Informal Sector, Corruption and Economic Development in Africa: An Empirical Analysis Based on Panel Data

By

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ABSTRACT

The informal sector has emerged as an important sector in Africa where many countries are striving to attain Sustainable Development Goal (SDG) number 8 on decent work and economic growth. The presence of a growing number of individuals and firms in the informal sector in Africa and the need to attain SDG 8 through formalisation have reignited the debate on informality and its possible causes and effects on the growth trajectory of African economies. Empirical questions on the determinants of informality are still not adequately answered. One question which continues to generate a lot of debate and contrasting results is the relationship between the informal sector and corruption. Both informality and corruption have emerged as 'twin challenges' in Africa, with a far reaching impact on economic development. The relationship between the informal sector and corruption has been an inconclusive and a polemical issue in both academic and developmental discourse. From a theoretical perspective, the two can be substitutes or complements, but the exact nature of the relationship is not clear.

The main objective of this study is to empirically investigate the relationship between the informal sector, corruption and economic development in Africa, over the period 2005 to 2015. The objective of the study was answered through two ways: theoretical and empirical methodology. In the theoretical methodology, a classical approach was applied. The classical theory suggests that in the presence of a market for corruption, corruption control can reduce the size of the informal sector through reducing the supply of corruption, thereby raising the price of corruption. The negative relationship between corruption control and the size of the informal sector is supported by the described empirical data for Africa.

The results from descriptive statistics, in particular the scatter plots, demonstrate that control of corruption, government effectiveness and economic development as measured by the Human Development Index (HDI) are negatively associated with the size of the informal sector. The negative association between the control of corruption and the size of the informal sector entails that corruption increases the size of the informal sector.

With regards to the empirical solution, the total population of 54 African countries was considered for the study. However, a panel of 46 countries was analyzed as the other eight countries, although considered together with the rest, were scientifically isolated from the panel due to data challenges. Robustness checks were carried out to check if estimates are not sensitive to sample size or region. Further, for purposes of this study, the sample was also divided into Southern and Eastern Africa, and Northern and Western Africa.

Panel data was applied in order to account for both time and country-specific heterogeneity. The use of panel data allows one to study variability through comparability of the level of informality in countries such as Zimbabwe where the economy has remained largely informalised. Four panel estimators, namely, the Pooled Effects, Fixed Effects or Within Effects, Random Effects or GLS, and Dynamic Panel Model (Arrelano-Bond), were applied. Model specification tests identified the Fixed Effect Model as the most appropriate model. Hence, the discussed results are largely from the Fixed Effects Model.

On measurement of informality, the study relied on the shadow economy estimates constructed by Medina and Schneider (2018) for 158 countries from 1991 to 2015. On corruption, the study used the Control of Corruption Index (COCO) published by the World Bank, in the Governance Index Report. Unlike previous studies which used GDP per capita only as a proxy for economic development, this study went a step further and used Human Development Index (HDI) as a proxy for economic development. Profit tax as a percentage of GDP was also tested as a potential determinant of informality. The endogeneity of the corruption variable was corrected using an instrumental variable.

The findings show that an improvement in the control of corruption or government effectiveness reduces the level of informality in Africa while, an increasing informal sector is a breeding ground for corruption. The two variables are complements or jointly determined. Countries with large underground economies possess high levels of corruption, and countries with high levels of corruption are associated with large

underground economies. The complementarity of corruption and the size of underground economy implies that policies that target one of the two will also help in tackling the other.

In addition, the results show that economic development reduces the magnitude of informality, while a larger informal sector today implies a bigger informal sector in the future. One of the findings of this study is that previous studies which applied GDP per capita as a measure of economic development largely underestimated the impact of economic development on the size of the informal sector.

The findings of the study show that the negative association between the control of corruption and the size of the informal sector holds for both the Northern and Southern regions of Africa. The impact is however bigger in the Northern Region, as a marginal improvement in corruption control has a bigger impact in reducing the size of the informal sector compared to the Southern Region.

The results from the study also show that the level of informality in a country has a memory. A bigger informal sector today is likely to propel the level of the informal sector in the future. The findings show that a growth of the informal sector by one percentage point today will increase the informal sector by about 0.185 percentage points in the following year. The results from time dummies also indicate that the size of the informal sector in Africa started to grow significantly during the financial crisis period in 2009.

The main implication of these findings is that African countries can target one of the two in order to reduce both the size of the underground economy and corruption. The other implication is that a policy that targets curing one of the problems will have positive external effects in curing the other unintended problem. Furthermore, the findings imply that African countries with large underground economies may continue to experience growing informal economies due to lack of regulatory capacity and weak enforcement. Solving the two problems is a double hurdle for African countries.

Key terms: informal sector, corruption, economic development, Panel Data Analysis, endogeneity, Fixed Effects, Random Effects, Dynamic Panel Model, Pooled Effects.

DECLARATION

Student Number: 57663106

Degree: DCom Economics

Title of thesis:

Informal Sector, Corruption and Economic Development in Africa: An Empirical Analysis Based on Panel Data

I, **David Mupamhadzi,** declare that this thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.

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Signature   Date

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LIST OF ACRONYMS AND ABBREVIATIONS

AFCFTA: African Continental Free Trade Area

ASEAN: Association of Southeast Asian Nation

BUFR: Business Freedom

COCO: Control of Corruption

CPI: Corruption Perception Index

DRC: Democratic Republic of Congo

DYMIMIC: Dynamic Multiple Indicators Multiple Causes Model

DPM: Dynamic Panel Model

ECM: Error Components Model

EU: European Union

FE: Fixed Effects

FRCO: Freedom from Corruption

GDP: Gross Domestic Product

GLS: Generalised Least Squares

GMM: Generalised Method of Moments

GNP: Gross National Product

HDI: Human Development Index

ICRG: International Country Risk Guide

IFI: International Financial Institutions

ILO: International Labour Organisation

IMF: International Monetary Fund

LSDV: Least Square Dummy Variable

MIMIC: Multiple Indicator, Multiple Causes Estimation

NIC: News –Flow Index of Corruption

OECD: Organisation for Economic Co-operation and Development

OLS: Ordinary Least Square

PE: Pooled Regression

RE: Random Effects

SADC: Southern Africa Development Committee

SDGs: Sustainable Development Goals

SEM: Structural Equation Model

SMEs: Small to Medium Enterprises

SSA: Sub Saharan Africa

STATA: Software for Statistics and Data Science

TI: Transparency International

TSLS: Two Stage Least Squares

UK: United Kingdom

UN: United Nations

UN-ILO: United Nations International Labour Organisation

USA: United States of America

US: United States

VAT: Value Added Tax

WBES: World Bank Enterprise Survey

CHAPTER 1: INTRODUCTION

1.1   Background of the Study

The informal sector has emerged as an important sector in developing countries in general and in Africa in particular. The growth and dominance of the informal economy in Africa has resulted in the sector playing a crucial role in terms of employment creation and economic activities (Ingram *et al.*, 2007; Gelb *et al.*, 2009). More firms in Africa are increasingly operating in the informal sector, contributing significantly to national output and job opportunities (Benjamin and Mbaye, 2014). The IMF (2017), for example, estimates that the informal sector contributes an average of 30%-40% of GDP in Kenya, Malawi, Zambia, Madagascar, DRC Congo, Ghana and Uganda; an average of 20%-30% of GDP in Namibia; an average of 40%-50% in Senegal, and over 50% of GDP in Tanzania. Studies by the World Bank (2016) estimate that in Kenya, 95% of the country's firms and microenterprises are operating in the informal economy. A huge proportion estimated at about 85.8% of all employment in Africa, or 71.9% excluding agriculture, is informal (International Labour Organisation, 2018).

The continued growth of the informal sector in Africa and its role in economic development have generated a lot of attention and interest, as more people try to understand this sector (Aryeetey, 2015). Although there is evidence that a significant proportion of the population in Africa depends on the informal sector, the major problem, however, is that informality has been associated with poor quality jobs and accountability difficulties in both the national income accounting and revenue collection (International Labour Organisation (ILO), 2018). Promoting decent work in the informal sector and promoting transition from informality to formality through appropriate policies and programmes is not only a key priority outlined in the Southern African Development Community (SADC) Decent Work Programme (2013 to 2017), but is also crucial for the UN 2030 Agenda on Sustainable Development which visualises decent work as a key component towards achieving the Sustainable Development Goals (SDGs). It is therefore crucial to have a firm grasp of the drivers of informality in Africa.

There is no single approach to defining informality in the academic and policy discourse. Frey and Schneider (2000) argue that the definition of the informal sector varies and depends on the purpose. The lack of a precise definition of the concept has resulted in the phenomenon attracting different names such as the black economy, the shadow economy, unreported economy, underground/hidden/invisible, unrecorded and parallel economy, amongst other names (Frey and Schneider, 2000; Hussmann, 2004; Gërxhani, 2004; Fields 2007 and Sherifat 2011). Some authors like De Soto (2000) conclude that although it may be complicated to come up with one acceptable definition, the phenomenon is known when seen in economies. The lack of consensus on the definition of the informal sector has resulted in disagreements on this subject and different interpretations of its meaning, as well as its measurement (Schneider *et al.*, 2010).

Despite these disagreements and lack of a uniform definition, the informal sector can broadly be defined as legal economic activities carried out by economic agents outside the regulatory framework of a country (Loayza, 2016). As such, the activities are not properly monitored, recorded or taxed by the government (Mishra and Ray, 2011). Buehn and Schneider (2016) posit that activities of the informal sector players are deliberately hidden from authorities for the following reasons:

i.   To avoid payment of tax obligations, for example, payment of income tax, corporate tax, Value Added Tax (VAT) or other related taxes;
ii. To circumvent payment of social security contributions;
iii. To avoid complying with certain gazetted labour standards like minimum wages, decent working conditions, working hours per day and safety requirements; and
iv. To evade compliance with certain administrative requirements like filling some paperwork.

The activities may vary from unregistered microenterprises to production activities, Small to Medium Enterprises (SMEs), retailers, small market stalls, street vending, cross border trading, and self-employed informal workers who are into farming, craft making and traders, amongst others.

Borlea *et al.* (2017) argue that the informal sector can be viewed through two main components. The first component constitutes the undeclared wages that are hidden from authorities to avoid payment of taxes or complying with labour regulation. The second component is whereby business deliberately under-reports income with a view to avoid tax obligations.

Although the expansion of the informal economy is generally acknowledged in Africa, it is very difficult to obtain an accurate level of informality owing to the fact that economic agents involved in this sector are off the government radar and, in most cases, they are not properly accounted for in the national accounts (Schneider *et al.*, 2010). This view is supported by Dreher and Schneider (2006) who argue that transactions in the informal sector are complicated to measure because firms or individuals involved in this sector prefer to remain anonymous. The lack of agreement on the definition of the informal sector and estimation procedures makes it even more difficult to come up with an agreed size of the informal sector in Africa.

Despite the challenges of measuring the size of the informal sector, a number of empirical studies confirm that the informal sector is indeed expanding, and in some countries at a very fast rate (Gerxhani, 2003; Feld and Schneider, 2010; Schneider, 2011, 2015, 2017; Hassan and Schneider, 2016; Schneider and Medina, 2018). Estimates by Schneider and Williams (2013), for example, indicate that the informal sector contributes about 40%-60% of Gross Domestic Product (GDP) in emerging countries, and about 10%-15% in more advanced countries. Williams (2015) concludes that about 17% of the total global non-agriculture workers are self-employed or are owners of informal sector microenterprises, while close to 32% are gainfully employed in the informal sector.

According to the (ILO, 2018), it is estimated that about two billion of the global employed total population above 15 years is locked in the informal sector. The incidence of informality is more pervasive in Africa, with an estimated 86% of the total workforce in the informal sector (ILO, 2018). In terms of microenterprises in Africa, the ILO (2018) estimates that close to 92.4% are located in the informal sector. Earlier studies carried out by Benjamin and Mbaye (2014) covering a number of African countries estimate the

contribution of the informal economy to the overall economy at levels around 50%-80% of Gross Domestic Product (GDP), and the sector is estimated to account for close to 90% of new jobs.

The presence of a growing number of economic agents in the informal economy in Africa has reignited the debate on informality as well as its possible causes and effects on the growth trajectory of African economies. Critically, with the growth and prevalence of the informal economy in a number of African countries, there are concerns over the impact of informality on the development of these countries (Schneider and Enste, 2000; Loayza *et al.*, 2009; Harati, 2014; Benjamin and Mbaye, 2014; Sparks, 2010).

The continued growth of the informal economy in Africa over the years is indeed defying the traditional theories which postulated that the informal sector would disappear as economies develop. Contrary to such theories, the concept is now deeply entrenched in Africa. Thus, in global economies in general and in Africa in particular, the informal sector is not any way near being some marginal enclave (Williams *et al.*, 2015).

However, despite the acknowledgement of the continued expansion of the informal sector by many African governments in recent years, the main determinants of informality are not well known (Benjamin *et al.*, 2014). Empirical questions on the determinants of informality are still not adequately answered (Torgler *et al.*, 2011). Understanding the size and the main drivers of informality is of importance in the context of developing countries, particularly in Africa (Mishra and Ray, 2011).

One question which continues to generate a lot of debate and contrasting results is the relationship between corruption and the informal sector. This issue has not been intensively investigated and the results are not conclusive (Dreher and Schneider, 2006; Buehn and Schneider, 2011).

Thus, given the proliferation of the informal sector in Africa and the high incidence of corruption, this study seeks to carry out an empirical investigation of the relationship between corruption and the informal sector, and economic development in Africa. Buehn and Schneider (2009) argue that in theory, corruption can act as a substitute or

complement to the informal sector, but the exact nature of the relationship is not clear. This view is supported by Shahab *et al.* (2015) who argue that the informal sector and corruption are viewed as "twins" that support each other or, in some instances, they even fight against each other. Corruption and the informal sector can be substitutes because an increase in the size of the informal sector reduces the propensity of public sector employees to demand bribes (Dreher and Schneider, 2006). On the other hand, the informal sector and corruption may show a complementary relationship due to the fact that corruption can be viewed as a form of a tax and, as such, economic agents pay a bribe to public sector officials in exchange for under-declaring tax liability. Thus, the nature of the relationship between corruption and the informal sector has been inconclusive and contested in literature (Bayar *et al.*, 2018).

Studying the relationship between corruption and informality is complex largely because much of the corrupt and informal activities are not properly recorded and, as a result, they are not easily accountable (Buehn and Schneider, 2012). Further, economic agents who are involved in these activities prefer to be anonymous, and their operations are hidden from the authorities. Thus, any empirical analysis of the relationship between corruption and the informal sector is hugely constrained by the unavailability of data and a lack of uniformity on the definition of what constitutes corruption and informality, especially in Africa (Dutta *et al.*, 2011).

However, despite the measurement challenges of both variables and definitions challenges, the prevalence of both corruption and the informal sector is visible in Africa. The high incidence of corruption and informality in Africa and the deepening of the 'twin challenges' across the continent are of increasing concern to policy makers and governments, given that such challenges have a far reaching effect on economic development, poverty alleviation and effective resource allocation in the respective countries.

It is against this background that this study seeks to investigate the relationship between corruption and informality in Africa using empirical evidence. There is not much research which has investigated this relationship using empirical evidence (Buehn and Schneider,

2009). Thus, this study is envisaged to make an empirical contribution on the relationship between corruption and informality in Africa. Further, empirical studies on informality are not common because of data challenges (Elgin and Oztunnah, 2013). This study, however, borrowed from the shadow economy estimates constructed by Medina and Schneider (2018) for 158 countries from 1991 to 2015. The study focuses on African countries, since the challenge of informality and corruption is more pervasive on the African continent. A panel of 47 countries[1] was analysed over the period 2005-2015. Seven African countries were not included in this panel due to data challenges.

On the measurement of corruption, there are a number of indices which are empirically used to measure corruption in an economy. These include the corruption perception index constructed by the Transparency International (TI index), the corruption index calculated by the International Country Risk Guide (the ICRG index), and the control of corruption index (World Bank Index), amongst others. These measurement indices have been widely used in a number of econometric researches either as dependent variables when investigating the causes of corruption, or explanatory variable when testing its impact. Dreher *et al.* (2004), conclude that these perception-based measurements have made a significant contribution to the deepening of researchers' understanding of the magnitude of corruption in both developed and developing countries.

This study used the Control of Corruption Index (COCO) published by the World Bank in the *Governance Index Report*, as the measurement of corruption. The choice of COCO was largely because most of the other datasets used in this study also came from the World Bank, a reputable international institution. Although perception-based measurements of corruption are widely used by researchers, they have their own shortcomings, chief of which is that they are all based on perceptions of corruption, which may not reflect the actual corruption (Aidt, 2009). However, despite this concern, perception-based indices are widely used as a measurement of corruption, as they

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[1] Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central Africa Republic, Chad, Congo Republic, Congo DRC, Cote d'Ivoire, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia Niger, Nigeria, Papua New Guinea, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe

capture the view of households which have directly and indirectly experienced various forms of corruption (Dutta *et al.*, 2011). The measurement of COCO is based on units, which range from -2.5 to 2.5, with higher values representing better governance outcomes and low level of corruption.

Besides testing the relationship between the informal sector and corruption, the study also investigated the relationship between informality and economic development in Africa. A number of studies that have investigated the relationship between the informal sector and corruption, like Buehn and Schneider (2009), Borlea *et al.* (2017), Dreher and Schneider (2010) and Shahab (2015), used GDP per capita, as a proxy for economic development. However, in this study, the Human Development Index (HDI) was used as a proxy for economic development. HDI is a broader and more inclusive measure of economic development compared to GDP per capita.

One of the main determinants of informality in literature is the country's level of taxation. Following this viewpoint, economic agents are rational entities who are not prepared to pay high taxes and as such, they will opt for informality to avoid paying high taxes (Shahab *et al.*, 2015). Given the high level of informality in Africa, one of the sub-objectives of this study looked at the relationship between informality and taxation. The study used profit after tax as a measure of taxation in Africa.

