

**THE SIZE AND DEVELOPMENT OF THE SHADOW ECONOMY
IN BANGLADESH: AN EMPIRICAL INVESTIGATION**

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Abstract

This paper estimates the size of the shadow economy in Bangladesh by applying the multiple indicator multiple cause model to time series data from 1975-2010. The estimated size of the shadow economy ranges from 13.47% in 1984 to 37% in 2010. Taxes are one of the key drivers while monetization reduces the size of the shadow economy in Bangladesh.

Keywords: Shadow economy; MIMIC model; Bangladesh.

JEL classifications: H11; H26; O17.

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1. Introduction

The article estimates the size of the shadow economy (SE)¹ in Bangladesh using time series data from 1975-2010 and employing a multiple causes and multiple effects approach. The SE plays an important role in both developed and developing economies. Investigating the causes of the SE is important, because of the policy implications for the effectiveness of governments' employment, fiscal, monetary, investment and other socio-economic policies that may be introduced to facilitate economic growth. Such analysis also assists in the construction of institutional reforms aiming at good governance, reducing corruption and improving efficiency of the public sector and revenue collection. Weak institutions and corruption are major obstacles to efficient allocation of resources and thus to achieving the full potential of a developing country such as Bangladesh.

It is widely established that good governance and well-functioning institutions generally work in partnership to facilitate economic development and the Asian tigers are a case in point. On the other hand, corruption is considered as one of the main causes of misallocation and misappropriation of national resources growth (see Iqbal and Daly (2013)) for a summary of the literature). Research suggests that inefficiency and corruption cost 0.5-2% of per capita real economic growth in developing countries (World Bank (1997)). Studies show that a one-standard-deviation reduction in the corruption index is estimated to be associated with an increase in the investment rate by about three percent of GDP (Bardhan (1997)).

Corruption is widely considered as an impediment to attaining human rights and economic development (Pillay (2013)), and to the strengthening of democratic institutions and the creation of a competitive market economy (Treisman (2000)). Money misappropriated through corruption over the years is sufficient to feed a good proportion of the world

¹ The shadow economy is also referred as underground, black, informal, hidden, parallel, unofficial, clandestine, second, irregular or household economy. We use these term interchangeably without affecting the meaning.

population: in that sense, corruption causes 870 million hungry people go to bed without or with insufficient food every night_(Pillay (2013) and Uma & Eboh (2013)). Less developed countries lost US\$8.44 trillion to unlawful financial flows from 2000-2009, which is ten times higher than the foreign aid these countries received (ibid). Research reveals that a rise of one percentage point in bribes reduces firms' growth by three per cent which is three times higher than negative tax effects (Fisman & Svensson (2007)). On-going research by the World Bank reveals that over \$1,000 billion is paid in bribes each year; one Asian country has lost \$48 billion over the past 20 years because of corruption, surpassing its entire foreign debt of \$40.6 billion. Studies by the Asian Development Bank show that corruption can cost a country up to 17 per cent of its gross domestic product. From 1970 and 2008, US\$1.8 trillion illicit financial flows took place in Africa (African Development Bank and Global Financial Integrity (2013))

In Bangladesh, real per capita GDP was US \$603 in 1980 and approximately doubled within 28 years by 2008 to US \$1233 (base 2005, adjusted for purchasing power parity). The average annual growth rate, around 2.6%, might seem respectable but the colossal cost of corruption and resulting inefficiency in resource allocation are pervasive. If Bangladesh could control its corruption to the level which prevails in countries with transparent governments, it could quadruple (instead of the actual achievement of double) the level of per capita income within the above mentioned 28 years from 1980-2008 by adding between 2.1 and 2.9 per cent to actual annual per capita GDP growth rate (various World Bank Reports cited in Iftekharuzzaman (2011)).

The Transparency International Bangladesh (TIB) survey show that costs of bribery in Bangladesh in 2010 were estimated at 1.4 per cent of GDP or 8.7 per cent of the annual budget of Bangladesh, and this increased in 2012 to 2.4 per cent of GDP and 13.4 per cent of the annual budget (Iftekharuzzaman (2012)). The TIB survey shows that corruption affects

everyone but the poorer people are affected the most. Some empirical findings reveal that shadow economy and corruption are correlated: the shadow economy and corruption are substitutes in high-income countries, but complements in low-income countries (Treisman (2000)). However, the findings on the causes and consequences of the shadow economy are inconclusive and an under-researched area, most especially for developing countries such as Bangladesh and this paper intends to address this gap.

This paper consists of six sections. Section two provides a brief background of the socio political environment which highlights the causes and extents of the hidden Bangladeshi economy. Section three reviews the literature on the causes and indicators of the shadow economy. Section four explains the MIMIC method which is applied in section five to Bangladeshi data and the shadow economy is estimated. The MIMIC method provides an ordinal series on the shadow economy in Bangladesh which is transformed into a cardinal series by the calibrating or benchmarking method (explain below) in section five. The final section draws conclusions.

