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Article

Exploring legal and political-institutional determinants of the informal economy of Pakistan

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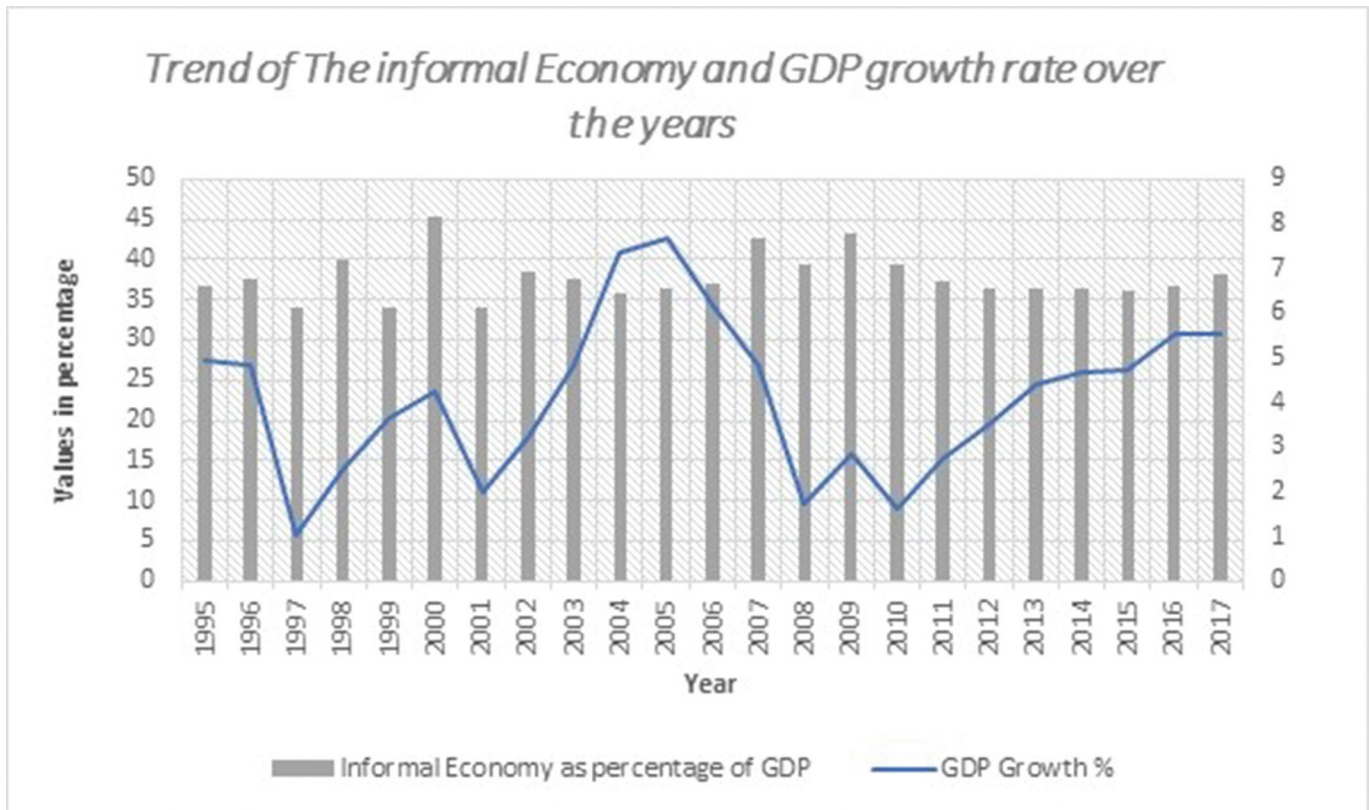
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FINANCIAL ECONOMICS | RESEARCH ARTICLE

Exploring legal and political-institutional determinants of the informal economy of Pakistan

Rizwana Hayat^{1*} and Abdul Rashid²

Abstract: In this paper, the size of the informal economy of Pakistan is determined by including the legal and political-institutional variables as determinants. By using the MIMIC model average estimate for the informal economy of Pakistan is 37.75 percent from 1995 to 2017. The study tries to explore the institutional implications of the informal economy for policymakers to reduce and control the informal economy in the developing country. Empirical results show that the most significant legal variable is Law and Order and the most important political variable is Religion in Politics for measuring the informal economy. Departing from existing studies, institutional determinants are explored in detail because these different institutional determinants may affect the informal economy differently in developed, developing, and underdeveloped countries. The policy formation process can be more effective in developing countries like Pakistan with consideration of the most relevant institutional factors in estimation.

Subjects: Politics & Development; Economics and Development; Development Economics; Political Economy

Keywords: informal economy; underground economy; formal and informal sectors; shadow economy; institutional arrangements; institutional quality; MIMIC model; Pakistan

Jet: codes: E26; O17

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PUBLIC INTEREST STATEMENT

Theoretically and empirically institutional quality is an important determinant of informal economy. This research work is based on exploring the institutional determinants of informal economy in a developing country. The institutional dimensions of developing countries differ from the developed world. Hence, similar policies which worked for high income countries may not work for the developing countries like Pakistan. Therefore, this research work has explored political and legal institutional determinants to find out the most significant ones in relevance to Pakistan. It may interest the policy makers and researchers to further explore the economic structures and institutional conditions which vary from country to country to study the most relevant institutional variables for estimation of informal economy in low and medium level income countries.

1. Introduction

The concept of the informal economy was given by Hart (1973) who described the informal economy as a form of survival for individuals lacking employment opportunities in the formal sector. F. Schneider (2010) defines the underground economy as all currently unregistered economic activities that contribute to the officially calculated (or observed) Gross National Product. They estimated the informal economy of developing countries between 40 to 60 % of the Gross Domestic Product. It is important to investigate the informal economy because National Accounts data is used to access the economic performance which does not reflect a true picture as informal economic activities are hidden or undetected.