There is renewed interest by academics and policy makers, especially in Africa, to get a deeper understanding of the main drivers of informality. This will help to inform governments on the necessary interventions to facilitate transition to formality. Of note is that this interest is no longer confined to Africa, but has now become global. The ILO, for example, put the formalisation of the informal sector at a global scale through their June 2015 International Labour Conference, which came up with the transition from the informal sector to the formal sector Recommendation (No.204). The United Nations followed up on this and adopted the 2030 Agenda for Sustainable Development in September 2015, which included the transition to formality in the targets for Sustainable Development Goal 8.

The increased concern on the level of formality in the world and in Africa in particular arises from the fact that a high level of informality is a sign of underdevelopment, and could be a further source of economic regression (Loayza, 2016; ILO, 2018).

The presence of a large number of firms in the informal economy that are not paying taxes to the national authority, can cause serious "free rider" problems in an economy, as they will demand public utilities without contributing to the fiscus (Loayza, 2007). Economic agents in the informal economy utilise public infrastructure like roads, but do not pay taxes which contribute towards the maintenance of the public utilities. Workers in informal employment also demand and utilize public utilities like health facilities, without contributing to their maintenance. This congests public utilities and constrains the capacity of government to maintain the utilities.

Furthermore, the growth of the informal sector in Africa adversely affects the tax base of these African countries, with severe implication on service delivery by governments (Ingram *et al.*, 2007).

One of the problems for African economies is that although the growth of the informal sector offers employment opportunities especially during periods of economic crises, the conditions of employment in this sector are deplorable and without security (Suwal and Pant, 2009). This view is supported by Oviedo (2009) who argues that most workers who are locked in this sector are at the lower echelon of society, with unpredictable incomes and insecure jobs. The (ILO, 2018) concurs with the above and posits that informal workers are not entitled to leave days, off-days when sick, maternity leave and medical aid, and are also not covered by national security. As such, they are vulnerable as they run the risk of losing their jobs any time. The nature of their employment makes it very difficult for them to make savings, and this exposes them to economic shocks, and may also have serious social impact to the economy at large.

The key challenge is that the majority of people who are plying their trade in the informal sector are locked in low productivity sectors, which implies underemployment. Underemployment of labour and low returns to it are proximate causes of poverty in most African economies. Thus, the continued growth of underemployment in Africa perpetuates

poverty and inequalities as more resources are trapped in low productive activities in the informal economy, a development which adversely affects the growth prospects of economies in Africa.

African governments are also concerned with the growth of the informal economy from a productivity perspective. Enhancing productivity is fundamental for African economies to realise their potential and increase aggregate output. Benjamin and Mbaye (2014) argue that the growth of the informal economy in Africa has adversely affected firms' productivity. This view is supported by Gajigo and Driemeier (2012), Harati (2014) and Sparks (2010) who conclude that the continued growth of the informal economy adversely affects the optimal utilisation of resources in economies due to the over- reliance on less capital intensive means of production, employment of less qualified people, low investment and the general lack of long-term horizon on operations.

Policy makers are also concerned with a growing informal sector due to distortions on economic indicators. For highly informalised economies, it is always difficult to have reliable data on variables like unemployment rate, income, consumption and overall size of the economy. Without accurate information of such key economic variables, policy makers find it difficult to come up with effective policy decisions. Policy based on unreliable statistics may result in misallocation of resources.

Furthermore, the informal economy is a gendered terrain in Africa, as there is a growing number of women participating in this sector. A regional comparison by the ILO (2018) found out that in Sub-Saharan Africa, with the exception of South Africa, over 90% of women are locked in the informal sector, thus making it a significant source of livelihood. In terms of age, the ILO (2018) also found out that young and old people are more engaged in the informal sector, with an estimated 94.9% of people aged between 15 years and 24 years in the sector, and 96% of people aged 65 years and above in informal employment. The huge presence of women in the informal economy means that any efforts to reduce gender imbalances and income disparities should focus on expanding economic opportunities through formalisation. This is crucial because in a number of African economies like Benin, Gabon and Ghana, amongst others, more than three

quarters of households are reliant on income derived from economic activities of women who are in the informal economy. (ILO, 2018). Policy makers interested in reducing poverty are thus concerned with the increase of informality from this perspective.

The existence of many enterprises in the informal economy that do not comply with any regulation, like paying taxes and labour and environmental regulations, for instance, offers unfair competition to formal firms that comply and carry additional costs (ILO, 2018). Informal traders in some African countries like Malawi, Zambia and Democratic Republic of Congo (DRC), for example, virtually sell wares like clothing items, computer consumables and cellphone accessories in front of formal shops that sell similar goods and services. Not only does this offer unfair competition to formal firms that are complying with regulations and offering secure employment to people, but in most instances, it threatens the existence of the formal firms. This has serious costs to government in terms of revenue mobilisation, employment creation and overall economic performance.

The continued growth of the informal sector against the backdrop of the above mentioned costs has stimulated a lot of research in developing countries, especially in Latin America. However, relatively few studies have been conducted in Africa on the drivers of the informal sector and, in particular, the relationship between corruption, the informal sector and economic development. Thus, given the high proportion of informality in Africa, as well as the high costs to nations due to the growing size of informality, it is important to conduct further studies in order to get a deeper understanding of the drivers, with a view to inform policy makers, governments and other key stakeholders on the appropriate strategies to facilitate transition to formality.

1.2   Problem Statement

Informality has emerged as a pervasive phenomenon in African economies which must be explained and grappled with as countries chart their growth trajectory. The key challenge is that the continued growth of the informal economy in Africa has adverse effects on the optimum utilisation of resources, and can distort incentives for capital accumulation and innovation, with dire impact on firm productivity and growth (Dabla-Norris *et al.*, 2008). Loayza *et al.* (2009) concur and further argue that the growth of the

informal economy is not only a sign of lack of development, but may also be the main driver of the continued underdevelopment of African countries. The growth of informality implies misallocation of resources and also results in firms missing out on the benefits of operating legally, like police and judicial protection, access to formal credit institutions, and participation in international markets. Thus, the growth of the informal economy could adversely affect the ability of African countries to unlock their potential due to their exclusion from formal domestic financial institutions and global markets.

Although a number of studies have been carried out especially in Latin America on the causes and cost of informality, very few studies have systematically looked at the drivers of the informal sector in Africa (Benjamin and Mbaye, 2012). In particular, a very important but little studied area in Africa is the relationship between corruption and informality from an empirical perspective (Dreher *et al.*, 2004). These intellectual gaps merit further research to understand the causal linkages between corruption and informality in Africa, and its impact of economic development.

Corruption and informality have emerged as 'twin challenge' for Africa, with a devastating impact on economic development and sustained growth of African economies. A number of studies have concluded that corruption adversely affects investment and reduces economic growth (Tanzi, and Davoodi 1997; Mauro, 1998; Mo, 2001; Gyimah-Brempong, 2002; Meon and Sekkat, 2005; Dreher and Schneider, 2006; Sahakyan and Stiegert, 2014). Aidt (2009) supports this view and posits that corruption creates poverty traps in countries. Thus, given the deepening of corruption and informality in Africa, it is critical to investigate the nature of the relationship between these dominant economic variables with a view to availing strategies to African governments on how to mitigate their expansion. This is particularly important given the fact that the 'twin challenges' have an adverse impact on economic growth and poverty alleviation on the continent.

There are also very few studies in Africa that have systematically focused on how to facilitate transition of firms from informality to formality. Many governments in Africa are currently battling with finding sustainable strategies to encourage formalisation of firms that are locked in the informal economy (Williams *et al.*, 2016). This study fills this gap by

providing policy recommendations to facilitate formalisation of firms, an area that is understudied.

1.3 Objectives of the Study

The main objective of this research is to empirically investigate the determinants of informality in Africa, mainly focusing on the role of corruption and economic development over the period 2005 to 2015.

The study seeks to first test the relationship between corruption and the informal sector, then the informal sector and corruption, followed by the impact of economic development on the size of the informal sector in Africa. Robustness checks were also carried out to test how the relationship between informality and corruption differs in the different regions in Africa. The study also investigates the impact of taxation on informality in Africa. The study seeks to contribute to the contested explanations of the drivers of informality, both theoretically and empirically, through exploring the relationship between the informal sector, corruption and economic development in Africa. The available evidence so far on the drivers of informality in Africa is mixed and inconclusive, and hence more rigorous research is required (Virta, 2007).

The research also explores transition mechanisms which African countries could pursue to facilitate or encourage formalisation. In doing so, the research hopes to contribute to the ongoing debate on how to encourage the formalisation of African economies and have more firms locked in the formal economy. Thus, the study contributes to the debate on how to facilitate transition from informality to formality, using evidence from selected African countries.

1.4 Hypotheses

The study aims to test the following hypotheses:

Hypothesis 1: Control of corruption reduces the size of the underground economy;

Hypothesis 2: Size of underground economy has a negative impact on control of corruption;

Hypothesis 3: Control of corruption and informality are complements in Africa;

Hypothesis 4: High profit taxes discourage entrepreneurs to formalise in Africa;

Hypothesis 5: In Africa, economic development reduces the size of the informal sector;

Hypothesis 6: Global developments such as the global financial crisis increase the size of underground economies in developing countries.

1.5   Significance of the Study

The unprecedented expansion of the informal sector in African economies over the years has drawn the attention of academics, development economists and policy makers, and has stimulated debate aimed at understanding this phenomenon and its impact on economies (Nazier and Ramadan, 2014). Fundamentally, contrary to earlier assertions that the informal sector was transitory, it has persistently grown and continued to evolve over the years in a number of African countries, (Chen, 2007). The growth of informality in Africa comes at a time when the continent is also experiencing a deepening of corruption in both the public and private sectors.

The continued expansion of the informal sector in Africa over the years and the information gap and contestations on the main determinants is a cause for concern in many African countries. Williams *et al.* (2015) concurs and argues that although the amount of literature on the informal sector has increased over the years, it is still relatively low, considering the widespread expansion of informal firms in developing countries. Confronted with this phenomenon, many African countries are struggling to design appropriate strategies to champion sustainable development. This research thus contributes to the emerging knowledge on the drivers of the informal sector through investigating the relationship between informality and corruption in Africa.

Further, this study is important for decision makers, academia and other key partners who are seeking to better understand a sector which has risen to prominence in Africa, and now constitutes a greater proportion of economic activity and employment. A comprehensive analysis of the determinants of informality and its consequences is crucial

for policy makers in African countries and other developing nations, as it will help them make informed decisions on developing appropriate strategies to strengthen their private sector. Thus, a comprehensive analysis of the relationship between corruption and informality is critical at this juncture of the development cycle of African countries, given that the majority of firms operating in these countries are now locked in the informal sector.

Theoretically, this thesis differs from previous studies with regards to the point of entry when studying how an entrepreneur makes a decision on either to formalise or informalise. This research considers an entrepreneur's decision-making process regarding formalisation as a business entry problem. Previous studies that have considered high bribe demands as a factor driving formal entrepreneurs to go underground have largely ignored the concept of rationality in decision making. A rational and compliant entrepreneur will not be driven out of the formal economy through a bribe once (s)he have decided to go formal. This is because when this entrepreneur initially preferred formal to underground operations, the benefits from formalisation were larger. Only a structural change that reverses the relationship between informal benefits and formal benefits will change the entrepreneur's preferences.

If entrepreneurs are rational when they initially decide to go formal, then they will not offer any bribe since with full compliance they still enjoy more benefits than operating underground. Only greedy entrepreneurs may want to pay a bribe to avoid compliance, and hence enlarge their profits. Such entrepreneurs act as informal actors or underground actors, despite being formally registered. This study therefore explicitly considers bribes as paid by informal operators rather than formal operators as in previous studies.

In addition, corruption is considered a two-way relationship. Although previous studies (Aidt, 2003, 2009; Jain, 2001), emphasised inspectors or regulators as the only corrupt actors, this thesis also considers entrepreneurs as equally corrupt. Corruption only happens if the two parties agree. Hence, there are consumers or buyers of corruption (entrepreneurs) and sellers of corruption (inspectors).

This study also yields significant knowledge to African governments that are facing serious fiscal challenges emanating from dwindling tax base due to the informalisation of their economies. A deeper understanding of the informal sector will help authorities to come up with mechanisms to ensure that the sector contributes effectively to the fiscus and also reduces negative externalities. An improvement in revenue collection is critical for governments to fund public goods and other social expenditures.

The continued growth of informality in Africa has serious repercussion on productivity and, hence, economic performance. With more economic activities now taking place in the informal economy in a number of African countries, any effort to stimulate growth and transformation of these economies should target this sector. Understanding the dynamics in this sector is crucial for African economies to unlock the huge economic potential and reduce poverty on the continent.

In terms of the empirical contribution of the thesis, it is important to note that empirical studies that focus on the drivers of informality are not common due to limitations on data availability arising from complexities around its measurement. This study borrows from the shadow economy estimates constructed by Medina and Schneider (2018) for 158 countries from 1991 to 2015. This study, however, focuses on African countries, since the challenge of informality and corruption is more pervasive on this continent. The study thus makes an empirical contribution to the study of informality, corruption and economic development.

Further, this research is one of the first studies to investigate the relationship between the informal sector, corruption and economic development in Africa. The study goes a step further and splits the African countries into various regions as a way of getting additional insights concerning the relationship between the informal sector, corruption and economic development.

Methodologically, the study contributes in various ways. First, the thesis considered unobserved factors that account for both country and period heterogeneities. Most have applied cross-sectional data, which has failed to account for period-specific

heterogeneity. In this study, these types of heterogeneities were tested using statistical procedures.

Second, several studies (Buehn and Schneider, 2013; Borlea *et al.*, 2017; Dreher and Schneider, 2010; Shahab, 2015) used GDP per capita only as a measure of economic development. However, economic development is a broader concept than just GDP per capita. Human Development Index (HDI) was therefore used as a measure of economic development in this study.

Third, a high level of informality today may be a breeding ground for future informality. In this view, this study took the inertia in the level of informality as critical in explaining the dynamics of the informal sector size.

In addition to addressing endogeneity prevalent in corruption as a driver of informality, this study also carried out a number of robust checks to validate and test the reliability of the estimated coefficients.

The study is also justified on the ground that understanding the transition mechanism from informality to formality is very important for African countries currently battling with the challenges of a high level of informality in their economies. The formalisation of economic activities is crucial for the sustainable development of the private sector in Africa. In addition to this, sustainable development and poverty alleviation require African countries to optimally use resources and focus on high productive activities.

Understanding the transmission mechanism of firms from informality to formality is also important for African governments as it enables them to ensure that firms are governed by uniform regulations, that they have access to the protection of state as well as access to benefits that come with operating formally. This study contributes to the body of knowledge on how to facilitate transition from informality to formality. This knowledge is valuable for African countries that are seeking strategies to facilitate transition.

1.6   Limitation of the Study

The current study has limitations in that the focus of the research was Africa, which comprises developing countries only. The study did not go as far as testing the relationship between informality and corruption using datasets from both developed and developing countries. Given the differences in the quality of institutions between developed and developing countries, a cross comparison of developing and developed countries is necessary for future studies.

1.7   Overview of the Study

This thesis has six chapters as outlined below:

Chapter 1: Introduction

This chapter covers the theoretical background to the research, the problem statement, objectives of the study, hypothesis, significance of the study and limitations.

Chapter 2: Literature Review – Informal Sector, Corruption and Economic Development

Chapter 2 discusses the theoretical foundations of the informal sector, corruption and economic development, as well as the theoretical literature that underpins this study.

Chapter 3: Empirical Evidence on the Relation between the Informal Sector, Corruption and Economic Development

Chapter 3 provides and discusses evidence from previous studies on the relationship between the informal sector, corruption and economic development.

Chapter 4: Research Methodology

Chapter 4 describes the research process or methodology applied in the study. The research design, as well as the theoretical and empirical models are described in this chapter.

Chapter 5: Results Presentation, Analysis and Discussion

Chapter 5 presents, analyses and discusses the research findings.

Chapter 6: Overall Conclusions

Chapter 6 summarises and concludes the study, while giving suggestions of areas for further research.

CHAPTER 2: THEORETICAL LITERATURE REVIEW – INFORMAL SECTOR, CORRUPTION AND ECONOMIC DEVELOPMENT

2.1 Introduction

This chapter provides the theoretical background and the literature that underpins the study. A well-developed literature review provides the framework for a good research project, while a weak literature review compromises the research project. This view is in line with Randolph (2009) who argues that a good literature review is critical for setting out the boundaries of the research problem, and provides the framework that a researcher can use to relate his/her findings with earlier studies. Therefore, the chapter provides a detailed analysis of literature on the informal sector, corruption and economic development, and identifies gaps in literature especially in the context of African economies. The chapter also explores different approaches to measure the size of the informal sector, corruption and economic development.

2.2 The Informal Sector

The concept of informality has drawn a lot of interest and debate in development economics. The continued expansion of the informal sector in developing countries and its prominence in terms of employment creation and the level of economic activities has made the concept a subject of intensive discussion (Charmes, 2009; Sina and Kanbur, 2012; Williams, 2015). African economies have not been spared this wave in the rising prominence of the informal sector over the years. With increased economic activities now locked in the informal sector in a number of Africa economies, there are renewed calls in academic discourse to further interrogate this phenomenon. This debate has become more pronounced given the fact that informality has risen in African economies despite rising economic growth in some of the countries (Kanbur, 2011; Nazier and Ramadan, 2014). This has given development economists renewed impetus to research more on informality and what it implies in terms of how economies are working (Perry, *et al.*, 2007). Fundamentally, this has brought more questions than answers in the academic discourse on the nature and dynamics of the informal sector, necessitating a review of the theoretical debates around this concept.

What is imperative is that development theories on informality have evolved over the years, from earlier literature in the 1950s which viewed the informal sector as marginal or temporary, to the more modern approaches by Hart in 1971 which officially coined the term 'informal sector'. Similarly, the ILO (1972) Kenya mission studies concluded that the informal sector was part of the economy, and that it would not disappear even with economic growth.

