Financial Development and the Shadow Economy: Evidence from South Africa

Ayodeji Oluwaseyi Jimoh

Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Science
in
Economics

Eastern Mediterranean University
February 2017
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

Prof. Dr. Mustafa Tümer
Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Economics.

Prof. Dr. Mehmet Balcılar
Chair, Department of Economics

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Economics.

Assoc. Prof. Dr. Hasan Güngör
Supervisor

Examining Committee

1. Prof. Dr. Mustafa Besim

2. Assoc. Prof. Dr. Çağay Coşkuner

3. Assoc. Prof. Dr. Hasan Güngör

ABSTRACT

South Africa is one of the fast-developing nations in African continent. Financial sector development is observed to be faster and wide spread compared to other countries in Africa. But the level of shadow economy is still a problem in this country. The research investigates the links between financial development and shadow economy in South Africa for the period of 1970-2009. Financial development data is obtained from the World Bank Economic Indicators and South African Reserve Bank whereas shadow economy data is obtained from Elgin and Öztunalı (2012). Time series econometrics is employed for the analysis of the case. The results are indicative for other African countries.

Keywords: Financial Development, Shadow Economy, African Economies.

ÖZ

South Africa, Africa kıtasında hızla gelişmekte olan ülkelerden biridir. Finansal sektörün Africa'daki diğer ülkelere kıyasla daha hızlı ve yaygın olduğu görülmektedir. Fakat gölge ekonomisinin seviyesi hala bu ülkede bir sorundur. Araştırma, 1970-2009 döneminde South Africa'da finansal kalkınma ve gölge ekonomisi arasındaki bağlantıları araştırıyor. Finansal gelişme verileri Dünya Bankası Ekonomik Göstergeleri ve South Africa Bankası'ndan alınırken, gölge ekonomisi verileri Elgin ve Öztunalı'dan (2012). Davanın analizi için zaman serisi ekonometri kullanılmıştır. Bulguların bir kısmı Schneider ve Enste (2000) ile uyumludur. Sonuçlar, diğer Africa ülkeleri için gösterge niteliğindedir.

Anahtar kelimeler: Finansal Gelişme, Gölge Ekonomisi, Africa Ekonomileri

DEDICATION

This research is dedicated to God Almighty and my honorable parents for giving me the best in life.

ACKNOWLEDGEMENT

I am most grateful to God Almighty for his unfailing love and undeserving protection throughout my life until this point. The immeasurable contribution and support of my committed and hardworking supervisor Assoc Prof Dr Hasan Gungor cannot be over emphasized in the success of this project. I appreciate all his effort and time devoted to this research work.

I also want to appreciate all my lecturers Prof Dr Glenn Jenkins, Prof Dr Selvin Ugural, Prof Dr Mustapha Besim, Assoc Prof Dr Cagay Coskuner and Asst Prof Dr Kemal Bagzibagli for the knowledge impacted on me during my study.

The research would not have been possible without the endless support and encouragement of my loving parents Prof David Jimoh and Mrs Mary Jimoh. To whom I am forever grateful. I also appreciate my siblings Tolulope Jimoh, Funmilayo Jimoh and Adeoluwa Jimoh for your support and prayers all through the program. To all my relatives and friends who have supported me in one way or the other, I say God bless you.

My study was made easier with the immerseful contribution of some friends Maria Ene Apoche, Olasehinde-Williams, Abdulsammed Sanusi, Mark Koffi Zando, Mrs Egbe Gladys, Georgina Abdul and Esther Makwin Eupharim to mention a few. I am really grateful for their contribution to my stay on the island.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ABSA	Amalgamated Banks of South Africa
ADF	Augmented Dickey Fuller
AFBD	Association of Future Brokers and Dealers
ECT	Error Correction Term
FDI	Foreign Direct Investment
FIN	Domestic Credit Provided by Financial Sector to Various Sectors
GMM	Generalized Method of Moments
LTD	Limited Liability
M2	Money Supply
OECD	Oil Exporting Countries
PP	Phillips Perron
PRIV	Domestic Credit Provided to Private Sector
SA	South Africa
SADC	Southern African Development Community
SACU	Southern African Customs Union
SEE	Shadow Economy Estimates
SSA	Sub Saharan Africa
UNDP	United Nations Development Program
VAR	Vector Auto regression
VAT	Value Added Tax
VECM	Vector Error Correction Model

Chapter 1

INTRODUCTION

1.1 Background to the Study

The relevance of the financial market to the economic development in a country cannot be over emphasized. Financial institutions provide funds in form of loans and credit facilities to potential business owners and entrepreneurs. This encourages innovation and entrepreneurial development and recent technology adoption (Greenwood & Smith, 1997). Financial development is a multidimensional concept which explains the deepening and advancement of various financial intermediaries such as commercial banks, investment companies, insurance firms, audit firms, microfinance banks amongst others. Diversification of the financial sector has boosted different economies around the world. This has led to economic growth in some developing countries such as South Africa which has experienced a high degree of financial deepening over the century (Allen & Ndikumana, 2000).

There exists a gap between the actual and the observable in the economy. Estimating this gap has been of great concern for economist and statisticians over the years. This idea gave birth to the concept of shadow economy. From the 1970s, shadow economy has experienced a rise in its contribution in terms of production to the economy. With liberation, increased government regulations and institutions discouraged individuals from engaging in productive activities within the formal sector. This led to an increase in the informal sector which is popularly known as the

shadow economy (Chaudhuri & Schneider, 2006). Unfortunately, the shadow economy on the other hand is a major challenge for various governments in different nations. This sector hinders the ability for government to access revenue generated by citizens through productive activities especially in developing economies. Various literature documents that shadow economy grows due to high taxes and burdensome regulations. This is further explained as shadow economy undermines established institutions and makes it difficult for government to adequately implement established policies. Also, the development of financial sector mitigates the activities in the informal sector. This is achieved through provision of necessary credits and funds for entrepreneurs by financial institutions. It is observed that a reverse causality exists between shadow economy and financial development variables (Berdiev & Saunoris, 2016).

1.2 Statement of the Problem

The prevalence of unemployment across the African continent triggers poverty related issues in various countries. South Africa which has been known to have the fastest growing economy in Africa is not exempted from this issue. Pauperism and unemployment dominance has birthed the idea of shadow economy. More of the South Africa population has dived into the shadow economy to curb the issue of unemployment. While many individuals are thrilled about this unique sector with no form of taxation or government regulation, the financial sector on the other hand deepened. Many financial intermediaries provide loans and grants for entrepreneurs and private businessmen. This sort of grants incentivizes participation in the recorded section of the economy. Gradually, the underground economy is depopulated as a percentage of its participants move towards formality.

In many developing economies, such as South Africa, the formal sector lacks the full capacity to engage a large proportion of its population. The implication is this; the financial sector has diversified over time but unemployment and poverty is still observed to be very high. Unemployment dominance may lead individuals to participate more in the shadow economy. As a result, government revenue decreases because it becomes difficult to tax productive activities in this sector. Decreased government revenue may result in budget deficit as government expenditure may not decrease. Both financial deepening and shadow economy contribute to economic development uniquely in South Africa.

Meanwhile a reverse causality exists between the two. This observed complex phenomenon birthed the idea of this research (Berdiev & Saunoris (2016). In the course of this research, it is hoped that the issue of unemployment and pauperism will be critically analyzed in respect to financial deepening and the prevalence of the shadow economy.

1.3 Objectives of the Study

The analysis of the relationship between financial development and shadow economy is the main priority of this study. Goals are set to help in the actualization of this target. These goals are as follows:

1. To investigate the presence of a long run convergence amongst the elements using Johansen Cointegration Test.
2. To determine the predicting power of the variables in forecasting future occurrences using granger causality test.
3. To ascertain the impact of the shock that exists between variables using impulse response.

1.4 Methodology

In this study, a detailed time series methodology is used to undertake a thorough research on the relationship between financial development and shadow economy. For this purpose, data is collected between 1970 and 2009 using South Africa as a case study. Necessary econometric tests are carried out to ascertain the best estimation technique to employ. Data is sourced from reliable database such as World Development Indicators and other relevant publications.

1.5 Structure of the Study

This research is organized into six chapters. Chapter one introduces the research explaining its background and the statement of the problem which birthed the idea of the study. This part also includes the achievable objectives and research methodology to employ. Chapter two explains the relevant literature on the study. Both financial development and the shadow economy are conceptually and empirically presented. The relationship between both is empirically analyzed.

The third chapter gives a general overview of the South African economy. This part analyzes the deepening process of the South African financial sector. The shadow economy in South Africa is also defined in context. The data and methodology employed in the study is brought forward in the fourth chapter. This section explains the nature and sources of the data. Specification of the econometric model is carried out in this part. Also, the estimation technique employed is carefully pointed out. Chapter five presents the estimation result derived from employing the estimation technique explained in the previous chapter. In this part, the regression results are properly interpreted for all the models used. Chapter six concludes the research using the analysis in the preceding section. Policy implications are presented.

Chapter 2

REVIEW OF LITERATURE

2.1 Financial Development

During the 1990s, countries within the region of South America and some parts of Asia experienced financial crisis which was characterized by various occurrences of currency crisis. This financial instability and economic downfall was caused by financial disruption which occurred during a period where financial systems were more globally integrated. Financial analysts were compelled to sort a remedy aimed at structuring the economy. This gave birth to the idea of financial deepening which was aimed at encouraging economic development (Federici & Caprioli, 2009). Unlike other developing economies in the world, financial development and liberation started in an unfavorably condition in the sub-Saharan countries. Necessary government policies were not structured to facilitate the advancement of the financial sector (Reinhart and Tokatlidis, 2003). Institutions that promote financial reforms had not fully developed to a capacity of facilitating proper financial liberation. It could be said that monetary and credit expansion contributed immensely to financial development in middle and high income nations. The deepening of the financial sector which was followed by liberation in the sector was not observed in African countries as it was in the rest of the world (Reinhart and Tokatlidis, 2003).

The development of the financial sector in any emerging market is aimed at stimulation of economic growth and poverty eradication. This can be achieved

through proper use of savings for productive activities, advancement of capital markets, improvements in insurance policies and availability of funds in form of loans and credit to entrepreneurs and business owners.

Basically, financial system encourages savings, exchange of goods and services, trading, diversification of risk portfolio and proper allocation of resources in the economy. Incentives such as interest accrued on savings raises savings rate, financial institutions such as banks can divert such funds for further investment. This can further lead to expansion in the financial system as institutions also engage in profitable investment with low risk. Rajan & Zingales, (2003) also asserted that proper financing of viable projects leads to anticipation of great return on investment with proper spread of risk and relatively low cost. This defines the financial development where these funds are available to finance businesses which have high potential of yielding returns with low risk.

Two very important factors that explains the emergence of the financial markets and its importance on economic growth is technological innovation and allocation of capital. Savings rate alteration is a means by which capital allocation affects financial markets. Also, in technologies and industries where capital is produced, savings is reallocated to enhance productive activities.The most important measure implemented to direct investment capital which will enable it yield high return is through financial markets. Financial contracts and its intermediation results from reducing in transaction costs incurred in the financial system. Steady state growth is influenced by alteration in technological innovation. (Levine 1997).

Mobilization and allocation of savings, liquidation generation, risk reduction and trade facilitation through credit extension and payment guarantee are necessary for economic development. These are encouraged by a properly structured financial system. As a result, policy and decision makers in SSA countries place financial reforms as priority on economic development agenda. Long term economic growth is accelerated through efficiency of banking sector and increased market capitalization. This supports the opinion that a well-developed and functional financial system will invariably lead to economic growth (Agbetsiafa, 2004).

Development of the capital market is quite slow in African countries unlike other developed countries. The level of FDI and gross capital flows is high in developed economies than in African countries. This invariably means that developed countries are accessible to international capital market. This has not been the case with African countries. The volatility of international capital flow is more prominent due to liberation of the financial system especially in Asia. Nevertheless, countries which lack the presence of liberation find it almost impossible to import capital from foreign markets (Reinhart & Tokatlidis, 2003).

In simple terms, there are great expectations that intensive deepening of the financial sector would invariably lead to proper economic development. Financial markets finances entrepreneurship and innovation which is highly relevant in economic development. As a result, one might conclude that financial development and economic growth are positively correlated. This may not always be true as the development in the financial sector could be a complex process ranging from capital control liberation, stock market development, banking intermediation, insurance growth amongst others.

2.1.1 Empirical Review of Financial Development

Various scholars have researched on financial development and its relevance to economic growth. In this part, we would carefully discuss their findings.

Cesar Calderon & Liu Liu (2003) employed the Geweke decomposition test to study the existing causality between financial development and economic growth. A conclusion was drawn that certain consequences resulting from the effect of this causality would affect policies necessary for development. It was further emphasized that financial development enhances economic growth. Also, financial deepening is more evident in less developed economies than in developed economies. Since developing countries are farther from steady state than the developed ones, their speed of convergence is faster than that of developed economies. In order words, financial intermediation is expected to occur at a quick pace in these countries. This is supported by the theory of conditional convergence which states that countries farther from steady state grow faster to converge relative to countries which are closer to their steady state. (Robert Solow, 1965)

A study was carried out with emphasizes on Latin America to ascertain if developed financial intermediaries is linked to capital amassment. Nazmi (2005) uses panel data which covered five countries within the period of 1960-1995. A summary was drawn which says that financial deepening would impact capital accumulation and investment. An equilibrium model was developed to explain the connection between a productive banking industry and accelerated capital expenditure which increases growth.

