

Size and Causes of the Informal Sector of the Nigerian Economy: Evidence From Error Correction Mimic Model

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Abstract

This work was motivated mainly by the need to empirically examine the magnitude of economic loss attributed to informality in Nigeria. Specifically, the objective of the study is to examine the size, development, and causes of the informal sector of the Nigerian economy. In recent times, multiple indicators multiple causes (MIMIC) models are applied to time series estimating the size and development of the informal economy for a particular country. However, in order to obtain more accurate estimates about the size, development and causes of the informal economy in Nigeria, this work applied an error correction MIMIC (EMIMIC) model which estimates the cointegration equilibrium relationship and the error correction short run dynamics. The results show that since 1970, the size of the informal economy has hovered between 53.6 – 77.2% of GDP, and that the average size of the informal economy was about 64.6% of GDP. Specifically, the results indicate that informal sector was about three-quarters of GDP in 2010. Furthermore, the results show that unemployment, tax burden, government regulation, and inflation are the most important drivers of informality in Nigeria.

Key words: Informal Sector, Nigerian Economy, Cointegration, Error Correction, MIMIC Model

1. Introduction

One of the major constraints to development policymaking and economic management in Nigeria is the paucity of credible statistics and systematic evidence on the informal sector. Despite the wide range of informal sector economic processes and activities, current knowledge of the size, causes, characteristics, and dynamics of the informal sector remains very scanty and inadequate (Oduh et al, 2008). However, improved knowledge and understanding of the nature, size, causes and dynamics of the informal sector will provide salient evidence base for more effective targeting of economic policy and control measures.

Economic activity that falls outside the purview of government accounting is known by various names as informal, hidden, underground, black, gray, clandestine, illegal, shadow, and parallel (Thomas, 1992; Feige, 1990; Schneider and Enste, 2000). According to Tanzi (1999), "there cannot be any question that the informal economy is a real phenomenon with important implications that deserve attention and study". Of greatest concern is that this activity is unrecorded, and, as such, official national income accounts statistics do not accurately represent the true state of the country's economy. Given that these statistics are employed to generate economic policies, unavailability of information on the size of the informal sector and its causes may lead to inappropriate policy responses.

Furthermore, Ajakaiye and Akerele (1996) and Oduh et al (2008) stated that Nigeria's informal economy still remains an enigma as it has neither been comprehensively studied nor understood. Clearly, several questions remain unanswered regarding the size, causes, and dynamics of the informal sector in Nigeria; and providing answers to these questions through scientific analysis represents a viable approach to supporting economic policies for integrating formal and informal sectors and eliminating dualistic markets.

Herein lies the motivation for this study which examined the magnitude, causes, and dynamics of the informal sector of the Nigerian economy over the period 1970 to 2010.

2. Conceptual Framework

Studies trying to measure the informal sector first of all face the difficulty of how to define it. Unfortunately, the informal sector does not have a commonly accepted definition in literature (Oduh et al, 2008; Ajakaiye and Akerele, 1996; Thomas, 1992). It has been difficult to evolve a conceptual framework which can be applied to precisely decide whether a particular activity is formal or informal. Unfortunately, without a precise and unambiguous conceptual framework for demarcating the boundaries between formal and informal activities, systematic research into the salient features of informal activities in ways that will enhance knowledge about this phenomenon may be difficult (Ajakaiye and Akerele, 1996).

In general, however, the informal sector has been defined in the literature from several dominant perspectives, namely: government regulations, social security, the number of people employed in an enterprise, physical and human capital per worker, mode of operation of the enterprise (such as customer base and location of the enterprise), source of income, and legal framework. From the perspective of government regulations, Oduh et al (2008) defined an informal enterprise as one which operates without regulations prescribed by the public authority to govern its organizational behavior. This definition suggests that informal economic units operate without the constraints of behavior prescribed by public authorities that may include the regulation of prices of inputs, control of entry in the sector, disclosure of production process information, safety and health standards. However, an informal economic unit may have its internal rules and regulations which may not be available to the public, yet the existence of such internal rules of behaviour does not confer on it the status of a formal enterprise.

Gbanador (2007) views informal sector activities from two perspectives. According to this approach, the underground (informal) economy is made up of two components, viz:

i. the production and distribution of illegal goods and services; and
ii. the non reporting of legal economic activities.

Other definitions of the informal sector can be found in Feige (1990), Loayza (1997), Henley et al (2006), Schneider (2002), Smith (1994), Bhattacharyya (1999), Hart (1973), and Ajakaiye and Akerele (1996).

In this empirical study, we shall adopt the conceptualization of the informal economy provided by Oduh et al (2008), which considered that one of the main features of Nigerian informal enterprises is that they are not legally independent from the households that own/manage them. Besides, these enterprises are characterized by small number of employees (less than 10 employees) and typically operate outside the regulatory capture (that is, not registered with the Corporate Affairs Commission as a separate legal entity and so do not subscribe to both corporate income tax and Pay-As-You-Earn tax).

3. The Nigerian Informal Sector

Akerele (2005) reported that before and years after independence, the Nigerian economy was predominantly rural and agrarian. Cash crops such as palm produce, ground nut, and cocoa as well as minerals such as tin ore, columbite, and zinc were major foreign exchange earners. These activities were carried out by individuals and small-holder enterprises. It is obvious that these activities were mainly performed by informal sector operators.

The Nigerian informal economy covers a wide range of activities. These include several small-scale and unregistered sole-proprietor businesses, and in some instances, joint-partnership businesses which can be found in both rural and urban settlements across the country. In this informal economy, tax evasion is very rampant as

income is unmeasured and unrecorded. The nature of the economic activities engaged in varies considerably from one locality to another. For example, in the rural areas, farming activities and allied occupations such as blacksmithing, weaving, and pot making are more prevalent. However, in urban centres like Lagos, Enugu, and Abuja, the informal economic activities include trading, small-scale manufacturing and repairing industries, such as carpentry, upholstery, furniture making, woodworks, metalworks, bakery, tailoring, bricklaying, and printing. Those in the area of repairing occupations include, among others, the automobile mechanics, electricians, clock and watch repairers and cobblers (Olowu and Okotoni, 1996).

4. Causes of the Informal Economy

In economic literature, the most important causes of the informal economy are increased tax burden and social security contribution, the complexity of the tax system, increased regulation in the formal economy especially in labour markets, government failure, increasing unemployment rate, inflation rate, interest rate, forced reduction of weekly working hours, earlier retirement and declining tax morale (Schneider and Enste, 2004; Ogunc and Yilmaz, 2000; Oduh et al, 2008; Salisu, 2001).

5. Review of the Empirical Literature

One of the estimates of the informal economies around the world is the study conducted by Schneider (2007), who used the DYMIMIC and Currency Demand Methods to estimate the informal economies of 145 countries, including developing, transition, and highly developed OECD economies over the period 1999 to 2005. The findings reveal that the size of the informal economy (as a percent of "official" GDP) in 2004/05 in Nigeria is 59.5%. Also, the average size of the informal economy in 2004/05 in 96 developing countries (including Nigeria) is 36.7%. Schneider also found that an increased burden of taxation and social security contributions, combined with a labour market regulation are the causes of the informal economy.