The debate around the informal sector spread in the 1980s to encompass developed countries, as production techniques in both North America and Europe were moving from big enterprises to small sized organisations and agile production units. Chen (2012) argues that this reorganisation of production was linked to the informalisation of employment relations. Subcontracting of economic activities and outsourcing to small firms became a dominant feature of production processes. Portes *et al.* (1989) concluded that the informal sector was a key component of the economy, which was, however, embedded with capitalist accumulation.

Although there has been considerable research on the informal sector since 1971 when the term was officially coined, there is still no standard agreed definition of this concept (Charmes, 2014; IMF, 2017). This means that researchers have so far found it difficult to come up with a common definition which is widely acceptable by all users. The nature and diversity of informal activities implies that the concept could have different meanings to different economic agents (Benjamin and Mbaye, 2014).

Rather than focusing on a specific definition, the ILO (2000), concludes that informality is a way of doing things, characterised by:

i.   Ease of entry;
ii. Reliance on indigenous resources;
iii. Family ownership of enterprises;
iv. Small scale of operation;
v.   Labour-intensive and adapted technology
vi. Skills acquired outside the formal school system; and
vii. Unregulated and competitive markets.

Losby *et al.* (2002) argue that one remarkable feature of informal firms is that their activities are not documented and in many instances are not correctly captured in the national accounts. This definition is in line with Kanbur (2009) who argues that informal firms are characterised by a lack of fixed location of operations, non-payment of statutory obligations, and failure to keep books of accounts. Earlier studies by De Soto (1989), on the other hand, define informality as a grouping of firms or workers whose operations are not covered by the legal and regulatory frameworks of the country. This implies that firms operating in the informal sector avoid the obligation of paying taxes, and operate outside the stipulated laws and regulation.

Williams (2015) argues that besides not paying taxes and adhering to the country's labour laws, the operations of informal firms are legal in all facets. Thus, economic agents who engage in illegal activities like drug trafficking are not part of the informal economy but a criminal syndicate in a society (Smith and McElwee, 2013).

What is imperative is that the lack of agreement on the definition of the informal sector has resulted in different interpretations of this phenomenon. Gërxhani (2004) argues that researchers are no longer fixated with finding a common definition but instead are defining the concept in relation to the challenge at hand. It is clear that whatever definition African countries take, the phenomenon is expanding at a shocking rate, and is now accounting for a great proportion of economic activities in a number of African countries.

2.2.1   Theoretical Approaches on Informality

The debate on the informal economy, which has been ongoing for over four decades, has culminated in the following main schools of thought regarding its nature and structure. More scholarly works on the subject are however emerging, stimulated by the continued expansion of the informal sector in developing countries.

2.2.1.1   Modernisation /Dualist Approach

Literature on informality can be traced back to economic theories which were dominant in the 1950s, which viewed the economy in a dualistic approach (Boeke, 1953; Lewis, 1954; Rostow, 1960). In this school of approach, the economy was seen as divided into

two distinct sectors, that is, the modern and the traditional, or the peasant and the capitalist sectors. Proponents of the modernization approach viewed the traditional sector as mainly comprising petty trade like street vendors, small shops operators/workers, and casual jobs, among others who were suppliers of labour to the modern capitalist sector. With the growth of the economies and the expansion of the modern capitalist sector, labour was expected to move from the traditional to the modern sector. The growth of the economy within the model was mainly driven by capital accumulation. Thus, within this framework, it was assumed that if governments came up with sound economic policies and resources, this would stimulate the expansion of the modern sector, and hence the transformation of the traditional sector as they provide labour to the modern sector (Chen, 2012).

The activities of the low traditional sectors were expected to be transformed into the modern sector with the growth of the economy. The jobless, workers suffering from underemployment and those engaging in survival activities in the traditional sector would in the long term be absorbed into the modern capitalist sector as economic fortunes improved. Surplus labour from the traditional economy would thus be absorbed into the mainstream economy as nations industrialised (Sherifat, 2011).

Radwan (2007) argues that these models were based on the expectations of a decline of the existing asymmetries over time and a gradual waning off of dualism as economies develop. This dualist approach viewed the informal sector as a marginal sector whose contribution to national income was insignificant. The participants in this sector were largely viewed as people who were waiting for formal employment opportunities.

Proponents of this dualistic development viewed development on the basis of movement from traditional to modern, unorganised to organised, and subsistence to capitalist sector. The growth of the informal sector was seen to be a result of lack of a modern values system or institutions and, hence, a result of exclusion from the market system (Sherifat, 2011).

The modernisation approach stimulated a lot of debate and literature on development theory, and resulted in several extensions over the years. Models like the Harris-Todaro (1970) and Fields (1975) were all premised on this approach.

2.2.1.2   The Harris-Todaro Model

The Harris-Todaro (1970) model was developed after the realisation of an interesting trend in developing countries, whereby rural-urban migration continued to increase, despite the prevalence of positive marginal products in agriculture and high levels in urban unemployment. This trend was defying conventional economic models that were based on singular dependency which were premised on the assumption of full employment equilibrium that economies were supposed to achieve through wage and price adjustments. Therefore, based on these models, it was hard to justify the growth of urban unemployment in the absence of absolute labour layoff in the country as a whole.

The Harris-Todaro model is premised on a two-sector model of rural-urban migration, which acknowledges the existence of a politically determined minimum urban wage at levels significantly higher than agricultural earnings. Based on this politically determined high minimum wage, the prevalence of rural-urban migration despite the surge in urban unemployment, is largely due to an economic rational choice on the part of the economic agent (individual migrant). The key assumption of this model was that the movement of people from the rural areas to the cities would continue as long as the expected urban real income at the margin exceeds real agricultural product. Thus, in this framework, potential rural migrants behave in a rational manner with a view to maximise expected utility. This model argues that rural-urban migration is not fueled by the wage income only, but by the urban opportunity structure. This view was supported by Hart (1973) who suggests that towns are attractive to many people because of the different prospects of income opportunities, compared to wages only. For this reason, migrants opt for the city, even without a guarantee of a formal job, taking a long-term view that one day a job will materialise. Thus, in this scenario, the informal sector offers the migrant a temporary employment opportunity.

The continued migration from rural to urban areas based on this model results in surplus labour, and contributes to the growth of informal sector employment in a number of African countries. Following this approach, the informal sector absorbs a number of the urban unemployed, and accommodates recently arrived rural migrants before they get jobs in the formal economy (Benjamin and Mbaye, 2014). Bhattacharya (2002) however argues that the informal sector should not be seen as a temporary home for rural migrants as they wait for better opportunities in the formal sector. Instead, it should be viewed as a vibrant sector with the capacity to attract and pay people, and which also makes substantial contribution to the economy.

Fields (1975) argues that migrants are faced with three choices: a formal sector job, open urban unemployment or a job in the urban informal sector. However, owing to the fact that in most developing countries there are no insurances to cover unemployed people, migrants in towns cannot afford to be openly unemployed. This naturally forces people to join petty trading, vending or other small-scale production activities as a means of eking a living. Following this approach, the urban informal sector in African economies is largely fueled by migrants who opt to do petty activities for survival as opposed to being openly unemployed. In this instance, the growth of the informal sector signifies a serious challenge of underemployment in these economies.

Although the modernisation approach provided the framework to guide policy making, and its predictions were largely consistent with developments in Europe and Japan after World War II, developments in developing countries in the 1960s started to challenge this model (Chen, 2012). Contrary to the predictions of the model, developing countries were experiencing increased challenges of unemployment and underemployment despite the fact that their economies were growing (Sherifat, 2011). The formal sector was failing to absorb surplus labour in developing countries, which contradicted the original thinking of the modernisation approach.

One of the weaknesses of this approach is that the model took a simplistic approach in showing the difference between the traditional and the capitalist sector in developing countries. This is largely so because showing different characteristics between the two

sectors does not necessarily imply that they experience different economic conditions or business environments. Nor does it imply that there is nonexistence of a relationship of dependency between the two sectors and the related behavior of subordination (Potts, 2007).

Further, this approach has also been criticised on the basis that it did not view the informal sector as a potential area for serious economic activities or a potential hub for entrepreneurial breeding, but only as a centre for backward ridden economic activities and a source of problems for countries (Sherifat, 2011). However, in a number of African countries, the informal sector has emerged as a potential area of serious economic activities.

Furthermore, in the context of African economies, there are a number of countries that have embraced modernisation or market systems with a high level of education and skills, but are still faced with a big challenge of the informal sector. This contradicts the prediction of the modernisation theory, which argued that informality was caused by backward economic systems and failure to embrace the modern world or the capitalist system.

2.2.1.3   Dependency Approach

The contradictions that developing countries were experiencing necessitated further research in the area to get a deeper understanding of what was driving the deviant behaviour. Hart (1971, 1973), whose pioneering work in Ghana focused on analysing economic activities among rural migrants in Accra, coined the term 'informal sector'. Studies by the International Labour Organisation in Kenya in 1972 found that economic activities in the traditional sector involved some firms that were profitable and well managed as well as small peripheral activities (ILO, 1972).

Contrary to the earlier assertion, the ILO (1972) report on Kenya argued that the informal sector could play an important role in developing economies in terms of employment creation and poverty alleviation. Their findings dismissed the earlier predictions which viewed the informal sector as comprising traditional or backward economic systems. This

alternative approach postulated that rather than eliminating the informal sector and its precarious working conditions, governments should focus on improving working conditions and the environment of firms operating in the informal sector (Heintz, 2009).

One of the main criticisms of the dependency theory is that proponents of this approach viewed informal activities as just survivalist in nature, without any profit motive. However, evidence from a number of African countries like Senegal, Zambia, Kenya, Zimbabwe, DRC and Tanzania show evidence of some micro enterprises in the informal sector whose motive is to maximise profit. Sherifat (2011) argues that one of the weaknesses of this approach is that it views the informal labour relationship as not part of the exploitative formal arrangements of production.

A critical look at African economies shows a mixed picture in terms of the objectives of firms that ply their trade in the informal sector. Some individuals or firms are in the informal sector for survival purposes, while others are after maximising profit.

2.2.1.4   The Legalist School/ Neo-liberalism

This school of approach was largely pioneered by De Soto (1989, 2000). The legalists argue that small business end up operating in the informal sector because of the high cost of formalisation. Complicated and cumbersome legal process and procedures push firms to locate their operations in the informal sector. Informality is thus defined as economic agents that do not comply with government gazetted taxes and regulations. Following this approach, the surge in informality in African economies is largely attributed to cumbersome regulations and high taxes promulgated by African governments that do not have capacity to ensure compliance (Loayza *et al*., 2009).

Proponents of this school of approach view microenterprises that are locked in the informal economy as entrepreneurs who have successfully stood up against excessive state regulations and are also making effort to pursue a free market economy (Sherifat, 2011). Such entrepreneurs are revolutionaries who are standing up against a state-controlled economy which is exclusionary and is bent on hindering them from turning into full capitalists.

Once they quit the formal systems, they operate outside with their own set of rules and regulations to guide their operations. The rules and regulations could be drawn or borrowed from the established legal system or community values which are upheld by the local leadership (Des Soto, 2000). Earlier studies by De Soto (2000) found out that in countries like Peru, it took about 289 days to register a small business, and the cost was 31 times the monthly minimum wage of one worker. For countries like Philippines, the study found out that the whole process of formalising the purchase of land would require 168 steps involving 53 public and private agencies, and taking 13 to 25 years. In Egypt the process would involve 77 bureaucratic procedures at 31 public and private agencies, and would take five to 14 years. This trend was consistent in a number of developing countries that De Soto studied and this led him to conclude that stringent regulatory requirements are punitive and force firms to opt out of formality.

The legalist school views the informal sector as comprising entrepreneurs whose activities are key to the sustainable growth of the economy. It comprises people who are very innovative and who can produce goods and services that can be used by the private sector as inputs. The economic activities taking place in this sector in most African economies are crucial for poverty alleviation and employment creation. De Soto (2000) argues that the magnitude of economic activities in the informal sector is huge and is not just a scenario of the poor serving the marginalised group of people in the society. The micro entrepreneurs in the informal sector are creating a new vibrant economy.

What is only lacking from these firms is formal registration and compliance with the law. The red tape involved with formal registration and the associated costs push these entrepreneurs to operate in the informal sector. De Soto, however, notes that the key challenge faced by these firms is that due to non-registration, they do not have legally enforceable property rights over their assets. Resultantly, in most African countries the assets that are in the informal economy are 'dead assets' because they cannot be used to regenerate more wealth. They cannot be leveraged as security to obtain credit from banks because they are no legal documents which clearly show ownership. This stifles the growth potential of the sector and its capacity to contribute to the national economy.

The neo-liberal approach came under attack especially after the failure of structural adjustment programmes in Africa and the economic crisis of the late 1990s and 2000s, which led people to question the efficiency of the markets. The adoption of structural adjustment programmes resulted in social exclusion and the elimination of safety nets programmes in a number of countries with detrimental effects on labour. Deregulation of prices and the privatisation of state utilities exposed many consumers in Africa as prices of basic goods and services became unaffordable (Sherifat, 2011).

2.2.1.5 Extension of the Legalist Approach

The groundbreaking work of De Soto, which put the state at the centre of driving the informal sector activities, inspired authors like Kanbur (2009) and World Bank work championed by Perry and Maloney (2007) to come up with further approaches to explain the prevalence of informality.

- **Kanbur Framework**

Kanbur (2009) argues that informality and formality should be viewed in terms of state regulations and laws, that is, how economic activities are undertaken in a society under a certain established set of rules and regulation(s). The Kanbur conceptual framework thus views formality and informality as exhibiting the way economic agents respond in relation to a particular set of regulations or procedures that are within their business environment. The Kanbur (2009) model came up with four types of possible responses from economic agents to specific regulations within their operation ambit. The first one (A) hypothesises that a firm operates within the defined regulations and complies with the rules. The second (B) postulates that a firm operates within the laid down regulation and rules but opts not to comply. The third scenario (C) is where the firm makes the necessary changes to exit the formal set up and the associated regulations, and the fourth (D) is when the firm, right at the outset, opts to operate outside the formal structures.

Kanbur argues that under the first scenario A, economic agents take a conscious decision to comply with the established rules and regulations, and hence category A is formal. Categories B, C and D all show informality of economic agents in an economy. However,

within these categories, the drivers of informality are different. Category B shows that firms are evading the country's rules and regulations, thereby making economic activities under this category illegal. Kanbur further argues that economic activities under categories C and D are not under the state rules and regulations. This could be because such activities are below the prescribed minimum firm size, and thus off the radar of the authorities. Kanbur (2009), however, further explains that the difference between categories C and D is that firms under category C deliberately adjusted their size to be below the minimum size, whilst firms under category D were already below the minimum size and hence off government radar.

Kanbur (2009) concludes that in order for governments and stakeholders seeking to understand the key drivers of informality to come up with an informed policy position to deal with informality, it is important to separate the drivers of informality. A single approach based on categories B, C and D will not tell a complete picture in terms of what drives economic activities to the informal economy. Thus, based on this model, African countries should gravitate away from an aggregate based approach towards a disaggregation approach to fully unpack informality as a phenomenon.

- **World Bank Approach to Informality**

The World Bank (2007) explores a new dimension on the causes of informality which focuses on the relationship between economic agents and the state. The approach highlights two important dimensions – exit (voluntary informality) and exclusion (involuntary informality). The model postulates that the interface between citizens and the state in terms of the net benefit of formality, and the ability of the state to enforce regulations amongst other factors, determine the behavior of citizens. Thus, following this model, the high rising level of informality in Africa is a clear statement from citizens that they are not happy with the level of services from the state and its capacity to enforce regulations, hence they opt out. The World Bank (2007) identifies three types of relationships between the individual and the state:

Opportunistic Evasion – The growth of the informal sector is largely due to firms evading state rules and established legal procedures even though the state has adequate

legislative framework and enforcement mechanism. This could include firms not complying with tax authorities and city council by-laws, as well as workers working in deplorable conditions without any security or protection. Thus, in this case economic agents 'opt out' of the established regulatory framework.

Defensive Evasion and Exclusion – This mainly arises when the state is not performing its regulatory duties well. If the state is predatory and the regulations are poor, some economic agents who would ordinarily have complied may respond by opting for defensive evasion. Thus, in this case, informality is largely a result of the high costs of formalising operations due to a bureaucratic state regulatory framework.

Passive Evasion and State Irrelevance – Informality under this scenario is driven by small firms that do not see themselves as part of the modern economy, and whose operations need limited, if any, services from the largely irrelevant state. On the other hand, the state, after carrying comprehensive cost benefit analysis, may decide that the size of some of these small firms is not worth pursuing in terms of compliance. The World Bank (2007) concludes that in this case the growth of the informal sector is a normal path in the development trajectory of a country, as opposed to being a result of firms leaving the formal sector because they never operated in the formal sector.

Government plays a crucial role in the expansion of informality, given the power that it wields in designing regulations and monitoring compliance. If government employees or groups related to them are likely to make money from the growth of the informal sector, they will make effort to create an environment which encourages the growth of informality, or increase incentives for economic agents to prefer informality (Loayza *et al.*, 2009).

Following this World Bank model, informality is largely driven by economic agents, namely, labour and firms which deliberately choose not comply with state rules and regulation largely because they feel that the state is excluding them from important benefits of formality. In addition to this, economic agents, after carrying out a comprehensive cost benefit analysis, may decide against formality (voluntary exit).

The World Bank (2007) concludes that informality driven by exclusion or exit is in most countries complementary rather than divergent frameworks. Resultantly, in most African countries with high levels of informality, the weight of informality caused by exclusion or exit differs due to different institutional arrangements and legal structures. Furthermore, in most African countries, it is very difficult to separate informality caused by exit from the one that is caused by exclusion, due to the fact that some microenterprises may be driven by both factors to opt for informality. The heterogeneous nature of informality may also make it difficult in reality to separate these two in most African countries. Hence, firms or individuals may locate in the informal sector due to a mix of exit and exclusion.

2.2.1.6 The Structuralist School

This school of approach was largely introduced by Castells and Portes in 1989. The structuralist school sees the informal economy as a phenomenon whose existence is linked to capitalist growth in societies. Structuralists argue that informality is not only caused by oversupply of labour or excess regulation in economies, but is also a result of a well-coordinated labour exploitation by the capitalist. Maloney (2000) concludes that the prevalence of the informal economy was not by accident or some structural weakness in a capitalist system, but rather firms that ply their trade in the informal sector are systematically "informalised" by capital under the realm of peripheral capitalist accumulation.