Allen & Ndikumana (2000) carried out a test on the positive correlation between financial intermediation and economic growth. Employing certain financial

indicators such as liquid liabilities of financial markets, it was concluded that indeed development in financial market and the advancement of the economy were positively intertwined. This case study was taken from regional integration of SADC countries and the growth of real GDP per capita is evident with intermediation of the financial sector. The use of other variables such as credit by banks and private sector makes the study inconclusive. Resources are allocated for production of goods and services. This can be as a result of expansion of financial system but the effect is not completely captured when other financial indicators are used.

Econometric methods such as Generalized Method of Moments (GMM) dynamic panel estimators and a pure cross-sectional instrumental variable are used to determine the nature of the impact of deepening financial intermediaries on economic development. Both approaches have similar results. Economic development is positively correlated with the external integral of the development of financial intermediary. Conclusion was also drawn from this study that countries with good legal system have a more developed financial system. This is because the cross-country distinctness in the degree of the financial intermediary deepening is easily understood by the diversity of creditors' legal rights, high standards of accounting system and the contract enforcement efficiency. This facilitates economic growth and development (Levine & Beck, 2000).

Furthermore, Beck at el (2000) examined the extent to which financial development affects economic development sources. Cross-country data ranging from 1960-1995 and a panel data set necessary in explaining the time-series nature of the data is used. These econometric procedures are used to carry out the test and a statistical significance is observed between financial intermediary deepening and growth of

total factor productivity (TFP). The same is seen in the case of financial development and real per capita GDP. In essence, financial intermediaries which are highly operational promote allocation of resources and fasten the overall factor productivity growth which leads to economic development in the long-run.

The application of Vector Error Correction (VEC) model to data collected for eight African countries shows a consistent result. This result affirms previous studies that show the long-run cointegration of financial deepening and economic development. This test was conducted on a sample of eight Sub-Saharan African (SSA) countries which are Kenya, Ivory Coast, Togo, Zambia, Ghana, South Africa, Senegal and Nigeria. There exists a long run relationship between variables for financial indicators and GDP per capita for eight countries. (Agbetsiafa, 2004).

A trivariate granger causality test was employed by Odhiambo (2009) to study the relationship between poverty eradication and financial deepening in South Africa. The empirical findings showed that poverty reduction was mitigated by both financial and economic deepening in South Africa. Also, granger causality exists between financial deepening and economic development. These results are derived using cointegration-based error-correction mechanism. As a result, monetization of the economy is encouraged to minimize the level of poverty prevailing in the nation.

2.2 Concept of Shadow Economy

Over the years, researchers have found it difficult to adequately define the shadow economy. This is because the unrecorded legal activities which define the shadow economy may include unrecorded payments which may be termed illicit. Also, certain illegal activities such as drug dealings may inject income into the economy.

Drug dealers may spend proceedings made from such businesses on consumption. This income spent on consumption expenditure serves as an injection to the economy of the nation.

The concept of shadow economy has been redefined due to changes and developments in the world economy. Generally, shadow economy can be viewed as an unrecorded part of the economy. This could be seen as the injection to the economy which is not part of the GDP but adds value to the economy. These activities maybe unrecorded but production of legal goods and services are undertaken here. It will be possible to tax these productive activities if they were accounted for in the GDP of the economy. These activities could be monetary or barter transactions. Most times, the shadow economy is not governed by institutional regulations and economic policies. Individuals that partake in this part of the economy are not guided by rules and regulations on daily operation (Schneider & Klinglmair, 2004).

A number of definitions abound for shadow economy, as given by several researchers, among which are; Shadow economy is viewed as productive activities which are intentionally not registered with regulatory bodies due to avoidance of tax payment, unwillingness to comply with union policies amongst others (Buehn & Schneider, 2011). These economic activities are actually legal and market-based. They should be accounted for in the GDP of the economy. Secondly, Schneider & Einste (1998) posited that shadow economy is seen as the economic activity which is not within the reach of the national account computed by statisticians in the government. These economic activities are not officially detected but involve legal productive activities.

Low and middle income countries have larger shadow economy size than high income nations. In developing economies, 60% of the economy operates as shadow and also accounts for 40% of the GDP (Ihrig & Moe, 2004). This proves that developing economies aren't as poor as world statistics have shown. This can be shown from the estimates of the shadow economy derived for 161 countries (Elgin & Oztunal, 2012). In this paper, it is evident that developing countries have larger shadow economy size. A number of reasons could be responsible for this, ranging from corruption, improper organization in the formal sector, heavy tax burden, and institutional regulations. The official GDP is negatively impacted as a result of the growth of the shadow economy (Elgin & Oztunal, 2012). Individuals dive into the shadow economy from the official sector due to a number of reasons which would be discussed further in the literature.

2.2.1 Literature on Shadow Economy

A close view of the shadow economies in Western Europe shows that official indicators and statistics may not be so accurate with an increase in the size of the shadow economy. Policy makers may encounter certain difficulties when discussing and deciding on crucial economic matters. This is because a good percentage of the productive activities may not be captured in the statistics of the economy. Statisticians and economists encounter problem when trying to measure the growth rate of the economy. (Schneider, 1997)

With economic development in oil exporting economies, OECD countries have put up measures to reduce shadow economy and also the evasion of taxes. Germany for example passed a law which was aimed at increasing the fight against hidden activities and tax evasion. Moreover, the German government also reduced tax burden for low income earners. An incentive believed to encourage shadow economy

participants to produce goods and services in the formal sector (Lars P Feld & Schneider, 2010).

The level at which certain economic policies become inappropriate and ineffective is highly influential by the size of the shadow economy. Also, increment in tax burden which creates an oppressive tax system and tough regulatory policies causes certain agents of the economy to dive into the unregulated and unrecorded part of the economy which is referred to as the shadow economy. These are some of the implications the shadow economy has on a nation (Fleming & Farrell, 2000). Avoidance of registration fees, union membership obligations amongst others are part of the numerous reasons individuals prefer to operate in the unregistered part of the economy. These activities may involve production of legal goods and services but are evaded of institutional rules and regulations guiding businesses in the economy. This has an implication on economic policies implemented by decision makers. The true value of the GDP may not be ascertained and resorbed. Economic reforms made using available data maybe faulty and ineffective as certain linkages exist in the economy via the shadow economy.

Another consequence of the increase in the activity of the shadow economy is a resulting budget deficit in the economy. Government expenditures are greater than revenue generated by the government at this point. This is because tax receipts decrease due to tax erosion and social security bases caused by an increase in the tax and social security burden (Schneider & Enste, 1998). Individuals operating in this sector of the economy fail to declare their assets. Non-declaration of assets by certain private entrepreneurs makes it difficult for tax agencies to efficiently tax such individuals. This affects the supposed revenue government requires to adequately

implement projects which are part of the approved budget of the nation. Shadow economy activities affect the achievement of a balanced budget by the economy.

This unrecorded part of the economy positively contributes to the development of the economy. A greater part of the income yielded in the shadow economy is used up in the official part of the economy. This is because private businessmen spend a part of this income as consumption expenses (Enste & Schneider, 1998). Certain injection into the economy which increases the amount of money circulated in the economy comes from this unaccounted sector where productive activities take place. Also, monetary policies implemented by the financial authorities are strengthened by this means. This injection adds to the money supplied by these authorities aimed at reducing the pressure of the local currency caused by money demanders.

Unreliable official indicators and statistical data creates problem for politicians as effective policy implementation is altered due to the existence of a non-captured part of production activities in the country. Computation of GDP is difficult because certain unrecorded production activities are not captured in the national account (Enste & Schneider, 1998).

Certain indicators are used to capture the features of the shadow economy. It is widely known that economists experience difficulty trying to directly measure and determine the size of the shadow economy. One of the indicators used in this measurement is the labor market indicator. The percentage of the economically vibrant part of the population otherwise referred to as the labor force participation rate and the growth in the labor force reflects the activities of the shadow economy. (Schneider & Montenegro, 2010) Many transactions are covered up by mainly using

cash through activities in the shadow economy. This extra use of cash reflects production activities in this part of the economy. When accounting for this injection in form of cash, monetary indicators such as currency outside banks and deposits are employed. Another very important indicator of the shadow economy is the GDP per capita growth rate. Using rate of purchasing power parity, one converts GDP to international dollars and divides it by the population to derive the GDP per capita in the economy (Schneider & Montenegro, 2010).

Fleming & Farrell (2000) classifies the shadow economy into four various categories which are the irregular, household, criminal and informal sectors. In the case of the irregular sector, legal goods and services are produced but there is an exclusion of tax payment and other legal requirements. The household sector is quite unique as it deals with domestic production and consumption. It may not necessarily add to the income of the economy but it is beneficial to individuals in the economy. Illicit produced goods and services which involves trade of illegal narcotic constituted the criminal sector of the economy.

2.2.2 Empirical Review of Shadow Economy

Various scholars have researched on shadow economy and its contribution to economic growth. In this part, we would carefully discuss their findings.

Schneider & Klinglmair, in 2004 carried out a study on the size and development of the shadow economy for 110 countries. Using MIMIC approach, they found out that shadow economy is significant both statistically and theoretically to the economic growth of a nation. An increase in the shadow economy causes a rapid growth in the economy of developed countries unlike in the case of developing economies. They

also concluded that a rise in government regulations and tax burdens is positively correlated with the growth of the shadow economy.

Similarly, Ihrig & Moe (2004) conducted a survey to ascertain the role of the government taxation policy on the size of the shadow economy. It was discovered that a two-way causality relationship exists between the real GDP per worker and the size of the shadow economy. It was also noted that tax rate plays a crucial role in determining the standard of living in a country. A positive interaction is found between tax rate reduction and a decrease in the shadow economy size. This opposes the negative relationship seen in the enforcement of government regulations and the size of the shadow economy. This survey emphasizes the fact that low tax burden is necessary to achieve a shrink in the shadow economy. The formal sector is increased as a result which helps government in the proper regulation of productive activities (Ihrig and Moe, 2004).

Several methods such as currency demand, physical input measure and the model approach was used by Enste & Schneider in 1998 to analyze the size and development of the shadow for transition, developing and OECD nations. The result obtained shows that the size of the shadow economy in developing nations in Africa, Central & South America and Asia makes up a large part of the GDP. In this grouping, Shadow activities in Africa are estimated to be as much as 43.9% of GDP. In the case of the transition nations, countries in Eastern Europe and former Soviet Union accounts for one-fifth of its GDP in the shadow economy. The OECD countries on the other hand have a lesser percentage of its GDP accounted for in the unregistered part of the economy (Enste & Schneider, 1998). A conclusion can be drawn from this survey taken by these two which supports the previous studies in

this area. The development of the shadow economy is triggered by increased tax burden, social security payments and increased regulatory activities carried out by the state.

Between the period of 1999 and 2007, 162 countries were selected across Eastern Europe, Central Asia and some high-income OECD region. The MIMIC approach was employed to estimate the size of the shadow economy. Schneider & Montenegro (2010) analyzed that shadow economy accounted for a weighted average of 17.2% of the official GDP. Between 1999 and 2007, the un weighted average of these countries fell from 34.1% of the official GDP to 31.0% of the official GDP. Regional disparities were observed among the various sampled groups with Sub-Saharan Africa topping the chart in the level of informality and OECD nations at the bottom of the chart. Since tax burden, quality of goods and services play significant roles in the growth of the shadow economy, it was concluded that minimizing tax burden, reducing certain business and fiscal regulations were very good policies necessary to control the expansion of the shadow economy.

2.3 Financial Development and Shadow Economy: Empirical Review

Several researchers have tried to investigate the relationship which exists between financial deepening and the shadow economy. Some very interesting results have been found in this subject matter. In this section, we would review some of the findings by various authors in this area.

The most recent study on the subject was carried out by Berdiev and Saunoris in 2016. They employed panel VAR analysis in studying the intricate relationship

between size of the shadow economy and level of financial development. Data for 161 countries was collected over a period of 1960-2009. From the results obtained, it was observed that this relationship changes over time. These changes resulted from an equal sided shock on some of the variables used in this study. Also, shadow economy shock causes a hindrance to financial sector development. They found a reverse causality relationship between the shadow economy and financial development. Furthermore, it was found that countries with low financial development receive a negative response from the shadow economy when there is a shock in the financial deepening.

This finding by Berdiev and Saunoris provides fresh insights for decision makers in relevant methods necessary to mitigate shadow activity and encourage financial deepening. Emphasizes on the use of a dynamic framework is placed when critically examining the relationship between financial development and shadow economy.