Oduh et al (2008) used the general MIMIC model to estimate the size and determinants of the informal sector in Nigeria over the period 1970 to 2005. The study also used a survey methodology to obtain data on enterprise-level characteristics, production patterns, investment practices and business conditions from 4,455 informal sector enterprises in eleven states in the South-South and South-East zones of Nigeria. Their study shows that since 1970, the size of the informal economy ranged between 44-73% of GDP; and that declining income, high tax burden, high black market premiums, and government control of the economy are some of the most important drivers of informality in Nigeria. Furthermore, wholesale, retail trade and personal services dominate the informal sector while financial intermediation is the least in terms of number of enterprises.

Salisu (2001) utilised the MIMIC approach to estimate the size of the hidden economy in Nigeria. The study found that the informal economy was about 9.64 – 65.43% of GDP in the period 1960 to 1997 and that the size of the informal sector in 1997 was about 58.76% of GDP.

6. Limitations of Previous Studies

The literature above summarized the current estimates of the size and causes of the informal economy in Nigeria. Schneider (2007) used the direct and indirect methods of estimating the size and development of the informal economy despite the inherent weaknesses in these methods.

Salisu (2001) and Oduh et al (2008) used the model approach (that is, the MIMIC model) together with the direct approach (survey method) to estimate the size of the Nigerian informal sector. However, while the MIMIC model developed by Oduh et al (2008) excluded the real GDP, inflation and interest rate, that of Salisu (2001) excluded both the real GDP and unemployment despite the fact that economic theory had identified unemployment as a major cause of informal activities in Nigeria. The MIMIC models developed by Oduh et al

(2008) and Salisu (2001) did not consider both the long run equilibrium relationships and the short run dynamic error corrections at the same time.

Furthermore, the estimates Schneider (2007) reported for Nigeria used a panel with a dominant cross-sectional dimension (145 countries over a limited period of ten annual time points), thus any time dynamics and differences between long- and short-run effects cannot be taken into consideration. The Nigerian informal economy estimates of Schneider (2007) were obtained from cross-sectional data generally treating the analyzed countries as random observations; they paid little or no attention to country peculiarities as the estimates of the informal economy were not obtained from time series data for Nigeria. Oduh et al (2008) noted that one growing fact about the measurement and the size of the informal sector is that methods and data availability determine its level of accuracy. This study has the advantage of more data availability and most recent estimation technique, that is, the EMIMIC modeling technique developed by Buehn and Schneider (2008).

7. METHODOLOGY

Economists and statisticians around the world have developed a variety of methods for estimating the size of the informal economy. Oduh et al (2008) stated that these methods can be summarized into three approaches: Microeconomic, macroeconomic and the use of econometric models.

Microeconomic approaches employ sample surveys based on voluntary replies or tax auditing and other compliance methods. The reliability of the surveys depends on a number of factors which range from methodology of sample designs to instruments of carrying out the survey. The disadvantages of this approach are connected with normal flaws that are associated with generating survey data including the precision of the questions, reliable responses, measurement errors, etc. They only result in point estimates and reveal little about increases in undeclared work. In fact, the responses are rarely reliable (Oduh et al, 2008; Schneider, 2002).

The macroeconomic approaches, also called indicator or indirect approaches, make use of various economic and social indicators that provide information about the development of the informal economy over time (Schneider and Enste, 2004; Oduh et al, 2008). In contemporary literature, there are five indicators for gauging trends of the informal economy, namely: Gap between national expenditure and income statistics; Discrepancy between the official and actual labour force; Currency demand or the ratio of currency to demand deposits; Transaction approach; and Electricity consumption method.

The main criticisms of this method as found in Thomas (1986,1999) and Feige (1986) are that not all informal transactions are performed in cash, it gives only a very rough indication of the informality, the same velocity of money in both the formal and informal economy, etc.

The model approach explicitly considers multiple causes that lead to the existence and growth of the informal economy, and to its multiple effects over time. The empirical method is based on the statistical theory of unobserved variable, a theory which considers multiple causes and multiple indicators of the phenomenon to be measured. The pioneers of this approach are Weck (1983), and Frey and Weck-Hannemann (1984), who applied this approach to cross-section data from the 24 OECD countries for various years.

8. The General MIMIC Model

The MIMIC model is an attempt at transcending the constraints found in the direct and indirect approaches. According to Buehn and Schneider (2008), the MIMIC model explains the relationship between observable variables and an unobservable variable by minimizing the distance between the sample covariance matrix and the covariance matrix predicted by the model. The observable variables are divided into causes of the latent variable and its indicators. The MIMIC model consists of two parts: the structural equation model and the measurement model. The structural equation model is given by:

$$\eta_t = \gamma' \mathbf{x_t} + \varsigma_t, \quad \ldots\ldots(1)$$

Where: $\mathbf{x_t} = (x_{1t}, x_{2t}, \ldots, x_{qt})$ is a $(1 * q)$ vector of time series variables as indicated by the subscript t . Each time series x_{it}, i = 1,2, …,q is a potential cause of the latent variable η_t. $\gamma' = (\gamma_1, \gamma_2, \ldots, \gamma_q)$, is a $(1 * q)$ vector of coefficients in the structural model describing the "causal" relationships between the latent variable and its causes. Since the structural equation model only partially explains the latent variable η_t, the error term ς_t represents the unexplained component. The MIMIC model assumes that the variables are measured as deviations from their means and that the error term does not correlate to the causes, that is:

$\mathbf{E}(\eta_t) = \mathbf{E}(\mathbf{x_t}) = \mathbf{E}(\varsigma_t) = 0$ and $\mathbf{E}(\mathbf{x_t}\varsigma'_t) = \mathbf{E}(\varsigma_t \mathbf{x'}_t) = 0$. The variance of ς_t is abbreviated by ψ while $\mathbf{\Phi}$ is the $(q * q)$ covariance matrix of the causes x_t.

The **measurement model** represents the link between the latent variable and its indicators, that is, the latent unobservable variable is expressed in terms of observable variables. It is specified by:

$$\mathbf{y_t} = \lambda \eta_t + \varepsilon_t, \quad \ldots\ldots(2)$$

where: $\mathbf{y_t} = (y_{1t}, y_{2t}, \ldots, y_{pt})$ is a $(1 * p)$ vector of individual time series variables y_{jt}, j = 1, 2, …, p. $\boldsymbol{\varepsilon_t} = (\varepsilon_{1t}, \varepsilon_{2t}, \ldots, \varepsilon_{pt})$ is a $(p * 1)$ vector of disturbances where every ε_{jt}, $j = 1, 2, \ldots, p$ is a white noise error term. Their $(p * p)$ covariance matrix is given by $\mathbf{\Theta_\varepsilon}$. The single λ_j, $j = 1, 2, \ldots, p$ in the $(p * 1)$ vector of regression coefficients λ, represents the magnitude of the expected change of the respective indicator for a unit change in the latent variable. Like the MIMIC model's causes, the indicators are directly measurable and expressed as deviations from their means, that is, $\mathbf{E}(\mathbf{y_t}) = \mathbf{E}(\boldsymbol{\varepsilon_t}) = 0$.

