship between shadow economy and corruption in the ASEAN and that (ii) the effect from corruption on shadow economy is more profound than the effect from shadow economy on corruption. Shadow economy and corruption are complement, not substitute, for the ASEAN. The implication for macroeconomic policies in these countries is that controlling corruption is a good starting policy to minimise the growth of the shadow economy.

8.1 Introduction

Shadow economy and corruption are generally known as unobservable factors. Nonetheless, there exists evidence of a relationship between these two factors reported by the World Bank and few empirical studies. A very few empirical studies have been attempted to examine a possible link between shadow economy and corruption for a group of countries. Some empirical studies concluded that shadow economy and corruption are complement. This means that an increase of shadow economy will result in an increase of corruption and vice versa. Other

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empirical studies provided the opposite findings in which shadow economy and corruption are negatively correlated.

In their study, Johnson et al. (1997) argued that the existence of a shadow economy will result in a reduction of an official economy. As such, businesses and individuals have motivations to work in the shadow economy, and they are prepared to pay for corruption to avoid getting caught by the government. As a result, shadow economy and corruption are complement. In other studies, Hindriks et al. (1997) and Hibbs and Piculescu (2005) provided the same conclusions on the link between shadow economy and corruption. In contrast, Choi and Thum (2005) and Dreher et al. (2009) argued that as long as businesses and individuals are joining in the shadow economy, there are no more opportunities for corrupt government officials to exploit. As a result, it is expected that an existence of a shadow economy will reduce a level of corruption in the official economy.

This study is conducted in response to a lack of empirical evidence designed for the ASEAN in particular. Following this Introduction, Sect. 8.2 provides brief definitions of shadow economy and corruption and the possible links between them. In applying the MIMIC approach, both cause variables and indicator (consequence) variables for both shadow economy and corruption are identified. These variables are presented in Sects. 8.3 and 8.4 of the paper. Section 8.5 provides a brief framework of the MIMIC approach together with the data used in this study. Research findings are presented in Sect. 8.6, followed by concluding remarks and policy implications in Sect. 8.7.

8.2 Shadow Economy and Corruption

8.2.1 *Shadow Economy*

Shadow economy is defined in theoretical and empirical studies to include economic activities which are measured but not reported into the gross national products (GNP) of a particular nation (Feige 1986, 1989). Smith (1994) defined shadow economy to include all economic activities taking place in the markets for goods and services which may be legal or illegal and are not officially measured and included in the national gross domestic products (GDP). In plain language, shadow economy includes all economic activities and incomes which avoid the interference of the government through the tax system (Feige (1989), Dell' Anno and Schneider (2004, 2006)). There is also an alternative view on a shadow economy which is developed through time and arguably followed the *water flow principle*: shadow economy adjusts automatically to be suitable with the tax system, the mechanism of punishment of the taxation office and the altitude of the society to activities taking place in the shadow sector (Mogensen et al. 1995). Table 8.1 classifies activities in the shadow economy.

Table 8.1 A classification of activities in the shadow economy

Illegal activities	Monetary transactions		Nonmonetary transactions	
	Trade in stolen goods, drug dealing and manufacturing, prostitution, gambling, smuggling, fraud		Barter of drugs, stolen, or smuggled goods	
			Producing or growing drugs for own use. Theft for own use	
Legal activities	Tax evasion	Tax avoidance	Tax evasion	Tax evasion
	Unreported income from self-employment	Employee discounts, fringe benefits	Barter of legal services and goods	All do-it-yourself
	Wages, salaries and assets from unreported work related to legal services and goods			Work and neighbour help

Source: Rolf Mirus and Roger S. Smith (1997, p. 5)

8.2.2 Corruption

A very typical definition of corruption is that corruption represents the abuse of public power for private benefits (Tanzi 1998, p. 8). In this definition, the abuse of public power in a private sector is not considered. Corruption can also be defined as an intentional ignorance of regulations for the use of relationship for private benefits. Corruption has caused significant losses to the society. *First*, corruption is a barrier to a democracy in which public power cannot be used for private benefits. *Second*, corrupt government officials have delivered lower-than-expected quality of public infrastructure such as hospitals and schools which is not in accordance with the costs involved. *Third*, corruption contributes to a distortion of equality in the economy and a reduction of competition in goods production and services provision. Fourth, corruption damages trust from the public to the government and its political regime (Transparency International 2009).