A panel dataset was used to examine the link between the credit market and the shadow economy in the Italian local credit markets. This study was carried out by Giorgio and Zizza in 2007 and data was taken between the periods of 1995-2003. Certain results were obtained from this study. First, bank lending to the total business sector is negatively impacted by the rate of shadow employment. A decrease in bank credit ratio to GDP is caused by a shift in a percentage of regional employment from the formal to the informal sector. Also, household lending in its totality is negatively impacted by the size of the irregular sector. A two way fixed effects model was applied which contained the estimates of the credit ratio to household sector GDP. It is shown that a negative correlation exists between the supply of credit to households

and the concentration of market index. With increase in density of bank branches, the loans to households' abundance is more evident.

A unique study was carried out by Boss, Capasso & Wurm in 2012 which was aimed at examining the relationship between the sizes of the shadow economy and banking sector development where both cross sectional and panel data was employed. Data of 137 countries between the periods of 1995 to 2007 was collected. They arrived at a conclusion that as shadow economy shrinks, the banking sector develops faster. Also, shadow economy minimization could be a factor of the efficiency and depth of the banking sector. This shows the existence of granger causality between the size of the shadow economy and the development of the banking sector. Moreover, this paper also shows that through the effect of the size of the shadow economy, real activity is influenced by the development of the banking sector

In summary, Cesar Calderon, Allen & Ndikuma and Levine & Beck among several researchers concluded that financial development enhances economic growth in a nation. In simple terms, there are great expectations that financial development would invariably cause proper economic development. Enste & Schneider and Schneider & Montenegro are some of the researchers who employed methods such as currency demand, physical input method and MIMIC approach to estimate the size of the shadow economy. Several researchers such as Berdiev & Saunoris (2016), Boss, capasso & wurm (2012) examined the relationship between financial development and shadow economy and arrived at the conclusion that a rise in financial development shrinks shadow economy.

Chapter 3

OVERVIEW OF THE SOUTH AFRICA ECONOMY

3.1 Economic Outlook

Though South Africa economy has experienced challenging phases, it still remains the largest economy in Africa with a GDP of about US$71.7 billion. Increased personal taxes, property taxes and VAT are some of the means in which government revenue has been boosted to US$68.04 billion. This makes up 24.8% of the GDP and has increased by 8.4%. The government operates with a budget deficit which is 3.6% of the GDP as at 2014/2015. This is evident as the government spends US$0.081 trillion on expenditure which is about 29.4% of the GDP. The debt accrued resulting from the deficit is financed through domestic treasury bills and government bonds. Through fiscal policy, the government is aimed at budget deficit reduction and debt stabilization. The government is also committed to the maintenance of the public sector employees wage rate. This improves the welfare of employees as purchasing power is maintained on a compensation framework through negotiations. (AFBD/OECD/UNDP, 2015)

Increased food prices and the existence of a weak domestic exchange rate are major factors that trigger inflation. Inflation was about 6.1% as of 2014 but is expected to rise to 6.8% and 7% in 2016 and 2017 respectively. Decline in commodity prices, volatility in Chinese equity market and tightening of US monetary policy are factors which have caused the volatility of the Rand exchange rate. This has depreciated

since 2013 and had declined by 5% in 2015. In 2015, the Rand had depreciated by 10.6% against the dollars and 10.8% against the Euro. Demand for domestic credit by private sector rose to 8.6% in 2015 in spite of the rising inflation rate.

In the bid to harness regional integration at every level, South Africa belongs to the Southern African Customs Union (SACU), the Southern African Development Community (SADC) and the Tripartite Free Trade Area which is aimed at market integration and infrastructure development. Economies of scale among member countries is achieved and trade in also encouraged internationally. This is aimed at job creation and economic development

Despite all these development, unemployment is still up till 25.5% of the labor force. The formal sector accounts for about 69.1% of the labor force. Agricultural activities are very low which explains the heavy importation of foodstuff by the South African government. Mining is the prominent sector in South Africa which is the largest platinum producer in the world. (AFBD/OECD/UNDP, 2015).

3.2. Financial Development in South Africa

Initially, short-term and long-term credits were awarded to farmers by the South African banking sector in the late 1790s and early 1800s. Lombard Discount established by the British in 1808 provided the short-term credits while Bank Van Leening established by the Dutch East Indian Company in 1793 provided the long-term credits. The emergence of the private banking era in the mid-1800s brought about local banks with less financial expertise. By the 19th century, Imperial banks such as Standard Bank of British SA LTD (1892), Barclays National Bank LTD (1926) amongst a few others gradually crept into the South African banking system.

These large banks with their networks gradually wiped out the smaller banks which were dominant in the 18th century. Implementation of direct monetary control instruments placed certain checks and balance on the development of securities market and the activities of the private banking (Odhiambo, 2004). Later in the 1980s, monetary authorities made the South African banks to adhere to certain free market principles. At the end of this period, the direct monetary control instruments gradually faded out due to the deregulation and rationalization process in the banking sector. Banking institutions were converted from mutual societies in the 1990s. Larger banks were formed in the middle of the 19th century which held most of the assets in the financial sector.

As at 2009, it is believed that South Africa had one of the most developed and advanced financial system in Africa. At that year, the country had about 47 banks, 15 of them were subsidiaries of foreign banks (Odhiambo, 2009). During the mid-1990s, First National Bank, ABSA, Standard Bank and Nedbank were the dominant banks which held 95% of the nation's asset. The remaining 5% were shared between 27 domestic banks, branches of foreign banks and some mutual banks. This showed the dominance of the financial markets by few intermediaries (Odhiambo, 2009). The stock exchange market in South Africa is also properly structured, liquid and is one of the best in the world. Johannesburg Stock Exchange established in 1887 is well known for its market capitalization (Odhiambo, 2009).

South African Reserve Bank which is the apex banking institution, commercial bank, life insurance companies amongst many others are some of the financial intermediaries and institutions which contributes to the well-established and highly advanced financial system in South Africa (Odhiambo,2009). Despite a level of

collaboration between the bank and the government, a level of independency exists in the South African Reserve Bank which was established in 1921.

3.3. Shadow Economy in South Africa

On the average, this sector accounts for as much as 28% of the GDP according to estimates by Elgin and Oztunali, (2012). About 34% of activities contributing to the economic development take place in this sector. As at 2012, about 2.1 million people participated actively in the shadow economy with the exception of agricultural activities. Limpopo province is known to be highly proficient in the activities of the shadow economy. Other notable province which is known for shadow activities includes Mpumalanga, the Free State, Kwazulu-Natal and the Eastern Cape. Economic activities such as home-based care workers, taxi drivers and street vendors are very prominent in this sector. The shadow economy is known to reduce the level of unemployment in South Africa from about 47.5% to 25% (source). But municipalities encounter difficulties in implementing policies which are necessary to create a favorable environment for shadow economy to operate. Poverty reduction, unemployment and crime are some of the vices in which shadow economy is aimed at curbing.

From estimates of shadow economy by Elgin and Oztunali, 2012, we observed that the size of this area of the economy has shirked over the years. This is due to a significant deepening and diversification of South African economy in terms of productivity and poverty reduction diversification of the financial sector. The shadow economy contributes significantly to the economy of South Africa in terms of productivity and wealth creation.

Chapter 4

METHODOLOGY

This chapter provides a detailed explanation of the nature and source of variables used in the study as well as the econometric techniques applied.

4.1. Description of Data

Measurement of a shadow economy is extremely difficult. The reason for this is quite obvious; many of those operating undergrounds make conscious effort to avoid detection. Nevertheless, various estimates for shadow economy have been constructed by several researchers. Examples include Schneider (2012), Alm & Embaye (2013) and Elgin & Oztunali (2012). For this study, we use the Shadow Economy Estimates (SEE) derived by Elgin and Oztunali, 2012. This is mainly because they have succeeded in delivering the most extensive time series data for shadow economy. Elgin and Oztunali, 2012 shadow economy estimates cover 161 countries, the estimates were constructed using a two-sector dynamic equilibrium model between the period of 1960 and 2009.

The concept of financial development is multidimensional in nature, due to this fact; we apply the three measures used by Elgin & Uras (2013) and Berdiev & Saunoris (2016) to capture the level of financial development. These are:

- Domestic Credit Provided by Financial Sector to Private Sector (% of GDP):

Financial institutions grant private sector financial resources through credits such as loans, grants, advances amongst others. Economic activity is affected by such credits through funding of production activities as well as consumption and capital formation. This data is known as DP for the purpose of this study. This data is outsourced from World Development Indicators and is employed in this study as a proxy for measuring financial development

- Domestic Credit Provided by Financial Sector to Various Sectors (% of GDP)

Financial institutions encompass of monetary authorities, banking institutions, Insurance Corporation, foreign exchange companies amongst others. These institutions provide credits to various sectors which are otherwise known as gross credit. Credits provided to government are not included in this data. For the purpose of this study, this data would be referred to as FIN. FIN is outsourced from World Development Indicator index. It also serves as a proxy for measuring financial development.

- Money Supply (M2)

This is comprised of the notes and coins currently in circulation, promissory notes, the cheque and transmission deposits which private sector have with monetary authorities and also includes certificates of deposits which are negotiable. This data is outsourced from South African Reserve Bank and is used for the purpose of this study as a proxy for financial development.

GDP (Constant)

In this study, GDP is included in the model to show that economic growth is influential to both shadow economy size and level of financial development (Berdiev & Saunoris, 2016). The data is sourced from World Development Indicators. It serves as proxy for economic growth.

4.2 Model Specification

Specification of this model is done using shadow economy estimate as the dependent variable to determine its relationship with measures of financial development in South Africa. Following the work by Berdiev & Saunoris (2016), the shadow economy estimates is regressed on each of the financial development measures such as money and quasi money (M2), domestic credit to private sector (PRIV) and domestic credit provided by financial sector (FIN). Growth is incorporated to each of the models to show how the level of economic development affects both shadow economy size and the extent of financial deepening in South Africa. According to Berdiev & Saunoris (2016), it is expected that more developed countries experience greater financial deepening and a shrink in the shadow economy will lower financial deepening and larger shadow economy encourages economic development. The choice of variables is gotten from the work of Berdiev & Saunoris (2016). They did a panel analysis on the relationship between financial development and the shadow economy using 161 countries as case study. These models incorporate relevant data necessary for the time series analyses. The functional forms to observe the relationship amongst shadow economy estimate and financial development measures are as follows:

$$SEE_t = f(M2_t, GDP_t) \quad 1$$

$$SEE_t = f(PRIV_t, GDP_t) \quad 2$$

$$SEE_t = f(FIN_t, GDP_t) \quad 3$$

Where:

SEE represents Shadow Economy Estimates

Growth represents Economic Growth

PRIV which stands for Domestic Credit to Private Sector

FIN which stands for Domestic Credit to Various Sectors

M2 which stands for Money and Quasi Money

These functional models can be written in a stochastic form as follows:

$$SEE_t = \beta_0 + \beta_1 M2 + \beta_2 GDP + \varepsilon_t \quad 4$$

$$SEE_t = \beta_0 + \beta_1 PRIV + \beta_2 GDP + \varepsilon_t \quad 5$$

$$SEE_t = \beta_0 + \beta_1 FIN + \beta_2 GDP + \varepsilon_t \quad 6$$

4.3 Stationarity Test

This test is employed to identify the occurrence of unit roots in a time series. The most common method used is Augmented Dickey Fuller (ADF) (Dickey & Fuller, 1981). In this method, the null hypothesis in this case is the non-stationarity of this series. Accepting the null hypothesis means we take the first difference of the series to make it stationary. Similarly, Phillips Perron is also used to affirm the result gotten from ADF. AR (1) model takes this form:

$$\Delta X_t = \delta x_{t-1} + \sum_{i=1}^{p} \alpha \Delta X_{t-1} + \varepsilon_t \quad 7$$

Where

X_t is the specific time series

p is the best number of lags

δ decides the correct number of lags

4.4 Cointegration

We undertake Johansen Cointegration Test to ascertain the actuality of a longrun relationship among the variables. Stock and Watson (1998) observed that variables which are cointegrated have stochastic trends which are common. The extent to which cointegrated variables deviate from long-run equilibrium influences their time path. Some of the elements must react to the degree of the disequilibrium in terms of its movement to enable the system to fall back to long-run equilibrium.

The trace test and eigen max test are techniques used in Johansen Cointegration analyses. Both tests have null and alternative hypothesis. The difference is that trace test uses joint test while max eigen test uses difference testing. It is important that at least one of the tests shows the presence of a cointegrating equation to conclude the existence of a long run relationship.

4.5 Vector Autoregression (VAR)

Vector Autoregression (VAR) technique was first mentioned by Sims (1980) as a technique employed by macroeconomist to identify structural parameters using a collection of variables which are with fewer restrictions. However, in applying its estimates to impulse response and variance decomposition, it becomes necessary to identify certain restrictions.