Buehn and Schneider (2008) derived the MIMIC model's covariance matrix, and considered the concepts of cointegration and error correction models extensively. They extended the general MIMIC model to include these concepts and as a result developed an error correction MIMIC (EMIMIC) model which comprises equations 3 and 4 below:

By putting equation (1) into equation (2), they obtained:

$$\mathbf{y_t} = \mathbf{\Pi x_t} + \mathbf{Z_t}, \quad \ldots\ldots(3)$$

where: $\Pi = \lambda\gamma'$ and $\mathbf{z_t} = \lambda\zeta_t + \boldsymbol{\varepsilon_t}$. The error term $\mathbf{z_t}$ in equation (3) is a $(p * 1)$ vector of linear combinations of the white noise error terms ς_t and $\boldsymbol{\varepsilon_t}$ from the structural equation and the measurement model, that is, $\mathbf{z_t} \sim (\mathbf{0}, \mathbf{\Omega})$.

$$\Delta \mathbf{y_t} = \mathbf{A}\Delta \mathbf{x_t} + \mathbf{B v_t} + \mathbf{K z_{t-1}} + \mathbf{w_t}, \quad \ldots\ldots(4)$$

Where: $\Delta \mathbf{y_t} = \mathbf{y_t} - \mathbf{y_{t-1}}$, $\Delta \mathbf{x_t} = \mathbf{x_t} - \mathbf{x_{t-1}}$, $\mathbf{z_{t-1}} = \mathbf{y_{t-1}} - \Pi \mathbf{x_{t-1}}$, and $\mathbf{A}$, $\mathbf{B}$, and $\mathbf{K}$ are coefficient matrices in this

dynamic, short run model specification. Furthermore, in this specification $\mathbf{A} = \lambda\alpha'$ is the $[p * (q - r)]$ coefficient matrix of the first differences of the I(1) causes, and $\mathbf{B} = \lambda\beta'$ is the $(p * r)$ coefficient matrix of the I(0) causes. The matrix $\mathbf{K} = \lambda\kappa'$ is the $(p * p)$ coefficient matrix for the long run disequilibrium's error correction term and $\mathbf{w_t} \sim (\mathbf{0}, \Omega)$ is a white noise disturbance.

8.1 Model Variables (Causes)

The variables of this study were selected having in mind data constraints, the need to compare findings with the previous informal sector studies, the micro and macroeconomic environment peculiar to the Nigerian economy, and the need for the causal and indicator variables to correctly, precisely and comprehensively correspond to the intended semantic content of the latent variable. Therefore, we have chosen our cause variables to include:

8.1.1 Tax Burden

In the literature, the most popular determinants of tax evasion and of the informal economy are tax rates. The common hypothesis is that an increase of the tax burden is a strong incentive to work in the unofficial economy. The tax burden is measured by means of the total share of direct and indirect taxes as a percentage of GDP. The higher the tax burden the higher is the incentive to work in the informal economy, ceteris paribus.

8.1.2 Real Government Consumption

A rise in the size of the public sector, and/or the degree of regulation of the economic system, provides an incentive to enter the informal economy (Aigner et al. 1988). We have used real government consumption (in percent of GDP) as proxy of all State regulatory activities. A positive sign of this coefficient will support the hypothesis that 'more State' in the market, and subsequently an increase in regulation, gives an incentive to operate in the unofficial economy.

8.1.3 Unemployment rate

According to Tanzi (1999), the relationship between the informal economy and the unemployment rate is ambiguous. Buehn and Schneider (2008) explained that whether the unemployment variable exhibits a positive or negative relationship depends on income and substitution effect. Income losses due to unemployment reduce demand in the informal economy as well as the formal economy. A substitution takes place as unemployed workers turn to the informal economy where cheaper goods make it easier to countervail utility losses. This may stimulate additional demand there. If the income effect exceeds the substitution effect, a negative relationship develops.

8.1.4 Inflation

Inflation is one of the factors that we think should determine the demand for money in circulation and hence the informal economy. It can be seen as a proxy for macro stability. The Nigerian economy had faced high levels of inflation since 1970's mainly due to high reliance on imports. This had affected the economy in various ways such as wiping out of small businesses and fostering black markets. Hence, following Giles (1999) the inflation rate is included to allow for the upward "creep" of tax brackets, and the associated incentive for taxpayers to engage in informal activities. The higher the inflation, the larger the expected size of the informal economy.

8.1.5 Interest Rates

Interest rates act as the cost of holding money in the form of cash. It is expected that a higher interest rate on bank deposits increases the opportunity cost of holding currency. Thus a rational expectation is that an increase in this rate will make economic agents hold less cash and opt for deposits while a lower rate will act as a disincentive to holding deposits. Ultimately, interest rates should have a negative effect on the currency in circulation outside of banks and hence the informal economy. In this study we shall use the average rate on time deposits.

8.1.6 Trade Openness

Openness of the economy to international trade may encourage the importation of contra band goods which have to be smuggled into the economy thereby increasing the activities of the criminal segment of the informal economy. In the literature, trade openness has been measured as the ratio of total trade to GDP. It is expected that the more open the economy is the higher the size of the informal economy. A positive sign is therefore expected for this variable.

8.2 Model Variables (Indicators)

To mirror activities in the informal economy, we use the monetary aggregate M1 and real GDP index. The discussion about the real GDP variable is crucial to the problem of identification, as well as for the theoretical consequences it implies, mainly because it is chosen as variable of scale (or reference variable). Assigning a positive (or negative) unit value to this variable makes it easier to find out the relative magnitude of the other indicator variables. A priori, it is not possible to determine the nature of the relationship between this variable and the informal economy (see Buehn and Schneider, 2008).

Transactions in the informal economy are typically carried out using cash or money that is drawn from a current account at a moment's notice. Dell'Anno and Solomon (2006) used the ratio M1/M2 as proxy for currency in circulation in their study to measure the size of the United States underground economy. However, in this study and in accordance with Giles and Tedds (2002) as well as Buehn and Schneider (2008), we used real currency in circulation (M1), and we expect a positive relationship between the informal economy and M1.

9. Unit Root Tests

The dataset for this study are secondary data covering 1970 to 2010 obtained from the Central Bank of Nigeria's Statistical Bulletin and the National Bureau of Statistics (NBS). The number of observations is 41. We began our empirical analysis by pre-testing the data. We conducted the Augmented Dicky-Fuller (ADF) unit root test and the results for all the variables are shown in Table 1 below:

Table 1: ADF Unit Root Test Results

Variable	Test Statistic	5% Critical Value	Order of Integration
Indicators:			
Real GDP (RGDP)	-5.678	-3.544*	I(1)
M1 (MSS)	-5.249	-3.548*	I(2)
Causes:			
Real Government Consumption (RGC)	-3.776	-3.540**	I(0)
Inflation Rate (INFR)	-6.458	-3.544*	I(1)
Interest Rate (INTR)	-7.518	-3.544*	I(1)
Trade Openness (TOP)	-9.063	-3.544*	I(1)
Tax Burden (TaxB)	-6.000	-3.544*	I(1)
Unemployment Rate (UNEMR)	-5.041	-3.544*	I(1)

Key: * Stationarity at 1%; ** Stationary at 5%

The unit root test results in Table 4.1 show that all the variables are integrated of order one at 5% level of significance, except for RGC which is stationary at levels and MSS which is integrated of order two. Since most of the cause variables have the same order of integration with RGDP at 5% level of significance, there was need

for co-integration test. However, in the case of MSS, we have established that there is no cointegration relationship since none of the cause variables has the same order of integration with MSS.