8.2.3 A Relationship Between Shadow Economy and Corruption

Evidence from studies on a relationship between shadow economy and corruption provides mixed findings. Conclusions from some studies indicated that shadow economy and corruption are complement. This means that an increase in corruption will be associated with an increase in shadow economy (Johnson et al. 1998a, b; Friedman et al. 1999). In contrast, some argued that it is not feasible for businesses and individuals to give bribes to corrupt government officials when their activities in the shadow economy are noticed. As such, it is argued that the presence of

corruption is independent with shadow economy. However, Choi and Thum (2005) and Dreher et al. (2007) provided evidence to argue that the presence of shadow economy can reduce a distortion of resources allocation because corrupt government's officials have no chance to corrupt. As a result, they argued that corruption and shadow economy are substitute.

For low-income nations, businesses starting their business provide bribes to corrupt government officials with an expectation that their economic activities in the shadow sector will not get caught by the government (Hindriks et al. 1999). Corrupt government officials receiving bribes will allow businesses to maximise their profits in the shadow sector (Hibbs and Piculescu 2005). As a result, corruption and shadow economy are positively correlated. In conclusion, a relationship between corruption and shadow economy appears to rely on the national income level and the effectiveness of the legal system. Johnson et al. (1997) concluded that corruption and shadow economy are complement. Using a full employment model, workers can choose to work in either the shadow economy or an official economy. It is argued that an increase in the shadow economy will result in the reduction of an official economy. In addition, corruption will provide an incentive for businesses and individuals to join a shadow economy. As a result, an increase in corruption will lead to an increase in shadow economy.

In relation to the effect of shadow economy to corruption, Dreher et al. (2008) concluded corruption leads to a reduction of a shadow economy. Shadow economy and corruption are substitute. The presence of economic activities in the shadow sector will reduce the official economy. Payments will take place in a hidden environment. Corrupt government officials are not provided any chance to be corrupt because all transactions are now hidden. As a result, they argued that shadow economy is negatively related to corruption.

It is noted that empirical studies on corruption have utilised a perception index of corruption representing for a level of corruption in the economy. However, it is argued that the perception-based indices reflect the quality of a country's institutions rather than its actual degree of corruption. Mocan (2004) argued that a perception of corruption is not related to the actual level of corruption in the economy because perception of corruption from businesses and individuals is distorted. Weber Abramo (2005) provided a similar conclusion that perceived corruption is not related to bribery.¹

In response to this criticism of a perception-based index, this study utilises the MIMIC approach to estimate corruption (a latent variable) based on a set of cause variables and a set of indicator variables. This approach is similar to the approach adopted to estimate the shadow economy. In conclusion, both corruption and shadow economy are estimated using the MIMIC approach in this study. The MIMIC approach requires a set of cause variables and a set of indicator variables for any latent (unobservable) variable to be estimated. As a result, it is fundamental

¹ See Bjorvatn and Soreide (2005) for a detailed criticism of a perception index.

for the study to determine the sets of cause and consequence variables for each latent variable, being the shadow economy and corruption.

8.3 Causes and Consequences of the Shadow Economy

8.3.1 Causes Affecting the Shadow Economy

Literature presents the following causes which affect significantly the size of the shadow economy.

8.3.1.1 Tax and Social Security Contribution Burdens

In previous empirical studies, one of the most important and significant causes for an existence and growth of a shadow economy is an increase in tax and social security contribution burdens (Tanzi 1999; Schneider and Enste 2000). The higher the tax rate, the lower the *morality of taxation*, encouraging people working in a shadow economy to evade taxes (Torgler and Schneider 2009; Alm and Torgler 2006; Alm et al. 2006). Various studies concluded that the higher the net income in the (official) economy, the lower the level of labour joining a shadow economy. In addition, a gap between gross income and net income increases; more and more people will join to work in a shadow economy. As such, it is argued that a difference between gross income and net income depending heavily on tax and social security contribution burdens. In this study, a tax burden and a social security contribution burden are used as proxies for causes of a shadow economy for the ASEAN:

- *A tax rate*: a tax rate is used to determine a tax liability to be paid to the government.
- *A fiscal freedom index*: this index measures directly an extent to which regulations from the government affect individuals and businesses in the economy. This index is one of many indices calculated and made available to the public by the Heritage Foundation. The index varies within the range of 0 and 100 in which 0 represents the lowest level of a fiscal freedom and 100 represents the highest level of the freedom (Heritage Foundation 2014).