In situations where no cointegration is observed among variables while integrated at same order, the most efficient technique to apply is VAR. It is written in this form:

$$\Delta X_t = \beta + \sum_{=1}^{q} \alpha \Delta X_{t-1} \quad 8$$

Such that

X_t is the period

β is the intercept

α is the shortrun coefficient

The functional form (1) can be written as:

$$\Delta SEE_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i-J} + \sum_{=1}^{q} \alpha \Delta M2_{t-i-J} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i-J} \quad 9$$

$$\Delta M2_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i-J} + \sum_{=1}^{q} \alpha \Delta M2_{t-i-J} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i-J} \quad 10$$

$$\Delta GDP_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i-J} + \sum_{=1}^{q} \alpha \Delta M2_{t-i-J} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i-J} \quad 11$$

4.6 The Vector Error Correction Model (VECM)

The occurrence of cointegration using Johansen Test and integration of the variables at the same order, for example, I(1) makes VECM approach the best approach to employ as an estimation technique for this study (Engle & Granger, 1991). VECM takes this form:

$$\Delta X_t = \beta + \sum_{=1}^{q} \alpha \Delta X_{t-1} + \pi ECT_{t-1} + \varepsilon_t \quad 12$$

Where:

X_t is the period

β is the intercept

α is the shortrun coefficient

π is the longrun coefficient

This study applies VECM approach since the variables are cointegrated. The functional form (2) is now written in a ECM as follows:

$$\Delta SEE_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i} + \sum_{=1}^{q} \alpha \Delta PRIV_{t-i} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i} + \pi ECT_{t-i} + \varepsilon_t \quad 13$$

$$\Delta PRIV_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i} + \sum_{=1}^{q} \alpha \Delta PRIV_{t-i} + \pi ECT_{t-i} + \varepsilon_t \quad 14$$

$$\Delta GDP_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i} + \sum_{=1}^{q} \alpha \Delta PRIV_{t-i} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i} + \pi ECT_{t-i} + \varepsilon_t \quad 15$$

The same applies for the functional form (3) as follows:

$$\Delta SEE_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i} + \sum_{=1}^{q} \alpha \Delta FIN_{t-i} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i} + \pi ECT_{t-i} + \varepsilon_t \quad 16$$

$$\Delta FIN_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i} + \sum_{=1}^{q} \alpha \Delta FIN_{t-i} + \pi ECT_{t-i} + \varepsilon_t \quad 17$$

$$\Delta GDP_t = \beta + \sum_{=1}^{q} \alpha \Delta SEE_{t-i} + \sum_{=1}^{q} \alpha \Delta FIN_{t-i} + \sum_{=1}^{q} \alpha \Delta GDP_{t-i} + \pi ECT_{t-i} + \varepsilon_t \quad 18$$

4.7. Granger Causality

In this joint hypothesis test, Xs is a useful predictor below the lagged values of Y. If X granger causes Y, it means that the previous values of X contains information necessary for prediction of changes in Y, above what is contained in the previous values of Y (Engle & Granger, 1991).

A bidirectional causality occurs when X granger causes Y and vice versa. This is also known as a two-way causality. A situation where X granger causes Y but Y does not necessarily granger causes X is known as a unidirectional causality. This study employs granger causality for forecasting future occurrences between financial development and the shadow economy.

4.8 Impulse Response

These functions are derived using the Vector Moving Average of a VAR which is found to be stationary. Plotting an impulse response function is a method applied to show the behavior of two series as they respond to certain shocks. Impulse response illustrates the time path of one variable as a result of an orthogonal shock to another

variable. This further explains the adjustment that occurs with certain variables over time.

Choleski decomposition is employed in a VAR system with two variables to enable the identification of the impulse response (Sims, 1986 & Keating, 1996). This is because of the non-availability of the methodology to researchers. These non-availability is caused by the under identification of the estimated VAR.

4.9 Variance Decomposition

Variance Decomposition Test is also carried out to affirm the results shown by impulse response. It shows the percentage of variance explained as a shock to another variable. This also measures the responsiveness of variables to economic shock and its extent.

Chapter 5

PRESENTATIONS OF EMPIRICAL FINDINGS

The results of the empirical tests carried out in this research are exhibited in this chapter. The estimation is carried out for the three models individually showing the relationship between shadow economy and each of the indicators for financial development. First, we start with the unit root test using ADF and PP to check the stationarity of the variables. Afterwards the long run relationship amongst the variables using Johanson Cointegration test is done. VECM is then employed to ascertain the speed of adjustment between shadow economy and financial development indicators. We utilize granger causality to define the direction of causality existing among variables. Finally, the determination of the extent of shock among elements is ascertained by employing impulse response.

5.1 Descriptive Statistics

The summary of the description for all the variables are shown.

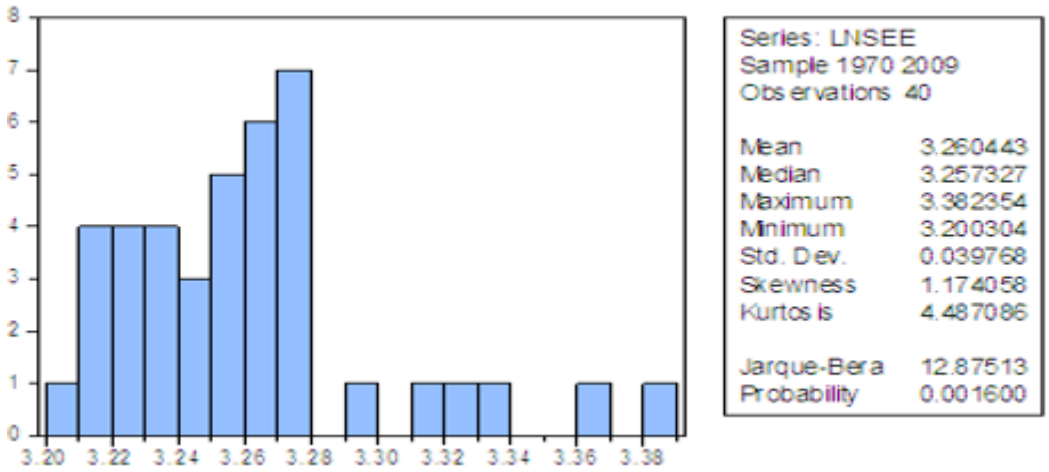

Figure 1: SEE Description

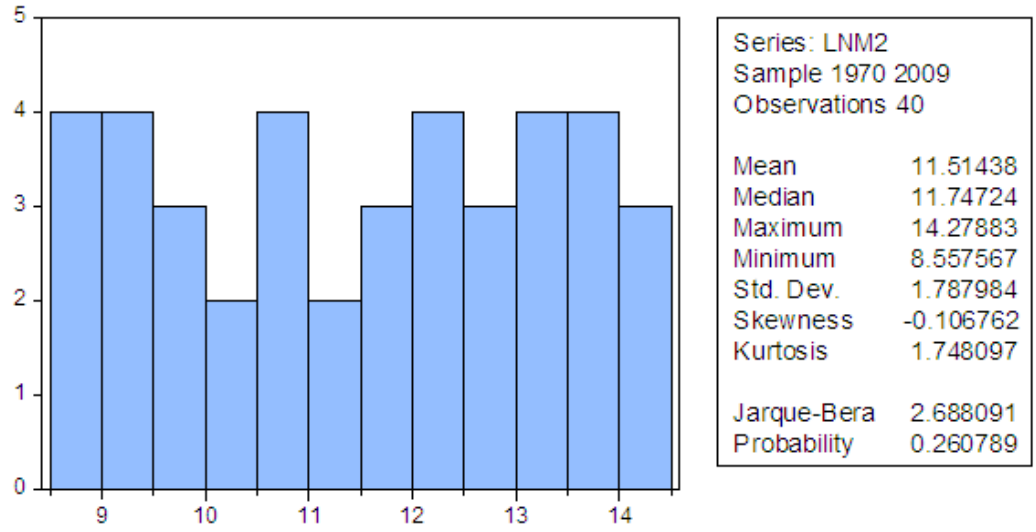

Figure 2: M2 Description

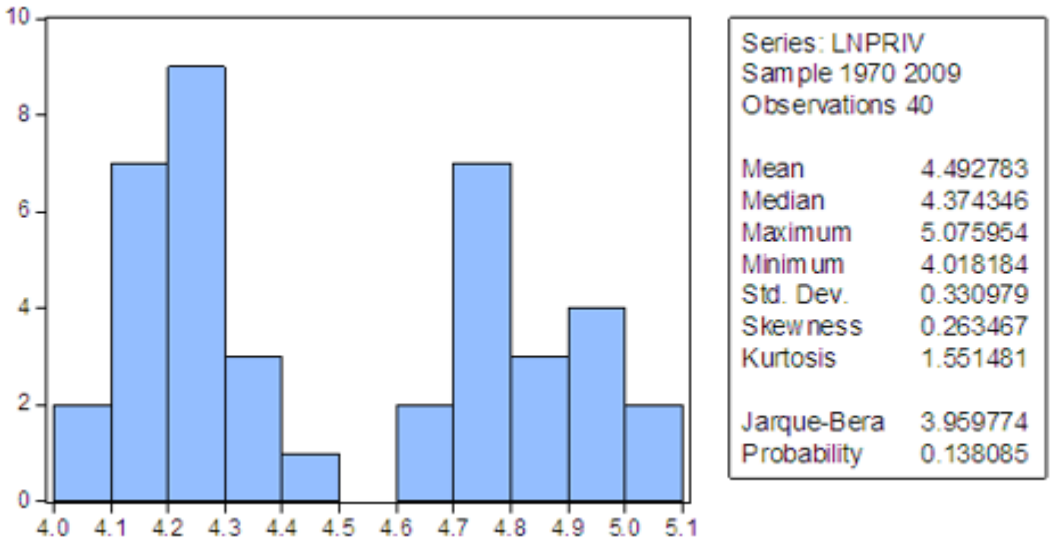

Figure 3: PRIV Description

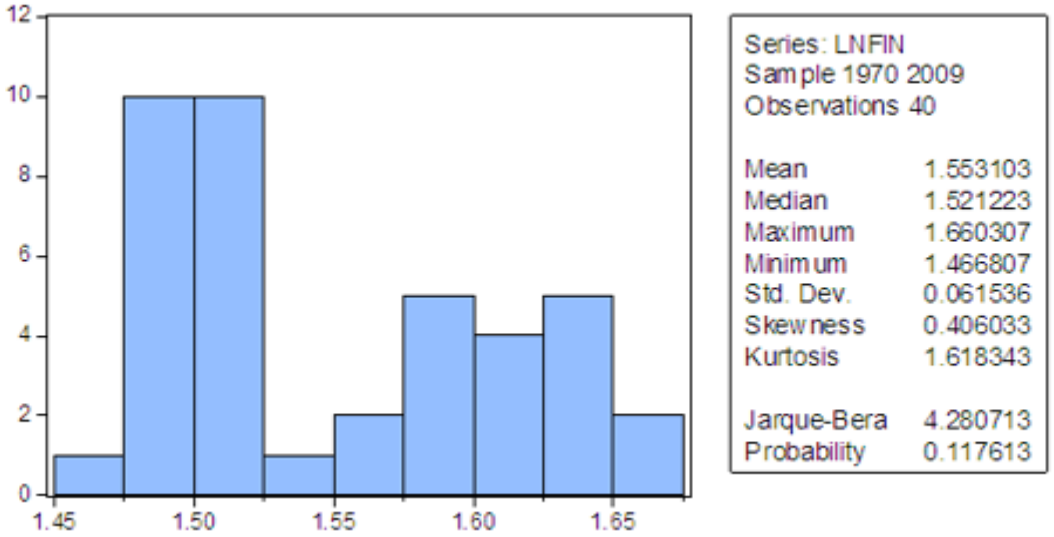

Figure 4: FIN Description

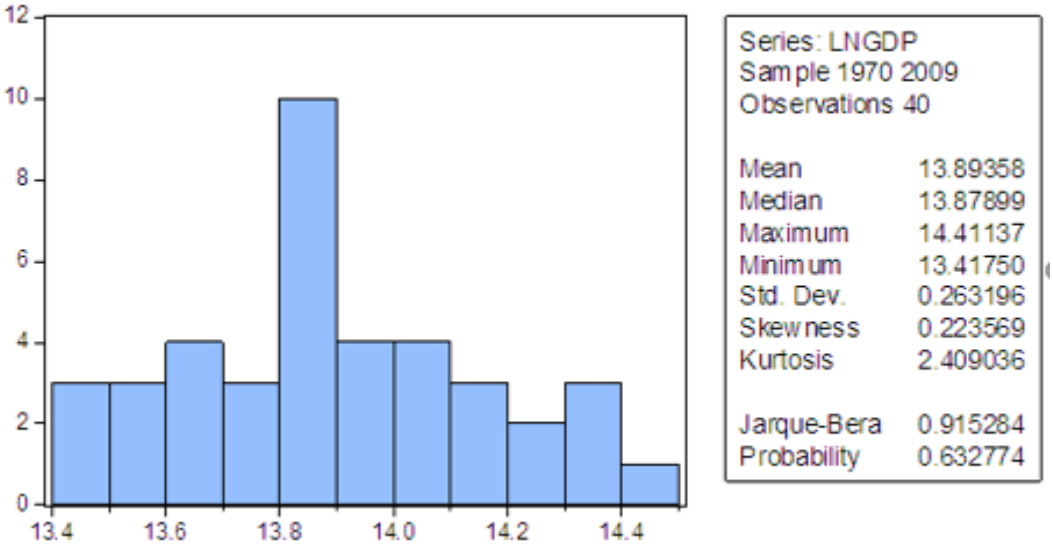

Figure 5: GDP Description

5.2 Unit Root Results

The unit root results for the three models are displayed in table 1 and 2 using ADF and PP tests respectively. In both results, all variables are observed to be I(1). This means that they are stationary at first difference. The PP test is done to affirm the results derived from the ADF test. In both tests, the null hypothesis is rejected at 5% and 10% level of significance.