10. Analysis of Co-integration Between Causes and Indicators (RGDP):

Firstly, the Johansen Tests for co-integration was conducted in line with Johansen (1988) and Johansen and Juselius (1990). This method detects the number of co-integrating vectors in non-stationary time series. The result of the test is presented in Tables 2 below:

Table 2: Johansen Co-integration Test Between Causes and RGDP

Maximum Rank	Trace Statistic	5% Critical Value
0	195.11	124.24
1	111.80	94.15
2	75.29	68.52
3	51.22	47.21
4	30.29	29.68
5	15.92	15.41
6	7.03	3.76

From Table 4.2, it is observed that there is co-integration between RGDP and the cause variables; that is, there is a long run relationship between RGDP and the cause variables. This long run relationship is considered strong since co-integration is established at maximum rank of 6.

We also employed the Engle and Granger two-step approach to reconfirm if the cause variables are indeed co-integrated with RGDP and therefore exhibit a valid error correction representation (Engle and Granger, 1987). To do this, we estimate least square regressions with variables in levels, where the RGDP is the dependent variable and the cause variables are the independent variables. Thus, the regression equation is:

$RGDP = \beta_1 RGC + \beta_2 INFR + \beta_3 INTR + \beta_4 TOP + \beta_5 TAXB + \beta_6 UNEMR + U_1$.

Since the variables are deviations from their means, no constant is included in this regression equation. The assumed co-integration relationship's residual U1 is then analyzed using the Augmented Dickey-Fuller (ADF) test. If the cause variables are co-integrated with RGDP, we expect the ADF test to reject the null hypothesis of a unit root. The result of the ADF test is presented in Table 3 below:

Table 3: ADF Unit Root Tests Result for Residual (U_1):

Variable	Test Statistic	5% Critical Value	Order of Integration
Resid1 (U_1)	-7.224	-3.540*	I(0)

Key: * Stationarity at 1%; ** Stationary at 5%

The unit root test result in Table 4.3 indicates that U_1 is stationary at levels both at 1% and 5% levels of significance. This reconfirms our earlier result that the cause variables are co-integrated with RGDP.

11. MIMIC Models Estimation Results:

In order to estimate not only the relative size of the parameters but also their levels, it is necessary to fix a scale for the unobservable latent variable. A convenient way to determine the relative magnitude of the variables is to set the coefficient of one of the measurement model's indicator variables to non-zero. Following Buehn and Schneider (2008), we fixed the coefficient of the variable RGDP for both the long run and the short run MIMIC estimation.

The establishment of co-integration relationship between the cause variables and RGDP (an indicator variable) permits the estimation of a long run equilibrium MIMIC model for the size and development of the informal sector of the Nigerian economy according to equation (3). This is followed by the estimation of the short run MIMIC model of equation (4) employing first differences of all cause variables and indicator variables. However, the short run estimation also includes the long run error correction term U1. In estimating the EMIMIC models, we observed the problem of multicollinearity involving our trade openness (TOP) variable and other cause variables. We therefore excluded the TOP variable from the estimations. The long run equilibrium parameter estimates and primary test statistics as well as those for the short run model generated from LISREL 9.1 software are presented in Table 4 below:

Table 4: MIMIC Models and Parameter Estimates

	Long Run MIMIC Model Coefficients	**Short Run MIMIC Model Coefficients**
Causes		
Inflation Rate (INFR)	-0.202 (-3.75)**	0.0357 (0.84)
Interest rate (INTR)	-0.125 (-0.48)	0.0337 (0.30)
Tax burden (TaxB)	1.255 (3.20)**	0.0553 (0.50)
Real Government Consumption (RGC)	0.193 (12.43)**	0.0051 (0.17)
Unemployment Rate (UNEMR)	-3.021 (-6.70)**	0.1542 (0.51)
Residual1 (U_1)	-	0.0546 (1.54)
Indicators		
Real GDP (RGDP)	1	1
Money Supply, M1 (MSS)	5826.00	119357.62
Statistics		
Chi-square	494.51	42.89
Degrees of freedom	4	5
P-value	0.0000	0.0000
Root Mean Squared Error of Approximation (RMSEA)	0.0000	0.0000
GFI (R^2)	0.983	0.834
P-value for test of close fit(RMSEA<0.05)	0.0161	0.0000

Notes: (1) ** Significance at 5% level. The values of t-statistics are reported in parenthesis; it is desirable that the absolute value of the t-statistics > 1.96 and fulfillment of this condition is marked with **.

(2) The goodness of fit index GFI (R^2) is the coefficient of determination and it ranges over the interval [0,1]; 1 = a perfect fit.

(3) For P-value for test of close fit (RMSEA<0.05), a positive (+) sign points to a good fitting. The root mean square error of approximation (RMSEA) is also a fit test that some authors argue is less sensitive to sample size than the above mentioned tests (see for example Schneider, 2007); its value varies between 0 and 1; by convention, there is good model fit if the RMSEA is less than or equal to 0.05.

11.1 Inflation:

The coefficients of inflation at long run and short long run are **-0.202** and **0.0357** respectively. Also, it is observed that inflation was statistically significant in the long run while its short run value was not significant as revealed by its t-values of **-3.75** and **0.84** respectively. This result shows that inflation is one of the factors that significantly cause the informal sector in Nigeria. The estimated coefficients have the theoretically expected signs particularly in the long run. The negative sign implies that an increase in the burden of inflation will drive economic agents into the informal sector, and this is in agreement with the findings of Salisu (2001).

11.2 Interest rate

Interest rate both at long run and short long run displays the coefficients of **-0.125** and **0.0337** respectively. The estimated coefficients have the theoretically expected signs particularly in the long run. This implies that increase in interest rate by 1 percent causes informal sector to decrease by 13 percent in the long run while it leads to an increase of 3.4 percent in the short run. However, interest rate was not statistically significant both at long run and short run as shown by its t-values of -0.48 and 0.30 respectively. This result implies that interest rate is not among the significant causes of informal sector activities in Nigeria.

11.3 Tax Burden

Tax burden have a statistically significant influence on informal sector and its estimated coefficients have the theoretically expected signs. The coefficients both at long and short run are **1.255** and **0.0553** respectively; while its t-values are **3.20** and **0.50** respectively. These results indicate that tax burden is a major cause of informal sector activities in Nigeria. This finding also validates majority of studies that pointed to a rise in tax burden as one of the most important causes of the increase in the informal economy (see Oduh *et al*, 2008; Salisu, 2001; Schneider (2007); Loayza, 1997; etc).