8.3.1.2 Intensity of Regulation

Schneider and Enste (2000) argued that an increase in intensity of regulation will reduce choices for individuals in the official economy (Note 1). An intensity of regulations generally measures a number of regulations and required certificates to work or operate regulations for a labour market. In Germany, the Deregulation Commission (1991) and Monopol-kommission (1998) concluded that various

regulations from the government contribute to the cost for labour in the official economy. In response to these increases in labour costs, businesses will reduce a number of jobs required for their businesses. As a result, workers join a shadow economy where these costs can be avoided. A model developed by Johnson et al. (1997) predicts that, inter alia, countries with more general regulation applied to economic activities in their economies tend to have a higher share of the unofficial economy in the total GDP. A study by Friedman et al. (1999) provides the same conclusion. On the ground of previous studies, two variables representing as causes of a shadow economy are adopted in this study to represent an intensity of regulations across countries in the ASEAN:

- *A business freedom index*: this index measures an extent to which individuals can establish and run a business without being heavily reported to the government. Unnecessary and unreasonable regulations will no doubt increase costs for businesses. These regulations will play as a barrier for business activities to enter into the official economy. These regulations will increase costs, and as a result, products and services provided by businesses in the official economy become less competitive in the marketplace. This index also varies within the range of 0, being the lowest level, and 100, being the highest level of a freedom (Heritage Foundation 2014).
- *A labour freedom*: this index measures an extent to which individuals can work anywhere without any regulations from the government. This index is considered one of the most important indices developed by the Heritage Foundation. It is argued that when a labour freedom increases, businesses will have more capacity to offer jobs to workers. As a result, an unemployment rate is expected to be lower. This is an important mechanism to improve productivity and to ensure economic growth for a nation because labour market is as important as a good and service market (Heritage Foundation 2014).

8.3.1.3 Public Sector Services

A study by Johnson et al. (1998) indicates that an increase in the size of a shadow economy will be associated with a loss of government revenue. In return, quantity and quality of public goods and services provided are lower. To ensure quality and quantity of public goods and services being provided to the economy, an increase in tax on the official sector is expected. This increase in tax burdens will result in an increase of economic activities taking place in the shadow economy, and individuals and businesses have now more incentive to join the unofficial economy. This study also presents evidence to support the view that a smaller size of the shadow economy is in relation with a country with a large revenue collection, lower intensity of regulations and lower level of bribe and corruption.

As such, on a ground of this study, *government spending* is used as an indicator to represent a capacity of a government in providing public goods and services. *Government spending* measures a total spending of a government in comparison

with total expenditure of the national economy which generally includes public and private spending. Government spending can be classified into different categories: government investment (infrastructure, research funds or human capital investment) and provision of public goods and services. The Heritage Foundation also produces the index representing a level of government spending across nations. As usual, this index varies within the range of 0 and 100 (Heritage Foundation 2014).

8.3.1.4 The Official Economy

It is argued that a prevailing condition of the official economy will determine the choice of individuals and businesses to join a shadow economy or an official economy (Bajada and Schneider 2005; Feld and Schneider 2010). In an economic expansion period where individuals can find jobs easily within the official economy, they have no incentive to join a shadow economy. However, this choice may not be available when the economy faces its downturn. Individuals may decide to join a shadow economy to find work. On the ground of this consideration, *an unemployment rate* will be used in this study.

8.3.2 Consequences of the Shadow Economy

A size of a shadow economy cannot be directly measured. As such, the approach adopted in this study is to link some observable variables with the size of a shadow economy. Based on previous empirical studies, some indicators below are used in this study.