Viewed through this lens, the growth of the informal economy in African economies is largely attributed to the behaviour of formal firms that strategically make efforts to reduce the cost of labour for their operations and enhance their competitiveness in the capitalist economy (Moser, 1978; Castells and Portes, 1989; Sherifat 2011 and Chen, 2012). With increased globalisation and the industrialisation of nations, the structuralists are of the view that this should lead to the growth of the informal economy as peripheral accumulation intensifies. More micro firms and labour will be required to serve formal firms to reduce their cost of production especially wages, and hence increase the profitability of formal actors. Thus, the informal economy is regarded as subordinated to

the formal actors, and is used as a reservoir for cheap labour and input for the capitalist economy.

Structuralist postulate that there are entrenched linkages between the informal economy and the growing capitalist economy. The relationships between these two sectors is structured (Castells and Portes, 1989). This relationship is aptly captured by Portes and Schauffler (1989) who conclude that the presence of firms in the formal or informal economy simply captures the dynamics of the same economy, and their operations are driven by the extent of state regulations, the conditions of capitalists companies, and the size and profile of the labour force.

Portes and Schauffler (1993) identify three key mechanisms in which the prevalence of the informal economy is structurally connected to the capital formal economy. Firstly, micro firms in the informal economy are suppliers of a variety of cheap goods and services to workers who ply their trade in the formal economy. Thus, workers in the capitalist economy who are not adequately compensated are cushioned by relying on supplies from the informal economy. Secondly, the prevalence of small firms in the informal economy can act as a catalyst for firms in the capitalist economy to opt to pay unjustifiable low wages. Thirdly, the existence of the informal economy oils the formal economy as it provides low cost, unprotected workers to support capitalist production. The informal economy contains a 'reserve army' of cheap labour for the capitalist economy.

Williams (2013) argues that the integration of the informal economy and the capitalist formal economy is enhanced by subcontracting and outsourcing tendencies in the corporate world. Firms in the informal economy are deeply integrated with the capitalist formal production through both backward and forward value chain linkages. The structuralists argue that in order to facilitate the reduction of informality in developing countries, governments should target redressing the uneven relationship between big capitalist formal firms and subordinated firms and workers by regulating both commercial and employment relationships (Chen, 2012).

Although there is some relationship between the informal economy players and the formal actors in some African countries, this relationship is not as developed as postulated by

the structuralist approach.   The subcontracting and outsourcing elements, which are strong components of the structuralist approach, are not that developed in Africa largely because of the quality of products that comes from the informal firms. Besides the issue of quality, informal firms also face the challenge of reliability which makes formal firms uncomfortable to subcontract them. Although this approach is applicable to some Latin American countries, the stage of development and the structure of the informal sector in a number of African countries make the relationship less vibrant. The economic linkages between the informal sector and formal sector are not that strong in Africa.

2.2.1.7   The Voluntarist School

This school of approach was pioneered by Maloney (2004). Proponents of this school focus on microenterprises that operate in the informal sector that deliberately decide to avoid state regulations and taxation, but unlike the legalist school, do not blame the bureaucratic registration procedures (Chen, 2012). The voluntarists argue that economic agents choose to operate informally after analysing the costs-benefits of informality compared to formality. Opting for informality is often the optimal decision given their preferences, the challenges they face in terms of their skills level, and the extent of formal sector labour productivity in the economy (Maloney, 2004). The voluntarists do not place much importance on the economic linkages between informal firms and formal microenterprises, but support the proposition that informal firms create an unfair playing field for formal microenterprises due to the fact that their operations is not formally regulated. As a result, they avoid paying taxes and other costs of production (Chen, 2012). Following this school of approach, informality is seen as a concise decision by economic agents or firms to avoid taxes and labour market regulation. Thus, based on this approach informality is a choice by microenterprises in an economy.

This approach could resonate well with the behaviour of informal firms in Africa, given that the majority consciously decide to operate informally after weighing the costs and benefits of formality. State institutions in Africa are struggling to provide value to firms, which justifies why they should formalise operations. Poor infrastructure, a difficult operating environment, and lack of accountability on revenue management or corruption

in general make it difficult for informal firms to willingly formalise operations in Africa. As such, the proponents of this approach resonate well with the behavior of informal firms in Africa.

These schools of approach highlighted above make an attempt to offer varying theories to explain the drivers of informality from different perspectives. However, in practical terms, the behavior of informal sector players is more complex, and cannot be narrowed down to a single explanation or perspective (Chen, 2012).

2.2.2 Estimating the Size of the Informal Economy

The measurement of the size of the informal economy has generated a lot of interest for policy makers and researchers, especially given its prominence in most African economies. However, despite its visibility in most developing countries, measuring the informal economy has remained a mammoth task for most governments and researchers. The main challenge emanates from a lack of consensus on the definition of this concept (Vuletin, 2008; Oviedo *et al.*, 2009). The situation is exacerbated by the fact that informality as a concept keeps on evolving, taking many different forms in different countries. This dilemma of finding an appropriate methodology to measure informal economy is well captured by Frey and Schneider (2000) who concluded that developing countries were facing a challenge to "measure the invisible". Further, the fact that economic activities under the informal economy take place outside the formal regulatory framework and often economic actors in this sector may not have permanent physical location makes it difficult to accurately measure its size in most African countries.

Measuring the size of the informal economy is important for policy makers because empirical evidence is increasingly showing that there is a direct relationship between the size of the informal economy and tax evasion (Schneider and Enste, 2000; Vuletin, 2008). This link has serious implications on the developmental aspirations of African economies. Secondly, failure to measure the size of the informal economy could underestimate the level of economic activity in an economy. Third, the shortage of knowledge on the actual size of the informal sector could adversely affect resources allocation and effectiveness of policy (Vuletin, 2008).

However, despite these challenges, researchers have come up with several techniques to try and measure the level of informality as shown below from the three different approaches which are widely used to measure the size of the informal economy.

2.2.2.1 Direct Approaches

This technique relies on micro approaches that depend on surveys and samples or tax auditing and other compliance techniques (Schneider and Buehn, 2016). Based on this approach, sample surveys are carried out amongst the economic actors in the informal economy. The World Bank's Enterprise surveys are widely used as part of individual surveys by a number of researchers. These surveys specifically ask the owners of the microenterprises operating in the informal economy when they started operating, and the period when the firm was officially registered. The difference between these two periods is when the firm is considered to have been informal (Oviedo *et al.*, 2009).

Under this approach, household or labour force surveys and interviews can also be used by researchers to ascertain the degree of informality in an economy. These instruments can be applied to unravel the nature of employment, that is, if workers have contracts, and social security issues, that is, pension, medical aid, and entitlement to leave days, amongst other things. This methodology relies on voluntary responses of participants.

The other direct approach method is based on tax audits. This approach estimates the size of the informal economy based on the differences between income declared for tax purposes, and that measured by random checks (Schneider and Enste, 2000). This technique depends on the analysis of tax returns by companies and social security agents. Based on this analysis, researchers find out the number of audited companies that are evading tax, and calculate the total amount of under-declared tax as the value of informal activity (Oviedo *et al.*, 2009). This approach relies on governments undertaking a comprehensive scrutiny of companies that are supposed to comply with regulations. Companies that fail to comply are regarded as informal (Schneider and Buehn, 2016). The key issue with this approach is for governments to undertake fiscal audits to quantify the amount of undeclared taxable income.

The main advantage of individual surveys is that they allow researchers to get on "the ground" detailed information about informality from economic agents who are actively involved in the sector (Vuletin, 2008). The approach allows researchers to make further interrogations on why people are in the informal economy, as well as their working conditions in general.

The main weakness of this approach is that the responses from the interviewees largely depend on how the questions are structured and, in some instances, the respondents may not be honest or may not be cooperative (Vuletin, 2008; Oviedo *et al.*, 2009). Respondents can at times choose what to disclose and what not to disclose, thus adversely affecting the integrity of the surveys.

One of the main disadvantages of the Direct Approaches is that both methods result in point estimates only (Schneider and Enste, 2000). Furthermore, this approach does not cover all the activities taking place in the informal economy, and can therefore be seen as based on reduced estimates. In addition, this approach does not enable researchers to use the information to make projections about the expected growth trajectory of informality (Schneider and Buehn, 2016).

The main weakness of tax audits is that they only cover taxable economic activities, and they do not have the capacity to identify all forms of tax evasion in an economy (Frey and Schneider, 2000). This approach therefore could exclude a number of economic transactions which take place in the grey economy. The estimated level of informality based on this approach may only represent a small proportion of its actual size. Furthermore, tax audits by their nature, are not carried out randomly, so the information obtained is not a true reflection of the total number of microenterprises (Oviedo *et al.*, 2009). There is a risk of biased samples based on this approach.

2.2.2.2   Indirect / Indicator Approaches

These approaches are largely based on macroeconomic analysis and rely on a number of macroeconomic and other variables that show information regarding the behaviour of the informal economy over time (Medina and Schneider, 2018). Under this approach, the

following five technical indicators can be used to estimate the size of the informal economy.

- **The Difference between National Expenditure and Income Statistics**

This approach estimates the level of informality based on the discrepancy between aggregate income and aggregate expenditure from the National Accounts (Oviedo *et al.*, 2009; Medina and Schneider, 2018). Based on national accounting approaches on measuring Gross National Product (GNP), the income approach should be equal to the expenditure measure of GNP. However, if there is an independent estimate of the expenditure side of national accounts, which finds a difference between the expenditure approach and the income measure, then that gap is the estimated size of the informal economy (Schneider, 2014).

Schneider (2014) further argues that because national statisticians are meticulous and aim to ensure that this discrepancy is low, it is advisable for policy makers or researchers to use the initial discrepancy or variance to estimate the level of informality, rather than published differences. If government manages to accurately estimate national income using the expenditure approach, then this technique will show a good estimate for the size of the informal sector. The challenge is that in practical terms, there are bound to be some activities which will be missed, apart from errors in the calculations of national income using the expenditure approach. This renders this technique unreliable.

- **The Difference between Official and Actual Labour Force**

This method relies on the difference between total labour force and total employment. A reduction in the involvement of labour in the formal economy can be viewed as a sign of a shift of activities towards the informal economy (Schneider, 2014). This approach assumes that total labour force participation is constant, so that a decrease in total labour force participation in the formal sector should then result in an increase in participation in the informal economy (Schneider and Enste, 2000). The main pitfall of this approach is that the discrepancies in labour force participation may be due to other factors like business cycle trends, scarcity of jobs, the level of education and retirement

considerations (Vuletin, 2008). Hence, estimates based on this approach may be deemed to be a weak measurement of the level of informality.

- **The Transactions Approach**

This method is largely attributed to the work of Feige (1979, 1989, and 1996). It is premised on the notion that there is a constant link over time between the volume of transactions and official Gross National Product (GNP), as was given by Fisher's quantity theory of money equation, that is, $M*V=p*T$

Where: M- Money, V-velocity, p-prices, and T- total transactions.

This approach assumed that there is a constant relationship between the money flows related to transactions and the total (official and unofficial) value added, that is:

Prices*Transactions= k (official GDP +informal economy), thus based on this, one can derive the following equation:

Money*Velocity=k (official GDP+ informal economy). From this model, the quantity of money and official GDP estimates are known, and money velocity can be estimated.

Following this approach, if the size of the informal economy as a ratio of the official economy is assumed to be known for a benchmark year, then the size of the informal economy can be deduced for the rest of the sample.

This approach has a number of flaws, for example, assuming that K is constant over time is not realistic. Secondly, with the changes in the real world due to technology and other factors, the amount of cash holdings may be affected by the usage of credit cards and electronic banking (Vuletin, 2008). Other authors like Schneider (2014) concluded that although this approach seems theoretically sound, the empirical rigor which is required to get reasonable estimates is very difficult to achieve, and thus its conclusions on the size of the informal economy may not be accurate.

- **The Currency Demand Approach**

This method, developed by Cagan (1958), looks at the relationship between currency demand and tax pressure as one possible cause of the growth of the informal economy in the USA during the period 1919 to 1955 (Schneider, 2014). This approach was expanded by Tanzi (1980, 1983) who calculated the size of the informal economy in the USA using an estimated currency demand function covering the period 1929 to 1980. The Tanzi approach was premised on the assumption that underground economic transactions are carried out using cash so that the regulatory authorities cannot trace the payments. Based on this assertion, an increase in the informal economy will result in an increase in the demand for currency (Vuletin, 2008; Schneider, 2014). An equation for currency demand is estimated over time to capture the subsequent excess demand for currency. All standard factors like income patterns, interest rates, payment behaviour, debit cards and electronic payment systems which can be used as an alternative to cash are controlled for. Furthermore, variables like the direct and indirect tax burden, government regulation, state institutions and tax morale, which are traditionally taken as the main reason for economic agents to operate in the informal economy, are included in the estimation equation.

Tanzi (1983) proposed the following currency demand equation:

$$ln(\frac{C}{M_2})_t = \beta_0 + \beta_1 ln\ (1+TW)_t + \beta_2 ln(WS/Y)_t + \beta_3 lnR_t + \beta_4 ln(Y/N)_t + \mu_t \qquad (2.1)$$

with $\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0,$

where *ln* denotes natural logarithms, C/M_2 is a ratio of cash holdings to current and deposit accounts, TW is a weighted average tax rate (to proxy changes in the size of the economy), WS/Y is a proportion of wages to salary in national income (to capture changing payment and money holding patterns), R is the interest paid on savings deposits (to capture the opportunity cost of holding cash), and Y/N is the per capita income.

Based on this model, a surge in currency beyond the normal level, or the amount unaccounted by normal variables is then linked to the increased tax burden and other factors that compel individuals/firms to locate in the informal economy. The estimated size of the informal economy can be deduced from comparing the difference between the

growth of currency if the direct and indirect tax burden and government regulation are held at minimum values, and the growth of currency with increased burden of taxation and government laws. Following this approach, if one assumes an equal income velocity for currency utilised in the informal economy as for legal M1 in the formal economy, the estimated level of the informal economy can be calculated in comparison to the formal GDP.

Although this method has been used widely by researchers, it is not devoid of weaknesses. The approach underestimates the level of informality in a country because not all transactions in the informal economy take place through cash payments. A growing number of firms or individuals in the informal economy are now relying on digital technologies and some countries are gradually moving towards a cashless society.

Secondly, a surge in currency demand in an economy may be triggered by a reduction in demand deposits rather than a spike in currency usage by players operating in the informal sector (Vuletin, 2008).

Thirdly, assuming equal velocity of money in the informal and formal economy may not hold in less developed countries. The main challenge is on the estimation of the velocity of money in both the formal and informal economies. This weakens estimation capacity of this approach (Schneider, 2014).

This approach was criticised by Feige (1986, 1996) on the basis that these studies focused on the US Dollar as a domestic currency in the USA only, and missed the dimension that the US Dollar is also used as an international currency and held by economic agents in cash abroad. Another criticism of this method is that it is based on the assumption that there is no informal economy in the base year. This assumption is difficult to hold in practice and any variation will affect the estimated size of the informal economy (Schneider, 2014).

- **The Physical Input (Electricity Consumption) Method**

This method is also known as the Kaufmann-Kaliberda Approach (Schneider and Buehn 2016). This approach, which was developed in 1996, is premised on the basis that the

best physical measure of informality in an economy is electricity consumption. Empirical evidence has shown that aggregate economic activities within an economy and electricity consumption have an elasticity which is normally close to one (Schneider, 2014). Thus, following this argument, the growth of total electricity consumption could be used as a proxy to measure the growth of the country's GDP (both formal and informal). Kaufmann-Kaliberda then proposed to use the difference between the growth of electricity consumption and the growth of official GDP as an estimate for the growth of the informal economy.

The main weakness of this approach is that informal economic activities do not all necessarily require or consume a lot of electricity. For example, in most African countries, activities like vending, cross border, and other service-based activities do not consume electricity, yet they dominate informal sector activities. In some instances, microenterprises in the informal economy may resort to the use of gas and coal, so the estimated size of the informal economy based on this approach may not be a true reflection of its actual size. Another weakness of this approach is that the increased usage of technology and innovation has resulted in more efficient production techniques and utilisation of electricity as compared to past years, and this affects both the official and unofficial economic agents. Further, the electricity-overall GDP elasticity may differ across countries and change with time.

- **The Lackó Method**

Lackó (1998, 1999, 2000a, 2000b) is premised on the assumption that within an economy, a portion of the informal economy is related to the household consumption of electricity. This portion includes household production, self-employed activities and other unofficial economic activities (Schneider, 2014). The Lackó model further assumes that in economies where the size of informality linked with household electricity consumption is big, then the rest of the informal economy will also be big. Lackó further assumes that in each economy, a portion of the household consumption of electricity is utilised in the informal economy. Lackó's model (1998) is captured by equations 2.2 and 2.3 below:

$$lnE_i = \alpha_1 lnC_i + \alpha_2 lnPR_i + \alpha_3 G_i + \alpha_4 Q_i + \alpha_5 H_i + \mu_i \qquad (2.2)$$

With $\alpha_1 > 0, \alpha_2 < 0, \alpha_3 > 0, \alpha_4 < 0, \alpha_5 > 0$ and

$$H_i = \beta_i T_i + \beta_2(S_i - T_i) + \beta_3 D_i \tag{2.3}$$

With $\beta_i > 0, \beta_2 < 0, \beta_3 > 0$

where i shows the number assigned to the nation, E_i is per capita households' electricity consumption in country i; C_i is per capita real consumption of households without the consumption of electricity in country i in US\$ (at purchasing power parity); PR_i is the real price of consumption of 1 KWh of residential electricity in US dollars (at purchasing power parity); G_i is the relative frequency of months during which there is need of heating in houses in country i; Q_i is the ratio of energy sources other than electricity energy to all energy sources in household energy consumption; H_i is per capita output of hidden economy; T_i is the ratio of the sum of paid national income corporates profit and tax on goods and services to GDP; S_i is the ratio of public social welfare expenditures to GDP; D_i is the sum of number of dependents over 14 years and of inactive earners, both per 100 active earners.