11.4 Real Government Consumption

Real Government Consumption expenditure was introduced as a proxy for all public sector activities. The results at long run and short long run displayed the coefficients of **0.193** and **0.0051** respectively. An increase in Real Government Consumption by 1 percent causes the informal sector of the economy to increase by 19 percent in the long run while it leads to an increase of 0.51 percent in the short run. The *a priori* findings of Oduh *et al* (2008) and Schneider (2007) are in conformity with this study. Real Government Consumption was highly statistically significant in the long run with t-value of **12.43**, while its short run t-value of **0.17** was not significant. An increase of the informal economy can lead to reduced government revenues which in turn can reduce the quality and quantity of publicly provided goods and services (such as the public infrastructure). Ultimately, this can lead to an increase in the tax rates for firms and individuals in the formal sector of the economy. When this situation is combined with deterioration in the quality of the administration, a stronger incentive to participate in the informal economy emerges. Johnson *et al* (1998) presented a simple model of this relationship. Their findings show that smaller informal economies appear in countries with higher tax revenues, if achieved by lower tax rates, fewer laws and regulations, and less bribery facing enterprises. Countries with a better rule of the law, which is financed by tax revenues, also have smaller informal economies.

11.5 Unemployment

The unemployment variable has -3.021 and 0.1542 as its long run and short run coefficients respectively. Hence, the overall long run effect is negative. That is, the income effect exceeds the substitution effect. This finding is in conformity with Buehn and Schneider (2008), and it is supported by the positive relation between the informal economy and official GDP, suggesting that in the long run the two are complements rather than substitutes. As expected, however, the short run relationship is positive, which implies that people who face unemployment switch to the informal economy thereby negatively affecting official GDP. The short run result is theoretically

appealing and conforms to Oduh *et al* (2008), which indicated a direct relationship between unemployment and the informal sector.

Even though its short run t-value of **0.51** is not statistically significant, unemployment is statistically significant going by its t-value of **-6.70** in the long run. It also has the largest estimated coefficient, which further reinforces its importance as a causal variable. We therefore conclude that unemployment is another major cause of informal sector in Nigeria. According to Oduh *et al* (2008), one important implication of the above results is that increase in the size of the informal economy following increased labour supply is an indication that resources have shifted from the formal to the informal sector. This displacement effect will tend to shrink the growth rate of the official economy and reinforce unemployment. The economy will then experience an unemployment trap – transfer of labour resources from the formal to the informal economy and subsequent decrease in output of the formal sector and a decrease in formal economy labour demand. As such, the resources transfer will slow down output growth in the official economy.

12. Overall Model Fit:

The robust findings of this study are coherent with the model's prescriptions. Nearly all the determinants of the informal sector used directly as explanatory variables present the expected sign, and are individually significant. Moreover, they are also jointly significant (the p-value of the F-statistic is 0.0000).

The parsimonious specification and the size of the coefficient of determination (R^2) are quite impressive. The R^2 of 0.983 for the long run model shows that the explanatory variables (Inflation, Interest rate, Unemployment, Tax burden and Real Government Consumption) adequately explained about 98% of the total variations in the latent variable (i.e. the size of the informal sector of the Nigerian economy).

The root mean square error of approximation (RMSEA) is also a fit test that Vuletin (2008) says is less sensitive to sample size than the above mentioned tests. The RMSEA-value varies between 0.0 and 1.0; and by convention, there is good model fit if the RMSEA is less than or equal to 0.05. Our results show that RMSEA for both the long run and short run MIMIC models is 0.0000, which indicates an overall good model fit.

The P-value for test of close fit (RMSEA < 0.05) has the values of 0.0161 and 0.0000 for the long run and short run models respectively. Apart from having the desired positive (+) sign, they are also less than 0.05, giving the indication of a good model fit. We therefore conclude that overall, the various test statistics point to a close fit.

13. Estimation of the Size of the Informal Sector

Both the long run equilibrium relationship and the short run dynamic error correction representation of the MIMIC model represent our error correction MIMIC (EMIMIC) model. With it, we can now estimate the size and development of Nigeria's informal economy. In the first step, we normalized the estimated coefficients to sum up to unity in line with Salisu (2001). Thereafter, the normalized coefficients of the fitted structural model were used to create an index for the informal sector. Lastly, we used the index for calibration of the size of the informal sector as percentage of the official GDP while correcting for deviations from equilibrium in the short run.

In our calibration, we followed Oduh et al (2008) and adopted 2002 as our base period. According to Oduh et al (2008), they chose 2002 as their base year because it was the year of the most recent country-wide study of the informal sector in Nigeria. We also adopted the calibration benchmark of 57.9% obtained by Oduh et al (2008) for 2002. Our decision to adopt this benchmark is also reinforced by the fact that it is approximately equal to the average of the estimates obtained by Oduh et al (2008) for the period 1970 to 2005, which is 58.2%. Besides, Oduh et al (2008) is the first detailed estimation of Nigeria's informal sector using an indirect approach that is consistent with time-series econometrics. Hence, we calibrated the size of the informal sector in Nigeria as:

$$Inf_t = \text{calibration benchmark} * \left(\frac{\text{fitted value of latent variable}_t}{\text{fitted value of latent variable}_{2002}} \right) \quad \ldots(10)$$

where t = 1970, 1971, . . ., 2010. Apart from Oduh et al (2008), other studies that followed this calibration procedure include Buehn and Schneider (2008), Salisu (2001), Schneider (2008), etc. Based on our model, we estimated the size of Nigeria's informal sector from 1970 to 2010 as shown in Table 5 below:

Table 5: EMIMIC Model Estimates of the Size of the Nigerian Informal Economy:

YEAR	*GDP (=N='Million)	**EMIMIC INFORMAL SECTOR (=N='Million)	**INFORMAL SECTOR % GDP (EMIMIC)
1970	5,281.10	4,075.35	77.17
1971	6,650.90	4,972.17	74.76
1972	7,187.50	5,308.03	73.85
1973	8,630.50	6,434.20	74.55
1974	18,823.10	11,959.99	63.54
1975	21,475.24	13,732.87	63.95
1976	26,655.78	16,228.50	60.88
1977	31,520.34	17,312.98	54.93
1978	34,540.10	19,143.86	55.43
1979	41,974.70	29,351.12	69.93
1980	49,632.32	33,607.34	67.71
1981	47,619.66	25,909.77	54.41
1982	49,069.28	30,781.63	62.73
1983	53,107.38	29,190.66	54.97
1984	59,622.53	33,049.14	55.43
1985	67,908.55	46,442.40	68.39
1986	69,146.99	46,732.79	67.58
1987	105,222.84	69,526.24	66.08
1988	139,085.30	92,070.19	66.20
1989	216,797.54	137,660.83	63.50
1990	267,549.99	168,877.67	63.12
1991	312,139.74	183,919.50	58.92
1992	532,613.83	352,738.95	66.23
1993	683,869.79	461,909.15	67.54
1994	899,863.22	628,130.97	69.80
1995	1,933,211.55	1,143,301.18	59.14
1996	2,702,719.13	1,503,851.71	55.64
1997	2,801,972.58	1,502,366.39	53.62
1998	2,708,430.86	1,709,562.76	63.12
1999	3,194,014.97	2,262,169.23	70.83
2000	4,582,127.29	3,070,258.46	67.01
2001	4,725,086.00	2,994,845.78	63.38
2002	6,912,381.25	4,002,268.74	57.90