8.3.2.1 Money Market

A money market is considered through some indicators such as total money supply into the economy. A money supply M_0 represents a level of the monetary base (cash which can be spent instantly) and M_1 represents a total of a money supply M_0 and deposits. Individuals and businesses joining a shadow economy generally avoid using transactions through banks because their activities may be noticed by the government. As a result, cash is the preferred means of settlement for transactions in the shadow economy.

8.3.2.2 Labour Market

A labour market index is used to measure a ratio of people joining a labour force. This is an index to represent a proportion of total population joining in economic

activities to produce and provide goods and services in a specified period of time (World Bank 2014).

8.3.2.3 Tax Revenue

A tax revenue for any government is a total of compulsory collections from individuals and businesses in the form of tax. For any government, tax revenue is one of the most important factors for the government to determine the level of goods and services provided to the economy. Empirical studies indicate that a presence of a shadow economy will negatively affect tax collection for the government. As such, tax revenue is used as a proxy for a consequence of a shadow economy in this study.

8.3.2.4 An Increase of GDP Per Capita

It is argued that economic activities taking in a shadow economy will contribute to the official economy. Money earned from activities taking place in a shadow sector is argued to be spent in the official sector. As such, an increase of GDP per capita will be used as an index to measure an effect from the shadow economy to the official economy.

8.4 Causes and Consequences of Corruption

8.4.1 Causes

8.4.1.1 Political Regime and Judicial System

A political regime and a judicial system are factors to indicate the level of a country's democratic and institutional quality. Shleifer and Vishny (1993) were of the view that corruption is associated with weaknesses of political system, corporate governance and regulations in place to prevent corruption. In addition, they argued that an improvement in a political environment and transparency will also lead to a reduction of corruption in the economy. Other characteristics of a country's political system such as electoral rules and the degree of decentralisation also affect corruption.

All these political and judicial factors are very typical in research on the importance of the government to economic growth and development. In particular, North (1990) and Easterly and Levine (1997) argued that an effectively and enforced fully legal system will provide a strong framework for economic activities and for a protection of asset ownership of businesses and individuals. They also argued that a weak legal system will lead to economic transactions taking place in

the shadow sector, reducing incentive for businesses and individuals in production and encouraging them to join the shadow economy. Based on the findings of previous empirical studies, three proxies used as *causes* representing a *political regime and a judicial system* are as follows:

- *Bureaucracy cost*: this cost measures an effectiveness of standards adopted in relation to goods production and services provision and other legal requirements in the nation (World Bank 2014).
- *Government's effectiveness*: this efficiency level measures the independence of publicly provided services, the quality of public institutions and the reliability on agencies which carry on the tasks of implementing legal requirements stipulated and adopted by the government such as the police (World Bank 2014).
- *Rule of law*: the rule of law measures the reliability and the quality of contract enforcement enforced by decisions from the court and implemented by the police towards businesses and individuals (World Bank 2014).

8.4.1.2 Fiscal Freedom

The government can interfere with economic activities in the economy through the use of regulations, policy and financial burden such as taxation and social security contribution to the private sector. Such an interference will contribute to a reduction of economic freedom. It is argued that an increase in economic freedom will be associated with a reduction of corruption because businesses and individuals have now more choices in relation to the industry they wish to join for goods production and services provision. Economic freedom also requires for a reduction of regulations stipulated and adopted which is associated with a reduction of bureaucracy of the government's official. A heavy interference from the government into the economy will create an environment in which givers and receivers of corruption will increase to avoid regulations. An increase in corruption will lessen the impact of policies and regulations on economic activities (Schneider 2012).

Tanzi (1998) and Dreher et al. (2007) emphasised that with a larger size of the public sector, government officials are assigned greater responsibility in terms of goods production and services provision. As a result, the extent of corruption may also be greater. Van Rijckeghem and Weder (2001) concluded that the above relationship between the size of a public sector and the shadow economy is more profound if government officials are paid low salaries to carry out their duties. Based on the considerations of the previous empirical studies, a variable representing for *fiscal freedom* is included in the model to compare the extent of this freedom across countries in the sample:

- *Fiscal freedom*: this index measures a freedom of individuals and businesses to manage their assets. These assets are used for the benefits of businesses and individuals (Heritage 2014).