2. Bangladesh: A Background Analysis²

Bangladesh achieved its independence in 1971 after a nine-month long liberation war in which three million people sacrificed their lives. The country has made admirable achievements in various socio-economic indicators since its independence despite its persistent lack of good governance (Wescott & Breeding (2011)). Bangladesh is ranked 144 out of 174 in Transparency International's Corruption Perceptions Index for 2012 (TIB (2012)). It has maintained a steady real economic growth rate from 5-6% since the early 1990s. The country's human development index (HDI) has improved from 0.365 in 1980 to 0.566 in 2012 (UNDP (2013))³. The child mortality rate has decreased from 239 per thousand

² This section is based on Iftekharuzzaman (2011) and the author's own research, if not stated otherwise.

³ The HDI used in the Human Development Report of the United Nations is a summary composite index that measures a country's average achievements in three basic aspects of human development: longevity,

live births in 1970 to 65 in 2010. Bangladesh outperforms other neighbouring countries in reducing severe poverty: data for 2011 show that 26.2% of the population is in severe poverty in Bangladesh, with comparable figures of 27.4% in Pakistan, 28.6% in India and 37.1% in Nepal. The population growth rate decelerated from 2.5 per annum in the 1980s to 1.39 in 2010. The most recent achievements in education are eye catching and are considered by international organisations and the developed world as a role model for developing countries. The agricultural sector has also made significant achievements.

The above praiseworthy achievements are the outcome of infant democracy as well as of the contribution made by law abiding common people and they are widely considered as the key social asset of Bangladesh. The common people in Bangladesh have always participated in the past to any movements called by politicians to protect democracy and national interests. However, the infant democracy falls far short in delivering good governance. Importantly, social planners in Bangladesh (knowingly and/or unknowingly) fail to motivate law abiding common people to use the full potential of their strong social values to limit corruption and inefficiency.

The social planners including the bureaucracy heavily rely on administrative means to resolve social problems instead of using public debate and the measures emerging from it. These administrative means involve substantial corruption and inefficiency; additional actions without proper public debate and motivation often generate further inefficiencies.

For example, there have been some but limited efforts by the core political command⁴ since the beginning of the democratic process started in 1991 to improve the accountability of the bureaucracy; creating an independent anticorruption commission is a part of this process.

knowledge, and a decent standard of living. This index shows the stage of human development of a country and can take a value between 0 and 1. Countries with indices 0.800 or above, between 0.500 and 0.800 and below 0.500 are considered as the high, medium and low achievers, respectively, in the quality of human capital.

⁴ There are still some but very limited core people in politics across political affiliations who have been sincerely trying to eradicate corruption from the society.

This commission will be able to prosecute civil servants for their alleged criminal activities, including the taking of bribes and the confiscation of state assets. The whole process is highly reliant on the administrative means, and has failed to increase public awareness in a manner that would put pressure on the bureaucracy. Consequently, the bureaucracy has mostly been uncooperative in the drive to cap corruption in government and such non-co-operation causes the anticorruption commission to be merely a toothless tiger that can be used as a threat to be used against political rivals.

In addition, these commendable achievements are marred by political malpractices, black money and muscle dominated politics. There is a “Gresham law in politics” in Bangladesh – “good” politicians are driven out from policymaking by the “bad” ones. Investment in politics is a lucrative business. Increasing numbers of businessmen turned politicians invest money in politics to achieve the control of both the party and government. Money from illegitimate sources is a major source of funding of all major political parties.

Iftekhharuzzaman (2011) argues that elections are considered by major competing political parties as a “winner takes all” game. Winners tend to use the mandate and power to make a profit out of investment during their tenure. However, in the context of Bangladesh, we would argue that there is an interesting mutual understanding among corrupt elements of major political parties, including both the incumbent and potential incumbent (i.e. the main opposition) to grab public funds. This mutual understanding is even extended to circumvent any independent debate on any major important national issues (see below).

Corruption is present in the whole process, including politics, business, running the parliament, administration and the judicial system. “Blaming games” are used by the ruling class⁵ as a shield to protect themselves for their corrupt practices and wrongdoings. Importantly, the absence of good governance is also reflected in widespread corruption in the

⁵ This class comprises politicians, businessmen, bureaucrats (both civil and military) and professionals (Choudhury (n.d.))

judicial system which has by and large been failed to bring any single key corrupt politician, bureaucrat, including judicial officials or businessman to justice during the 42 years since independence⁶. Technical faults and loopholes in the prosecution help to protect culprits. These technical faults and loopholes are largely considered as a staged drama (i.e. a fixed game) to conceal the severity of the situations from the eyes of the common people. Leading figures in the bureaucracy, judiciary and parliament are under the oath (or commitment) to uphold the constitution⁷. However, they often violate their oath and fail to bring culprits to justice, focusing less on the main spirit of the constitution and more on technical faults and loopholes which are considered as a part of the game by which leading figures protect each other. A quote from the renowned educationist and intellectual of Bangladesh Serajul Islam Choudhury (n.d.) gives an overview the ruling class of Bangladesh: "The country today suffers from many known diseases, such as corruption, violence and militant fundamentalism, but the greatest threat to its security and prosperity has been its ruling class itself." Cooperating with each other to enhance the prosperity of deprived people is absent in politics in Bangladesh. Hence, there has been no effective, significant attempt to introduce a transparent and well informed potential policy package to control corruption in the system. The rule of thumb followed by the ruling class to control the corruption subject to the condition is 'don't touch us' because 'it's our turn'. Over-invoicing and over pricing is a very common practice and 'extras' are shared among the ruling class, with a major share to the incumbent.