The model was anchored on a cross country analysis, and to be able to determine the estimated size of the informal economy, the value of economic activity to be produced by a given level of electricity in the informal economy should be known for each economy. However, because this data was not available for most economies, the model then relied on the usage of estimated size of the informal economy of 10.5% of GDP which was done by Morris in 1993 for the USA economy, in order to estimate the size of the informal economy for other countries (Schneider, 2014).

The main weaknesses of Lackó's approach is that informal economic activities do not solely rely on the utilisation of a considerable amount of electricity. In most African economies, informal actors rely on other sources of energy like solar and gas. Furthermore, the location of informal activities only at the household sector in the model has some limitations because informal activities takes place at other areas beyond the household level. Another weakness of this approach is that in most developing countries, the ratio of social welfare expenditure cannot be used effectively as a variable to explain

the informal economy. Finally, the model is premised on identifying a reliable base value of the informal economy, which can then be used to estimate the size of the informal economy for all other countries. However, in practice it is difficult to identify this base year especially for African economies.

2.2.2.3   The Model Approach

The Model Approach provides a significant departure from the approaches highlighted above as it focuses on multiple drivers of the growth of the informal economy and various dimensions of the impact of informality on economies (Schneider, 2014). This is a departure from the other approaches of estimating the size of the informal economy that largely focus on one variable, that is, the role of taxation on determining the extent of informality in an economy. This approach is anchored on the statistical theory of unobserved variables, which looks at multiple drivers and multiple signs of the concept to be measured. Besides focusing on a number of causes, this approach also looks at the various effects of informality in an economy. Since the size of the informal economy is not known, a latent estimator method using the Multiple Indicators, Multiple Causes (MIMIC) estimation approach is adopted.

A structural model is used to show the relationship between the unobservable variable and observable variables. As such, a MIMIC model represents a simultaneous specification of a factor and a structural model.

The development of the informal economy over time is captured by the structural equation framework summarised below:

Figure 2.3: Structural Equation Framework for the Development of the Informal Economy
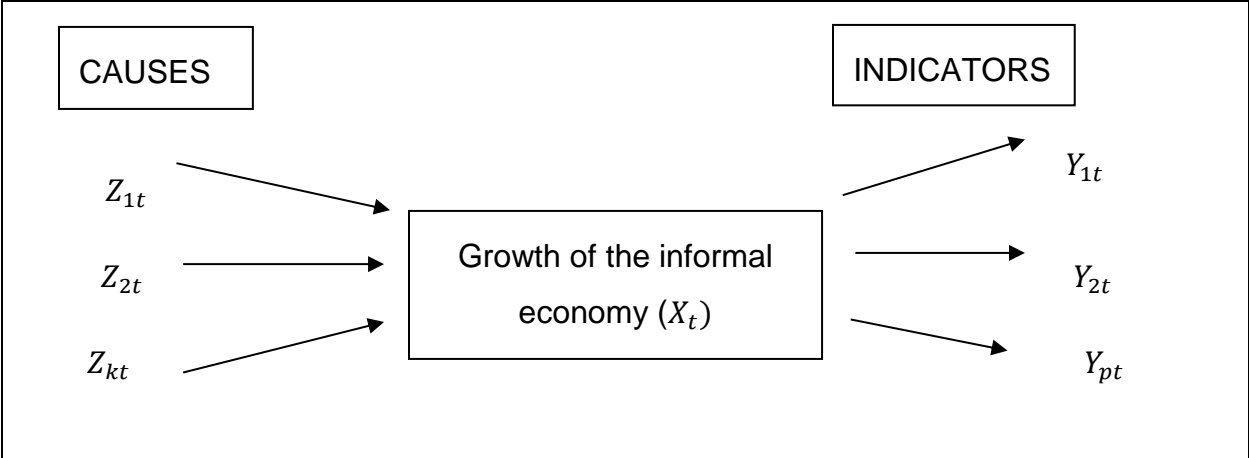
Source: Schneider (2014)

The estimation of the size of the informal economy is based on linking the unobserved parameters to observed indicators. The interface over time between the drivers Z_{it} $(i = 1, 2, \ldots , k)$, the size of the informal economy X_t, and the indicators Y_{jt} $(j = 1, 2 \ldots , p)$, is highlighted above. Following this approach, an increase in the size of the informal economy can be seen through a surge in monetary transactions by economic agents, alternatively, a rise in the number of workers in the informal economy could result in less people working in the formal economy, or workers in the formal economy may opt to reduce the number of their working hours (Schneider, 2014).

One of the main weaknesses of this model pertains to the definition of the unobservable variable within the model. The confirmatory approach that the model is based on rather than exploratory, implies that a researcher is highly likely to establish if a particular model is valid, rather than to "discover" an appropriate model (Schneider, 2014). As a result of this, it is feasible that the defined model may include shadow economic activities other than the one the researcher is studying.

The model is also criticised on the basis that the estimations may result in unstable coefficient, as a result of variations of the sample size and model specification. This limitation was, however, dismissed by Dell' (2003), who argued that instability is not material when the sample size is enlarged.

2.2.2.4 A Summary of the Theoretical Approaches to Informality

The most common factor in all these theoretical approaches is their level of analysis, which is a macro level. Although some of these approaches such as the World Bank approach recognise that the decision to informalise rests with the firm in question, they have concentrated on the macro-level analysis of the informal sector. The major weakness is the lack of connectivity between the micro decision made by the entrepreneur to remain informal, and the degree of informality at national level. For instance, the theories identify macroeconomic factors such as government regulation, inflation and other macro factors as drivers of high levels of informality in some countries. However, the change in the percentage of informality at national level is directly linked to micro-level developments. It is against this background that one of the contributions of this study is the provision of the missing theoretical link between micro-level and macro-level informality analysis.

2.3 Corruption

Corruption by its nature is complex, multi-faceted and may have different meanings depending on the situation and context. Dreher and Schneider (2010), define corruption as the abuse of public office or power for private benefit. This means that corruption refers to a scenario whereby public officials who are mandated to carry out tasks by government are involved in some action or activities leveraging on the office they hold for private enrichment. The activities of the public officials in this case are not consistent with laid down rules of engagement (Jain, 2001). Virta (2007) posits that corruption normally takes place when the anticipated benefit from the corrupt activity outweighs the anticipated costs. Economic agents who are involved in corrupt activities expect benefits related to associated economic rents that are available in the community, whilst the anticipated costs are related to the probability of being caught, and the extent of the punishment.

Following the definitions above, Aidt (2003) argues that there are three conditions that are necessary for corruption to take place and continue in a society.

- **Discretionary Power**: the involved bureaucrat must have the power to design or implement regulations and government policies using his/her discretion.
- **Economic Rents**: the discretionary authority should allow the extraction of currently available economic rents or creation of economic rents which can be extracted.
- **Weak Institutions**: the state of institutions, that is legal, administrative and political, must give public sector officials an incentive to use their discretionary authority to extract or pursue actions, which leads to the creation of rents in the society.

Bardhan (2010) argues that corruption is not only confined to public office holders, as it is equally prevalent in the private sector. In most African countries corruption is not only rampant in public and private sectors, but also in civic society as well. Jain (2001) concludes that the use of public power for personal gain by public officials, law makers and politicians in a society results in three types of corruption, that is, bureaucratic, legislative and grand. The major differences in these three types of corruption is the nature of decisions that are triggered by the corruption and the source of the derived power of the person responsible for decision making. The relationship of the populace, the judiciary executives, politicians and administrators is illustrated by the following types of corruption.

2.3.1   Main School of Approach on Corruption

Literature on corruption has largely been dominated by two schools of approach, that is, efficient corruption hypothesis or grease the wheels, whose main proponents include Leff (1964), Lui (1985), Beck and Maher (1986). The second approach is sand the wheels hypothesis whose main proponents include Buchanan and Tullock (1962), Rose-Ackerman (1990) and Tanzi (2000).

2.3.1.1   Grease the Wheels Hypothesis (Efficient Corruption)

This school of approach argues that corruption is efficiency-enhancing in an economy because it facilitates business transactions that ordinarily would not have happened (Aidt, 2009). This view got prominence through the work of Leff (1964), after the publication of an article entitled "Economic Development through Bureaucratic Corruption". Leff's

approach was given a theoretical foundation by Lui (1985) and Beck and Maher (1986). Proponents of this school of approach argue that corruption promotes efficiency as it enables economic units in the private sector to rectify pre-existing public sector failures of different magnitude. From this perspective, corruption is viewed as a rational decision by economic players to counter preexisting failures by the public authorities (Aidt, 2009). Proponents of this school of approach are of the view that in an economy with weak and inefficient institutions which impede investment, some greasing or money is required to speed up transactions (Meon and Sekkat, 2005). Thus, in such a scenario, paying a bribe is essential to circumvent the bureaucratic inefficiencies, thereby increasing efficiency in the economy and investment.

Leff (1964) uses an example of a government decision to enforce price controls in Chile and Brazil to support this argument. In Chile, public sector officials were honest and enforced the controls, and food production stalled. However, in Brazil, the bureaucrats were not honest and did not enforce the freeze, but food production improved to the betterment of the society. In this scenario, corruption greases the wheels of trade, and its outcome is not always negative as conventionally envisaged.

There are largely two channels that are normally highlighted through which corruption could improve allocative efficiency in a society. The first is, the greasing the wheels hypothesis, and the second is a situation whereby corruption is perceived to introduce competition for the allocation of scarce government resources, a development which results in services being availed in a more efficient way than would ordinarily have been the case. The theoretical framework of these two channels is grounded in the "queuing model" which was advanced by Lui (1985), and the "auction model" propagated by Beck and Maher (1986).

2.3.1.2   Queuing Model

The queuing model assumes that there is a public official who is mandated with the responsibility of allocating industrial licences to individuals who join a queue to receive them. Individuals hate waiting in the queue to different magnitudes, but these magnitudes are not observed by the public sector official. Lui (1985) argues that the licences are given

to the individuals in the queue on the basis that those who are prepared and have capacity to pay a high bribe are attended to first. Following this rule, the average time spent in the queue is minimised. The payment of bribes shows how much individuals value not spending time in queues and, by accepting the maximum bribe, the public sector officials are implicitly giving priority to individuals who value getting the service quicker (Aidt, 2003). The model further strangely claims that the bureaucrat will not willingly slow down the speed at which the queue is moving, because this would reduce the number of people joining the queue to such a degree that it would adversely affect total bribe money.

The queuing model thus gives possibilities for the corrupt public sector official to engage in price discrimination among waiting customers who have different time preferences (Bardhan, 1997). Another dimension of the efficient corruption argument is to view it as "speed money" which decreases delays in moving files in public offices, and in sluggish queues for government services.

2.3.1.3   Auction Model

The auction model is premised on the notion that bureaucrats use a competitive approach, synonymous with open auctions to issue licences. The licence is allocated to the same private sector players, at an expected cost under two different scenarios. The argument here is that the corrupt public officials in principle carry out an open auction to the entrepreneurs, and will issue the license to the entrepreneur who pays the highest price or bribes (Aidt, 2003).

The efficient hypothesis theory of corruption is of the view that corruption improves the expected outcomes amongst agents domiciled in the private and public sectors. Shleifer and Vishny (1994) conclude that corruption should be viewed as a cheap way to allocate wealth between politicians and economic agents in the private sector, and as such both agents will seek to maximise wealth. The efficient model argues that without corruption, politicians would expropriate wealth in a less efficient manner and the subsequent allocation of resources would be influenced by the political interests, and will thus be inefficient. Following this approach, the presence of corruption improves efficiency by enabling private sector players to find their way out of some of the inherent inefficiencies

that are introduced by politicians. Aidt (2003), however, argues that there is no certainty that a first best option of resource allocation will be realised, unless the aim of the behavior of the private sector and the politician reflect precisely the social welfare.

2.3.1.4 The Sand the Wheels Hypothesis

The efficient corruption hypothesis is premised on second best thinking, as corruption promotes allocative efficiency in the society, as economic agents rectify pre-established government failure, yet the first best approach is to ensure that there are no distortions. Thus, instead of correcting inefficiencies in the society, this school of approach argues that corruption causes inefficiencies (Aidt, 2003). This view is supported by Meon and Sekkat (2005), who posit that although the argument that bribes can result in some benefits in a country with poor institutions may be valid, bribes could actually impose more costs, thereby worsening the inefficiencies.

This school of thought has its roots within the public choice discourse advocated by authors like Buchanan and Tullock (1962), Rose-Ackerman (1990), and Tanzi (2000). Following this approach, corruption takes place because public sector officials seek rents at every opportunity, subject to constraints provided by economic, legal and political institutions (Aidt, 2009).

Governments are seen as consisting of officials whose main objective is to advance their personal gains instead of maximising social welfare (Shleifer and Vishny, 1998). Corrupt bureaucrats are in most instances able to change both the quantity and quality of their services with a view to influence the level of the bribe. As such, the actions or behaviour of the public officials in reality may have an influence on how the queue is organised and moving (Aidt, 2003). Thus, corrupt public sector officials may purposely cause red tape in public institutions in an effort to get more bribes. Hopkin and Rodriguez-Pose (2007) conclude that public sector officials are thus seen as "grabbing hand".

The capacity of the bureaucrats to enhance efficiency in the processing of licences or permits for example, is constrained when the administrative process has many decisions makers. The public sector officials have the capacity and incentive to slow down the

processing of permits or licences at each stage (Meon and Sekkat, 2005). Thus, with many layers of authorisation in the public sector, each stage of authorisation brings its own costs when officials are corrupt. The increased costs of corruption at each stage offsets any perceived benefits, thereby increasing inefficiencies in doing business (Jain, 2001). This view is in line with Bardhan (1997), who argues that market failures in the economy are endogenous to the system, and are part of mechanisms to aid corruption and create opportunities for rent seeking.

The distortions that corruption purports to address or overcome are in practice created by the corrupt officials in order to create opportunities for corruption (Aidt, 2009). Therefore, instead of corruption providing a mechanism to overcome the burdensome rules and regulations and weak institutions, it can promote discretionary rules and burdensome regulations to create more opportunities for corrupt officials (Kaufmann, 1997).

The increased costs and inefficiencies arising from corruption in society led to the development of the sand the wheels hypothesis, an opposite approach to the grease the wheels hypothesis. Proponents of the sand the wheels hypothesis school of approach are of the view that there is a need to return to the market to ensure an efficient allocation of resources.

2.3.2 Types of Corruption

2.3.2.1 Grand Corruption

This involves the activities of the political elites in a society when they exploit their vested powers to make economic decisions or policies. Politicians have a duty to make decisions around resource allocation in a society, and this decision is supposed to be informed by demands of the citizens. Explained through these lens, politicians need to balance the interests of the populace and their own political interests, namely, the desire to retain power. However, corrupt political leaders acting in their own interest can manipulate either the national policies or their implementation, at a huge cost to the citizens. Resultantly, public resources are shifted to areas where the benefits of corruption are huge and minimal attention is paid to the requirements of the majority (Porta and Vannucci 1997).

2.3.2.2   Bureaucratic Corruption

This involves corrupt activities of the public sector officials in their interaction with their bosses (the political leadership) or with the citizens. This normally involves public sector officials requesting citizens to pay a bribe in order to obtain a service, which citizens are legally entitled to, or to facilitate the speeding up of the process and procedures (Jain, 2001). Public sector officials may in some instances demand payments while doing work assigned to them by their superiors. A number of bureaucrats in Africa use their access and proximity to the political elites for private benefit. Facilitation fees are paid to the bureaucrats to facilitate access to government ministers or other senior government officials. Jain (2001) further argues that bureaucratic corruption can also include bribes that are paid to the judiciary to reduce the severity of judgement or penalties imposed by the courts.

2.3.2.3   Legislative Corruption

This relates to the way and the magnitude voting pattern of lawmakers can be manipulated. Economic agents with vested interests can bribe lawmakers to pass legislation that supports or promotes their interests. In Africa, there is an emerging trend of state capture by the private sector in countries like South Africa and Zimbabwe. Powerful economic players with vested interest in the country, especially economic or commercial, use their resources to control legislators and other political interests, for their personal benefit. The captured political elites or legislators then pass laws that are in favour or in support of the interests of the powerful cartels in return for money and other associated benefits.

2.3.3   Measurement of Corruption

The measurement of corruption has proved to be challenging as the concept is multifaceted, and parties involved are not readily available to provide information (Tanzi, 1998). Many acts of corruption take place underground, behind closed doors, and are thus generally hidden. Hlatshwayo *et al.*, (2018) posit that the measurement of corruption is difficult because corruption by its nature is done in a secretive manner, and resultantly,

there are numerous attempts in literature to improve how corruption is measured. This view is supported by Aidt (2009) who posits that corruption by its nature is not easily observable, hence researchers interested in its study must use ingenious methods of measuring and deduce its implications from the observable. Tanzi (1998), Dreher (2004) and Abramo (2008) conclude that the prevalence of corruption in a society can only be measured through the use of indirect methods. On the other hand, Hlatshwayo *et al.*, (2018) conclude that the measurement of corruption can be summed by the **Three Generations** of corruption related measurement.

2.3.3.1 The First Generation Measures of Corruption

These are commonly used in literature, and they rely on surveys which measure the populace and other experts' perceptions of the magnitude of corruption and its form in a society. These surveys can be focused on particular institutions within a country, like tax authority or municipal authority, or they may cover the whole country. The examples of the first generation of measurement include the Transparency International Corruption Index, the Global Competitiveness Report, the Political Risk Services, and the Political and Economic Risk Consultancy. These indicators measure the society's perception of corruption rather than the actual corruption.

The main advantage of the perception surveys is that they provide a fairly good coverage of the degree of corruption in a society, owing to the fact that it is less complicated to obtain people's perceptions of corruption than to measure actual corruption (Olken, 2012). The key challenge of these indices is that they are based on perceptions of corruption, which is not actual corruption (Aidt, 2009). In this regard, they may not measure corruption accurately. Despite this weakness, perception indices have been widely used as a reliable proxy for actual corruption in countries (Abramo, 2008).