8.4.2 Consequences

In order to identify and measure corruption, many studies have considered factors that can be used to measure a level of corruption in the economy. By the natural choice, these studies adopted an index representing a corruption in the society. This index was measured using the responses to the question: “In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes?” (Gwartney et al. 2008, p. 194). As a result, this study utilises the *bribe payers index* as an index representing the *consequences* of corruption in the model:

- *Bribe payers index*: this index is developed based on perception of individuals to the extent in which bribes and corrupt activities are conducted without reporting and recording (World Bank 2014).

Buehn and Schneider (2009, 2012) and Schneider (2006) considered that, together with a bribe payers index, a variable representing a judicial independence is also required because this index indicates a level of equality of a judicial system in the influence of government officials, lobbyists and special interest groups, as well as private citizens and/or businesses. As such, this study utilises an index measuring *an independence of a judicial system* as an indicator representing *consequences* of corruption in the research model:

- *Judicial independence*: this index measures judicial independence of the judiciary in a country which is independent from political influences of members of the government, citizen and firms (World Bank 2014).

An extensive literature review also indicates that the *GDP per capita* is also widely used in empirical studies on corruption. As a result, this study uses *GDP per capita* as a variable representing *consequence* of corruption in the model.

8.5 Data and Research Method

8.5.1 A MIMIC Approach

Among various approaches which can be used to estimate the size of the shadow economy, a MIMIC approach is classified as a model approach which can be used to estimate the size and the trend of the shadow economy. While some methods such as a *monetary demand approach* or an *electricity consumption approach* only focus on one indicator to estimate the size of the shadow economy, an extensive economic literature review indicates that the shadow economy is influenced by various factors such as production, labour and monetary market. This approach focuses on causes and consequences of the shadow economy simultaneously. This approach is based on the DYMIMIC (dynamic multiple-indicators multiple causes) model which includes two different models: (i) a *measurement model* which is used to

link observable indicators to the size of the shadow economy and (ii) a *structural equation model* which is used to present the link between causes and consequences among various indicators. This model approach is argued to be a more comprehensive approach than other previous models. However, a limitation of this approach is that it requires a large amount of data which may not be available in the developing countries.

In this study, a MIMIC model is adopted – a type of the structural equation model (SEM) to estimate the size of the shadow economy for ASEAN nations, including Vietnam. A key contribution of the SEM is to link and investigate the relationship between latent variables and observable variables by using the covariance matrix. In the MIMIC model, a shadow economy is an unobservable variable which can be analysed based on observable variables. For this purpose, first of all, a variable representing a shadow economy is linked to observable variables in the factor analytical model or to be named a *measurement model*. After that, a relationship between a variable proxied for a shadow economy and explanatory variables is determined using *the structural equation model*. As such, a MIMIC model is to use both models including factor model and a structural equation model.

A structural equation model can be expressed as below:

$$\eta = \gamma'X + \zeta \quad (8.1)$$

where $X = (x_1, x_2, \dots, x_q)$ is a $(q * 1)$ vector and each $x_i, i = 1, \dots, q$ is a potential cause of the latent variable η and $\gamma' = (\gamma_1, \gamma_2, \dots, \gamma_q)$ is a $(1 * q)$ vector of coefficients describing the relationships between the latent variable and its causes. As such, the latent variable η is determined by a set of exogenous causes.

A measurement model can be expressed as below:

$$y = \lambda\eta + \varepsilon \quad (8.2)$$

where $y = (y_1, y_2, \dots, y_p)$ is a $(p * 1)$ vector of several indicator variables. λ is the vector of regression coefficients, and ε' is a $(p * 1)$ vector of white noise disturbances.

When equations (8.2) and (8.3) are combined, a multivariate regression model is formed in which endogenous variables $y_j, j = 1, \dots, p$ are *indicator variables* of a shadow economy variable η and exogenous variables $x_i, i = 1, \dots, q$ are *cause variables* of a shadow economy variable η . A general equation can be expressed as below:

From (8.3), $\Leftrightarrow \eta = \lambda^{-1}(y - \varepsilon)$.