⁶ Sadly, the establishment and the judicial system of Bangladesh failed to effectively disqualify a single top politician, bureaucrat, judicial officer from politics and from the participation of public debates because of their criminal involvements since its independence.

⁷ According to the written constitution of Bangladesh, the people are the owners of the country and national resources. Each and every citizen is equal and should have similar access to national resources. All geographical locations within the national boundary should benefit in a similar way from the development process. All legal provisions and their applications should be aimed to facilitate this spirit of the constitution and any technical fault and loophole *must not* be an obstacle in upholding of such essence of the constitution.

There is an unwritten agreement among the ruling class is to keep common people in the dark (i.e. uniformed) and to avoid independent, proper, effective, informative public debate on any important national issues such as aiming to control, if not to eliminate, corruption in the public sector development projects, purchases and procurements.

All major political parties, from the far left to the far right, drastically disrespect their constitutional and moral obligation to participate in public debate and inform common people about the corruption committed by the incumbent. The whole system fails to facilitate competition of talented and qualified people. Nepotism and subservience along with ‘commissions’ are key parameters for being appointed for a job or to be selected to supply goods or services to the public sector or to be appointed to build a development project.

Other major concerns of the country as a whole are malfunctioning of the institutions such as the practice of democracy within the party⁸ and ineffective parliament. Ironically, the judicial and para judicial system are more effective against the critics of the incumbent, whom they often prosecute in order to suppress the voice of the opposition. The institutions aiming at curbing corruption and criminal activities are more proactive on the executives of the immediate past government and there are fewer and ineffective steps undertaken to prevent current corruption. There is no effective and visible intention by the judicial and para judicial institutions to bring corrupt top bureaucrats to justice.

The alleged criminals who hold influential positions in major political parties, bureaucracy and / or in the society successfully apply deferral / delay techniques in the prosecution process aiming to become incumbents and influence to withdraw criminal cases against them.

This type of tempering of the judicial system is a common practice in Bangladesh. These

⁸ National and local units of the key (incumbent and potential incumbent) political parties are not democratically elected. Capability and contributions to the party or organisation are often ignored in assigning key positions in the party. Politicians, who competently praise and appreciate the head of the party and its family, generally achieve key positions in their own political party.

alleged criminals become inactive in their own party and /or choose to join to the ruling party if their own party faces defeat.

A positive aspect is that the range of media is growing and becoming more powerful. However, a significant number of owners of electronics and printing and the some of the owner turned editors invest their black money in the industry to uphold their social status and also use their media power to hide and protect their black money and unethical and criminal activities.

The democratic practices within the parties and the oath of national interest must be put above any party interests. Mechanisms should be in place to make all institutions accountable to the people of Bangladesh and specific targets should be set for controlling corruption. Assets, incomes and expenditures of all public officials should be made publicly available for all including their close relatives, executives of all political parties and any candidate who stands in any election, including trade unions, and the sponsors of political parties. The same should be true for donors of charitable organisations and the executives of non-government organisations.

3. The Causes and Indicators of the Shadow Economy

The growth of the shadow economy is generated by many different factors. The most important and often cited ones are: the rise of taxes and social security contributions; increased regulation in the official economy, especially of labour markets; forced reduction of weekly working hours; earlier retirement; unemployment; and the decline of civic virtue and loyalty towards public institutions combined with a declining with tax morale (Schneider and Enste (2000), Schneider et al (2007), Chaudhuri et al (2006)). These key causes can be grouped in three major categories: (a) high taxation, (b) heavy regulation, and (c) declining

“tax morality” (citizens’ attitudes toward the state). The impact on the shadow economy of these causes is explained below.

3.1 The Causes of the SE: Taxes and Related Issues

A rise in tax and social security burdens generally causes an increase in the size of the shadow economy. Taxes affect labour-leisure choices, and also stimulate the labour supply to the (untaxed) shadow economy. It can also be argued that formal and informal labour markets offer competing substitute products and employers may turn to the informal market because of higher prices in the formal market⁹.