Economic reforms being essential for economic development are mainly hindered by institutional weaknesses and high levels of corruption (Abed & Gupta, 2002). The informal economy becomes significant with the inefficiency of institutions, especially in low and middle-income countries like Pakistan. The impact also varies according to geographic and demographic changes. Before analyzing the impact of the informal economy, it is important to estimate its size and scope. In middle-income countries like Pakistan, this assessment becomes crucial because the formal economy is not as robust as in developed countries. Complex regulations and institutional formalities make it difficult to do business in the formal sector. It is no surprise that entrepreneurs then look for a safe haven in an informal economy to avoid corruption, taxes, regulations, and institutional barriers. This study brings novelty to the existing literature by instigating a debate about the most relevant political and legal institutional determinants of the informal economy for a developing country.

Empirical literature emphasizes corruption as the greatest obstacle for economic development along with reasonable research present on the relationship of the informal economy with the tax burden, institutions, and government regulations. De Soto (2000) argues that the establishment of institutions can improve the potential of growth for underdeveloped countries. Torgler and Schneider (2007) examined the relationship of the informal economy with institutional quality and tax morale. Razmi et al. (2013) found for OIC countries from 1999 to 2008 that institutional indicators of the rule of law, political stability, and control of corruption have a significant reverse linkage with the informal economy. They concluded that the large size of the formal economy and freedom of doing business causes a smaller size of the informal economy. Departing from previous studies based on World Bank Governance Indicators, institutional variables are distinguished as political and legal based on the institutional classification of Joskow (2004). With confirmatory factor analysis religion in politics and bureaucratic quality are found to be two significant political-institutional determinants. Law and order and protection of property rights are the most significant legal institutional determinants. The literature strongly emphasizes the quantitative importance of these factors to understand the level and changes of the informal economy. Neo institutional economists argue that good governance is important for creating competitive markets and efficient allocation of resources which is necessary for economic growth. Knack and Keefer (1995) tested and found a positive relationship between institutional quality and economic growth. The assumption here is that institutional quality helps in boosting economic growth in the countries which have achieved an adequate level of economic and social development. Political stability is the most significant institutional factor for increasing economic growth in developing countries. Economic reforms and restructuring of the economy are required for economic development as good governance is not a precondition for it. The role of economic reforms and restructuring can be further explored in future studies in reference to the effectiveness of good governance in economic growth.

Relatively new available data sources offer the unique opportunity to shed more light on the understanding of a topic that has received increased attention. We find strong support that law and order and religion in politics are significant institutional quality determinants for the economy of Pakistan along with tax burden and the unemployment rate as empirically tested. Due to the flexibility for considering multiple determinants, Multiple Indicators and Multiple Causes Model is

used to estimate the informal economy. It helps to estimate the latent variable with the associations of observable causes and indicators (Loayza, 1996).

An informal economy can be controlled with the liberalization of policies, privatization, taxation, and fewer regulations. A collection system for taxes, if effective, can yield more revenue than heavy taxes in developing countries. This study sheds light on the importance of strengthening legal and political institutions for the estimation of the informal economy. Different factors need to be controlled to address specific policy issues faced by any economy in order to yield maximum economic benefits. Relatively new available data sources offer the unique opportunity to understand the topic from new perspectives that have received increased attention in the literature of the informal economy.

The outline of the paper is as follows. The section below has an overview and literature of the informal economy and its relation with the institutional quality. Section 3 describes the variables. Section 4 explains the methodology. Estimates and results are explained in section 5 and the discussion in Section 6. The conclusion is presented in the final section.

2. Literature review

The informal economy is a subject of discussion and interpretation for economic and financial researchers internationally. The reason for its increasing significance is its expansion globally and the indirect role of job opportunities in the informal economy and economic growth. As defined by OECD (2002) informal economy includes “those activities that are productive and legal but are deliberately concealed from the public authorities to avoid payment of taxes and social security contributions or complying with regulations”. Johnson et al. (1997) found empirically that countries with high regulations have a large informal economy. F. Schneider and Enste (2000), F. Schneider & Enste (2002) observed that implementation of regulations yields better results than increasing the number of regulations. An increase in regulations increases the informal economy. Rigidity in regulations increases both the informal economy and corruption as studied by Dreher and Schneider (2010).

In literature, multiple estimates of the informal economy are presented by using different estimation techniques. The currency demand approach is widely used by researchers investigating the informal economy of Pakistan. In literature, taxes are considered to be the most significant, and in some cases, the only indicator of the informal economy in Pakistan. Pakistan being a third world country has a narrow tax base due to tax evasion (Gulzar et al., 2010). Prior to Arby et al. (2010) tax was assumed to be the only significant causal variable. They included the unemployment rate as another important cause of the informal economy in Pakistan. In empirical literature institutional variables like government regulations are considered as the cause of informal economic activities (Loayza (1996), Johnson et al. (1997), and Dreher and Schneider (2010)). However, institutional variables could not get much attention for the estimates of Pakistan. Pakistan is no different from other developing countries due to the excessive regulatory and bureaucratic formalities. Strict regulations, multiple and excessive procedural formalities make it difficult to run a business in the formal sector. Hence, businesses opt to stay informal to avoid procedural formalities, taxes, and corruption in government departments. According to M. Ahmed and Ahmed (1995) tax revenue losses were around 45 billion in 1990 due to the informal economy.