2.3.3.2 The Second Generation Measures of Corruption

The second generation measures are a significant upgrade of the first generation as they aim to measure actual corruption as opposed to the perceived. They attempt to measure corruption directly based on victimisation surveys and bureaucratic quality indicators, for

example, fiscal authority transparency and efficiency of tax collection. Instead of asking survey participants about their view on corruption, victimisation surveys focus on asking participants if they have experienced corruption directly. Although these measures provide more information about the actual corruption, they are also reliant on perceptions, and are thus subjective. The respondents on the victimisation surveys may give answers clouded by their perception of corruption as opposed to what they have actually experienced. Further, information sources on key indicators like governance may not be open about their methodology, and at times the responses may show differences among countries in public sector capacity, than actual corruption (Hlatshwayo *et al.*, 2018).

2.3.3.3   The Third Generation Measures of Corruption

The increased usage of the internet and access to large datasets have resulted in the emergence of third generation measures of corruption that are unified by the usage of the large datasets (Hlatshwayo *et al.*, (2018). These include India's IPaidABribe.com and procurement analysis that focuses on identifying contractual outliers and politically-related shifts in the issuance of government contracts. Third generation approaches are less subjective and also use more transparent methods. They are not based on views of a select group of experts who assess the size of corruption in a society. This approach therefore produces a more robust higher frequency and less sticky measure of corruption. Examples of the third generation measurement of corruption include the News-Flow Index of Corruption (NIC). The NIC and anti-corruption news (anti-NIC) measures rely on big datasets and are a significant improvement on the measurement of corruption as they do not rely on governments to share data on procurement or citizens reports which may not be reliable. They rely on substantiated news on corruption from reputable news agencies or papers, and this enhances their credibility. This allows researchers to construct anti-NIC measurements which give insights into the extent and prevalence of anti-corruption initiatives over time.

The NIC shows higher frequency movements in the measured corruption compared to approaches that rely on public views or perceptions on corruption, or the opinions of experts. The use of NIC allows policy makers or other interested stakeholders to track the

impact on initiatives like the anti-corruption, as this is immediately captured through the reduction of news stories on corruption (Hlatshwayo *et al.*, (2018). This gives an immediate feedback on government efforts to fight corruption through the reduction of news on corruption.

The key challenge with news-based measurements is that they work effectively in countries with press freedom. When there is a repressive regime, which is equally deeply involved in corrupt activities, this measure becomes ineffective. Most of the corrupt activities, especially those linked to the political leadership or bureaucracy, go unreported. Further, in a number of developing countries particularly in Africa, the penetration of electronic and print media is very low, thus most corrupt activities are not reported. It is also difficult to use this measure to do cross-country analysis, due to different levels of openness in countries and the penetration of both electronic and print media. Table 2.1 below shows the three generations approach of measuring corruption.

Table 2.1: The Three Generations Approach of Measuring Corruption

First Generation: Perceptions	Second Generation: Victimisation & Indicator Based	Third Generation: Big Data Methodology
• Corruption Perceptions Index • Control of Corruption • Global Corruption Barometer • Global Integrity Index • ICRG Corruption Component	• Global Corruption Barometer • Index of Public Integrity • World Bank Enterprise Survey	• IPaidABribe.com • Procurement analyses • News-flow Index of Corruption

Source: Authors Own Compilation

A number of studies have recently used news coverage to measure corruption. For instance, Brogaard and Detzel (2015) and Hlatshwayo and Saxegaard (2016) have used this approach to evaluate risks of various policies. Grigorian and Manole (2017) also used this technique to investigate and measure sovereign risk, and Shapiro *et al.*, (2018) adopted this methodology to analyse changes in market behaviors. Perez-Costas *et al.*,

(2012) investigated how scandals related to land usage in Spain influenced the voting shares of the leadership in government using the extent of domestic coverage by newspapers as a measure of the degree and quality of the disseminated information on the scandals. The same methodology was similarly used by Rizzica and Tonello (2018) while undertaking an analysis in Italy on the effect of media content on beliefs about corruption. Goel *et al.*, (2012) relied on the use of the frequency of corruption and bribery on search engines for a particular country as an estimate for corruption awareness in that country. Hlatshwayo *et al.* (2018), however, argue that this approach has a number of weakness, for example, the measurement cannot differentiate between anti-corruption and corruption, or evaluate the frequency of false positives.

2.4   Economic Development

The concept of economic development has been dominating economic policy discussions globally, and in Africa in particular for a number of years. However, there is lack of clarity on the meaning and a shared understanding of the concept (Feldman *et al.*, 2014). For instance, Lee (2018) argues that economic development is a multidimensional concept which does not have a universally accepted definition. One of the main sources of confusion in policy engagements and debates is that the term 'economic development' is often interchanged with 'economic growth' (Hammer and Pivo, 2016). For this reason, there is need to make a clear distinction between these concepts.

Economic growth can generally be defined as an expansion of a country's aggregate output (Feldman *et al.*, 2014). Pioneering work on economic growth by Ricardo (1819) and Solow (1956) amongst others, views the economy as being driven by factors of production like labour, capital and land, which drive production, and hence national output. Economic growth, therefore, focuses on the change in an economy's national output and is traditionally measured by variables like GDP.

Economic development, on the other hand, is more broad-based than economic growth. Blakely and Bradshaw (2002) define economic development in terms of the capacity of nations to create wealth, measured by economic variables like per capita income, jobs, tax base, and GDP. Fagerberg *et al.*, (2013), on the other hand, posit that economic

development focuses on the improvement of the welfare of citizens, equitable distribution of wealth, quality of life and effectiveness of institutions.

Feldman *et al.* (2014) define economic development as the generation of capacities that increase the capabilities of economic agents. In this regard, economic development occurs when economic agents are empowered and have the latitude to fulfil their potential. Sen (1999) views economic development as the strengthening of freedoms, which enables economic agents to fully engage in economic activities. Earlier work by Schumpeter (1961) concludes that economic development is a total transformation of the economy. This involves transferring the means of production from the established systems to new, productive and innovative ways. While economic growth involves putting more inputs to work within a defined economic set up, economic development focuses on changing the framework so that factors of production can be deployed more productively, and with a shift towards a transformative agenda or value addition. Lee (2019a) concurs with the transformative aspect of economic development and posits that sustained transformation of economies is crucial for nations to achieve high productivity and expand income and employment opportunities for citizens.

The literature above shows that it is possible for nations to record growth in national output without economic development, although economic development provides the necessary conditions that promote long-term economic growth. Feldman *et al.* (2014) conclude that economic development may be seen as both a condition to, and an outcome of economic growth. Amsden (1997) posits that economic growth can provide the resources that if redeployed to support the sustained economic development of an economy, provide the foundation for future expansion of national output. This view is supported by Lee (2018) who argues that although it cannot be equated with economic development, economic growth is crucial as it lays the foundation for nations to achieve some of the objectives of economic development.

Whatever definition one takes, what is clear is that developing countries which have failed to achieve sustainable development are battling to eradicate poverty. The fight against

poverty has been put on the international agenda through the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs).

2.4.1   Theories of Economic Development

Economic development theories can be traced back to the traditional approaches, that is, classical and neoclassical, that view economic development mainly from an efficient allocation of resources perspective (Coccia, 2018). In their analysis of economic development, these approaches looked at how nations allocate scarce resources to support sustainable growth, as well as the expansion of the type of goods and services produced. However, new emerging theories on economic development focus on the improvement of social, economic and political dimensions such as social welfare, poverty reduction, strengthening of institutions and good governance (Todaro and Smith, 2003; Coccia, 2017).

Traditional theories of economic development mainly rely on Gross Domestic Product (GDP) per capita as the measurement of economic development. The new emerging theories on the other hand, have expanded the indicators for measuring economic development to include Human Development Index (HDI) and other socio-economic indicators that capture the well-being of citizens. Additional indicators include variables like the quality of education, health and nutrition, individual freedoms, environmental factors, and the creation of more economic opportunities for citizens (Lee, 2018).

2.4.1.1   Classical Theories of Economic Development

- **Linear Stage Theories:** This theory was pioneered by the work of Rostow (1960), Harrod (1939), and Domar (1946). Rostow's stages of growth, and the Harrod-Domar growth model which is widely known as the theory of stage of growth, are premised on the notion that high levels of saving and investment in an economy stimulates economic growth. The theory of stages has some limitations in explaining economic development in developing countries, because its drivers are a necessary but not sufficient condition for stimulating economic growth (Coccia, 2018). Most developing

countries, especially in Africa, do not have the institutions, human skills and physical capital to drive sustained economic growth.

- **Structural-Change Model:** This model is based on the notion that poor countries can change the structure of their economies from traditional agro-based to industrialised economies. The approach is mainly based on the two-sector labour surplus model by Lewis (1954), and the work of Chenery and Syrquin (1975) on the patterns of economic development. The Lewis model (1954) is based on a modern sector growth and widening of employment opportunities which continue to expand until all surplus labour from the rural areas is absorbed in the new modern sector. Following this model, nations go through structural transformation as economic activities shift from the traditional communities to modern industry. One of the main weaknesses of the Lewis model is that it assumed that the industrial sector will experience diminishing returns, but this is not consistent with empirical evidence on the ground which shows higher returns in the industrial sector (Coccia, 2018).

- **The Development Analysis of Structural Change:** This approach is based on the work by Chenery and Syrquin (1975) which focuses on the structural changes that are necessary to drive a sustained increase in income and general well-being of citizens. The approach explores the sequential steps which a nation should go through to facilitate transformation from being an underdeveloped to a developed one. The transformation of the economy will result in the growth of new industries to replace the tradition sectors as the main drivers of the economy. The change in the patterns of development will result in gradual accumulation of both human and physical capital; shift in consumer demand from basic goods and services to processed, high value goods and services; and expansion of cities as more people migrate from rural to urban cities. Sound economic policies are however necessary for the transformation of economies and generation of sustained patterns to stimulate economic development.

- **The International-dependence Models:** This model is based on the relationship between developing countries and their dependence on developed countries. The

main approaches based on this school of approach include the neo-colonial-dependence, false-paradigm, and dualistic models (Coccia, 2018). The main focus of the international-dependence model is the international power imbalances between poor and rich nations. Wallerstein (1974) posits that the international system is anchored on "core" and "periphery" regions, whereby the powerful and rich, that is, the "core" nations, dominate and exploit the less powerful states that are weak and vulnerable. The powerful countries reinforce and accelerate the flow of surplus to core nations due to the fact that they offer more incentives to their capitalist economic agents on the global markets.

2.4.1.2   Contemporary Economic Development Models

- **Endogenous Growth Theory**: This approach is based on the notion that the national output growth is driven by the framework governing the production process rather than factors outside the system (Aghion and Howitt, 1998; Lucas, 1988; Rebelo, 1991). This new theory of growth attempts to explain economic growth rate differences across nations and components of the change of the size of the GDP which were not explained and determined exogenously in the Solow neoclassical growth model (Coccia, 2018). Endogenous models of growth explain contradictions of international capital movements that create wealth inequalities between developed and developing countries. The key challenge is that the expected higher rates of return on investment in developing countries that are not capital intensive, is not fully realised due to inadequate infrastructure, low human skills and general shortage of innovation. One of the main weaknesses of this theory is that it is based on numerous neoclassical assumptions which may not hold in developing countries.

- **New Theory of Economic Development:** The new theory on economic development puts more emphasis on the complementarities between a number of conditions that are necessary for countries to achieve sustainable economic development (Todaro and Smith, 2003). The presence of complementarity in a society increases the chances that an action taken by one economic agent will be repeated by other economic agents. Following the Model of Big Push, for example, production decisions

by firms in the modern sector mutually reinforce each other (Todaro and Smith, 2003). Similarly, Kremer O-Ring's model (1993) posits that the value of upgrading human skills in an economy depends on other agents undertaking a similar upgrading process. Production in an economy is based on many facets which must be efficiently coordinated to maximise output. Following this line of argument, the underdevelopment that countries experience may be due to coordination problems which result in an undesirable outcome (Jones, 2013).

- **General Theory of Economic Development**: This theory explains the process of economic development from the lens of the relationship of corporations, markets and government (Jwa, 2017). Economic development is realised from systematic coordination of these three pillars of the economy, and countries should provide targeted incentives for high economic performance through market-based incentives. This theory emphasises that economic development must not be benchmarked on increases in output, but should be viewed from a sustained transformation of the economy point of view (Jwa, 2017). Further, based on this theory, economic development does not accidentally take place in economies, but is a result of deliberate policies driven by innovation and skills upgrade, amongst other factors. Although the theory acknowledges the importance of the market, it concludes that markets alone are not sufficient to start the process of economic development due to the problem of market failures. The problem of free-rider or externalities, for example, prevents proper compensation for innovation and skills upgrading necessary to kick-start economic development (Lee, 2018).

Based on this theory, corporations and government are crucial for solving this market failure. Corporations can reduce or avoid transaction costs through leveraging on their internal control systems (Jwa, 2017). Government on the other hand, can use policies to address the problem of free-rider, and also support economic agents who are innovative, thereby facilitating the economic development process. The complementarity of corporations, government and markets is viewed as the "holy trinity" of aiding economic development. The systematic coordination of these three

institutions, coupled with good political leadership, provides a good platform for nations to realise economic development.

2.5   Summary and Conclusion

This chapter discussed the theoretical foundation of the study. The chapter also provided a detailed analysis of literature mainly focusing on corruption, the informal sector and economic development. The literature revealed gaps on the definitions, measurement and the general relationship of these variables. There is contestation on the nature of the relationship of the variables, which indeed warrants further investigation. The challenges identified in literature call for a more rigorous approach to be adopted on the methodology, estimation approach and theoretical model to investigate the relationship. The literature review confirmed that a study on informality and corruption is difficult to undertake due to data challenges because participants are not forthcoming with information. As a result, the choice of datasets and estimation technique is complex and requires a thorough analysis of empirical evidence from previous studies.

One of the main gaps identified is that the literature review on informality, for example, portrays the informal economy as a constant/fixed variable during a particular period, whereas in reality the informal economy is very fluid and is always in motion because economic agents are always joining and leaving the sector during any given time period.

The literature review facilitated the empirical analysis of the relationship between the informal sector, corruption and economic development. The next chapter focuses on the empirical evidence of the relationship of these variables.

CHAPTER 3: EMPIRICAL LITERATURE ON THE RELATIONSHIP BETWEEN THE INFORMAL SECTOR, CORRUPTION AND ECONOMIC DEVELOPMENT

3.1 Introduction

This chapter looks at the empirical evidence on the relationship between the informal sector and corruption. It also explores the empirical evidence on the relationship between economic development and informality. Understanding the empirical evidence is important as this helps to inform the methodology which this study adopts.

There is increased debate in academic circles on the relationship between corruption and informality. Much of the debate focuses on whether corruption and the informal sector are substitutes or complements. This debate is more pertinent in Africa, given the growing size of the informal sector and the deepening corruption across the continent. Although it is generally acknowledged that the informal sector and corruption are widespread in Africa, carrying out research in these two particular areas is a scientific journey of trying to know the unknown (Dreher and Schneider, 2006). This is largely because the measurement of these two variables is complex, and the actors involved are not easily open to be counted or measured.

Despite the measurement challenges that researchers in this area face, some emerging studies in the last decade or so in both developed and developing countries have provided valuable empirical evidence.

3.2 Empirical Evidence from Selected Studies

Johnson, Kaufmann and Shleifer (1997) considered a full employment model whereby individuals are employed either in the formal or the informal sector. In their model, the informal sector is a substitute for the formal economy and shows a negative relationship, implying that an increase in the informal sector results in a decline in the formal economy. Using a cross-section data for 15 countries, these researchers also found out that corruption positively affects the informal sector while it negatively affects the formal

economy. Their findings indicate that corruption acts like a tax on companies that are operating in the formal economy, thereby pushing them to go informal.

Friedman, Johnson, Kaufmann and Zoido-Lobaton (2000) investigated the determinants of the informal sector activities in 69 countries. They tested the validity of two main schools of approach on the drivers of informality. The first school of approach postulates that high tax rates are the main drivers of informality, while the second focuses on the role of political and social institutions as the main drivers of informality. Friedman *et al.* (2000) tested these two theories using data for 69 countries from Asia, Africa, Middle East, Europe, Eastern Europe and some former Soviet Union countries.

The dataset used by Friedman *et al.* (2000) were tax rates, bureaucracy, corruption, the legal environment, and the size of the informal sector. The main sources of data used in the study differed across regions. The main source of data on Eastern Europe and the former Soviet Union was Kaufmann and Kaliberda (1996) and Johnson *et al.* (1997). On the estimates for Latin America, the primary source of data was Loayza (1996). On the estimates for the informal sector for Organisation for Economic Co-operation and Development (OECD) countries, the study relied on datasets from Schneider (1997) and Williams and Windebank (1995). The main source for Africa and Asia was Schneider and Enste (1998). On estimates of policy, the study relied on ratings from experts on business climate measured by institutions like Fraser Institute, the Heritage Foundation, Freedom House, Transparency International and Corruption Perception index.

Friedman *et al.* (2000) did not find any evidence to support the hypothesis that higher levels of taxation are closely associated with a growing size of the informal sector. On the contrary, they found some evidence which showed that higher direct tax rates are linked to a smaller informal sector. The relationship, however, was found not to be significant when they controlled for per capita income, to factor in the possibility that developed countries have better managed administrations. On the other hand, the study found that more red tape, high incidence of corruption, and a less robust legal environment were all closely associated with a bigger informal sector, even after controlling for per capita

income. The results of the study showed that weak institutions and a large size of the informal sector are closely associated.

Dreher and Schneider (2006) also argue that the relationship between corruption and the informal sector is expected to differ in developed and less developed countries. This is so because in developed countries chances of bribing public sector officials when caught operating in the informal sector are very slim. The robust institutions in high income countries make it difficult for economic agents to use bribe when caught.