A distortionary effect of high taxes in choosing labour -leisure ratio has important policy implications on the supply of labour to both the official and shadow economy. A high tax rate reduces after-tax earnings and provides incentives to avoid taxes by reducing the labour supply in the official economy and by increasing the labour supply in the shadow economy. With an additive-separable utility function and a two-stage decision by a consumer, marginal tax rates positively and wages in the official economy negatively affect the labour supply in the shadow economy. In addition, the wage and indirect tax rates in the official economy positively affect the demand for labour and the supply of goods and services in the shadow economy. A complex tax system with weak enforcement causes tax evasion to be easier and profitable and hence reduces the labour supply in the shadow economy. A less complex, broader based tax system with efficient enforcement increases regulation and reduces the shadow economy. Red tape in bureaucracy generates a shadow economy since many entrepreneurs often go underground not to escape taxes but to avoid bureaucracy and corruption. In addition, forced reduction of weekly working hours, earlier retirement and unemployment in the official market causes people to work for the unofficial economy and thus there is an increase in the size of the shadow economy.

⁹ I am thankful to Vince Daly for his suggestion to add this factor.

3.2 The Causes of the SE: Intensity of Regulations

The extent of enforcement of a regulation rather than an increasing number of regulations is considered as the main factor which exerts tax burdens on firms and individuals and drives them into the shadow economy. However, politicians prefer introducing more inoperative laws and regulations instead of bringing any radical and effective change to control the shadow economy in order to avoid losing support from voters, the beneficiaries of the shadow economy.

Studies show that every available measure of regulation is significantly correlated with the share of the unofficial economy. More regulation is correlated with a larger shadow economy. A one-point increase in an index of regulation (ranging from 1-5) is to be associated with a 10-percent increase in the shadow economy in 76 developing, transition and developed countries (Johnson, Kaufmann, and Zoido-Lobatón (1999)). These results highlight the fact that more emphasis on reducing the bulk of regulation or at least on improving the laws and regulations are required, instead of increasing the volume of regulation.

3.3 The Causes of the SE: Good Governance, Tax Morale and Related Issues

Tax morality negatively affects the shadow economy. Political institutions and democratic practices influence social norms and tax morale which in turn affect the shadow economy. The public's attitudes towards taxes depend on the quality of both the government and the provision of public goods. Citizens in a democratic society are relatively more inclined to stay in the official sector and prefer to contribute taxes if their opinions are reflected in the decision processes. Citizens also judge the quality of public goods compared to tax contributions (Johnson, Kaufmann, and Zoido-Lobatón (1999)). On the other hand, people have little trust and low incentives to co-operate with the official sector in the presence of

inefficient tax systems and weak institutions which generally provide inadequate and low quality public goods. A high level of unemployment and income inequality damages morality and may positively affect the shadow economy.

There are other factors which are linked to good governance and tax morale that may negatively affect a shadow economy. These factors include (i) a well-functioning judicial system, (ii) transparency in the government and (iii) a perfect flow of information.

3.4 Indicators of the Shadow Economy (SE)

3.4.1 Openness

Trade penetration ratios (or openness) are considered as an indicator of the shadow economy. Increasing foreign trade or openness in the presence of weak governance can increase the opportunities for under-invoicing of imports over-invoicing of exports to avoid tariffs or trade barriers in the presence of more taxes of imports than on exports. Therefore, a rise in the size of the shadow economy could be reflected in openness. That is, openness is considered as a positive indicator (effect) of the shadow economy in the presence of weak governance.

However, trade liberalisation which boasts openness can also negatively be related to the shadow economy in the long-run (see Schneider, Friedrich and Enste, Dominik (2000) for a comprehensive survey). Trade liberalization policies remove entry barriers for the industry by facilitating competition, reducing corruption and also encouraging firms to move from the shadow economy into the official economy.

3.4.2 Official Economy

The official economy is considered as another indicator of the shadow economy and the direction or sign of the relationship between both economies depends on various factors including the quality of (or public attitudes towards) a government and its institutions, public services and tax morality etc. There is a positive relationship between the growth of the

shadow economy and the official one if an expansionary fiscal policy stimulates both the formal and informal economies because of weak enforcement and low entry costs into the shadow economy (Schneider, Friedrich and Enste, Dominik (2000) references therein).

On the other hand, both the official and shadow economy could also be negatively related if a reduction in the size of the shadow economy boosts tax revenues and improves the quantity and quality of public goods and services, which ultimately can stimulate economic growth in the official economy. Empirical results are mixed (Schneider, Friedrich and Enste, Dominik (2000) for a comprehensive survey). We argue that the relationship between both sectors in an economy at its early stage of development such as Bangladesh should be positive since one complements to the other, more particularly, the unofficial economy facilitates the growth of the official one.

4. Modelling Shadow Economy: Methodology

There are three main approaches used in the literature to measure the shadow economy (see Schneider and Enste (2000) for a comprehensive survey). Firstly, direct approaches are micro methods such as surveys and samples based on voluntary replies, or tax auditing and other compliance methods. Secondly, indirect or indicator approaches are mostly macroeconomic methods which use various economic and other indicators that contain information about the development over time of the shadow economy. Finally, the model approach provides a ranking of the relative size of the shadow economy. This approach explicitly considers the multiple causes of, as well as the multiple effects of, the shadow economy and is known as the multiple indicators and multiple causes approach (MIMIC), which is a variant of linear independent structural relationship models (LISREL). This method is based on the statistical theory of unobserved variables developed by Jöreskog and Goldberger (1975) and Jöreskog and Sörbom (1993). This method can only yield a time series index for the latent variables: an ordinal index, which is required to be converted into a cardinal series of values of hidden

economy sizes (see section 5.1 below) (see Dell’Anno and Soloman (2008) for an application of this method in estimating the size of a shadow economy).