Literature shows that the informal economy is between 20 to 60 percent of GDP in the case of Pakistan. According to Iqbal et al. (1998) the informal economy expanded continuously and reached 20.2 % in 1996. According to Khalid (2002) the informal economy increased in Pakistan till 1998 and then declined. Yasmin and Rauf (2004) found that the informal economy increased enormously by 2002. They used a data set from 1974 to 2002. M. A. Kemal (2003), M.A. Kemal (2007) found a similar trend that the informal economy continuously increased from 1974 where it was 74 % to 54 % in 1998, and expansion slowed down till 2003. Arby et al. (2010) concluded that the informal economy was at 30 % in the 1960s and it expanded till 2008. Aslam (1998)

recommended direct taxes on hidden economic activities. Gulzar et al. (2010) used data from 1973 to 2010 and used multiple approaches like Monetary Approach, Dynamic Ordinary Least Square (DOLS), Electricity consumption approach, labor market approach, and MIMIC model. They concluded that the informal economy has a significant impact on small manufacturing and cottage industry. The informal economy has a significant role in poverty alleviation. The expansion is majorly due to the corruption of the government. M. Ahmed and Ahmed (1995) used Tanzi's approach and found that the size of the informal economy reduced from 52% to 35%. According to the study by Q.M. Ahmed and Hussain (2008) the informal economy of Pakistan was at 2 % during the 1960 s, 17% in the 1970 s, 15 % in the 1980 s, and 13 % in the 1990 s. Arby et al. (2010) concluded the informal economy to be around 30 % in the 1960 s and 33 % in the 1990 s and declined by 10 % in the 2000 s. In recent estimates, the informal economy was estimated to be 49 % in 1998 and reduced to 27 % in 2015 as concluded by Manzoor et al. (2018). The most recent study with reference to Pakistan is by Mughal and Schneider (2018) in which tax and unemployment rate are taken significant indicators for estimation of Pakistan's economy along with the government regulations and control.

This study is a further contribution in literature by taking taxes, unemployment rate (as it is an evident significant variable for estimation of the informal economy in literature for Pakistan) along with institutional variables. Two specifications are used in the study. In the first specification, six variables are taken, in the second specification, only the most significant two variables are used as indicators of the informal economy. As in the previous literature, the unemployment rate is considered as a significant indicator of the informal economy, it is also taken into consideration. Hence, we expect that an increase in taxes, an increase in the unemployment rate, and low institutional quality are the contributory determinants in the estimation of the informal economy of Pakistan.

The MIMIC method is used and most recent estimates from 1995–2017 are made. Summary of literature review is shown in Table 1. In literature, different estimation methods are used to estimate the informal economy of Pakistan. Shabsigh (1995) used monetary approach to estimate the informal economy of Pakistan from 1975–91 and estimated the informal economy around 21 %. M. Ahmed and Ahmed (1995) used Tanzi's approach to estimate the informal economy from 1960–90 and found a declining trend. Aslam (1998) also used Tanzi's approach and estimated the informal economy by taking tax revenues and the interest rate on time deposits as independent variables. Khalid (2002) estimated the informal economy by taking real rate of interest and Gross domestic product per capita as independent variables with monetary approach. M. A. Kemal (2003) and M.A. Kemal (2007) used GDP growth as a proxy of economic development and Yasmin and Rauf (2004) estimated the informal economy by using the currency demand approach. Mughal and Schneider (2018) estimated the informal economy from 1973–2015 by using the ARDL model. The MIMIC approach is not generally used in the literature for the estimation of the informal economy of Pakistan. Previously, the MIMIC model is used by Arby et al. (2010) and Gulzar et al. (2010). Using the MIMIC model is more appropriate if dealing with multiple conceptual determinants. It is a theory-based approach that confirms the impact of causal variables on a latent variable under study. The informal economic activities cannot be observed directly. Frey and Weck-Hannemann (1984) argued that the combined effect of determinants of the informal economy can measure the informal economy. This is a novelty of this study to use this flexible method where the impact of multiple causes on the informal economy can be studied as multiple institutional determinants are included. This flexibility is absent in the traditional methods. The latent variable model or MIMIC model precisely yields more accurate results than traditional approaches by minimizing the biasing effects of measurement errors on estimation treatment effects. Further, it is considered as a more appropriate method because deviating from simple response variables it focuses on conceptual variables.

Results show that the informal economy has a positive impact on the formal economy in the long run and a negative impact in the short run. From a policy perspective, it is important to find if weak institutions lead to the larger informal economy. Previous studies with respect to Pakistan were mainly focused on the estimation of the informal economy with tax burden and the

unemployment rate as significant causes whereas our findings include legal and political institutions in the informal economy estimation along with tax burden and unemployment rate. Our findings suggest that attention should be given on the institutional causes of the informal economy because policies for economic development are dependent on both the informal economy and institutional quality. Addressing the related issues of the informal economy is important for policy measures. This paper contributes to the literature by determining the informal economy with its potential institutional causes. Findings suggest that combating the informality requires proper targeting of its causes and indicators.

According to the empirical literature, institutional changes impact on economic development is long run and slow. Instead of focusing on cross country analysis, it would be more effective to focus on a small sample of countries and study the long term interactions between institutional and economic changes. Among institutional quality indicators government effectiveness, political stability, control of corruption, and regulatory quality have a positive impact on economic growth in South East Asian countries. The results suggest that governance matters for economic growth but it depends on the country's development level (Han et al., 2014). A study by Alshammari et al. (2019) identifies that good governance has an impact on the economic growth of the countries by classifying the countries as low, medium, and high-income level. They found that income distribution among countries plays an important role on impact of good governance indicators on economic growth. In low-income countries, the indicators of good governance were more likely to affect the economic growth. Policies should be developed toward the role of good governance in economic growth according to the income distribution in the country.

New institutional economics emphasizes improved institutional quality for increasing business, innovation, and extension of markets. The nature of policies pursued by governments like high inflation or high budget deficits adversely affects economic performance. Alongside macroeconomic stability involvement of economic structures is important for governance. According to Acemoglu and Robinson (2012) economic structures and state market relationships are important in determining economic performance. Governance indicators are regarded as pivotal for economic growth in developing countries but the theory of economic structures explains why institutions perform differently in different countries (Constantine, 2017). The performance of an economy depends not only on governance indicators but also on the economic structures of the country. According to the research by Khan, 2000, Khan, 2004), economic structures and government capabilities are important for improving economic growth. In recent years, there has been a development policy discussion in reference to good governance. There is still a growing body of literature on the instrumental value of institutional quality in economic development (Acemoglu & Robinson, 2012; Rodrik, 2008). Specifically, exploring economic policies and structures alongside institutional quality can help in studying and resultantly making relevant policies for economic growth. Specific economic policies according to the regional and local level economic conditions and the country's income level are important for economic growth alongside improving the institutional quality. Rashid and Mansoor (2018) examined the money, income, and prices in Pakistan by taking the informal economy into consideration and found that the money supply is positively and significantly related to total economic activities including the informal activities. Therefore, the magnitude of the informal economy is important for designing economic policies.