Choi and Thum (2005) considered a model in which the entrepreneurs' ability to choose to operate in the informal sector constrains the corrupt public sector officials' ability to demand bribes. As such, the informal economy mitigates market distortions in the formal economy and disables public officials from realising personal benefits. Following this line of argument, it means that the prevalence of the informal sector reduces public sector-led distortions and, resultantly, this improves the level of economic activities in the formal market. Thus, the informal sector plays a complementary rather than a substitute role to the formal sector. Choi and Thum (2005) concluded that initiatives to eliminate informality in economies should focus on addressing the challenges of corruption first. Their findings and conclusion were at variance with early work which was done by Loayza (1996) and Johnson *et al.* (1997) which concluded that the existence of the informal sector was undesirable to countries, as the sector reduces economic performance.

Dreher *et al.* (2004) estimated corruption based on the structural relationship between variables that drive corruption and indicators of corruption, based on a sample of 100 countries. The structural model, which they used in their study, managed to provide more information on the losses to nations due to corruption. They found that in high-income countries, the loses related to corruption as a proportion of GDP per capita were relatively low at 22.26% during the period 1991-1997, whilst in low-income and transition economies the losses were significantly higher especially in Sub-Saharan Africa where it averaged about 60% of GDP per capita. Thus, following their findings, corruption has a strong bearing on economic development especially in developing countries, and Africa in particular.

Dreher *et al.* (2008) carried out an investigation on how institutions affect corruption and the informal sector in 108 countries. The study relied on informal sector data from Schneider (2005a, 2005b), which estimated the size of the informal sector for 145 countries, covering the period 1999 to 2003. On the measurement of corruption, the study used estimates from the International Country Risk Guide (ICRG), which ranges from 0 (high corruption) to 6 (no corruption). They found that the informal sector decreases with higher GDP per capita, better institutional quality (measured by greater government effectiveness), and a lower fiscal burden, whilst corruption decelerates with good government effectiveness and the level of democracy. Dreher *et al.* (2008) concluded that corruption and the informal sector were substitutes. They also found that the effect of institutional quality on the informal sector was unambiguously negative, while the impact of institutional quality on the level of corruption was ambiguous and depended on the relative strength of institutions.

Buehn and Schneider (2009) argue that the impact of institutional quality on corruption is not straight forward and much depends on the robustness of the anti-corruption measures. The payment of bribes by economic agents or entrepreneurs have a direct impact on their returns, just as bureaucratic delays in the processing of licences, certificates and other documents required to ensure compliance, indirectly affect them through lost productive times. In most developed countries, economic agents may not pay the bribes requested by government officials because they can easily report the corrupt public officials to the authorities. However, in less developed countries, economic agents operating in the informal economy can easily find their way out if the authorities catch them. There is a high chance that entrepreneurs if detected by authorities will pay bribes to get their freedom (Dreher and Schneider, 2006). Thus, the level of development of countries, that is, high-income or low-income, has a bearing on the nature of the relationship between corruption and the informal sector.

Dreher and Schneider (2006) used a cross-section of about 120 countries covering the period 1999 to 2002 to test the relationship between corruption and the informal sector. They used an index of actual corruption, based on structural model, over and above the perception-based indices. Their sample size was divided into developed and less

developed countries. They found that there is no significant relationship between corruption and the informal sector if the Transparency International perception-based indices are used. They, however, found that in developed countries, corruption decreases with the size of the informal economy.

Dreher and Schneider (2006) also found out that the informal sector has a significant impact on corruption. Their findings show that corruption increases as the size of the informal sector expands, with coefficients significant at the 10% level using the Ordinary Least Square (OLS) and robust regressions. The positive relationship of the informal sector on corruption was mainly found in low-income countries. In low-income countries, a one percentage point increase in the informal sector as a percentage of GDP increases the index of corruption by 0.06 points. The coefficient of the informal sector is significant at the 5% level in less developed countries, whilst it is insignificant in developed countries.

The findings of Dreher and Schneider (2006) support the view that corruption and the informal sector are substitutes in developed countries, but complements in less developed countries. One of the key conclusions from the study by Dreher and Schneider (2006) is the impact of the choice of economic variable on the results. The use of actual corruption, for example, compared to perceived corruption as measured by the indices, yields different results of the relationship between informal sector and corruption.

The use of perception-based indices to measure corruption is now increasingly under challenge in academic literature (Shahab *et al.*, 2015). Mocan (2004) argues that perceptions on corruption do not, in themselves, translate to actual corruption. Similarly, Abramo (2005) concludes that a society's perception of corruption is not directly related to the payment of a bribe. Given the above reservations on the use of perception-based indices, it is thus imperative to explore the use of other measures of corruption (Dreher and Schneider, 2009).

Gajigo and Driemeier (2012) analyse the determinants of formality of start-up firms in four African countries, namely, Ivory Coast, Kenya, Nigeria and Senegal. Their dataset captured information that included the current registration status of firms and the status of firms at start-up, that is, whether the firm was registered or not when it was started.

Using a total sample size of 1 967 firms covering the period from late 2009 to early 2010, they found out that about 5% of firms that were registered at inception later moved to informality. This was largely due to the costs to formal firms associated with bribes that are paid to government officials. Thus, the payment of bribes pushes firms to move away from formality even after start-up to informality.

Gajigo and Driemeier (2012) also found out that on average firms use close to 3% of their annual turnover for bribes or brown envelopes for government officials. Thus, corruption, which is generally rampant in many African countries, increases the cost of operating business in the formal economy, and adversely affects the chances of formality. They also found out that access to finance, higher education, size at start-up and the past experience of the owner of the firm in working for formal firms enhances the chances of formality.

Buehn and Schneider (2009) applied a Structural Equation Model (SEM) approach to investigate the relationship between corruption and the shadow economy. The SEM estimates corruption and the informal economy as two distinct latent variables and investigates their relationship based on the covariance structures between these latent variables' causes and indicators. The researchers based their analysis on annual data for 51 countries, from 2000 to 2005. The composition of their sample comprised 10 OECD countries, six non-OECD countries and developed countries, while the rest were emerging markets countries. On the measurement of the informal sector, they averaged Schneider's (2006) calculations for 2001, 2002 and 2003. On corruption, the study relied on the Transparency International Corruption Perception Index (CPI) scores for the countries. They found that both coefficients measuring the impact of the informal economy on corruption and the impact of corruption on the informal sector were statistically significant and positive.

Buehn and Schneider (2009) found that although the coefficients for corruption and the informal sector were both positive, they differed significantly in magnitude. This means that the causal effect of the informal sector on corruption is bigger than the impact of corruption on the informal economy. The study concluded that this could be because

corruption acts as an additional tax in the formal economy, which invariably increases informality. Further, the informal sector promotes higher levels of corruption as public sector officials exercise their power when engaging with firms or individuals in the informal sector who are prepared to pay bribes and hide their operations below the radar.

Ingram *et al.* (2007), analysed the determinants of firms' decision to locate in the informal or formal sector based on the hypothesis that a firms' decision concerning formality depends on a model of profit maximisation. This means that the decision to locate in the informal or formal sector is informed by a comparative analysis of the benefits and costs of either being in the informal or formal sector. Using the World Bank's enterprise surveys in six countries, namely, Kenya, Uganda, Tanzania, Zambia, South Africa and Senegal, they found out that the firms' decision to operate in the informal sector is correlated with the benefits and costs associated with the investment climate. They also found that the incidence of formality is positively correlated with perceptions concerning the availability of electricity supply, access to finance and access to land, and negatively correlated with the rate of taxation and corruption. Thus, based on their findings, improvements to the investment climate, which enhances the benefits of formality and reduces the costs, would result in more firms opting to operate in the formal sector as compared to the informal.

Ali *et al.* (2013) investigated the correlates of tax-compliance behaviour among four African countries, namely, Kenya, Tanzania, Uganda and South Africa. Based on binary logit models, they found that tax compliance behaviors are influenced by the strength of the regulatory environment that makes it unviable for firms to evade taxes. Their findings are consistent with the early theories of De Soto (1989), Loayza (1996) and Dabla-Norris *et al.* (2008). Further, Ali *et al.* (2013) concluded that the probability of compliance is also influenced by the level of citizen satisfaction with the state's provision of public utilities. Variables like availability of tax information were also found to be key determinants of tax compliance and, hence, formality.

Mawejje (2014) assessed the impact of the business environment on informality and tax evasion in Uganda, using the 2006 World Bank dataset of a cross-section of Uganda

firms. The study used two different approaches of parameter estimation, that is, OLS and maximum probability Tobit methods. The results showed that the efficiency of the regulatory framework defined by the degree to which courts are fast in resolving disputes and the degree of affordability, are highly correlated to tax evasion and informality. The study also concluded that firms opt for informality in response to inadequate public utilities provision by the state as well as corruption.

Adamec *et al.* (2016) assessed the determinants of the informal sector in Ghana, Nigeria and the United Kingdom using the multiple indicators and multiple causes model (MIMIC). They found that for Ghana, direct tax rate, size of government, total tax rate and the rate of unemployment were statistically significant in determining the size of the informal sector. The study found that a rise in total tax rates by a percentage point results in an increase of the informal activities by 0.40%, and it also accelerates by 0.17% for every percentage increase in the rate of unemployment.

For Nigeria, the study found that the size of the informal sector grows by 0.05% for every percentage point increase in the size of government. The study also established that the informal sector grows by 0.20%, 0.04% and 0.39% as a result of percentage point increases in the total tax rate, unemployment rate and regulations, respectively. Informality was also found to decline by 0.81% for every percentage point increase in the quality of government services.

For the United Kingdom, the study established that the informal sector was driven by the size of government, unemployment as well as the self-employment rate. The researchers found that an increase in the size of government by a percentage point results in a 0.35% growth in the informal sector. They, however, found a negative sign of coefficient for unemployment, implying that an increase in the level of unemployment by a percentage point results in a decrease in informal sector activities by 0.22%. The availability of social welfare benefits in advanced economies like the UK could explain why at times some individuals opt to remain unemployed and rely on welfare benefits.

Loayza *et al.* (2005) analysed the impact of excessive taxes and regulations on informality using country level data in Latin America. The study used an endogenous growth model

and found out that the size of the informal sector depends positively on the proxies for tax burden and labour restrictions, and negatively on the proxy of the quality of government institutions. They found that a standard deviation improvement in the robustness and efficiency of the state of institutions in a country is linked to a 0.42 standard deviation reduction in the size of the informal economy. As such, a robust and less cumbersome institutional set up decreases the size of informality in an economy.

Perry *et al.* (2007) assessed the impact of labour regulations on informality using Enterprise Survey data for Argentina, Bolivia, Colombia, Mexico, Panama, Peru and Uruguay. They found that firms that are constrained by labour laws have a higher likelihood of evading taxes or not contributing to social security benefits. At country level, this was the case for Argentina, Colombia and Mexico. In Panama, the study found a strong relationship between the number of microenterprises that were visited by tax authorities and the percentage of sales that were under-reported.

Vargas (2015) tested the determinants of informality for Paraguay using the household and enterprise survey and utilised several panel data regressions based on country-specific fixed impact and country/time-fixed impact. They concluded that regulations, enforcement of policies and government effectiveness were the main determinants of informality. Vargas (2015) also concluded that a large informal sector is associated negatively with economic growth and good economic institutions, and positively with inequality.

Dabla-Norris and Koeda (2008) tested the relationship between informality and bank credit using a firm-level dataset for 26 countries in Eastern Europe and Central Asia. They found strong evidence of a negative relationship between informality of firms and access to bank financing. Further, their results indicated that this negative relationship is deeper in countries that have weak tax administration and higher costs of tax compliance. Their study also found that informality is strongly associated with a higher degree of financing challenges, implying that firms that struggle to get funding are likely to locate in the informal sector.

Dabla-Norris *et al.* (2005) used an ordered probit model to test the determinants of informality using the World Bank Environment Survey (WBES) data of about 4000 firms in 41 countries[2]. They found that all firm level obstacles (financial, legal, corruption, tax and regulatory) had a positive and significant impact on the incidence of informality. On firm size, they concluded that small firms had a high likelihood of informality as compared to large firms. On firm age, they found a negative relationship with informality, but this impact was not significant if fixed effects were included, implying the existence of unobserved heterogeneity across firms and nations that is significantly correlated with firm age. They also found that educational qualification was negatively and significantly associated with the size of the informal sector.

Further, tests by Dabla-Norris *et al.* (2005), based on fitted values from the ordered probit, showed that a firm that views financing as a main obstacle, has about 16% likelihood of having above 50% of its sales off the books, whilst a firm that views it as a minor obstacle has only about 7.6% probability of having such a size of informality. In the same vein, a firm that views the regulatory environment as a major constraint has a 17% probability of having over 50% of its sales undeclared, while a firm that views it as a minor obstacle has only about 9% likelihood of having such a size of the informal sector.

Dabla-Norris *et al.* (2005) also concluded that the quality of the legal system of a country is a key determinant of informality. Their findings are consistent with literature which postulates that increasing the probability of being caught, as well as the punishment forces firms to locate in the formal sector.

Voluntary choice by economic agents can also play a critical role in influencing the behaviour of economic agents in terms of their decision making on formality or informality. Maloney (2004), using a survey-based approach focusing on empirical literature on

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[2] Countries covered were Argentina, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Czech Republic, Dominican Republic, Ecuador, France, Germany, Hungary, India, Indonesia, Italy, Kazakhstan, Lithuania, Malaysia, Mexico, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Thailand, Turkey, Ukraine, United Kingdom, United States, Uruguay and Venezuela.

informality in Latin America, reported evidence of voluntary movement of enterprises into the formal sector. Maloney (2004) found that in Mexico, more than 60% of the respondents justified their movement to informality from formal labour market due to a quest for more independence and better incomes. Further, based on survey data from Argentina and Brazil, Maloney (2004) found that 80% of economic agents that are self-employed, and over 62% men that are self-employed, were not prepared to move back to formality. Maloney's (2004) findings of voluntary informality can be viewed as supporting the hypothesis that corruption is a complement of, and also increases the growth of the informal sector.

Virta (2007) tested the relationship between corruption and the informal sector with a panel of 79 and 95 cross-sections based on a regional approach for the period 2000-2002. The basis for this approach was that the incidence of corruption varies among different geographical locations of the world. Virta (2007) further highlighted that bribes that are paid by economic agents to get projects or win tenders have a different impact with respect to informal sector growth, compared to bribes that are paid to reduce taxes. On the measurement of the informal sector, the study was based on estimates from Schneider (2006) which were calculated using the Dynamic Multiple Indicators Multiple Causes Model (DYMIMIC) and the currency demand method. On the measurement of corruption, the study relied on the index constructed by Dreher *et al.* (2004), which is based on the structural model. Virta (2007) observed that one key challenge that researchers focusing on corruption face is that most available indices measure corruption in general terms and, as such, it is difficult to directly distinguish between the different forms and types. The study concluded that the effect of corruption on the informal sector is largely depended on the type of corruption. If economic agents pay bribes to get projects, then an increase in corruption will drive the informal sector and the two, that is, corruption and the informal sector are complements. On the other hand, they found that the effect of corruption on informality is ambiguous if economic agents pay bribes to reduce taxes. Virta (2007) concluded that in some extreme cases, corruption might actually reduce informal sector activities. Such a relationship would likely apply if a country has poor institutions.

Further, the study found that in terms of geographical location, the bigger the proportion of a country's area located in the tropics, the more likely that a given level of corruption stimulates informal sector activities. On the contrary, corruption seemed not to have an impact on the level of the informal sector outside the tropics.

Fjeldstad (2003) investigated the relationship between fiscal corruption and shadow economies, and found a positive relationship between the two. As fiscal corruption expands, the shadow economies also increase.

There are a number of studies which have investigated the relationship between corruption and economic development. A growing literature views corruption as having an adverse impact on economic development, and the high incidence of corruption has been linked to developing countries (Borlea *et al*., 2017). The World Bank (2009) has also identified corruption as one of the main obstacles to economic development and poverty alleviation. Treisman (2000) and Paldam (2009) are of the view that corruption is a poverty driven problem which should disappear as the country develops and becomes richer.

De Rosa *et al*. (2010) reported a 0.81% correlation between GDP per capita and the level of corruption. Mauro (1995) and Paldam (2009) found out that corruption has a negative impact on economic development, and is a barrier to investment in economies. Kaufman (2010) found a positive relationship between corruption and fiscal deficits in advanced economies. In addition, Kaufman found that corruption reduces tax revenues, adversely affect productivity and economic performance of economies. This view is supported by Ivanyna *et al*. (2010) who concluded that the high incidence of corruption reduces government revenues and adversely affects economic growth.

Borlea *et al*. (2017) empirically tested the relationship between corruption and the informal economy among the European Union nations over the period 2005-2014. They also investigated the impact of corruption and the informal sector on economic development. The study found that close to one-fifth of the total European Union (EU) GDP is lost due to the existence of the informal sector. Countries like Bulgaria, Romania, Hungary, Estonia, Greece and Italy were found to have the highest prevalence of corruption and informality. Nordic countries like Denmark, Finland, Sweden, Netherlands, Austria and

Luxembourg had the lowest levels of corruption. The study further found a strong and positive relationship between corruption and the informal sector amongst the EU nations. Regarding the impact of corruption and the informal sector on economic growth, they found a higher and negative relationship, which means that rising corruption and informality negatively affected the economic performance of the EU bloc of countries from 2005-2014.

Bayar *et al.* (2018) investigated the relationship between corruption, the rule of law and the informal sector in 11 transitioning economies in Central and Eastern Europe during the period 2003-2015, using panel cointegration and causality analysis. In terms of the measurement of the informal sector, the study relied on the dataset calculated by Schneider (2015), which is based on the MIMIC method. On the measurement of the rule of law and control of corruption, the study used the World governance indicators from the World Bank (2016).

Bayar *et al.* (2018) found a complementary relationship between the size of the informal economy and corruption. Furthermore, the causality test showed that there was a bilateral causality between the control of corruption and the informal economy for all the cross-section units. They, however, found a two-way causality relationship between the rule of law and the informal sector only in Bulgaria, Czech Republic, Poland and Romania. A one-way causality from the rule of law to the informal sector was found in Croatia, Estonia, Hungary, Slovakia and Slovenia.