In the MIMIC approach, output or income of the underground economy is a latent variable or index which is not directly observable. However, causes and effects of the underground economy are observable. The observable ‘causal’ and ‘indicator’ variables are connected by a single unobserved index. The index is estimated using a statistical model and the data on causes and indicators variables. The estimated index is then considered as an ordinal time-series index of the underground economy. This ordinal index is scaled into a cardinal series which represents the relative, but not an absolute, magnitude of a hidden economy. This scaling is completed by calibrating/equalising the value of the ordinal series in a (base) year to a value in the same year for which the size of the shadow economy is generally known in the literature. To make the base year value of the shadow economy more representative and acceptable, the average of various available and reasonably acceptable (cardinal) measures¹⁰ in the base year could be used in calibrating the ordinal series.

The dynamic mimic model equations can be stated as:

$$\mathbf{y} = \lambda\eta + \varepsilon \quad (1)$$

$$\eta = \gamma\mathbf{x} + \zeta \quad (2)$$

Where \mathbf{y} is a column vector of p indicators of the latent variable η , and \mathbf{x} is the column vector of the ‘ q ’ causes of η . As can be seen, the dynamic MIMIC model consists of two parts: Equation 1 is a measurement model for η , which links the unobserved variables to observed indicators. Equation 2 is the structural equation model for the latent variable η ; which specifies causal relationships among the unobserved variables; ε is a $(p \times 1)$ measurement error while ζ is the scalar structural error. It is assumed that ζ and all elements

¹⁰ These various values of the shadow economy for a (common) base year might have been obtained by using different methods and the average of these values are by and large accepted in the literature.

of ε are mutually uncorrelated, with $\text{var}(\zeta) = \psi$ and $\text{cov}(\varepsilon) = \Theta_\varepsilon$. Substitute (2) into (1) to derive the following p-equation multivariate regression model:

$$\mathbf{y} = \Pi\mathbf{x} + z \quad (3)$$

Where $\Pi = \lambda\gamma'$, $z = \lambda\zeta + \varepsilon$, and $\text{cov}(z) = \lambda\lambda'\psi + \Theta_\varepsilon$.

Equation (3) above is a p-equation model. The rank of both the regression matrix, Π , and the error covariance matrix of the p-equation model (equation 3) is constrained to one in order to avoid normalisation and identification problems associated with (estimating) simultaneous equation models.

The size of the shadow economy, an unobserved variable, is to be influenced by a set of indicators: highlighting the structural dependence of the shadow economy on variables that may be useful in predicting its movement and size in the future. The interaction over time between the causes Z_{it} ($i = 1, 2, \dots, k$) of the size of the shadow economy X_t , and the indicators Y_{jt} ($j = 1, 2, \dots, k$) is shown in Figure 1.

Identification

A model has to be identified in order to estimate it. As a necessary (but not sufficient)¹¹ condition, the number of observed variances and covariances must be equal to or greater than the number of parameters to be estimated (including variance of latent factor, variances of disturbances, covariances among observed variables, etc.). A sufficient (but not necessary) condition of identification is that the number of indicators is two or greater and the number of causes (i.e. exogenous variables) is one or more. As can be seen, the reduced form parameters indicate that unique solutions to λ and γ cannot be obtained since altering the scale of η yields the same reduced form solution. This identification problem can be resolved by setting one of the coefficients in the column matrix λ (the scale of the unobserved variable) to a constant.