Table 1: ADF Result

VARIABLES	LEVEL	REMARK	FIRST DIFFERENCE	REMARK
SEE	0.411	Not Stationary at Level	0.0269*	Stationary at First Difference
GDP	0.9387	Not Stationary at Level	0.0034*	Stationary at First Difference
PRIV	0.9757	Not Stationary at Level	0.0000*	Stationary at First Difference
FIN	0.9778	Not Stationary at Level	0.0000*	Stationary at First Difference
M2	0.5253	Not Stationary at Level	0.0005*	Stationary at First Difference

The values shown are the probability figures. The probabilities rejected are shown with *

Table 2: PP Result

VARIABLES	LEVEL	REMARK	FIRST DIFFERENCE	REMARK
SEE	0.0769	Not Stationary at Level	0.0366*	Stationary at First Difference
GDP	0.9597	Not Stationary at Level	0.0066*	Stationary at First Difference
PRIV	0.9862	Not Stationary at Level	0.0000*	Stationary at First Difference
FIN	0.9932	Not Stationary at Level	0.0000*	Stationary at First Difference
M2		Not Stationary at Level	0.0048*	Stationary at First Difference

The values shown are the probability figures. The probabilities rejected are shown with *

5.3 Results for Model 1

5.3.1 Lag Selection Criteria

The preferable lag for this model is lag 1. This is presented in the appendix as table I.

5.3.2 Analyzing the Cointegration Result

With all the variables integrated, we check for a long run convergence among the elements. Johanson cointegration result below shows that nonexistence of cointegration at 5% in both Trace and Max eigen tests. This means that the variables do not have a long run haul thereby there is no form of convergence in the long run. This is shown in table 3 below.

Table 3: Johanson Cointegration Result

Cointegration Test (Trace)

No of eqn	Eigenvalue	Trace	Critical Value	Prob**
None	0.292769	22.86611	29.79707	0.2527
At most 1	0.232972	10.04939	15.49471	0.2769
At most 2	0.006352	0.235783	3.841466	0.6273

** shows significance at 0.05 level

Cointegration Test (Maximum Eigenvalue)

No of egn	Eigenvalue	Max Eigen	Critical Value	Prob**
None	0.292769	12.81672	21.13162	0.4692
At most 1	0.232972	9.813604	14.2646	0.2245
At most 2	0.006352	0.235783	3.841466	0.6273

** shows significance at 0.05 level

Normalized Coefficients

Lnsee	lnm2	Lngdp
1.000000	-0.070822	0.531471
	(0.00990)	-0.06598

The normalizing coefficients propose positivity between shadow economy and money supply in table 3. This is in contrast to the findings of Berdiev & Saunoris (2016). Increment in money in circulation is significant to shadow activities.

An observed negative relation exists between GDP and shadow economy in table 3. Increment in GDP shows a decrease in shadow activities. Findings of Berdiev & Saunoris (2016) confirm this result

5.3.3 The Vector Auto Regression Result

The Johansson Cointegration Test done previously presents the nonexistence of long run correlation amongst the elements. As a result, we carried out a VAR test and the result is shown in the appendix. Coefficient of shadow economy is significant at lag 1. We can say that shadow economy increased by 0.963679% from the previous year.

A 1% increase in GDP leads to a 0.122494% fall in shadow economy. This is because the coefficient of GDP is significant at lag 1. Positivity is observed between M2 and shadow economy at all lags but this result is observed to be statistically insignificant. This is shown in table II in the appendix section.

5.3.4 The Causality Presentation

The granger causality result for this model is presented in table 4.

A unidirectional causality is observed as M2 granger causes SEE at 1%, 5% and 10% All other variables do not granger cause each other.

Table 4: Granger Causality

Causality Test		
Hypothesis	F-Stat	Prob**
Lnm2 does not granger cause lnsee	4.93668	0.0133**
Lnsee does not granger cause lnm2	1.04567	0.3628
Lngdp does not granger cause lnsee	14.0176	4.00E-05
Lnsee does not granger cause lngdp	2.12127	0.1359
Lngdp does not granger cause lnm2	0.45807	0.6365
Lnm2 does not granger cause lngdp	0.66364	0.5217
** Reject null hypothesis		

5.3.5 Presenting Impulse Response Analogy

An observable negative trend is seen as a reaction takes place in the shadow economy resulting from a shock in money supply. A shock of one standard deviation to m2 decreases activities of shadow economy by 0.02% of GDP in the fourth year. This is shown in figure 1.

Shadow economy responds negatively to a shock in GDP. For example, a one standard deviation shock to GDP causes shadow activities to decrease by 0.09% in the 8^{th} year. A shock on both money supply and GDP to shadow economy causes a positive reaction. This explains that GDP and money supply increases due to a shock in shadow activities.

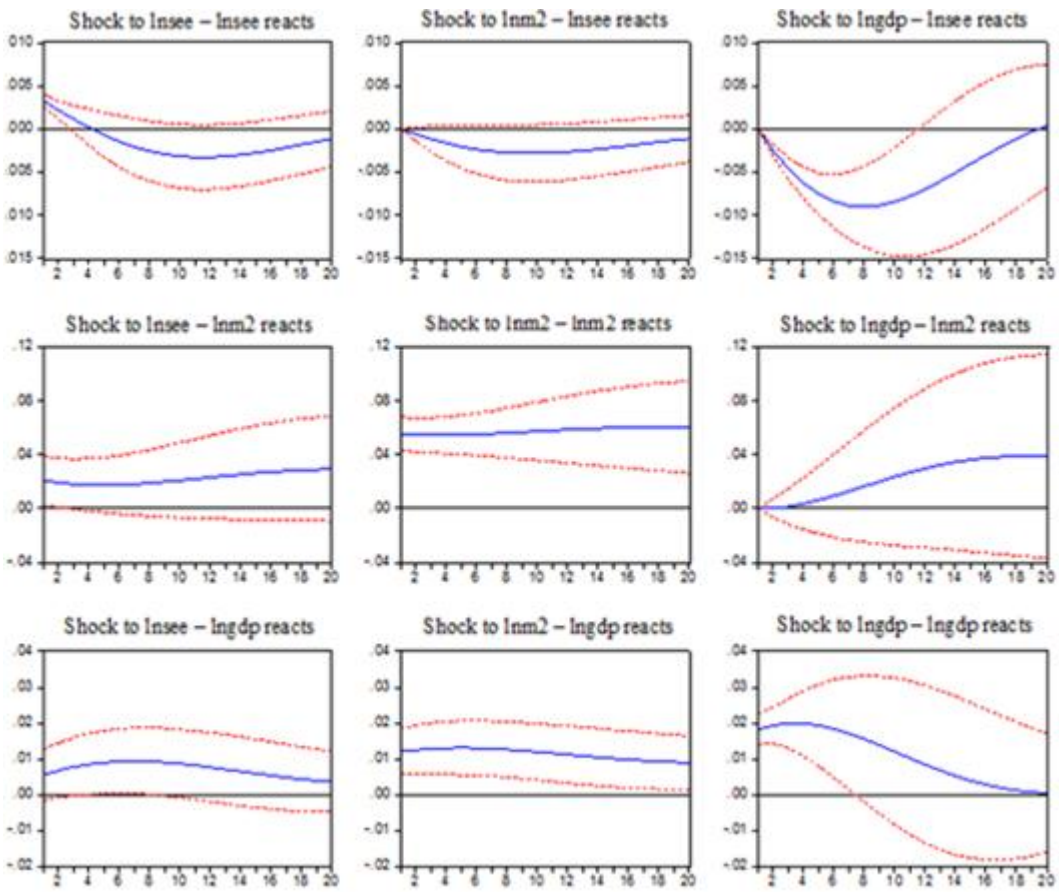

Figure 6: Impulse response functions for lnsee, lnm2 and lngdp

5.3.6. Variance Decomposition Report

This report is quite similar to that of impulse response. It is observed that the percentage of shadow economy which is explained as a result of a shock in M2 is really low. Throughout the 10 years, it is observed to be lower than 20%. This is shown in figure 4 in the appendix.

5.4. Results for Model 2:

5.4.1. Criteria for Lag Selection

Table III Presented in the appendix shows that lag 3 is the preferable lag for this model.

5.4.2. The Cointegration Report

Furthermore, trace test in the cointegration analysis rejects the null hypothesis that suggests the nonexistence of cointegration at 5% level of significance. This is not the case in Maximium Eigen Value Test as the nonexistence of cointegration is accepted. For the purpose of this study, we use the results from Trace test and conclude that a long run correlation is observed amongst the variables. A convergence is observed among variables over the long haul. This is shown in table 5.

Table 5: Johanson Cointegration Result II

Cointegration Test (Trace)

No of eqn	Eigenvalue	Trace	Critical Value	Prob**
None	0.426470	32.56513	29.79707	0.0234**
At most 1	0.218150	12.55109	15.49471	0.1323
At most 2	0.097466	3.691774	3.841466	0.0547

** shows significance at 0.05 level

Cointegration Test (Maximum Eigenvalue)

No of eqn	Eigenvalue	Max Eigen	Critical Value	Prob**
None	0.426470	20.01404	21.13162	0.0711
At most 1	0.232972	8.859314	14.2646	0.2981
At most 2	0.006352	3.691774	3.841466	0.0547**

** shows significance at 0.05 level

Normalized Coefficients

Lnsee	lnpriv	lngdp
1.000000	0.003741	0.000000
	(0.03747)	

Table 5 shows the normalized cointegrating coefficients. These coefficients suggest the existence of negativity between GDP and shadow economy. As observed in the first model, rise in GDP suggests fall in shadow economy.

Positivity shadow economy and domestic credit to private sector dose not conform to the findings of Berdiev and Saunoris, 2016.

5.4.3. The Error Correction Analysis

The VECM in table IV displayed in appendix section shows the speed of adjustment for the variables during economic uncertainties. The error correction term in this model is -0.038945. This means that 3.8% speed of adjustment is necessary for short run values of shadow economy to converge in the long haul. But this result is statistically insignificant with a low coefficient.

The short-term coefficients of shadow economy are insignificant at all lags. GDP short term coefficients are significant at lag 1. This means that a 1% increase in GDP would invariably lead to a 0.135016% drop in shadow activities. The same applies for the coefficients of domestic credit to private sector which are shown to be statistically insignificant at all α levels.

5.4.4 Granger Causality Result

A unidirectional causality is observed from SEE to GDP at 1%, 5% and 10%.

All other variables in the model do not have a causal relationship between them. This means that shadow economy does not granger cause domestic credit to private sector. This is shown in table 6.

Table 6: Granger Causality Result II

Causality Test		
Hypothesis	F-Stat	Prob**
Lngrowth does not granger cause lnsee	14.0252	7.E-06
Lnsee does not granger cause lngdp	4.64716	0.0088**
Lnm2 does not granger cause lnsee	1.25580	0.3072
Lnsee does not granger cause lnm2	0.84218	0.4816
Lngdp does not granger cause lnm2	2.04746	0.1283
Lnm2 does not granger cause lngdp	1.89539	0.1517
** Reject null hypothesis		

5.4.5. Presenting Impulse Response Findings

An interesting phenomenum is noticed in figure 2 which shows the case of a response of shadow operations to a shock in domestic credit to private sector. This response trends positively in the initial years but becomes negative at the 15th year. In the 20th year, a one standard deviation shock in domestic credit to private sector mitigates shadow operations by 0.01%.

Domestic credit to private sector responds positively to a shadow economy shock. This is detected from the first year as a one standard deviation shock in shadow economy raises domestic credit to private sector by 0.25% in the fifth year. This result is seen to be statistically significant.

Both shadow economy and domestic credit to private sector responds similarly to a shock in GDP. At the beginning, both variables trend negatively but shadow economy becomes positive at the 15th year. Domestic credit on the other hand moves towards positivity on the 13th year. These results are shown to be statistically insignificant.