3. Data source and variables

The MIMIC model originated in the factor analysis studies by Zellner (1970) and later by Joreskog and Goldberger (1975). Later, this idea was further developed by Aigner, Schneider, and Ghosh in 1988 with some adjustments. The principal goal of the MIMIC model is to examine the relationship between an unobserved variable and a set of observable variables using their covariance. Frey and Weck-Hannemann (1984) were pioneers of using the MIMIC model in investigating the informal economy. It was followed by the work of Giles and Tedds (2002) and Trebicka (2014). Significant work is done by Frederich Schneider in multiple papers including few prominent studies including R. Dell'Anno and Schneider (2004), F. Schneider (2006), F. Schneider and Bajada (2003),

R. Dell'Anno and Schneider (2009), and Schneider et al. (2010), Schneider (F. Schneider, 2016). Typically, the currency demand method is used as a benchmark. In this study, the same approach is used for the evaluation of the size of the informal economy. This study contributes by deviating from the existing literature and dividing institutional quality into further groups to identify the most significant variables for a developing country like Pakistan. Specific institutional determinants can help in the policy-making process to address the actual institutional issues specific to Pakistan. Tax burden and unemployment rate are added as significant determinants for the informal economy of Pakistan as empirically tested.

Variables are divided into causes and indicators to estimate the latent variable i.e the informal economy Variables are explained in Table 2. North (1993) classified institutions as formal and informal. Institutional variables can also be classified into legal, political, social, and economic institutions (Joskow, 2004). The quality of these institutions directly or indirectly affects the size of the informal economy. Legal institutions have a significant presence and impact on the economic behavior of society. In the formal classification of institutions, legal institutions and political institutions have a large part and impact. Literature emphasizes that institutional factors are important in understanding the level of the informal economy and changes in its size.

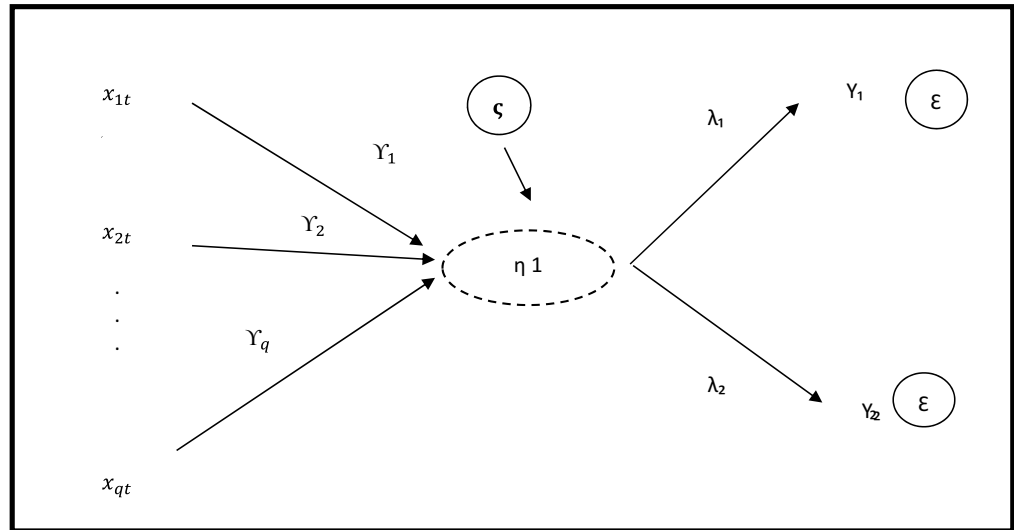
Legal institutions are omnipresent kind of institutions as they are based on social interactions. State-level or public legal institutions are an extensive part of formal institutions. Legal institutions have significance in property rights, formal contracts, the legal system and its effects, and law enforcement to name few issues. Further, political institutions are also considered due to their broad scope like voting rights, electoral rules, rule of government, the establishment of political parties, etc. Economic institutions are significant when growth and income relevant policies are developed. However, they are intersected by the legal institutions and they need a sound political and legal environment to work efficiently. Legal variables initially chosen on the basis of a study by Kuncic (2014) were Property rights, Legal Environment, Civil Liberties, Judicial independence, Impartial courts, Protection of property rights, Law and order, Religion in Politics and Rule of Law. Political institutional variables were Political Environment, Political Rights, Institutionalized Democracy, Checks and balances, Democratic accountability, Corruption, Bureaucratic quality, internal conflict, Military in politics, Control of Corruption, Corruption perceptions index Transparency international and Political terror scale. After testing various specifications variables are eliminated which do not exhibit statistically significant results. Based on the significance level of parameters and value of coefficients of determination, the optimal model is considered with the specification of 6-2-1. The variables are reduced to two along with the two indicators of the informal economy which are GDP growth rate per Capita and Currency Ratio in the second specification of 2-2-1. Initially, the significant institutional variables selected for estimation of the informal economy are religion in politics, protection of property rights, law and order, bureaucratic quality, unemployment rate, and tax burden.

The data of the International Country Risk Guide provides political, economic, and financial risk rating. In total 22 variables are included in the three categories. Data for Law and Order, Religion in politics, bureaucratic quality data is taken from ICRG. The index by the Fraser institute measures the degree of economic freedom in five major areas. One of them is the legal system and property rights which have a sub-component of Protection of property rights. Data of Tax burden and Unemployment Rate is taken from World Bank datasets and data on GDP growth and Currency ratio is taken from the data of State Bank of Pakistan.

4. Methodology

In structural equation modeling, a latent variable(s) is approximated by using the observable indicators. A latent variable is denoted by η and observable indicators are denoted by x . There are two components of this model: a structural model which specifies causal relationship(s) between unobservable variable(s) and their causes; and a measurement model that relates unobservable variable(s) to the indicators. The general structure of the MIMIC model is shown in Figure 1:

Figure 1. General Structure of a MIMIC Model.