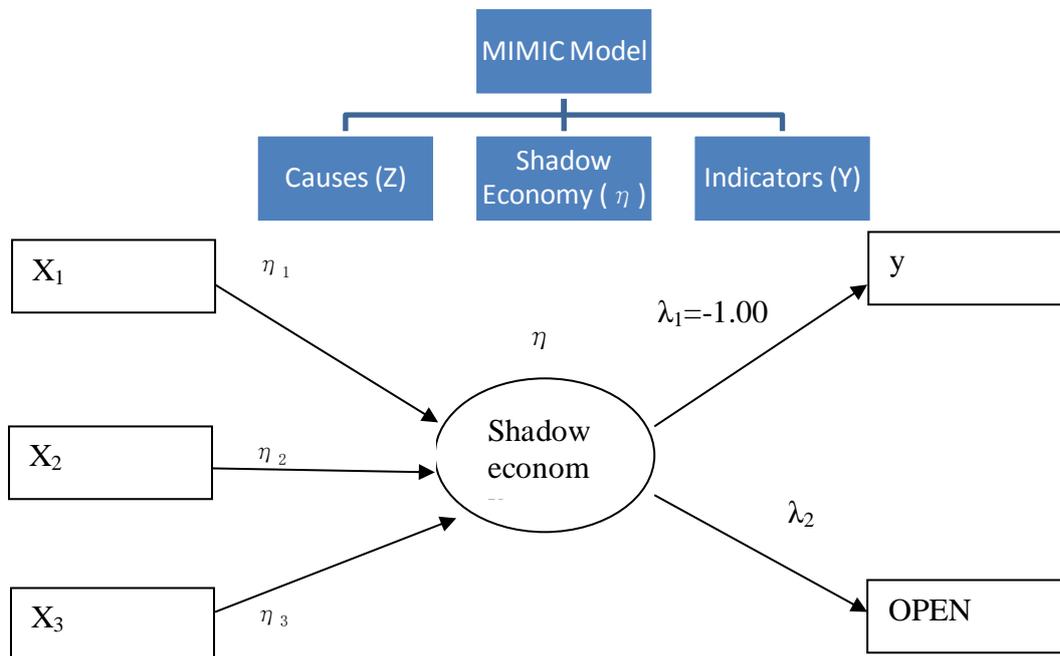
¹¹ Dell'Anno & Gómez-Antonio & Pardo (2007)

Our model meets the conditions for identification. We have two indicators (y and openness) and three causes (taxes, government size or expenditures and demand for currency); the coefficient of y (one of the indicator variables is normalised to one (i.e. $\lambda=1$)).

Measuring Variables (Causes and Indicators)

There are two indicators of the shadow economy: y is measured as the growth of real per capita GDP and OPEN is measured as exports plus imports as a percentage of GDP.

There are three causing variables. Taxes are measured as the total tax revenues as a percentage of GDP. The government size is measured as the total government expenditures as a percentage of GDP. The demand for currency is measured as the total currency in circulation ($M0$) as a percentage of $M2$ or $M3$ ¹². All variables are in logarithms.

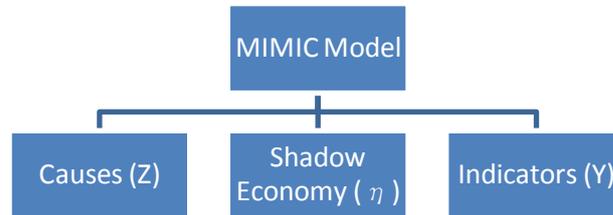


¹² A rise in the demand for currency caused by taxes and tax related factors and other compliances increases the size of the informal economy, it is possible to determine how much of the increase in informal economy relates to the increase in the demand for currency. It is also argued that taxes increase shadow economy which, in turn, increases the demand for currency.

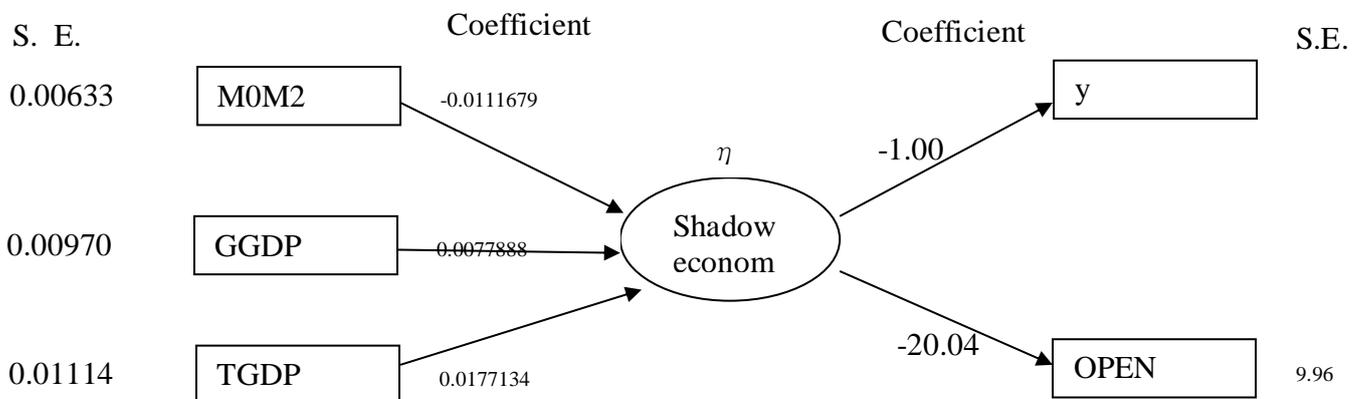
Parameters are estimated by maximum likelihood with the identification conditions as constraints. This study has used specialist software LISREL.