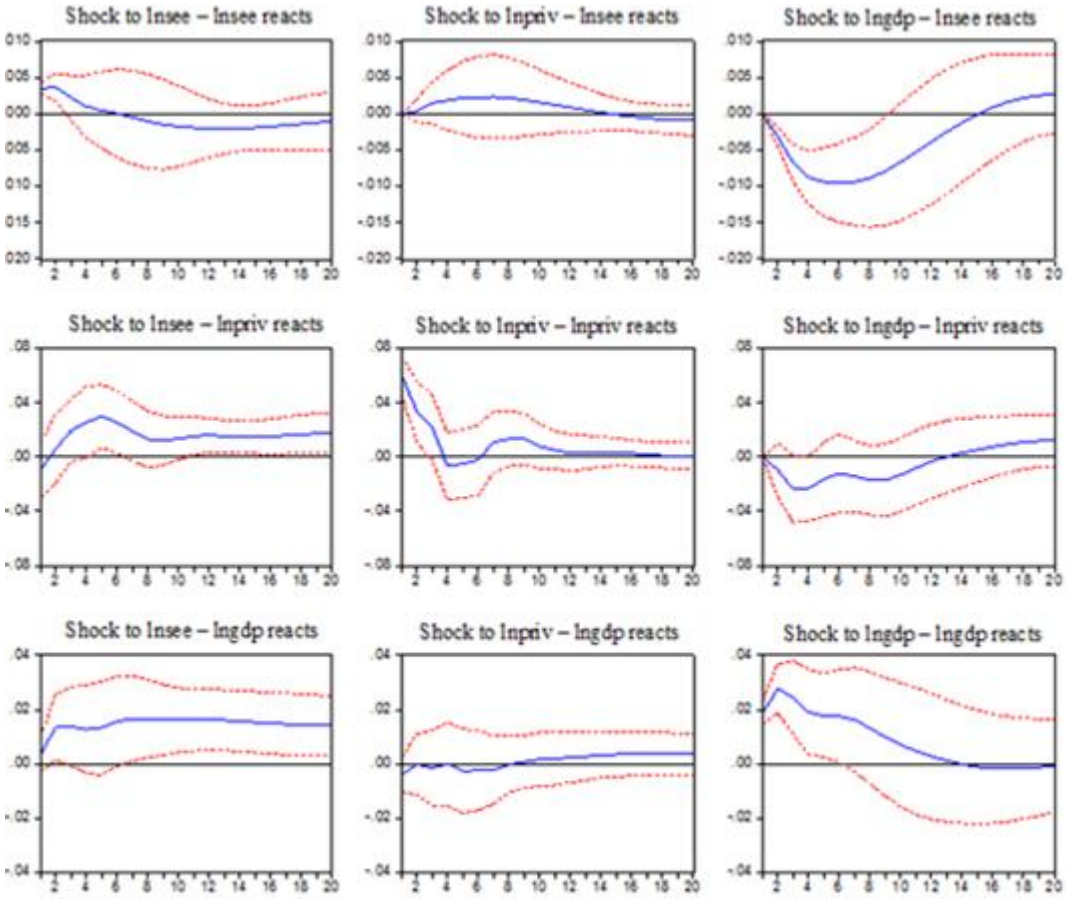

Figure 7: Impulse Response Functions for lnsee, lnpriv and lngdp

5.4.6. Variance Decomposition Report

The report provided by the variance decomposition affirms the results derived from the impulse response. Figure 5 in the appendix presents the result of the variance decomposition test carried out. Again, it is observed that the percentage of shadow economy which is explained due to a shock in domestic credit to private sector is low. It is below 20% throughout the years. On the other hand, the percentage of private sector explained by a shock to shadow activities rises over the years till it reaches 40%.

5.5. Results for Model 3:

5.5.1. Lag Selection Criteria

Lag 3 is selected as the preferable lag for this model using the VAR lag order. This is displayed as table V in the appendix.

5.5.2. Cointegration Report

Both Trace test and Maximium Eigenvalue test indicates the existence of one cointegrating equation. Rejection of the null hypothesis at 5% level of significance affirms this. At this point, we can confidently conclude that there would be a convergence among the elements in the long haul. This further supports that a long run association is found amongst the variables in the model. This is shown in the table 7.

Table 7: Johanson Cointegration Result III

Cointegration Test (Trace)				
No of eqn	Eigenvalue	Trace	Critical Value	Prob**
None	0.590018	46.06882	29.79707	0.0003**
At most 1	0.183450	13.96971	15.49471	0.0838
At most 2	0.169211	6.673680	3.841466	0.0098**
** shows significance at 0.05 level				

Cointegration Test (Maximum Eigenvalue)				
No of eqn	Eigenvalue	Max Eigen	Critical Value	Prob**
None	0.590018	32.09911	21.13162	0.0010**
At most 1	0.183450	7.296025	14.2646	0.4547
At most 2	0.169211	6.673680	3.841466	0.0098**
** shows significance at 0.05 level				

Normalized Coefficients		
Lnsee	lnfin	Lngdp
1.000000	-0.246563	0.000000
	(0.01623)	(0.01960)

The normalizing coefficients suggest negativity between shadow economy and Growth. This is in conformity with the findings of the other two models in this study. A positive relation exists among shadow activities and domestic credit to various sectors. This finding is unreliable with previous findings in this hypothesis and suggests a long run positive relation between credits provided by financial institutions and shadow economy.

5.5.3 The Error Correction Analysis

Table VI in the appendix shows the VECM results for this model. The ECT is -0.089475. The speed of adjustment for the short run coefficients of shadow economy to coincide in the long run is 8.9%. This result is observed to be statistically insignificant.

An increase in Growth causes shadow economy to decline significant. This is evident in previous values of GDP which are negative. Shadow economy decreases by 0.126213% when there is a rise in GDP by 1%. All other coefficients are statistically insignificant as shown in table 7 in the appendix.

5.5.4 Analyzing the Causality Findings

From table 8, the following observations are made concerning the granger causality result:

SEE granger causes GDP at 1%, 5% and 10%

FIN granger causes SEE at 5% and 10%

FIN granger causes GDP at 5% and 10%

These observed causalities are unidirectional. In both cases, the null hypothesis is rejected. The absence of granger causality amongst the remaining variables is observed. This means that the previous values for FIN can be used in forecasting variations in SEE. The same applies to SEE & GDP and FIN & GDP.

Table 8: Granger causality Result III

Causality Test		
Hypothesis	F-Stat	Prob
Lngdp does not granger cause lnsee	14.0252	7.E-06
Lnsee does not granger cause lngdp	4.64716	0.0088**
Lnfin does not granger cause lnsee	4.02507	0.0161**
Lnsee does not granger cause lnfin	0.84057	0.4824
Lnfin does not granger cause lngdp	3.89076	0.0184**
Lngdp does not granger cause lnfin	1.75610	0.1768
** Reject null hypothesis		

5.5.5 Impulse Response Analogy

It is observed in figure 3 that shadow economy reacts in a negative manner to a shock in domestic credit to various sectors after the fourth year. Shadow economy shrinks by 0.02% in the seventh year resulting from a one standard deviation shock in domestic credit to various sectors.

Moreover, financial development reacts positively to a shock in shadow economy. This is observed to be statistically significant. Domestic credit to various sectors expands by 0.03% due to one standard deviation shock in the fifth year.

Furthermore, the response of financial development to a shock in GDP trends negatively. The same reaction is noticed in the case of shadow economy responding to a shock in GDP. The reverse is the case as GDP responds positively to a shock in shadow economy as well as financial development.

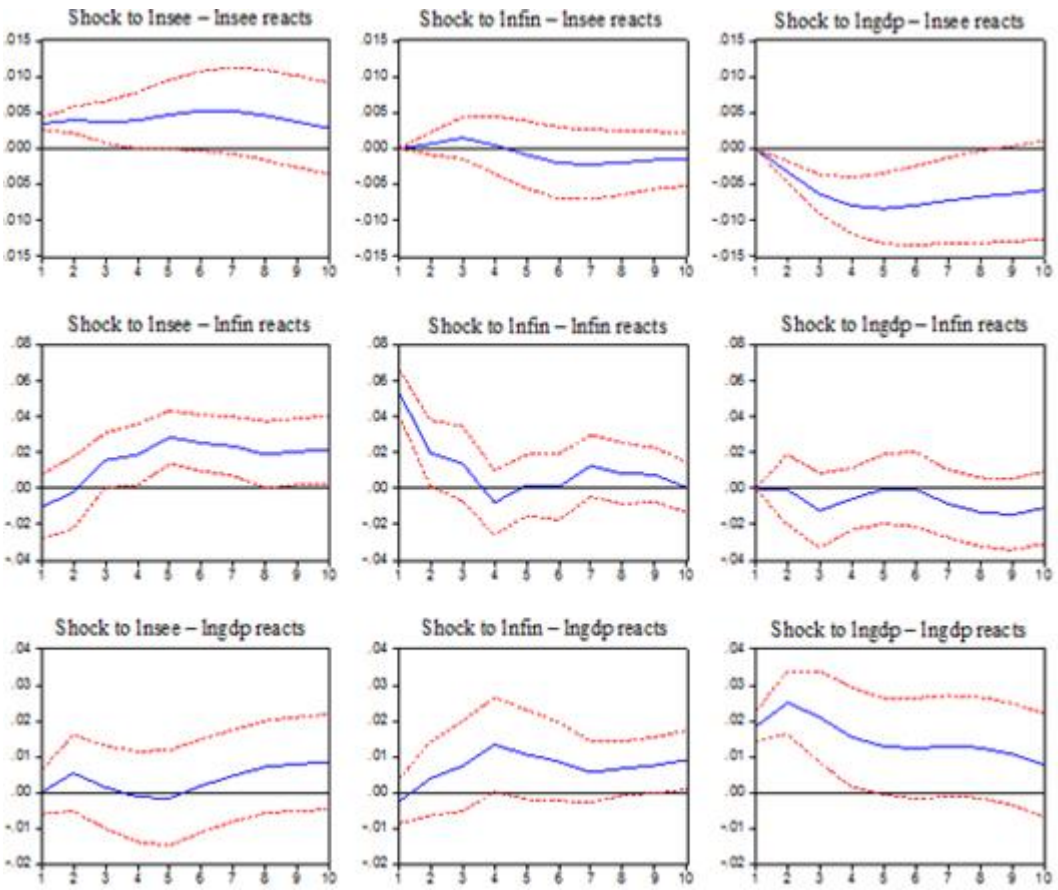

Figure 8: Impulse Response functions for LNSEE, LNFIN and LNGDP

5.5.6 Variance Decomposition Report

The result presented in figure 6 in the appendix supports the result presented by impulse response. As observed previously with the other indicators of financial development, less than 20% of shadow economy is explained by a shock in domestic credit to various sectors. In the case of the percentage of domestic credit to various sectors explained by a shock in shadow activities, it is observed to rise to almost 60% in the seventh year. This trend is maintained in consequent years.

Chapter 6

CONCLUSION

In this chapter, a comprehensive summary is provided for the findings of this research. This makes policy implications and recommendations easy for decision makers.

6.1. Conclusions on Findings

The empirical findings of this study present all variables to be stationary at first difference. A long run convergence is found between shadow economy and all the variables except money supply.

The Vector Auto regression (VAR) presents all the variables to be statistically insignificant at all lag levels except shadow economy and GDP which are both significant at lag 1. A negative relationship is noticed between shadow economy and GDP in this result. This is in conformity with findings of Schneider and Enste, 2000. This is possible because an expansion in the formal sector leads to GDP growth. This shrinks shadow economy as more individuals dive into the registered and recorded part of the economy. The short-term coefficient of shadow economy in the VAR result also shows increment in its activity from one period to another can be true as a remedy to curb the problem of unemployment in South Africa.

The presence of a long haul among the variables is shown in the Vector Error Correction Model (VECM) which has a negative error correction term observed to be

statistically insignificant in both VEC models. All variables are observed to be statistically insignificant at all lags except GDP which is statistically significant at lag 1 in both models. The short term coefficient of GDP is negative in both cases which mean that a rise in GDP causes a decline in shadow activities. This is in further conformation with Schneider and Enste (2000).

Granger causality results show a unidirectional causality among all observed causality in the models. There exists causality between money supply and shadow economy at 1%, 5% and 10% significance level. Shadow economy is observed to have a causal relationship with GDP at 1%, 5% and 10% level of significance in both VEC models. Domestic credit to various sectors granger causes both shadow economy and GDP at 5% and 10% level of significance in the second VEC model. This means that previous values of money supply and domestic credit to various sectors is important in predicting changes in shadow economy. In forecasting GDP, past values of shadow economy and domestic credit to various sectors are very essential. In general, this is very important in forecasting future occurrences.

The following observations are made from the impulse response results. Shadow economy is observed to respond negatively to a shock in the three measures of financial development independently. This is in support with the findings of Berdiev & Saunoris (2016). It means that an increment in domestic credit provided to both private and public sectors by financial institutions attracts more investors to the formal sector. The deepening of the financial sector leads to a shrink in shadow activities.

This research also finds a positive response of the three financial development indicators independently to a shock in shadow economy estimate. When shadow economy rises, money in circulation increases resulting from a rise in money demand. Financial institutions respond positively to a rise in shadow activities by increasing loan and grants made available to investors. This is done as an incentive aimed at encouraging business owners and entrepreneurs into the formal sector. The normalizing coefficients further suggest positivity between financial development and shadow economy.