2003	8,487,031.57	6,144,530.90	72.40
2004	11,411,066.91	8,339,813.59	73.09
2005	14,572,239.12	8,152,872.75	55.95
2006	18,564,594.73	11,330,817.07	61.03
2007	20,657,317.67	12,836,653.50	62.14
2008	24,296,329.29	17,922,719.98	73.77
2009	24,794,238.66	16,359,892.25	65.98
2010	29,205,782.96	20,788,612.34	71.18

Source: * CBN 2010 Statistical Bulletin; ** Own computations by the author

The findings indicate that from 1970 to 2010, the size of Nigeria's informal economy hovered between 53.6 – 77.2% of official GDP, while the average size was 64.6% of GDP. In particular, our estimates show that the informal sector was about 71.2% of official GDP in 2010. These results are comparable to previous research evidence on the Nigerian informal sector. However, this study has the benefit of a more comprehensive data as well as the most recent technique of EMIMIC modeling developed by Buehn and Schneider (2008).

Our results as shown in Table 5 above also show that the informal sector constitutes a very large proportion of the economy and contributes significantly to employment and the growth of gross domestic product in Nigeria. For over three decades, the informal sector in Nigeria has been an expanding source of employment especially for a large number of literate and non-literate populations who are unable to access employment in the formal sector. The informal sector, which has wide range of economic activities, operates below officialdom and outside the ambient of public institutions and regulations. According to Ishola (2008), the sub-sector accounts for about 70% of the total industrial employment. Instead of working partly in the official sector and offering additional services underground as in high-income countries, enterprises in Nigeria completely engage in informal activities. Examples of such enterprises operating completely underground are restaurants, farms, bars, haircutters, and even big production and service companies (see Table 6 below).

Table 6: Characteristics of Business Owned by Entrepreurship Development Centre (EDC) Lagos Trainees

Characteristics of informal sector	**No of conformity**	**Percentage Distribution**	**No of non-conformity**	**Percentage Distribution**	**Total**
Size between 1 and 10 people	200	100%	-	-	200
Largely Unregistered	130	65%	70	35%	200
Ownership Legally independent	170	85%	30	15%	200
Labour-intensive	200	100%	-	-	200
Sourced capital personally	200	100%	-	-	200
Mostly commodity trading	96	42%	104	58%	200

Sourced: Entrepreurship Development Centre, Lagos

As indicated above, businesses owned can be structurally classified as largely informal on the dimension of size, regulation, legal framework, ownership, sources of capital and labour.

14. EMIMIC Estimates vs. Long Run Equilibrium

Table 7 below compares our EMIMIC estimates with those of the long run equilibrium relationship and illustrates the deviations from long run equilibrium. Unlike previous studies, our approach used the long run equilibrium estimation for the initial calculation of the informal sector time series index. The calibration methodology is then used to correct for deviations from equilibrium in the short run. Previous studies, on the other hand, simply derive the index of the informal economy from their DYMIMIC estimates using some type of calibration methodology. Our EMIMIC model thus estimates the size and development of the informal economy more precisely.

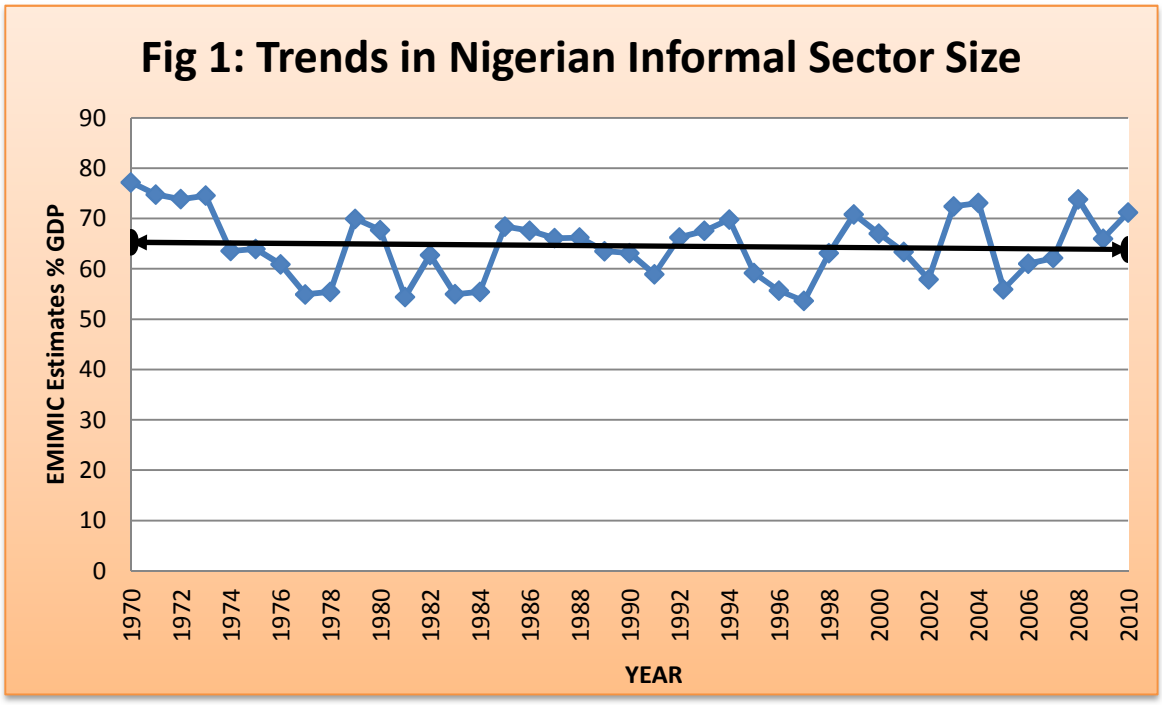
Table 7: EMIMIC vs. Long Run Equilibrium (% of Official GDP):

YEAR	EMIMIC ESTIMATES % OF GDP	LONG RUN EQUILIBRIUM ESTIMATES % OF GDP	DEVIATION FROM LONG RUN EQUILIBRIUM
1970	77.17	77.52	-0.35
1971	74.76	74.26	0.50
1972	73.85	74.21	-0.36
1973	74.55	74.32	0.23
1974	63.54	63.71	-0.17
1975	63.95	64.44	-0.50
1976	60.88	60.31	0.57
1977	54.93	54.31	0.61
1978	55.43	55.53	-0.11
1979	69.93	69.11	0.82
1980	67.71	67.26	0.45
1981	54.41	54.12	0.29
1982	62.73	61.75	0.98
1983	54.97	55.66	-0.69
1984	55.43	55.48	-0.05
1985	68.39	68.79	-0.40
1986	67.58	68.21	-0.62
1987	66.08	65.84	0.23
1988	66.20	66.20	-0.01
1989	63.50	63.21	0.29
1990	63.12	63.12	0.00
1991	58.92	58.48	0.45
1992	66.23	66.16	0.07
1993	67.54	67.48	0.07
1994	69.80	69.10	0.71
1995	59.14	59.98	-0.84
1996	55.64	55.56	0.09
1997	53.62	53.73	-0.11
1998	63.12	62.73	0.39
1999	70.83	70.60	0.23