5. Empirical results

In this section, the results of the estimated structural models are reported below:



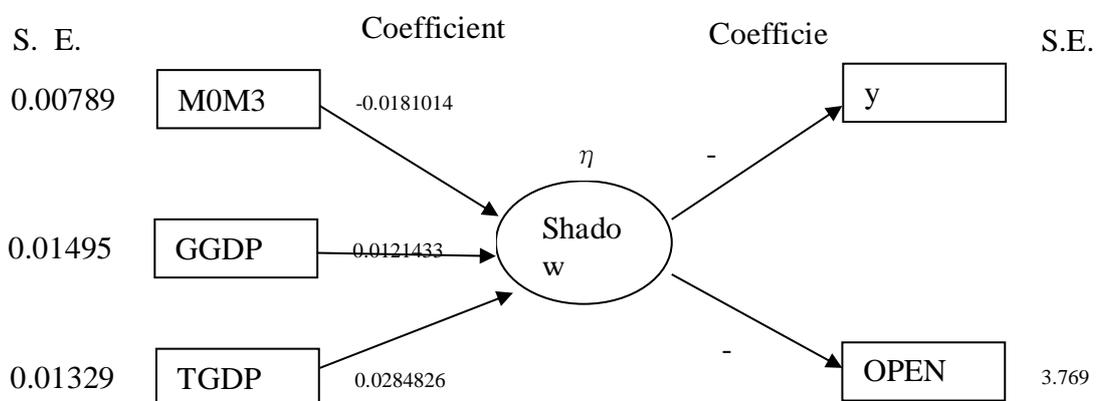
Model 1



Structural equation:

$$(\tilde{\eta}_t / GDP_{2010}) = -0.0112 \times M0M2 + 0.0078 \times GGDP + 0.0177 \times TGDP \quad (4a)$$

Model 2:



Structural equation:

$$(\tilde{\eta}_t / GDP_{2010}) = -0.0181 \times M0M3 + 0.0121 \times GGDP + 0.0284 \times TGDP \quad (4b)$$

Our estimated models shows that taxes are a cause of the shadow economy which have an expected positive sign and are statistically significant, implying that a rise in the tax rate (or revenue) increases the size of the shadow economy. Our results also show that government expenditures have the expected sign but are statistically insignificant which may be due to the fact that taxes captures the impact of government expenditures.

In addition, the sign of the coefficient of the demand for currency measured as the ratio of M0 to M2 or M3, another causal factor suggested by the literature, is negative and statistically significant. The negative sign is contrary to the argument since it is generally argued that people prefer cash transactions to avoid taxes: cash transactions cause the shadow economy. However, such arguments may not be applicable in the context of a country such as Bangladesh where a large proportion (or even most) of people are out of the formal financial system and a large part of these people contribute to the informal economy because of the absence of formal financial facilities in the rural dominated economy¹³. A rise in the currency ratio is tantamount to an increase in the recorded (i.e. formal) part of the economy which results in a reduction of the shadow economy. That is, an increase in the monetization of the economy indicated by a rise in the currency ratio causes a reduction of the informal economy. Entrepreneurs can only access external finance by disclosing credible information in formal documentation Gobbi and Rizza (2011). This may be impossible for many informal producers, who lack proper accounting records.

¹³ About 80 per cent people live in the rural areas and most of them either do not have facility to use formal financial system or do not use it partly because of their subsistence level of income and even a large part of urban people with subsistence level of income do not use the formal financial system.

5.1 Obtaining the Size of the Shadow Economy

In this section, we explain how to transform the ordinal series $(=\tilde{\eta}_{2010}/GDP_{2010})$ derived from the MIMIC method into a cardinal one $(=\hat{\eta}/GDP_{2010})$ for the unobserved variable. As discussed in section 4, we use a base year value which is known and acceptable in the literature. We use 2010 as a base year for which an exogenous estimate of an index of the shadow economy $(=\eta_{2010}^*/GDP_{2010})$ is 37% of the official economy (see Schneider & Montenegro (2010)). The relationship between changes in $\tilde{\eta}_t$ and in the real economy (i.e. GDP) as a ratio of GDP in 2010 can be explained by the measurement equation:

$$\frac{GDP_t - GDP_{t-1}}{GDP_{2010}} = -\frac{\tilde{\eta}_t - \tilde{\eta}_{t-1}}{GDP_{2010}} \quad (5)$$

Structural equation:

$$\frac{\tilde{\eta}_t}{GDP_{2010}} = -0.0112 \times M0M3 + 0.0779 \times GGDP + 0.0177 \times TGDP \quad (4a)$$

We scale up the above ordinal series $(=\tilde{\eta}_{2010}/GDP_{2010})$ to a cardinal series $(=\hat{\eta}/GDP_{2010})$ by calibrating (or benchmarking) the size of the shadow economy in 2010 to 37% of the official GDP $(=\eta_{2010}^*/GDP_{2010})$. The ratio of shadow economy to current GDP $\left(=\frac{\hat{\eta}}{GDP_t}\right)$ is also derived from $\tilde{\eta}_{2010}/GDP_{2010}$. The size of the shadow economy $\hat{\eta}$ is given as:

$$\hat{\eta} = \tilde{\eta}_t \times (\eta_{2010}^*/\tilde{\eta}_{2010}) \quad (6)$$

where $\tilde{\eta}_t$ is the value of the MIMIC index, $\tilde{\eta}_{2010}$ denotes the value of this index in 2010, η_{2010}^* is the exogenous estimate (base value) of the shadow economy which is 37% in 2010 in