The model used in this study has a causal variable which is institutional quality. It is further explained by legal and political institutions. They are further explained by their indicators. The indicators of the informal economy are a monetary indicator which is a monetary base/broad money ratio or commonly known as Currency Ratio and State of the official economy (annual growth rate of GDP per capita), These indicators construct the latent variable of the informal economy. Structural equation modeling has its advantages which include the use of multiple observed variables to understand their study. It also involves greater recognition of the measurement instruments in terms of reliability and validity. In structural equation modeling measurement error is considered during statistical analysis of data. The variance-covariance matrix is used in the computation of structural equation modeling. A variance-covariance matrix is made of variance terms on the diagonal and covariance terms off the diagonal. Factor analysis determines which observable variables/indicators have variance-covariance characteristics that define the factors or latent variables. In this study, the confirmatory factor model approach is used to test the significance of the hypothesized factor model. With the help of explanatory factor analysis, the MIMIC model is formed for the estimation of the informal economy. Other than institutional variables tax burden and unemployment rate are taken on the basis of the empirical literature. In the MIMIC

Figure 2. MIMIC Model used for estimation.

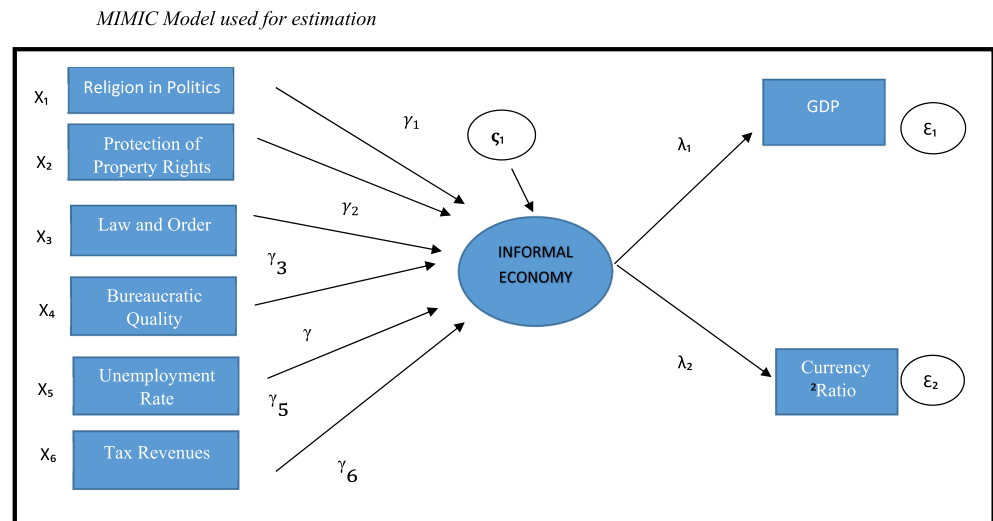
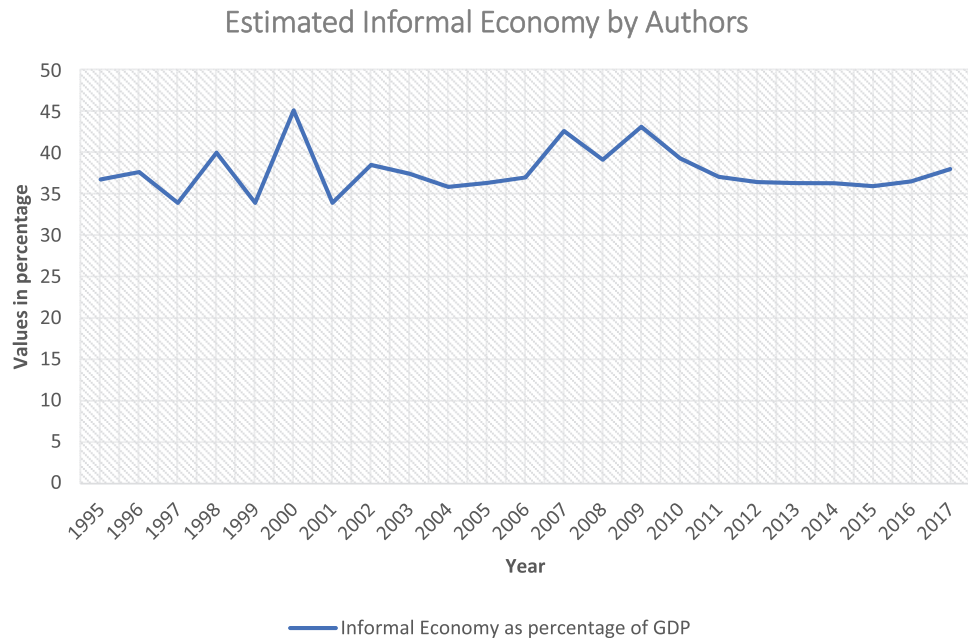


Figure 3. Trend of The informal Economy as a percentage of GDP.



model, a relationship between an exogenous and latent variable is established which makes the MIMIC model a confirmatory method. Frey and Weck-Hannemann (1984) were first to use the MIMIC model to estimate the informal economy for OECD countries.

The flexibility of the MIMIC model makes it a suitable choice for estimating the informal economy. Multiple indicators and causes can be selected on the basis of a particular aspect of the informal economy under study, data availability, and time period. The MIMIC model has its limitations but it is useful for calculating the informal economy and identifying the variables which have the biggest impact on the size of the informal economy and reasons for its expansion. The selection of relevant variables may help the policymakers to adopt the most relevant policies to control the informal economy expansion. The informal economy analysis with the help of the

Figure 4. Trend of The informal Economy and GDP growth rate over the years.