The empirical findings present positive response of GDP to shock in the various financial development indicators. This finding implies that there is an observable growth in the economy due to deepening in the financial sector. This is in conformity with findings of Cesar & Liu Liu (2003), Allen & Ndikumana (2000) and Beck at el (2000).

Positivity is observed between GDP and shadow economy as GDP responds positively to a shock in shadow economy. This becomes statistically significant in the sixth year. It is supported by findings of Schneider & Klinglmair (2004). Shadow economy is very essential in the development of various economies.

Normalizing coefficients also suggests that shadow economy and GDP are negatively intertwined which is further observed in the manner in which shadow economy responds to a shock in GDP. As more investors dive into the formal sector due to financial development, shadow economy is observed to shrink further. This is supported by findings of Berdiev & Saunoris.

6.2 Policy Implication and Recommendation

Conclusively, the above reports reveal that the three indicators of financial development have certain implications on the activities in the shadow economy. This is very important for policy makers as both concepts affect economic development greatly. Economic analyst may find this research very useful when trying to understand the complexities of shadow economy when relating it with financial development. Government of various countries such as South Africa can make relevant reference to the study for proper policy implementation.

REFERENCES

Agbetsiafa, D. (2004). The finance growth nexus: evidence from Sub-Saharan Africa. *Savings and Development*, 271-288.

Allen, D. S., & Ndikumana, L. (2000). Financial intermediation and economic growth in Southern Africa. *Journal of African Economies*, *9*(2), 132-160.

Berdiev, A. N., & Saunoris, J. W. (2016). Financial development and the shadow economy: A panel VAR analysis. *Economic Modelling*, *57*, 197-207.

Beck, T., Levine, R., & Loayza, N. (2000). Finance and the Sources of Growth. *Journal of financial economics*, *58*(1), 261-300.l

Buehn, A., & Schneider, F. (2011). A preliminary attempt to estimate the financial flows of transnational crime using the MIMIC method. *Research Handbook on Money Laundering*, 172-189.

Capasso,S., & Jappelli, T. (2013). Financial development and the underground economy. *Journal of Development Economics*, *101*, 167-178.

Chaudhuri, K., Schneider, F., & Chattopadhyay, S. (2006). The size and development of the shadow economy: An empirical investigation from states of India. *Journal of Development Economics*, *80*(2), 428-443.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*, 1057-1072.

Elgin, C., & Oztunali,O. (2012). Shadow economies around the world: model based estimates. *Bogazici University Department of Economics Working Papers*, *5*, 1-48.

Elgin, C., & Uras, B. R. (2013). Is informality a barrier to financial development? *Series*, *4*(3), 309-331.

Federici, D., & Caprioli, F. (2009). Financial development and growth: An empirical analysis. *Economic Modelling*, *26*(2), 285-294.

Feld, L. P., & Schneider, F. (2010). Survey on the shadow economy and undeclared earnings in OECD countries. *German Economic Review*, *11*(2), 109-149.

Ihrig,J., & Moe, K. S. (2004). Lurking in the shadows: the informal sector and government policy. *Journal of Development Economics*, *73*(2), 541-557.

Keating, J. W. (1996). Structural information in recursive VAR orderings. *Journal of economic dynamics and control*, *20*(9), 1557-1580.

Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of economic literature*, *35*(2), 688-726.

Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of monetary Economics*, *46*(1), 31-77.

Nazmi, N. (2005). Deregulation, financial deepening and economic growth: The case of Latin America. *The Quarterly Review of Economics and Finance*, *45*(2), 447-459.

Odhiambo, N. M. (2004). Is financial development still a spur to economic growth? A causal evidence from South Africa. *Savings and Development*, 47-62.

Odhiambo, N. M. (2009). Finance-growth-poverty nexus in South Africa: A dynamic causality linkage. *The Journal of Socio-Economics*, *38*(2), 320-325.

Rajan, R. G., & Zingales, L. (2003). The great reversals: the politics of financial development in the twentieth century. *Journal of financial economics*, *69*(1), 5-50.

Reinhart, C. M., & Tokatlidis, I. (2003). Financial liberalisation: the African experience. *Journal of African Economies*, *12*(suppl 2), ii53-ii88.

Schneider, F., & Enste, D. (1998). Increasing shadow economies all over the world-fiction or reality.

Schneider, F., & Klinglmair, R. (2004). Shadow economies around the world: what do we know?

Schneider, F., Buehn, A., & Montenegro, C. E. (2010). Shadow Economies all over the World: New Estimates for 162 Countries from 1999 to 2007.

Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: Journal of the Econometric Society*, 1-48.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, *70*(1), 65-94.

Stock, J. H., & Watson, M. W. (1998). *A comparison of linear and nonlinear univariate models for forecasting macroeconomic time series* (No. w6607). National Bureau of Economic Research.

APPENDICES

APPENDIX A

TABLE I: LAG SELECTION CRITERIA

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	67.06678	NA	6.29e-06	-3.463069	-3.332454	-3.417021
1	315.3624	442.9056*	1.52e-11	-16.39797	-15.87551*	-16.21377*
2	325.6270	16.64539	1.44e-11*	-16.46632*	-15.55202	-16.14399
3	333.6463	11.70378	1.56e-11	-16.41331	-15.10716	-15.95283
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

TABLE II: VAR RESULT

Vector Autoregression Estimates			
	LNSEE	LNGDP	LNM2
LNSEE(-1)	0.963679	3.234261	4.167906
	(0.18994)	(1.18102)	(3.01255)
	[5.07353]	[2.73852]	[1.38351]
LNSEE(-2)	-0.156043	-2.434437	-3.866297
	(0.15032)	(0.93469)	(2.38420)
	[-1.03804]	[-2.60454]	[-1.62163]
LNGDP(-1)	-0.122494	1.251638	0.806735
	(0.03248)	(0.20196)	(0.51517)
	[-3.77119]	[6.19736]	[1.56597]
LNGDP(-2)	0.011418	0.166986	-0.434875
	(0.04812)	(0.29919)	(0.76317)
	[0.23730]	[0.55813]	[-0.56983]
LNM2(-1)	0.000987	-0.072380	1.016407
	(0.01311)	(0.08149)	(0.20785)
	[0.07531]	[-0.88825]	[4.89003]
LNM2(-2)	0.014078	0.016134	-0.082936

	(0.01239)	(0.07704)	(0.19650)
	[1.13630]	[0.20944]	[-0.42206]
C	1.995367	-7.732219	-5.240390
	(0.50833)	(3.16068)	(8.06225)
	[3.92535]	[-2.44638]	[-0.64999]
R-squared	0.989807	0.993843	0.999149
Adj. R-squared	0.987835	0.992651	0.998985
Sum sq. resids	0.000361	0.013944	0.090728
S.E. equation	0.003411	0.021209	0.054099
F-statistic	501.7353	833.9408	6067.778
Log likelihood	165.8175	96.37572	60.79234
Akaike AIC	-8.358818	-4.703985	-2.831176
Schwarz SC	-8.057157	-4.402324	-2.529515
Mean dependent	3.254587	13.91754	11.66842
S.D. dependent	0.030925	0.247399	1.697714
Determinant resid covariance (dof adj.)		9.25E-12	
Determinant resid covariance		5.02E-12	
Log likelihood		332.5712	
Akaike information criterion		-16.39849	
Schwarz criterion		-15.49350	

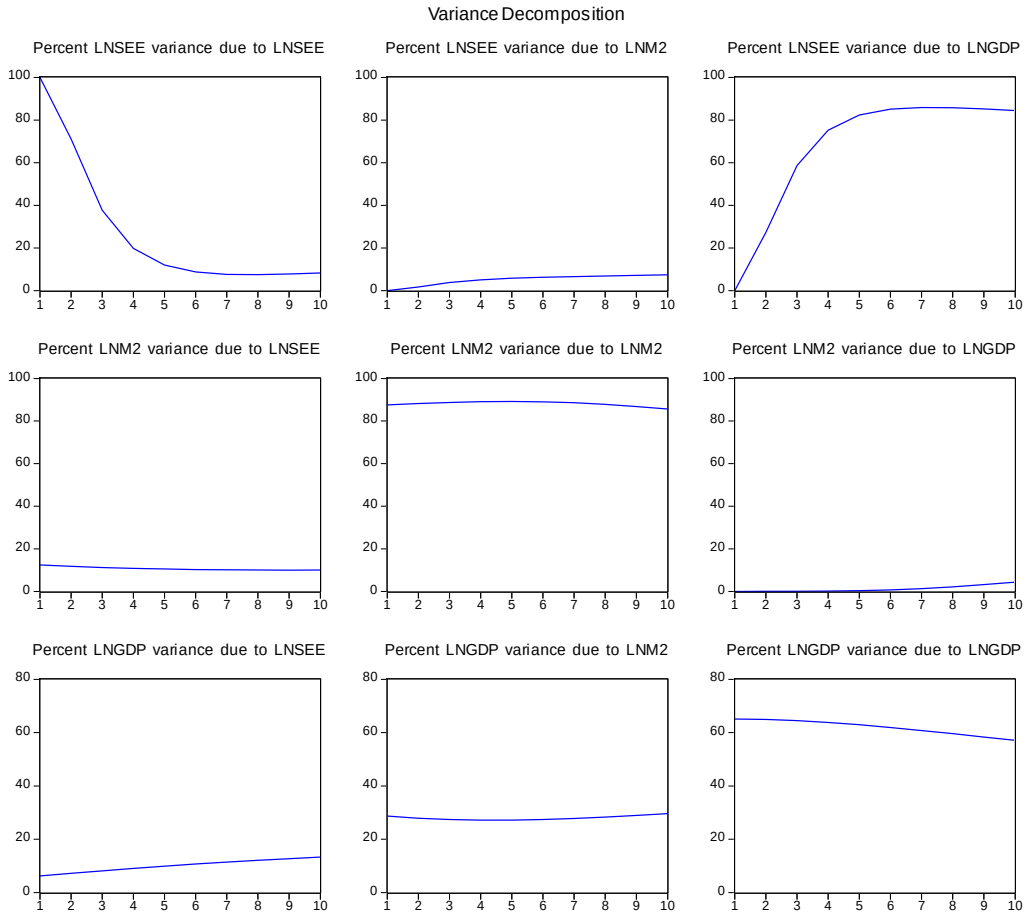

Figure 9

TABLE III: VECM II

Vector Autoregression Estimates			
	LNSEE	LNGDP	LNM2
LNSEE(-1)	0.963679	3.234261	4.167906
	(0.18994)	(1.18102)	(3.01255)
	[5.07353]	[2.73852]	[1.38351]
LNSEE(-2)	-0.156043	-2.434437	-3.866297
	(0.15032)	(0.93469)	(2.38420)
	[-1.03804]	[-2.60454]	[-1.62163]
LNGDP(-1)	-0.122494	1.251638	0.806735
	(0.03248)	(0.20196)	(0.51517)
	[-3.77119]	[6.19736]	[1.56597]
LNGDP(-2)	0.011418	0.166986	-0.434875
	(0.04812)	(0.29919)	(0.76317)
	[0.23730]	[0.55813]	[-0.56983]

LNM2(-1)	0.000987	-0.072380	1.016407
	(0.01311)	(0.08149)	(0.20785)
	[0.07531]	[-0.88825]	[4.89003]
LNM2(-2)	0.014078	0.016134	-0.082936
	(0.01239)	(0.07704)	(0.19650)
	[1.13630]	[0.20944]	[-0.42206]
C	1.995367	-7.732219	-5.240390
	(0.50833)	(3.16068)	(8.06225)
	[3.92535]	[-2.44638]	[-0.64999]
R-squared	0.989807	0.993843	0.999149
Adj. R-squared	0.987835	0.992651	0.998985
Sum sq. resids	0.000361	0.013944	0.090728
S.E. equation	0.003411	0.021209	0.054099
F-statistic	501.7353	833.9408	6067.778
Log likelihood	165.8175	96.37572	60.79234
Akaike AIC	-8.358818	-4.703985	-2.831176
Schwarz SC	-8.057157	-4.402324	-2.529515
Mean dependent	3.254587	13.91754	11.66842
S.D. dependent	0.030925	0.247399	1.697714
Determinant resid covariance (dof adj.)		9.25E-12	
Determinant resid covariance		5.02E-12	
Log likelihood		332.5712	
Akaike information criterion		-16.39849	
Schwarz criterion		-15.49350	