Bangladesh. The absolute values of SE ($\hat{\eta}$) are generally not estimated and reported and thus this equation cannot be used in empirical analyses. Thus, equation 6 can be transformed to:

$$\frac{\tilde{\eta}_t}{GDP_{2010}} \times \left(\frac{\eta_{2010}^*}{GDP_{2010}} / \frac{\tilde{\eta}_{2010}}{GDP_{2010}} \right) \times \frac{GDP_{2010}}{GDP_t} = \frac{\hat{\eta}}{GDP_t} \quad (7)$$

Where

- (a) $(\tilde{\eta}_t / GDP_{2010})$ is the MIMIC index of SE economy calculated by equation 4a.
- (b) $(\eta_{2010}^* / GDP_{2010})$ is the exogenous estimate of shadow economy in 2010 obtained from the literature. We use the World Bank estimate of 37%.
- (c) $(\tilde{\eta}_{2010} / GDP_{2010})$ is the value of the MIMIC index in 2010.
- (d) $(\hat{\eta} / GDP_{2010})$ is the estimated shadow economy as a percentage of official GDP.

The ratio between (b) and (a) (the middle terms in brackets of the left hand side) satisfies the condition that the size of the shadow economy as a percentage of GDP in 2010 is 37%. The final term on the LHS converts $\tilde{\eta} / GDP_{2010}$ (the MIMIC index) into the shadow economy as a ratio of current GDP.

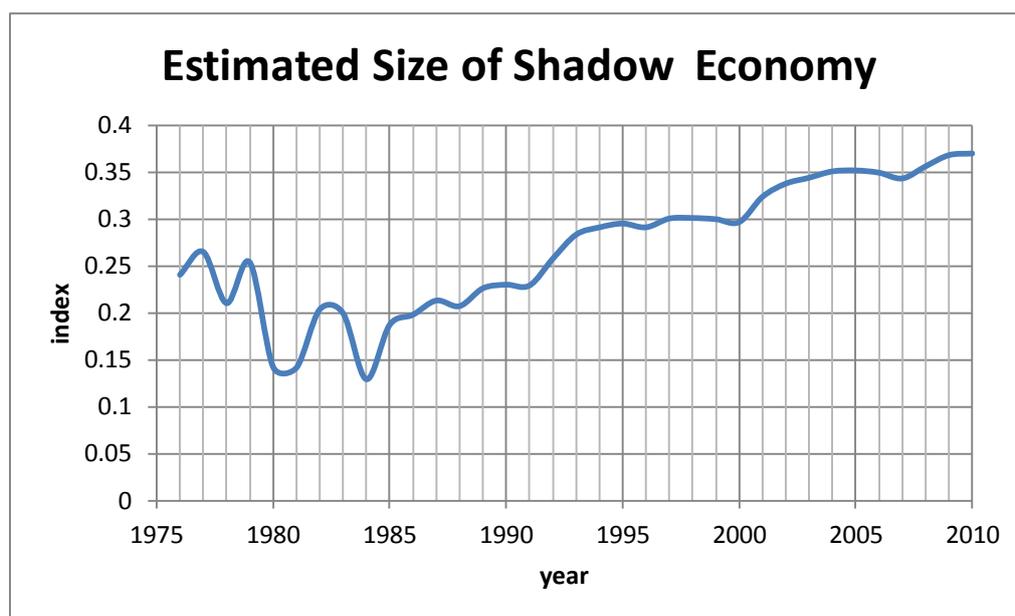


Figure 1

6. Conclusions

In this paper, we estimate the size of the shadow economy in Bangladesh using time series data from 1975-2010 and the multiple indicator multiple cause model. We also provide a critical review of socioeconomic and political background on Bangladesh. Our analyses reveal that Bangladesh has admirable achievements in the key socioeconomic sectors, with around a six per cent rate of economic growth during the reign of infant democracy despite the prevalence of corruption and the persistent absence of good governance which acts as a catalyst of the shadow in the country. Our estimated size of the shadow economy in Bangladesh during our sample periods ranges from 13.47% in 1984 to 37% in 2010 and the size is in an increasing trend since 1984.

Our empirical analyses imply that taxes are a cause of the shadow economy, i.e. they increase the size of the shadow economy. We also find that government expenditures have the expected sign but are statistically insignificant which may be due to the fact that taxes captures the impact of government expenditures. Our finding on the impact of the demand for currency on the shadow economy is novel: the sign of the coefficient of the demand for currency is negative and statistically significant, implying that an increase in the monetization of the economy causes a reduction of the informal economy.

Our results on the causing factors of taxes and the demand for currency suggest that the government should introduce a policy package which includes instruments to simplify tax structure, facilitate good governance and monetization of the economy in order to control the shadow economy. This research could further be benefitted by including the indices of corruption in estimating the shadow economy.

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