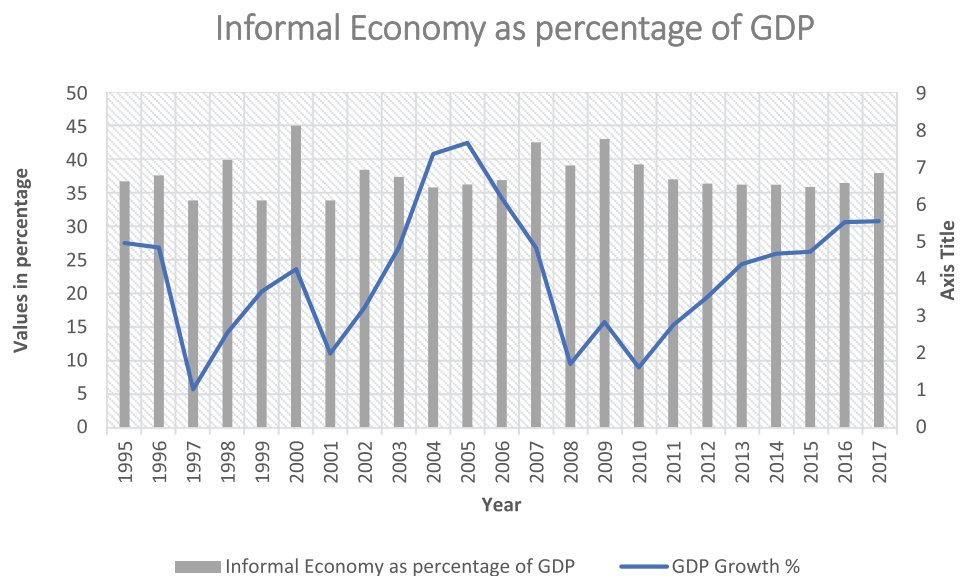
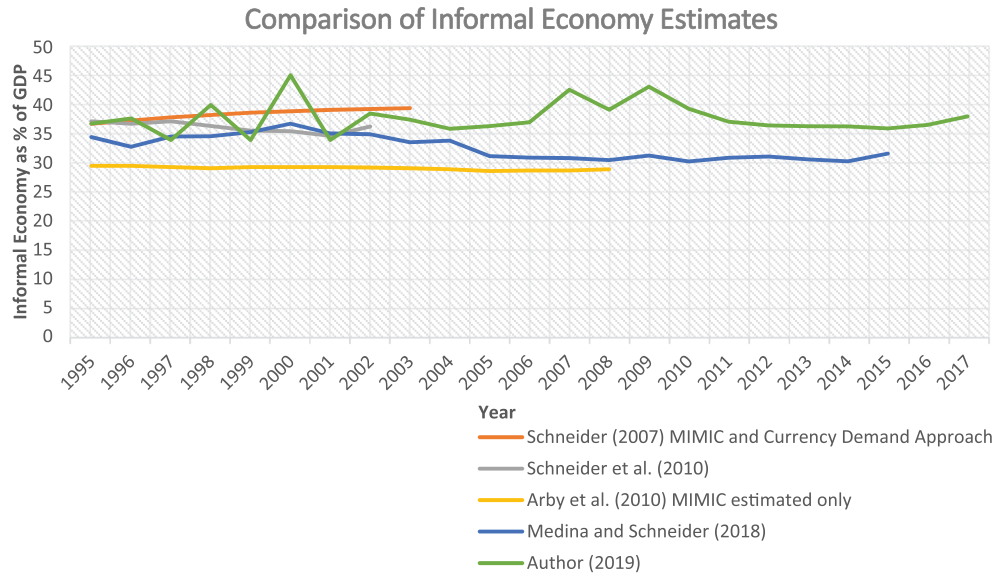


Figure 5. Comparison of estimates of the informal economy in literature.



MIMIC model can help policymakers aware of the important factors. Closest to actual figures can help in addressing the expanding the informal economy and issues arise with it. According to Giles and Tedds (2002) it is a wider approach than direct and indirect methods. Like direct and indirect methods MIMIC model does not need restrictive assumptions as argued by Cassar (2001). Instead, it relies on the broad definition of the informal economy by including all the informal economic activities.

MIMIC model is briefly explained as under:

- (1) The informal economy is taken as a latent variable.
- (2) The relationship between the latent variable and its causes is described in the structural model which is as under:

$$\eta_t = \gamma'x_t + \varsigma_t$$

- (1) The relationship between the latent variable and its indicators is explained by the measurement model:

$$y_t = \lambda\eta_t + \varepsilon_t$$

Where

η_t : latent variable (informal economy)

x_t : (q x 1) vector of causes in the structural model

y_t (p x 1) vector of indicators in the measurement model

γ' : 1 x q coefficient matrix of causes in structural equation

λ : 1 x p coefficient matrix in the measurement model

Table 1. Summary of Literature Review on the informal Economy of Pakistan

Author(s)	Theoretical Model (estimation technique used)	Average The informal Economy Estimates for Pakistan
M. Ahmed and Ahmed (1995),	Modified Tanzi's Monetary Approach * (OLS)	41.79%
Shabsigh (1995),	Modified Tanzi's Monetary Approach (OLS)	22.70%
Aslam (1998),	Modified Tanzi's Monetary Approach (OLS)	39.33%
Iqbal et al. (1998),	Modified Tanzi's Monetary Approach (OLS)	34.30%
M. A. Kemal (2003),	Modified Tanzi's Monetary Approach(OLS)	31.82%
Yasmin and Rauf (2004),	Tanzi's Approach(OLS)	23.62%
M.A. Kemal (2007),	Modified Tanzi's Approach(OLS and **VAR model)	25.77, 49.54, and 36.37 %
Q.M. Ahmed and Hussain (2008)	Modified Tanzi's Approach(OLS)	25.22% and 30.51%
Arby et al. (2010)	Modified Tanzi's Approach(***ARDL model)	29.68%
	MIMIC Approach (SEM)	29.43%
	Electricity Consumption	21.60%
Gulzar et al. (2010)	Tanzi's Approach(OLS)	34.11%
	Modified Tanzi's Approach (****DOLS)	23.84%
	MIMIC (SEM)	29.93%
	Electricity Consumption Approach	50.25%
	Labor Market Approach	26.74%
Kemal and Qasim (2012)	Discrepancy Approach based on import & export mis-invoicing	91.44%
Kiani et al. (2015)	Modified Tanzi's Approach(ARDL model)	26.72%
Mughal and Schneider (2018)	Currency Demand Approach (ARDL model)	26.4, 25.3 & 26.1 %

*Ordinary Least Squares

**Vector Auto regression model

***Autoregressive distributed lag model

****Dynamic Ordinary Least Scale

ζ_t error term in structural model

ε_t is a vector (px1) of measurement error in Y

Structural disturbance and measurement errors have normal distribution and they are mutually independent. These assumptions are based on the study by R. Dell'Anno (2003) and they are crucial for the quality of the results.