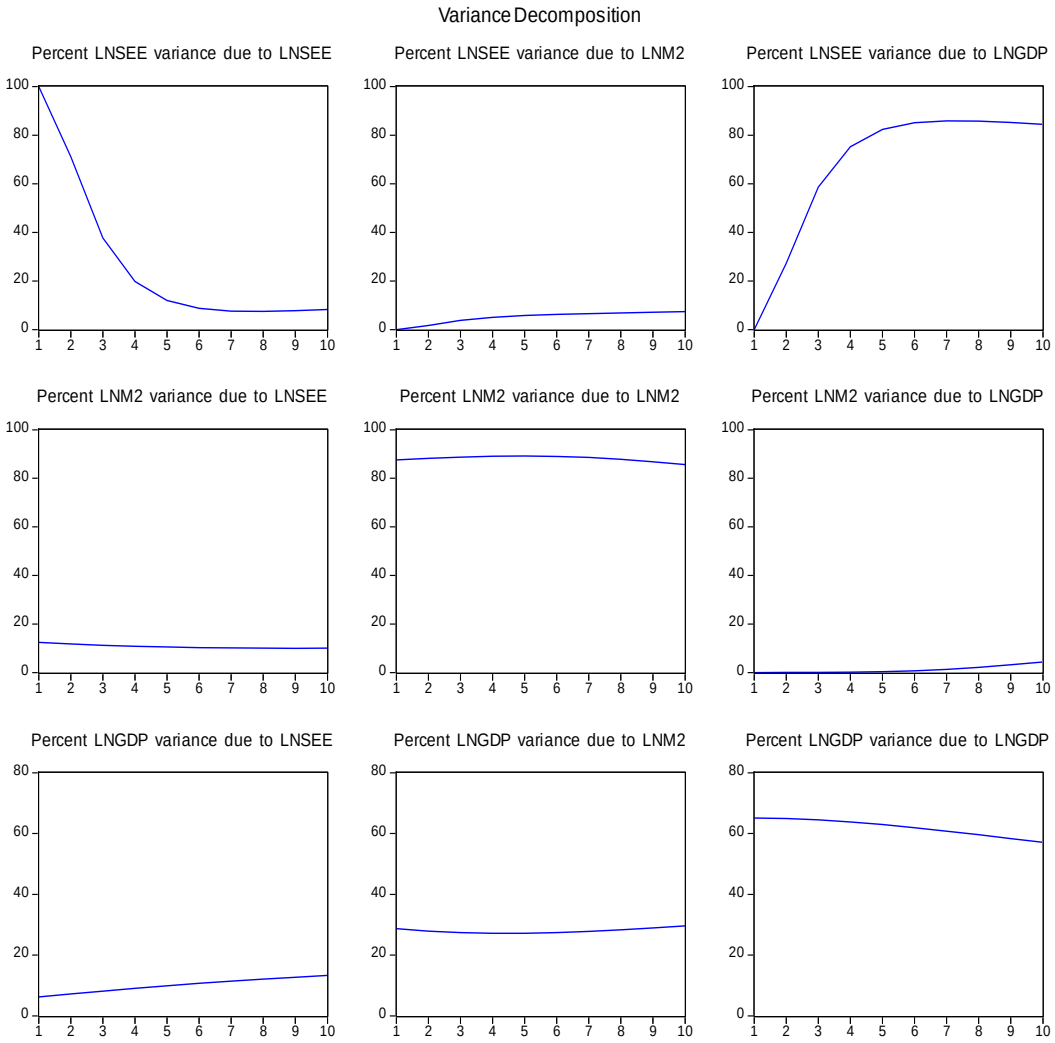
Variance Decomposition
Percent LNSEE variance due to LNSEE
Percent LNSEE variance due to LNM2
Percent LNSEE variance due to LNGDP
Percent LNM2 variance due to LNSEE
Percent LNM2 variance due to LNM2
Percent LNM2 variance due to LNGDP
Percent LNGDP variance due to LNSEE
Percent LNGDP variance due to LNM2
Percent LNGDP variance due to LNGDP

Figure 10

APPENDIX B

TABLE IV: LAG SELECTION CRITERIA III

VAR Lag Order Selection Criteria						
Endogenous variables: LNSEE LNPRIV LNGDP						
Exogenous variables: C						
Date: 11/17/16 Time: 05:26						
Sample: 1970 2009						
Included observations: 37						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	116.9870	NA	4.23e-07	-6.161458	-6.030843	-6.115410
1	276.0013	283.6472	1.28e-10	-14.27034	-13.74788	-14.08615
2	302.6476	43.21017	4.98e-11	-15.22419	-14.30989	-14.90186
3	319.4269	24.48875*	3.36e-11*	-15.64470*	-14.33855*	-15.18422*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Vector Error Correction Estimates			
Cointegrating Eq:	CointEq1		
LNSEE(-1)	1.000000		
LNGDP(-1)	0.316296		
	(0.02466)		
	[12.8246]		
LNPRIV(-1)	-0.203578		
	(0.01695)		
	[-12.0078]		
C	-6.739129		
Error Correction:	D(LNSEE)	D(LNGDP)	D(LNPRIV)
CointEq1	-0.038945	-0.262243	4.690125
	(0.06128)	(0.36490)	(1.09967)

	[-0.63553]	[-0.71867]	[4.26504]
D(LNSEE(-1))	0.275133	3.026049	-3.128948
	(0.19618)	(1.16823)	(3.52059)
	[1.40242]	[2.59029]	[-0.88876]
D(LNSEE(-2))	0.102848	-3.015702	0.708070
	(0.16865)	(1.00424)	(3.02640)
	[0.60985]	[-3.00297]	[0.23396]
D(LNSEE(-3))	0.211008	0.582598	2.275275
	(0.15445)	(0.91973)	(2.77172)
	[1.36616]	[0.63344]	[0.82089]
D(LNGDP(-1))	-0.135016	0.763816	-1.833599
	(0.03866)	(0.23022)	(0.69378)
	[-3.49232]	[3.31783]	[-2.64290]
D(LNGDP(-2))	-0.084305	0.197035	-2.103584
	(0.05262)	(0.31336)	(0.94435)
	[-1.60204]	[0.62878]	[-2.22754]
D(LNGDP(-3))	-0.033228	-0.041453	-1.114467
	(0.04412)	(0.26275)	(0.79184)
	[-0.75305]	[-0.15776]	[-1.40744]
D(LNPRIV(-1))	-0.013407	0.070941	0.334385
	(0.01005)	(0.05983)	(0.18029)
	[-1.33449]	[1.18577]	[1.85466]
D(LNPRIV(-2))	0.008865	-0.069042	0.383883
	(0.01092)	(0.06504)	(0.19599)
	[0.81165]	[-1.06159]	[1.95864]
D(LNPRIV(-3))	-0.004465	-0.067918	0.160603
	(0.01083)	(0.06450)	(0.19439)
	[-0.41215]	[-1.05292]	[0.82619]
C	0.005294	0.003618	0.132083
	(0.00199)	(0.01184)	(0.03568)
	[2.66293]	[0.30565]	[3.70236]
R-squared	0.884157	0.488367	0.518339
Adj. R-squared	0.837820	0.283713	0.325674
Sum sq. resids	0.000289	0.010257	0.093157
S.E. equation	0.003402	0.020256	0.061043
F-statistic	19.08091	2.386312	2.690371

Log likelihood	160.0879	95.85706	56.14396
Akaike AIC	-8.282660	-4.714281	-2.507998
Schwarz SC	-7.798807	-4.230428	-2.024145
Mean dependent	-0.003525	0.024319	0.021313
S.D. dependent	0.008447	0.023934	0.074337
Determinant resid covariance (dof adj.)		1.53E-11	
Determinant resid covariance		5.11E-12	
Log likelihood		314.7525	

TABLE V: LAG SELECTION CRITERIA III

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	127.4681	NA	2.40e-07	-6.728005	-6.597390	-6.681957
1	278.0596	268.6227	1.14e-10	-14.38160	-13.85914	-14.19741
2	309.5515	51.06787	3.43e-11	-15.59738	-14.68307*	-15.27504
3	325.7164	23.59198*	2.39e-11*	-15.98467*	-14.67852	-15.52419*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

TABLE VI: VECM III

Vector Error Correction Estimates			
Cointegrating Eq:	CointEq1		
LNSEE(-1)	1.000000		
LNGDP(-1)	0.346755		
	(0.01960)		
	[17.6942]		
LNFIN(-1)	-0.246563		
	(0.01623)		
	[-15.1902]		
C	-6.910351		
Error Correction:	D(LNSEE)	D(LNGDP)	D(LNFIN)

CointEq1	-0.089475	-0.781473	4.722725
	(0.06075)	(0.34977)	(0.88407)
	[-1.47281]	[-2.23428]	[5.34201]
D(LNSEE(-1))	0.323899	3.220943	-7.029215
	(0.19013)	(1.09466)	(2.76688)
	[1.70353]	[2.94241]	[-2.54048]
D(LNSEE(-2))	0.140537	-2.187443	-1.175306
	(0.16983)	(0.97775)	(2.47137)
	[0.82753]	[-2.23722]	[-0.47557]
D(LNSEE(-3))	0.221124	0.413914	2.188879
	(0.15123)	(0.87068)	(2.20074)
	[1.46217]	[0.47539]	[0.99461]
D(LNGDP(-1))	-0.126213	0.888623	-1.490394
	(0.03479)	(0.20029)	(0.50625)
	[-3.62800]	[4.43670]	[-2.94397]
D(LNGDP(-2))	-0.065413	0.268693	-2.279416
	(0.04855)	(0.27952)	(0.70651)
	[-1.34734]	[0.96128]	[-3.22631]
D(LNGDP(-3))	-0.019531	0.243843	-2.004530
	(0.04472)	(0.25746)	(0.65077)
	[-0.43673]	[0.94709]	[-3.08024]
D(LNFIN(-1))	-0.017224	0.005123	0.260168
	(0.01304)	(0.07509)	(0.18981)
	[-1.32050]	[0.06822]	[1.37068]
D(LNFIN(-2))	0.005213	-0.085837	0.409617
	(0.01281)	(0.07373)	(0.18637)
	[0.40704]	[-1.16415]	[2.19787]
D(LNFIN(-3))	-0.010282	-0.041815	0.177108
	(0.01150)	(0.06621)	(0.16736)
	[-0.89403]	[-0.63154]	[1.05827]
C	0.004829	-0.004686	0.130791
	(0.00186)	(0.01069)	(0.02702)
	[2.60060]	[-0.43827]	[4.84000]
R-squared	0.890293	0.547068	0.645553
Adj. R-squared	0.846410	0.365895	0.503774
Sum sq. resids	0.000274	0.009081	0.058014
S.E. equation	0.003310	0.019058	0.048172
F-statistic	20.28802	3.019591	4.553243

Log likelihood	161.0676	98.05065	64.66869
Akaike AIC	-8.337086	-4.836147	-2.981594
Schwarz SC	-7.853233	-4.352294	-2.497741
Mean dependent	-0.003525	0.024319	0.020073
S.D. dependent	0.008447	0.023934	0.068385
Determinant resid covariance (dof adj.)		8.26E-12	
Determinant resid covariance		2.77E-12	
Log likelihood		325.7902	
Akaike information criterion		-16.09946	
Schwarz criterion		-14.51594	

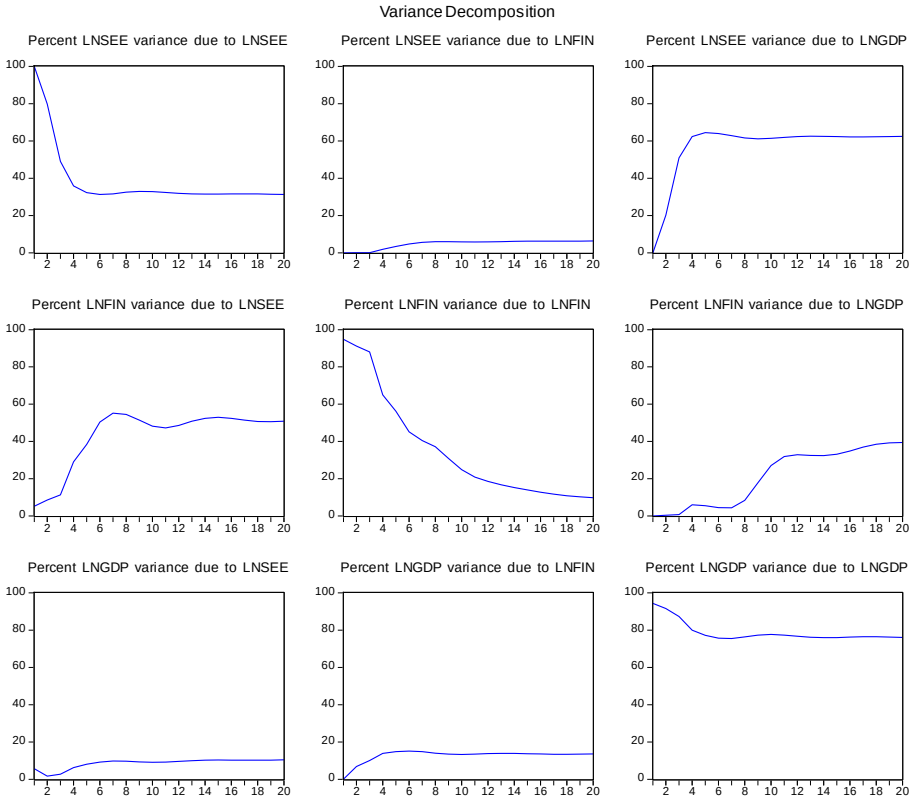

Figure 11