From (8.2) and (8.3):

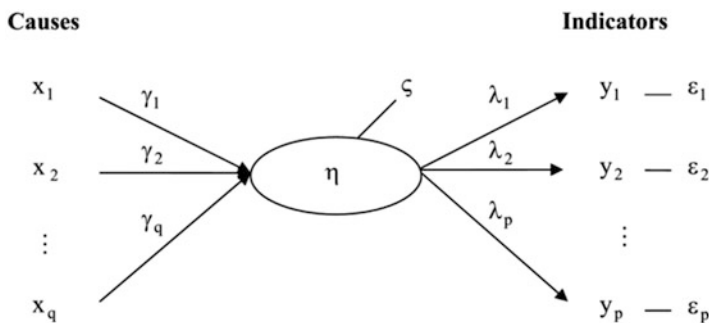


Fig. 8.1 General structure of a MIMIC model

$$\begin{aligned}
 \gamma'X + \zeta &= \lambda^{-1}(y - \epsilon) \\
 \Leftrightarrow y &= \lambda\gamma'X + \lambda\zeta + \epsilon \\
 \Leftrightarrow y &= \Pi X + z
 \end{aligned}
 \tag{8.3}$$

For simplicity, Fig. 8.1 presents a general structure of the MIMIC model.

In summary, a MIMIC approach to estimating the shadow economy is to determine a hypothesis on a relationship between shadow economy (latent variable) and observable variables including causes and indicators. However, this approach is only to produce a *relative estimate* of the size of the shadow economy in comparison with a shadow economy at base value in a particular *base year*.

This study uses data for countries with low and average GDP per capita in the ASEAN nations including Vietnam, Laos, Cambodia, Indonesia, Malaysia, Thailand, Myanmar and the Philippines for the period from 1995 to 2014. Singapore and Brunei are not included in the sample because these two countries are at a high income level. East Timor is not included in the sample because of missing data for the research period. A MIMIC model is adopted in this study which can be illustrated as in Fig. 8.2.

Table 8.2 and Table 8.3 present descriptive statistics of cause and indicator variables for both shadow economy and corruption.

8.6 Findings

The MIMIC approach is adopted to identify and quantify the relationship between shadow economy and corruption for the ASEAN for the period from 1975 to 2014. The estimated coefficients for cause variables and indicator variables are presented in Table 8.4.

The chi-square value indicates the level of suitability of the research model to the data, and its p-value measures the probability of achieving this chi-square value. The results from the research model indicate that the reliability of the model is approximately at 90 %. In addition, the chi-square/Df which is smaller than