The MIMIC model is as shown in the Figure 2:

Civil liberties and rule of law from freedom house

Judicial independence, impartial courts, protection of property rights Fraser Institute

Law and order ICRG

Table 2. Variables data sources

Variables	Source
Causal variables	
Protection of property rights(Legal institutional variable)	Fraser Institute
Law and Order (legal institutional variable)	International Cooperation Review Group (ICRG)
Bureaucratic quality	ICRG
Religion in Politics	ICRG
Tax Burden	World Bank Data
Unemployment Rate	World Bank Data
Indicator variables	
Currency Ratio	Calculated from State Bank of Pakistan Data
GDP growth rate per capita	World Bank Data

Annotation: yearly data
 Description of variables (See Appendix).

Rule of Law WB World Governance Indicators

Political rights freedom house

Democratic accountability World Bank DPI

Control of Corruption and Bureaucratic Quality ICRG

In this figure:

$$X = X_1 + X_2 + X_3 + X_4 + X_5 + X_6 (\text{Observable causes of informal economy})$$

$$\gamma = \gamma_1 + \gamma_2 + \gamma_3 + \gamma_4 + \gamma_5 + \gamma_6 (\text{Parameters of structural model})$$

$$Y = Y_1, Y_2 (\text{observable indicators})$$

$$\lambda = \lambda_1, \lambda_2 (\text{Parameter of measurement model})$$

$$\varsigma_1 = \text{measurement error of structural equation}$$

$$\varepsilon = \varepsilon_1, \varepsilon_2 (\text{measurement errors of measurement equations})$$

By starting with the most generic specification of the MIMIC model which is 6 – 1–2, the least significant variables are dropped and in this way, the model will be optimized.

5. Empirical results

The focus of this section is to provide a comprehensive interpretation of estimates of the informal economy obtained from the MIMIC model. Furthermore, significant institutional determinants causing the informal economy are highlighted. Two specifications are considered. While comparing our estimates with the recent studies available, the results are more in line with the results of Schneider et al. (2010) and Medina and Schneider (2018). In this study, we have employed a time series analysis of the MIMIC model by using six causes and two indicators of the informal economy. Tables 3 and 4 below presents the estimated results of the MIMIC model

Table 3. Specification I (6-1-2)

Causes	1	2	3	4	5	6
	Religion in Politics	Protection of Property Rights	Law and Order	Bureaucratic Quality		
		Unemployment Rate	Tax Revenue			
	3.794***	-.2045***	-1.473***	-2.112***	-.1426***	-.0986***
Indicators	GDP	Currency Ratio				
	1	20.94***				
Statistical tests	**RMSEA	*Chi Square				
	.030	.403				

*Chi square is sensitive to sample size

**Root mean square error of approximation

Own calculations by taking most significant indicator variables of institutional quality

which shows that values are significant at a conventional level. All coefficients possess the expected signs as per economic theory. Religion in Politics is positively associated with the informal economy and it is a statistically significant causal variable in the long run where it plays its role in the expansion of the informal economy. Another significant causal variable is Law and Order. This is negatively associated with the informal economy and according to the economic theory improvement in law and order reduces the size of the informal economy. Corruption in the police department and other law enforcement departments can be important factors contributing to poor state of law and order in Pakistan. In the first specification, tax revenues, unemployment rate, bureaucratic quality, and protection of property rights were other significant contributory factors alongside religion in politics and law and order.

Coefficients estimated by the MIMIC model for The informal Economy are as follows:

The estimated coefficients by MIMIC Model are required to be converted to real-life figures by converted as a percentage of official Gross domestic product. This requires calibration or benchmarking procedures. The benchmarking procedure used by R. Dell'Anno (2008) and R. Dell'Anno and Schneider (2009) is used for benchmarking.

Table 4. Model specification II (2-1-2)

Causes	1	2
	Religion in Politics	Law and Order
	1.348***	-1.699***
Indicators	GDP	Currency Ratio
	1	18.27
Statistical tests	**RMSEA	*Chi Square
	.072	.3393

*Chi square is sensitive to sample size

**RMSEA is Root mean square error of approximation

Own calculations by reducing the indicator variables from 6 to 2 on the basis of significance.

Table 5. Estimates of the informal economy of Pakistan and comparison with literature

Year	Schneider (2007)	Schneider et al. (2010)	Arby et al. (2010) MIMIC estimated only	Medina and Schneider (2018)	Authors
1995			29.5	34.48	36.81
1996			29.5	32.81	37.71
1997			29.3	34.58	33.98
1998			29.1	34.63	40.05
1999	36.8	37.2	29.3	35.35	33.98
2000		36.8	29.3	36.8	45.18
2001	37.9	37.2	29.3	35.12	33.98
2002		36.4	29.2	34.97	38.56
2003	38.7	35.6	29.1	33.58	37.49
2004		35.5	28.9	33.87	35.91
2005	39.2	34.7	28.6	31.19	36.37
2006		36.3	28.7	30.94	37.04
2007	39.5		28.7	30.84	42.68
2008			28.9	30.49	39.21
2009				31.28	43.20
2010				30.28	39.37
2011				30.91	37.14
2012				31.12	36.50
2013				30.62	36.35
2014				30.29	36.33
2015				31.62	35.99
2016					36.58
2017					38.07

Source: Schneider (2007), Schneider et al. (2010), Arby et al. (2010), Medina and Schneider (2018)

In the first step, the Index of the informal economy is calculated by using a structural equation. The coefficients are multiplied by the significant causal variables.

$$\text{StructuralEquation} : \eta_t = 1.348X_{1t} - 1.699X_{3t}$$

This index is converted to the absolute values of the informal economy. The base year is taken as 1995 and the exogenous value is taken for the informal economy is from F. Schneider (2010) which is 36.8 % for Pakistan.