2000	67.01	66.53	0.47
2001	63.38	63.25	0.14
2002	57.90	57.90	0.00
2003	72.40	71.51	0.89
2004	73.09	72.31	0.77
2005	55.95	56.92	-0.97
2006	61.03	60.98	0.06
2007	62.14	62.03	0.11
2008	73.77	74.20	-0.43
2009	65.98	65.81	0.18
2010	71.18	72.05	-0.87

Source: Own calculations by the author

15. Trends in the Nigerian Informal Sector:



Source: Own graph

The trend in Nigerian informal sector as shown by our results is captured in Fig. 1 above. This figure is in conformity with the observation of Oduh et al (2008) that the changing structure of the Nigerian informal sector is characterized by two transitional periods namely, enforcement and institutional periods. Here, the enforcement factor deals with the public sector or state activities, in terms of choice of economic policy and policy enforcement. On the other hand, the institutional factor is concerned with political transition from one regime to another.

Recent upsurge in the regulatory activities of the Central Bank of Nigeria (CBN) after Sanusi Lamido Sanusi assumed office as the governor of the apex bank in June 2009 has two major implications that lead to upward trend in the size of informal sector. Thousands of bank employees who lost their jobs as a result of the CBN reforms have found refuge in the informal sector. Similarly, numerous small and medium scale enterprises that

can no longer access credits from the banking system now resort to informal financial institutions to fund their operations. Our analysis indicates an increase in informal activities by 5.2% in the period 2009 – 2010.

Furthermore, National Agency for Food Drug Regulation and Control (NAFDAC) regulation also has important implications for the size of the informal sector. Theoretically, increased enforcement amidst high incidence of poverty could bring about net increase in informal activities. This probably accounted for increase in the size of the informal sector despite increase in the rate of enforcement. This scenario was as a result of poverty rate offsetting the enforcement rate. The size of the informal sector increased by 15.2% between 2002 and 2004. Oduh et al (2008) also noted that the upsurge in the informal sector during this period can be partly attributed to the liberalization of the communication sector which increased the number of call centres in Nigeria.

According to Oduh et al (2008), the political transitional points are characterized by what could be termed "regime break points", that is, between "hand-over" and "take-over" periods. Examination of trends in the size of informal sector suggests changes between political transition periods. The periods between 1978 – 1979, 1983 – 1985, and 1998 – 1999 witnessed a dramatic increase in the informal economy by 14.5%, 13.4% and 7.7% respectively. These were three different political transition points marking the change from one regime to another in Nigeria. The period 1998 – 1999 particularly witnessed the demise of former Head of State, General Sani Abacha and the emergence of General Abdulsalami Abubakar who subsequently commenced a transition to civil rule program. Hence, the Nigerian informal sector can be said to be transitional variant, that is, the informal economy in Nigeria has two determinant factors, economic factors and socio-political factors which are dependent on democratic forces. The interpretation is that during transitional points, informal activities tend to change depending on the perception of the operators about the incoming regime and changes in economic policies instituted by the incoming regime.

The Structural Adjustment Period which was an experiment period slowed down informal activities temporarily. There was an attempt to encourage small and medium scale enterprises. This policy relaxed state activities in terms of formal regulation. The period between 1986 and 1990 witnessed a relative stability in the size of the informal economy which averaged at 65.3%. This result is in conformity with Oduh et al (2008).

According to results, the post-war period of 1970 – 1975 witnessed a remarkable decline in the size of the Nigerian informal sector by about 13.2%. This period tends to be characterized by rapid picking up of economic activities and integration of the war torn areas into the formal economy. Increased government expenditure towards rebuilding the nation in the aftermath of the civil war also contributed towards increased activities in the formal sector to the detriment of the informal sector. This result is contrary to Oduh et al (2008) and Salisu (2001) that reported rapid increase of the informal economy within this period. However, Oduh et al (2008) found that the second national development plan implemented within this period contributed to the decline in the size of the informal economy in 1975 by 5%.

Generally, our results show that the size of the informal economy hovered around an average of about 65% of the official GDP. This is easily seen from the thick trend line in Fig. 1 above.

16. Conclusions:

The main objective of this study as earlier stated is to examine the size, development, and causes of the informal sector of the Nigerian economy. We utilized the methodology of the EMIMIC model developed by Buehn and Schneider (2008) which better quantifies the size of the informal economy because it considers both the long run equilibrium relationships and the short run dynamic error corrections at the same time.

We find that since 1970, the size of the informal economy has hovered between 53.6 – 77.2% of GDP. Also, our estimates show that the average size of the informal economy was about 64.6% of GDP. Specifically, our analysis indicates that informal sector was three-quarters of GDP in 2010. Furthermore, our results support a

direct relationship between increasing unemployment and the size of the informal sector. Other important drivers of the informal sector as shown by our results are increased burden of taxation, increased government regulation of economic activities and inflation. Finally, our findings indicate that interest rate is not a key driver of informality in Nigeria.

References

Aigner, D. et al (1988), "Me and My Shadow: Estimating the Size of the US Hidden Economy from Time Series Data", in W. A. Barnett; E. R. Berndt and H. White (eds.):*Dynamic Econometric Modeling*, Cambridge (Mass.): Cambridge University Press, pp. 224-243.

Ajakaiye, O. and Akerele, W. O (1996). "Overview of Conceptual and Methodological Issues in Informal Sector Research", in *Conceptual and Methodological Framework for Informal Sector Research in Nigeria*, CBN/NISER Informal Sector Study, pp. 7 - 26

Akerele, W. O (2005), "The Effects of Economic Adjustment on Employment in the Urban Informal Sector of Ibadan City", *NISER Mimeograph No. 3,* NISER, Ibadan

Bhattacharyya, Dilip K. (1999), "On the Economic Rationale of Estimating the Hidden Economy", *The Economic Journal*, Vol. 109, No. 456, June, p. 348-359

Buehn, Andreas and Schneider, Friedrich (2008), "MIMIC Models, Cointegration and Error Correction: An Application to the French Economy", *IZA Discussion Paper No. 3306,* pp. 1 – 30.

Central Bank of Nigeria (2010), *Statistical Bulletin*, in http://www.cenbank.org.

Dell'Anno, Roberto and Solomon, Offiong Helen (2006), "Shadow Economy and Unemployment Rate in USA: Is There A Structural Relationship? An Empirical Analysis", *The European Public Choice Society*, Finland, pp. 2-19.

Eboh, (2001). "Informal Economy in the National Development Context: Landmarks and Perspective in the Literature", *A Technical Report of Scientific Literature Review Presented to the Centre for Research and Documentation*, Kano

Engle, R. F. and Granger, C. W. J. (1987), "Co-integration and Error Correction: Representation, Estimation and Testing", *Econometrica, Vol. 55*, p.48.

Feige, Edgar L. (1986), "A Re-examination of the 'Underground Economy' in the United States: A Comment on Tanzi", *IMF-Staff Papers 33*, No 4, pp. 768 – 81.