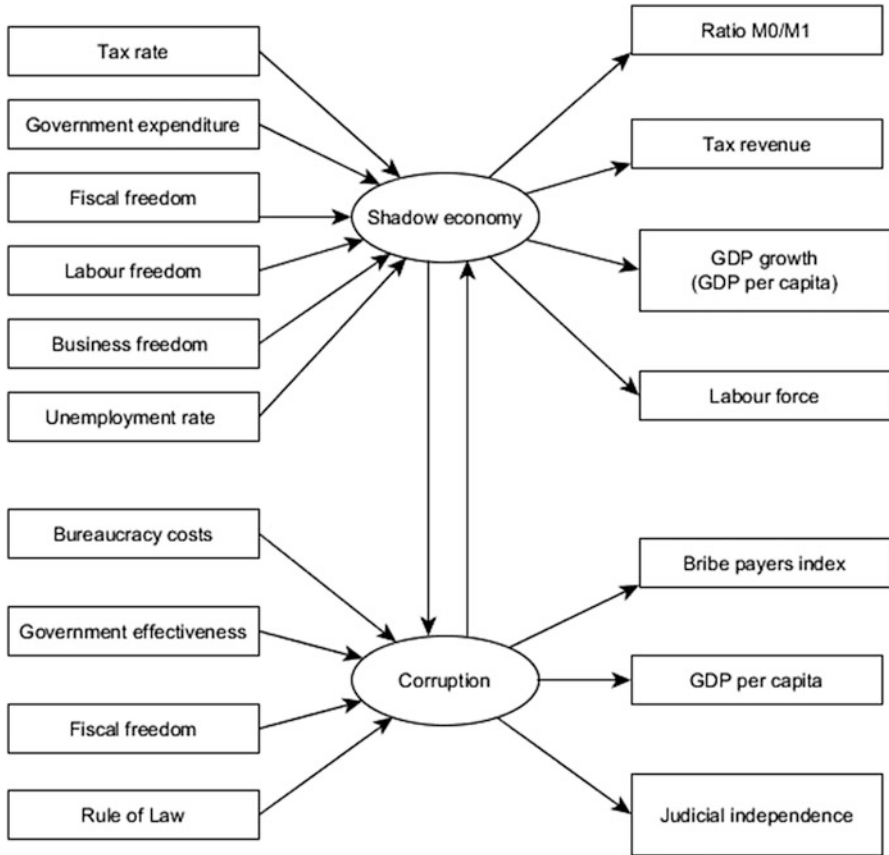


Fig. 8.2 A link between a shadow economy and a corruption: a MIMIC approach

2 indicates that the estimates are appropriate and reliable in consistency with the conclusions from Carmines and Mciver (1981). Browne and Cudeck (1993) concluded that the value of RMSEA of smaller than 0.05 indicates that the model is correctly specified, and as such, estimates are reliable and valid.

An important conclusion from the research findings is that there is a causal positive relationship between the shadow economy and corruption. This finding is consistent with the findings from other studies which concluded that the shadow economy and corruption are complements in developed countries. The findings from this study indicate that the effect from corruption on the shadow economy is greater than the effect of shadow economy on corruption.

Table 8.2 Descriptive statistics of *cause variables and indicator variables for shadow economy*

	Mean	Median	Max	Min	Std. dev.	Skewness	Kurtosis	Jarque-Bera	Obs.
<i>Tax rate (% profits)</i>	37.59	37.5	52.7	21.4	8.79	-0.09	2.68	0.94	160
<i>Government expenditure</i>	87.65	89.3	98.7	66.5	6.35	-0.77	3.379	17.04	160
<i>Fiscal freedom</i>	76.64	77.65	91.7	32.2	11.81	-2.02	8.21	290.69	160
<i>Labour freedom</i>	55.3	53.8	79.3	20	16.88	-0.72	2.87	14.15	160
<i>Business freedom</i>	54.14	55	85.6	20	15.07	-0.12	2.77	0.73	160
<i>Unemployment rate (% population)</i>	4.28	3.84	11.82	0.1	2.85	0.84	3.01	18.97	160
<i>Ratio M_0/M_1 (%)</i>	12.24	0.544	96.96	0.19	31.12	2.27	6.15	204	160
<i>Tax revenue (%GDP)</i>	10.21	11.77	19.75	0	5.64	-0.59	2.15	14.16	160
<i>GDP growth (%)</i>	8.27	9.36	45.18	-56.4	12.67	-1.23	8.27	226.17	160
<i>Labour force (% population)</i>	73.67	76.2	85.8	59.1	7.88	-0.22	1.76	11.53	160

Source: Authors' calculations

Note: *Business freedom, fiscal freedom, government expenditure and labour freedom* vary within the range of 0–100

Table 8.3 Descriptive statistics of *cause* variables and *indicator* variables for *corruption*

	Mean	Median	Max	Min	Std. dev.	Skewness	Kurtosis	Jarque-Bera	Obs.
<i>Bureaucracy costs</i>	4.58	4.15	8.4	1.5	1.28	0.99	3.69	29.74	160
<i>Government effectiveness</i>	-0.33	-0.31	1.25	-1.65	0.72	0.34	2.53	4.58	160
<i>Fiscal freedom</i>	76.64	77.65	91.7	32.2	11.8	-2.02	8.21	290.69	160
<i>Rule of law</i>	-0.55	-0.57	0.61	-1.68	0.62	0.33	2.19	7.2	160
<i>Bribe payers index</i>	4.13	3.8	7.4	2.3	1.05	1.34	3.96	54.28	160
<i>GDP per capita (USD)</i>	1971.66	1126	10422	125	2236.98	1.99	6.91	207.18	160
<i>Judicial independence</i>	4.32	4.3	7.3	2.3	1.02	0.71	3.07	13.48	160

Source: Authors' calculations

Note: *Rule of law* and *fiscal freedom* vary within the range of 0–100. *Bureaucracy costs*, *judicial independence* and *bribe payers index* vary within the range of 1–10. *Government effectiveness* varies within the range of -2.5 and 2.5