The benchmark equation is as follows:

$$\frac{\tilde{\eta}_t}{GDP_{1995}} \frac{\eta^*_{1995}}{GDP_{1995}} \frac{GDP_{1995}}{\eta_{1995}} \frac{GDP_{1995}}{GDP_t} = \frac{\eta_t}{GDP_t}$$

- (1) Where $\tilde{\eta}_t/GDP_{1995}$ is calculated by the structural equation which will be determined with the coefficients of estimation by using the MIMIC model. It will be the exogenous estimation of the informal economy.
- (2) (η_{1995}/GDP_{1995}) is a value of index which will be estimated by the structural equation.

- (3) GDP_{1995}/GDP_t will convert the index of changes respect to GDP in the base year in the time series of The informal economy/current GDP.
- (4) η_t/GDP_t will be the estimated the informal economy as a percentage of official GDP.

By simplifying the equation becomes:

$$\frac{\tilde{\eta}_t \cdot \eta_{1995}^*}{\eta_{1995} \cdot GDP_t} = \frac{\eta_t}{GDP_t}$$

6. Discussion and implications

Average the informal economy of Pakistan as estimated by taking into account the institutional factors is 37.75 percent from 1995 to 2017. The informal economy is an untapped potential of the economy which reflects the legal economic activities in the country which would contribute to the national GDP. The estimation results for the first specification show that among six causes, by using 6-1-2 MIMIC model Religion in Politics and Law and Order are the most significant causes in terms of Pakistan's economy. The results of the second specification (2-1-2) are used to estimate the size of the informal economy in Pakistan. The estimated results in Figure 3 show that the informal economy in Pakistan fluctuated and showed an upward trend from 1995 to 2009. While the informal economy comparatively showed a downward trend from 2010 to 2017.

The estimates of the informal economy and GDP in Pakistan in Figure 4 show that with an increase in GDP, the informal economy goes down. Empirically, a similar trend is observed in other developing countries. The informal economy exists in every country and it includes activities which are not included in national account. This reduces the effectiveness of government policies which are mainly based on the figures of the official economy. Previously, the tax burden and unemployment rate are used as causes of the informal economy. Estimates of this study did not show variation from the empirical literature and show the same expanding trend followed by the reducing trend in recent years.

Empirical literature shows that the informal economy in Pakistan was increasing from 1990 to the early 2000 s and showed a reducing trend there onwards (see Table 5). The informal economy expanded as studied by Schneider (2007). It showed almost no change as it reached a maximum value of 37.2 % in Financial Year 1999 and Financial Year 2001 and a minimum of 34.7 in FY2005 with an average value of 36.2 % from FY1999 to FY2007 as studied by Schneider et al. (2010). Arby et al. (2010) estimated the informal economy from FY1995 to FY2008 for Pakistan. Estimates show that the informal economy did not show much fluctuation and remained within 28.6 (FY 2005) to 29.5 % (FY 1995, 1996) with average the informal economy being 29.1 %. Recently, Medina and Schneider (FY 2018) found the average the informal economy of 32.6 % from FY1995 to FY2015. The informal economy expanded from FY1995 to FY2004 and reduced from FY2005 to FY2015. In this research as depicted in Figure 5, estimates of the informal economy also show similar results and expanded from FY 1995 to FY 2009 and show a downward trend from FY 2010 to FY 2017. Average the informal economy of Pakistan is estimated at 37.7 % of GDP.

The study is specific in its scope by investigating legal and political-institutional quality indicators only. It can be considered as a debate initiator for further exploring studies on the subject matter in relevance to Pakistan by adding the local economic structures and economic institutional variables. This study has its limitations like the commonly accepted definition of the informal economy is still missing. A particular definition will help with the estimation and comparison of the informal economy among different countries. The core indicators of the informal economy and still not identified specifically. The benchmarking method should also be developed for empirical results to improve their credibility.

7. Conclusion

The informal economy is challenging to estimate. The significance of the informal economy has increased in recent times due to its expansion. The need for its estimates has also increased to develop the policies to bring it under the official economy. In this study, it is concluded that the informal economy is prevalent in developing countries like Pakistan. The improvement in institutional quality is needed to improve the overall state of the economy by reducing the size of the informal economy. Like every developing country, the trend has shown that the informal economy goes down with an increase in the formal economy. The interaction with the institutional variables to estimate the informal economy also shows that the informal economy has not reduced in Pakistan in the last three decades. One of the main reasons alongside tax evasion and unemployment is low legal and political-institutional quality. For policy implications, the most important conclusion that can be derived from this study is that to reduce the informal economy tax increase is not an effective solution. Policy considerations for poverty alleviation and economic development are important. Institutional development is an important contributor to reduce the size and impact of the informal economy in developing countries. The efficiency of institutions can yield more benefits for a developing economy that increasing the tax base.

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Appendix: Description of variables

Variable	Definition
Bureaucratic quality	Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.
Law and Order	Two measures comprising one risk component. Each sub-component equals half of the total. The “law” sub-component assesses the strength and impartiality of the legal system, and the “order” sub-component assesses popular observance of the law.
Religion in Politics	domination of society or governance by a single religious group that seeks to replace civil law by religious law to exclude other religions from the political or social process.
Protection of Property Rights	Property rights, including over financial assets, are poorly defined and not protected by law.
	Tax Burden is tax revenue to GDP which is taken from World Bank data.
Unemployment Rate	Unemployment as a percentage of total labor force.
GDP Growth Rate	GDP Growth rate per Capita
Currency Ratio	Monetary base to broad money ratio is calculated from State Bank of Pakistan data.



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