Feige, Edgar L. (1990), "Defining and Estimating Underground and Informal Economies: The New Institutional Economics Approach", *World Development, Vol. 18, No. 7*, pp. 989-1002.

Frey, Bruno S. and Pommerehne, Werner (1984), "The Hidden Economy: State and Prospect for Measurement", *Review of Income and Wealth 30, No. 1*, pp.1 – 23.

Galli, Rosanna and Kucera, David (2003). "Informal Employment in Latin America: Movements Over Business Cycles and the Effects of Worker Rights", *Decent Work Research Programme,* International Institute for Labour Studies, Geneva

Gbanador, Clever A. (2007), *Modern Macroeconomics*, Port Harcourt: Pearl Publishers.

Georgiou, George M. (2007), *Measuring the Size of the Informal Economy: A Critical Review*, Central Bank of Cyprus, pp. 10-29.

Giles, David E.A. (1999), *Modelling the Hidden Economy and the Tax Gap in New Zealand*, University of Victoria.

Giles, David E. A. et al (1999), *The Canadian Underground and Measured Economies: Granger Causality Results*, University of Victoria.

Giles, David E.A. and Tedds, Lindsay M. (2002), "Taxes and the Canadian Underground Economy", *Canadian Tax Paper No. 106*, Canadian Tax Foundation, Toronto/Ontario.

Granger, C.W.J. and Newbold, P. (1974), "Spurious Regressions in Econometrics", *Journal of Econometrics 2*, p.4.

Granger, Clive W. J. and Weiss, A. A. (1983). Time Series Analysis of Error-Correcting Models, in *Studies in Econometrics, Time Series, and Multivariate Statistics*, New York: Academic Press, pp. 255-278

Greene, W. H. (2007). *Econometric Analysis*, Prentice-Hall: London.

Gujarati, D. N. (2004), *Basic Econometrics, 4th ed*, Tata McGraw-Hill, New York.

Hart, K (1973). "Informal Income Opportunities and Urban Employment in Ghana", *Journal of Modern African Studies*, Vol. 2

Henley, Andrew *et al* (2006), "Defining and Measuring the Informal Sector", *Policy Research Paper 3866.* The World Bank

Hill, Roderick and Kabir, Muhammed (1996), "Tax Rates, The Tax Mix, and The Growth of the Underground Economy in Canada: What Can We Infer?", *Canadian Tax Journal/Revue Fiscale Canadienne 44, No. 6,* pp. 1552-83.

Isachsen, Arne J. *et al* (1982), "The Hidden Economy in Norway", in Tanzi, *The Underground Economy in the United States and Abroad,* pp. 209-31.

Johansen, S. (1998), "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamic and Control,* 12: 231 – 254

Johansen, S. and Juselius, K (1990) "Maximum Likelihood Estimation and Inference in Cointegration with Applications to the DXemand for Money", *Oxford Bulletin of Economics and Statistics,* 52(2): 169 – 290

Jöreskog, K. and Goldberger, A.S. (1975), "Estimation of a Model with Multiple Indicators and Multiple Causes of a Single Latent Variable", *Journal of the American Statistical Association, 70*, 631-639.

Kaufmann, Daniel and Kaliberda, Aleksander (1996), "Integrating the Unofficial Economy Into Dynamics of Post Socialist Economies: A Framework of Analyses and Evidence", *The World Bank Policy Research Working Papers.*

Loayza, Norman (1997), "The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America", *The World Bank Policy Research Working Papers 1727*, February, pp.1-31.

MacAfee, K. (1980), "A Glimpse of the Hidden Economy in the National Accounts", *Economic Trends, Vol. 136, No. 1*, pp. 81-7.

Maldanado, Carlos (1995), "The Informal Sector: Legalization or Laissez-Faire?", *International Labour Review, Vol. 134, No. 6.*

Mogensen, G. V. et al (1995), *The Shadow Economy in Denmark 1994: Measurement and Results*, Copenhagen: The Rockwool Foundation Research Unit, Study No 3.

Nastav, B. and Bojnec, S. (2008), "Small Businesses and the Shadow Economy", *Czech Journal of Economics and Finance, Vol. 58, Issue 01-02*, pp. 68-81.

Oduh, Moses *et al* (2008), "Measurement and Explanation of Informal Sector of the Nigerian Economy", *AIAE Research Paper 3*, pp. 1-64.

Ogunc, Fethi and Yilmaz, Gokhan (2000), "Estimating The Underground Economy in Turkey", *The Central Bank of The Republic of Turkey Research Department, Discussion Paper*, September, 2000, p.7.

Ogwuma, P. A. and Phillips, D (1996). "Foreword", in Olisadebe & Ajakaiye (eds.) *Conceptual and Methodological Framework for Informal Sector Research in Nigeria*, CBN/NISER Informal Sector Study

Olowu, D. and Okotoni, O (1996). "The Informal Sector in Nigeria: Some Analytical and Developmental Issues", in *Conceptual and Methodological Framework for Informal Sector Research in Nigeria*, CBN/NISER Informal Sector Study, pp. 27 - 40

Park, T. (1979), *Reconciliation between Personal Income and Taxable Income*, Washington, D.C.: Bureau of Economic Analyses.

Salisu, M. (2001), "Incentive Structure, Civil Service Efficiency and the Hidden Economy in Nigeria", *World Bank Institute for Development Economic Research (WIDER)*

Schneider, Friedrich (2002), *Shadow Economy*, Johannes Kepler University, Linz, pp. 2-25.

Schneider, Friedrich (2007), "Reducing the Shadow Economy in Germany: A Blessing or a Curse?", *Discussion Paper*, Department of Economics, University of Linz, Linz.

Schneider, Friedrich and Enste, Dominik H. (2000), "Shadow Economies: Size, Causes, and Consequences", *Journal of Economic Literature, 38/1*, pp. 77-114.

Schneider, Friedrich and Enste, Dominik H. (2004), *The Shadow Economy: An International Survey*. United Kingdom: Cambridge University Press.

Tanzi, Vito (1999), "Uses and Abuses of Estimates of the Underground Economy", *The Economic Journal, 109*, p. 338.

Thomas, J. (1986), "The Underground Economy in the United States: Comments on Tanzi", *IMF Staff Papers, Vol. 33, No. 4*, pp. 782 – 788.

Thomas, Jim J. (1992), *Informal Economic Activity*. New York, London: Harvester Wheatsheaf.

Thomas, Jim J. (1999), "Quantifying the Black Economy: Measurement Without Theory Yet Again?", *The Economic Journal, 109, No 456*, June, pp. 381-389.

UNESCAP (2002), *Role of the Informal Sector (Annex 1)* in "Protecting Marginalized Groups During Economic Downturns: Lessons from the Asian Experience", Bangkok: UN Economic and Social Ommission for the Asian Pacific, pp. 73 – 82.

Weck, Hannelore (1983), *Schattenwirtschaft: Eine Moglichkeit Zur Einschrankung der Offentlichen Verwaltung? Eine Okonomische Analyse*, Lang, Frankfurt/Main.