Table 8.4 Regression results

	Shadow economy	Corruption
Cause variables		
<i>Tax rate</i> ^a	1	
<i>Fiscal freedom</i>	1.952 (6.205)***	
<i>Government expenditure</i>	-0.167 (3.001)***	
<i>Labour freedom</i>	0.259 (10.916)***	
<i>Business freedom</i>	0.15 (6.177)***	
<i>Unemployment rate</i>	-0.316 (2.561)***	
<i>Bureaucracy costs</i>		-0.006
<i>Government effectiveness</i>		0.039 (4.213)***
<i>Fiscal freedom</i>		-0.033 (6.271)***
<i>Rule of law</i>		-0.03 (3.002)***
Indicator variables		
<i>Ratio M_0/M_1</i> ^b	1	
<i>Tax revenue</i>	-0.032 (2.235)***	
<i>GDP growth</i>	0.045	
<i>Labour force</i>	0.117 (6.285)***	
<i>Bribe payers index</i>		-0.972 (6.879)***
<i>Judicial independence</i> ^c		-1
<i>GDP per capita</i>		-2.278
A relationship between shadow economy and corruption		
Shadow economy → corruption		0.021 (9.225)***
Corruption → shadow economy		62.942 (9.495)***
Goodness-of-fit statistics		
RMSEA ^d	0.037	
Chi-square (p-value)	25.665 (0.08)	
Observations	160	
Df	87	

Source: Author calculations

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

^aPrevious studies assume that *tax rate* is positively correlated with shadow economy. As such, its estimated coefficient is fixed

^bThe MIMIC approach requires that the estimated coefficient of one of the indicator variables is fixed. A ratio of M_0/M_1 is selected for consistency with other studies

^cAs above, *judicial independence* is selected

^dRoot mean square error of approximation

8.7 Concluding Remarks and Policy Implications

This study has been attempted to examine and quantify the link between shadow economy and corruption for the ASEAN for the period from 1995 to 2014. The MIMIC approach is used in this study. It is noted that the MIMIC approach requires a set of *cause* variables, which cause the presence of the shadow economy, and a set of *indicator* variables which are considered as the consequences of the presence of

the shadow economy. On the ground of theories on the shadow economy and previous empirical studies, the *cause* variables and the *consequence* (indicator) variables have been identified and utilised in this study.

In relation to the causes of the shadow economy, *the fiscal freedom, government's expenditure, labour freedom, business freedom* and *unemployment* are all statistically correlated with the shadow economy. *Government's expenditure* and *unemployment* are negatively correlated with the shadow economy, whereas all the others have a statistically positive relationship with the shadow economy. While it may be clear from the negative relationship between government's expenditure and shadow economy, it may not be that clear for the unemployment. It can be argued that, at least for developing countries in the ASEAN, a reduction of unemployment does not guarantee for a reduction of the shadow economy. The research finding from this study indicates that a shadow economy is expected to be greater when unemployment is lower. It means, people have the jobs in an official economy who also want to join the shadow economy if their income aren't enough for living. This finding may provide evidence to support the view that reforms aiming to reduce unemployment are not necessarily associated with a reduction in the shadow economy.

In relation to corruption, *the effectiveness of the government, fiscal freedom* and *rule of law* are statistically correlated with a level of corruption. This study fails to find evidence to support the view that there is a link between *government's bureaucracy cost* and *corruption* for the ASEAN in the period from 1995 to 2014.

In particular, this study finds empirical evidence to support the view that there is a causal relationship between the shadow economy and corruption for the ASEAN for the period from 1995 to 2014. On one side, the shadow economy is positively correlated with corruption, and, on the other end, the corruption is also positively correlated with the shadow economy. These two relationships are statistically significant. In addition, it is noted that the effect of corruption into the shadow economy is more significant than the effect of shadow economy on corruption.

The findings from this study indicate that controlling shadow economy (and/or corruption) may be a better way to reduce the level of corruption (and/or shadow economy). However, for developing countries in the ASEAN, it may be more appropriate to start with the policies to reduce the corruption level than the other way round. Controlling corruption in those developing countries in the ASEAN will also mean that shadow economy is now controlled.

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