Ouagadougou (2017) tested the relationship between governance, corruption and the informal economy using data from 23 Sub-Saharan countries. The study established that a high level of corruption and weak institutions promote growth of the informal sector. Further, they also found a negative relationship between the unemployment rate and the size of the informal sector.

Vo, Ha and Ly (2015) investigated the relationship between the informal sector and corruption focusing on the Association of Southeast Asian Nations (ASEAN) for the period 1995-2014, using a MIMIC model. The use of MIMIC models required the researchers to identify a set of cause variables which drives the presence of the informal sector, and

another set of indicator variables which are looked at as a result of the existence of the informal economy. Pertaining to the causes of the informal sector, they found that the fiscal freedom, government expenditure, labour freedom, business freedom and unemployment were all statistically correlated with the informal sector. The study found that unemployment and government expenditure were negatively correlated with the informal sector, whilst all the other variables were positively correlated with the informal sector. The findings of Vo, Ha and Ly (2015) show that the informal sector is expected to be high when unemployment is low. The explanation for these findings was that people who have jobs in the formal sector might also want to be joining the informal sector if their incomes are low and not adequate for a decent living. Thus, following this finding, reforms aimed at reducing unemployment in a country may not necessarily result in a reduction of the informal sector.

Vo, Ha and Ly (2015) found empirical evidence to back the narrative that there is a causal relationship between the informal economy and corruption for ASEAN during the period 1995 to 2014. Their findings show that the informal sector is positively correlated with corruption, whilst on the other hand corruption is positively correlated with the informal sector. Further, their study concluded that the impact of corruption on the informal sector was more significant compared to the effect of the informal sector on corruption. Thus, based on their findings in ASEAN, efforts to control corruption in these countries will also help to control the informal sector. The starting point should be to implement appropriate measures to tackle corruption, and this will have a positive impact on reducing the growth of the informal sector.

Polonski (2009) analysed the relationship between corruption and the informal sector for 66 Ukrainian and Russians regions and found no evidence of a relationship.

Putnins and Sauka (2011) investigated the factors that drives economic agents to locate in the informal sector, in the Baltic States. They concluded that one of the key factors driving informality in the Baltic States was entrepreneurs' unhappiness with and mistrust in the government and the general tax structure.

Shahab *et al.* (2015) tested the relationship between the informal economy and corruption in two groups of countries numbering 25 each from high income and less developed countries during the period 1997 to 2007, using static and dynamic panel regression. In terms of data on the size of the informal sector, they relied on the World Bank dataset which used the MIMIC approach. On corruption they employed two different corruption indices and compared the sensitivity of the results in terms of both measures. The first measure of corruption which they used was the Control of Corruption Index (COCO), published by the World Bank, and for the second measure, they used Freedom From Corruption (FRCO) as a corruption index, and tested the robustness of their results based on an alternative index. Other key variables used in this study include GDP per capita, government effectiveness, regulatory quality, and Business Freedom (BUFR).

The researchers found that when they used COCO as the corruption measure, there was no significant effect of corruption on the informal sector for both developed and developing countries. They, however, found a significant impact in advanced countries at the 5% level of significance when they used FRCO instead of COCO. The sign of estimated coefficient of FRCO implies that corruption and the informal sector were complements in 25 advanced countries. Based on the Two Stage Least Squares Method (TSLS) estimation in selected low-income countries, they found no significant impact of corruption on the informal sector, neither after using COCO nor FRCO. For the 25 developed countries, the significance of the impact depends on the corruption measure used.

Shahab *et al.* (2015) however found that if they change the estimation method, the effect changes. They found a significant effect of corruption on the informal sector in the two groups of countries when they used the Generalised Method of Moments (GMM). Further, they found that GDP per capita has a positive and significant impact on the level of informality for all countries under study. Their findings imply that the size of the informal sector increases as economic growth improves. On regulatory quality, they found a negative and significant relationship in the 25 developing countries. As such, an improvement in regulatory quality decreases the size of the informal sector. On Business Freedom (BUFR), the signs of the estimated coefficient were positive and significant for

advanced countries. Thus, the informal sector is expected to decrease as business freedom increases.

Albulescu *et al.* (2016) researched the impact of corruption, taxation and financial stability on the informal sector using a panel of 23 OECD nations from 2001 to 2013 using a dynamic regression. The study found that corruption has a positive influence on the size of the informal sector.

Togler et al. (2011) analysed the degree to which governance and the state of institutions affect the informal sector. They used measures of corruption, voice and accountability to investigate their relationship with the size of the informal sector. They found out that a strong voice in an economy, coupled with accountability, reduces informality. Their results supported the hypothesis that there is a strong negative correlation between voice and accountability, and the level of informality. On the impact of corruption, the study found a significant correlation between corruption and the size of the informal sector. The coefficient was statistically significant at the 1% level. On a comparative note, they found that the impact of corruption was stronger than the impact of voice and accountability (as compared to GDP per capita effect).

Torgler *et al.* (2011) also found that not only do economic performance (measured by GDP per capita), reduces the size of the informal sector, but also reduces tax morale. Further, they also observed a positive correlation between unemployment levels and the size of the informal sector.

Marjit *et al.* (2006) analysed the determinants of informality based on a political economy lens. They posit that for countries faced with high levels of unemployment, deepening poverty and inequalities, government may take a strategic approach to reduce the level of 'good' governance. This will be a deliberate choice by the government to enhance income for a big informal economy, and minimise the risks of social and political conflicts or uprisings. A number of African governments faced with rampant levels of unemployment, especially among the youth, opt to have the youth gainfully engaged in the informal sector, as a way of managing the political risk of uprisings, which is a threat to their hold to power.

Dutta *et al.* (2011) investigated the relationship between the informal sector and corruption using data for 20 main states in India. On the measurement of corruption, they used the Transparency International database and found support to the view that a higher level of corruption results in an increase in the size of informality. They also found that if a state used to have a high level of income, then the current effect of corruption on the level of the informal sector is low.

Rei and Bhattacharya (2008) carried out an empirical analysis on the impact of institutions and policy on informality in developing countries. The focus of their study was to test the hypothesis that informality is a natural defensive strategy by economic agents against too many regulations by the state. Their findings, based on the income measure of the informal sector, suggest that governance quality has a key role to play in determining the size of informality. They, however, concluded that the effect of strict rules and regulations was generally overrated. Rei and Bhattacharya's (2008) study concluded that a good mixture of regulation and governance was likely to yield better results in terms of encouraging formality.

Mishra and Ray (2011) explored the relationship between informality, corruption and the impact of rising income inequality. Their study was based on pooled World Bank Enterprise Surveys (WBES), data from 2002 to 2006. They found that there is strong complementarity between the informal sector and corruption, and that growing inequalities in societies drive the informal sector. Mishra and Ray (2011) also concluded that corruption and the informal sector are determined jointly by a number of firm level variables as well as macroeconomic level factors like the stage of development and literacy rate.

Elgin and Öztunali (2013) analysed the change of the informality sector during the various stages of economic development by specifically examining its relationship with institutions. They borrowed from the informal sector estimates constructed by Elgin and Öztunali (2012) for 141 countries from 1984 to 2009, and used panel data estimation methods to test the relationship between informality and economic development, proxied by GDP per capita. They found that institutional quality has a strong bearing on the

relationship between economic development and the size of the informal sector. They found that a higher GDP per capita is closely linked with a bigger informal sector in nations where the institutional quality is poor. Their findings were consistent with a two-sector dynamic general equilibrium model of the informal sector.

Gillanders and Parviainen (2015) investigated the relationship between corruption and the informal sector, mainly focusing on regional level data. The use of regional data in their study was a significant departure from previous studies, which had mainly focused on the use of cross-country data. Their study relied on the World Bank Enterprise Surveys (WBES) dataset, and they created regional indicators from the firm level dataset. The list of countries included in the analysis comprised 36 Sub-Saharan Africa countries, 26 European and Central Asian countries, 23 Latin American and Caribbean countries, and 14 from the rest of the world. Gillanders and Parviainen (2015) tested the relationship using OLS methods, using data obtained from surveys of firms at sub-national levels. Their findings were therefore limited to establishing associations and not finding causality relationships.

Gillanders and Parviainen (2015) found that there was a significant positive relationship between corruption and the informal sector at the regional level. They found that sub-national areas which had more firms that reported corruption as a big barrier to their business operations were also regions in which more firms reported that the informal sector was a big threat to their operations. A one standard deviation rise in the informal sector variable was found to be associated with an increase in the corruption variable of 0.28 of a standard deviation, whilst a one standard deviation rise in corruption is associated with an increase of 0.35 of a standard deviation in the informal sector variable. Their findings imply that efforts to reduce informality at a regional level will also assist to reduce corruption. In the same vein, efforts to reduce corruption at a regional level should also yield benefits on reducing the informal sector.

Gillanders and Parviainen (2015) also split the countries into regions, that is, Europe and Central Asia, Latin America, Carribean, and Sub-Saharan Africa. Based on this split, their initial findings above were applicable to all other regions except Sub-Saharan Africa. For

Sub-Saharan Africa, they failed to find any significant association between corruption and the informal sector. The specific coefficients were not only insignificant but were also very small in magnitude.

There is, however, a strand in literature which gives divergence views on the relationship between corruption and economic development. Jiang and Nie (2014) undertook an empirical study on China, focusing on the strong economic growth of the country and the high level of public sector corruption. They found that for countries with weak institutions like China, corruption could actually improve resource allocation and enhance productivity. These views were supported by the findings of Beck and Maher (1986) who argue that if there are no penalties for bribery, suppliers of goods and services would be indifferent between paying a bribe and the bidding institutions. Zaman and Goschin (2015) concluded that the informal sector, especially in countries with high levels of corruption, could represent a crucial bridge for addressing many problems like high levels of unemployment and efficient utilisation of public goods and services, based on market forces in a scenario in which goods and services are utilised by a small number of beneficiaries who pay different amounts and unforced contributions.

3.3 Summary and Conclusion

The literature above shows that there are a number of factors which drive the growth of the informal sector in economies. The experiences of countries with informality are bound to vary from country to country due to differences in socio-economic and political conditions. However, some common factors can be deduced from literature in terms of key drivers of informality. Available empirical studies from both developed and developing countries, especially from Latin America and some African countries, found variables like corruption, regulatory framework and strength of enforcement, access to finance/credit, that is, the characteristics of business environment, the institutional framework and general government policies as some of the key determinants of informality. Empirical evidence also found that individual characteristics and family background including gender, age, marital status, household size, poverty levels and education levels were key

drivers of informality. The empirical evidence available is largely consistent with economic literature on informality.

Empirical evidence from a growing number of studies that were carried out for both developing and developed countries shows that although the measurement of informality and corruption is complex due to the nature of these two variables, many scholars are increasingly relying on estimates from researchers like Schneider (on the size of the informal sector) and expert views on surveys carried out by international institutions like the World Bank and Transparency International. Similarly, this study takes the same approach and utilises these established sources which are now generally used by a number of scholars. These measures are not without their own shortfalls and as such, this study will highlight the weakness and carry out a number of robustness tests to improve our results.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

Research methodology is the general approach of how the research was carried out and, to some extent, the approach dictates the particular tools used (Leedy and Ormrod, 2015). According to Quinlan *et al.* (2015), research methodology focuses on how the study was carried out and outlines the philosophical assumptions which anchored the study. The purpose of this chapter is to discuss in detail the methods that were used to collect data, test its reliability and validity and the mechanism that was used to analyse the data. The chapter also details ethical issues considered.

Saunders, Lewis and Thornhill (2016) proposed the research onion as a way of depicting the research process to be carried out to ensure that the research questions are answered. The researcher provides a chronological demonstration of the research process, which consists of six layers as depicted in Figure 4.1

Figure 4.1: Research Onion Diagram
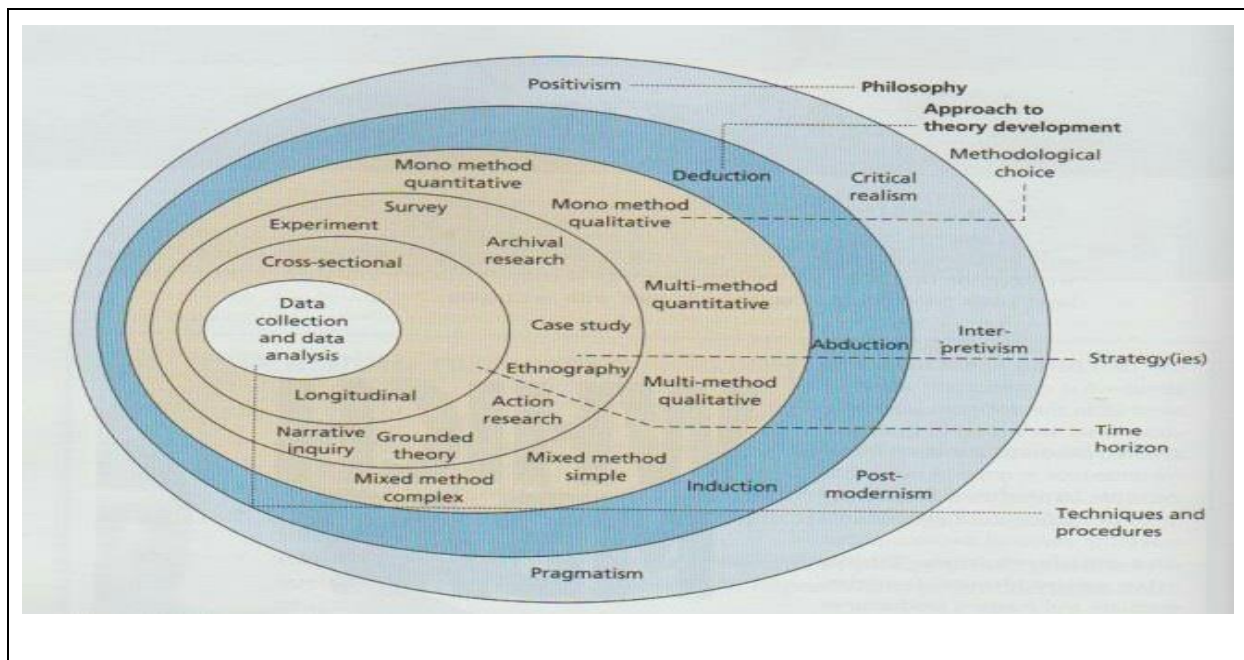
Source: Saunders and Lewis (2016)

The various stages of the research process are captured metaphorically through the research onion (see Figure 4.1 above). The outside layers of the onion ring depict the research philosophies and approaches, the central layers reflect the research strategies and choices, while at the centre of the onion, data collection and analysis are the central concern. The presentation of the different stages of research are covered below.

4.2 The Aim of the Empirical Investigation

The objective of this study is to analyse the relationship between informality, corruption and economic development in Africa over the period 2005 to 2015. This study is premised on the notion that firms will formalise based on costs and benefits analyses of the two sectors. This means that economic entities will formalise if the anticipated profit in the informal sector is less than that in the formal sector. This study defines firms that are registered for taxes as formal micro-enterprises; while those that are not are defined as informal. To formalise operations, a firm must register with government registration authorities.

4.3 Research Philosophy

Saunders *et al*. (2016) define research philosophy as a system of beliefs and assumptions about the creation of knowledge, and the nature of that knowledge in relation to research. The authors further indicate that in every research a number of assumptions are made, for example, assumptions about human knowledge (epistemological assumptions), about realities encountered in research (ontological assumptions), and the extent and ways the researcher's values influence the research process (axiological assumptions). Cresswell (2014) posits that there are four different philosophical approaches – constructivist, transformative, pragmatic and positivist/post positivist.

Constructivism is premised on an ontological assumption that purports that social actors are continuously accomplishing social phenomena, and it is antithetical to objectivism (Bryman and Bell, 2015). Constructivism or social constructivism is at times combined with interpretivism, and it is a technique which is ideal for qualitative research. According

to Bryman and Bell (2015), interprevitism is a contrasting epistemology to positivism and it is an epistemological position that requires the social scientist to grasp the subjective meaning of social action. Interprevitism relates to the study of social phenomena in their natural environment. It is adopted by researchers whose aim is to carry out a detailed analysis of a problem or concept that is of a qualitative nature, and it is more concerned with building of theory rather than testing it.

Saunders *et al.* (2016) argue that the pragmatic philosophical approaches are only important where they support action, and augur well when research begins with a problem and works towards making a practical contribution that helps to inform the future. This philosophical approach arises from concrete actions, scenarios and consequences rather than antecedent conditions (as in post positivism) where there is concern with applications, and solutions to problems (Creswell, 2014). It is applicable to mixed methods research.

Bryman and Bell (2015) posit that positivism is an epistemological approach that advocates for the use of methods that are based on natural sciences as the study of social reality and beyond. Post positivists show a deterministic philosophy concerning research in which drivers probably have a say on effects or outcome. The research philosophy adopted for this study is positivism or post positivism. The use of positivism enabled the researcher to answer the research questions of the study.

4.4 Research Approach

According to Saunders *et al.* (2016), there are three research approaches, namely, deductive, inductive and abduction. Deductive is an approach to the relationship between the theory and research in which the latter is conducted with reference to hypotheses and ideas of the former. Abductive, on the other hand, is a type of reasoning with strong ties to inductive reasoning that grounds social scientific accounts of social worlds in the perspectives and meanings of participants in those social worlds. Inductive is an approach to the relationship between theory and research in which the former is generated out of the latter (Bryman and Bell, 2015). Deductive reasoning is typically used

in quantitative approaches where one uses theory deductively and places it towards the beginning of the proposed study (Creswell, 2014).

4.5 Research Design

McQueen and Knussen (2013) argue that a research design is the strategic plan of a research study which identifies all the necessary variables to test the hypothesis. This includes identification of elements like independent and dependent variables and relevant experimental techniques, amongst others. A research design presents the abstract outline according to which the inquiry will be conducted (Saunders *et al.* 2009). The general principle is that the research strategy or strategies, and the methods or techniques, must be appropriate for the questions the research intends to answer (Robson, 2002). The research design serves as 'logical plans' for the study.

The conceptual framework for a research design is summarised below based on work by Robson (2002).

Figure 4.2: The Conceptual Framework for a Research Design
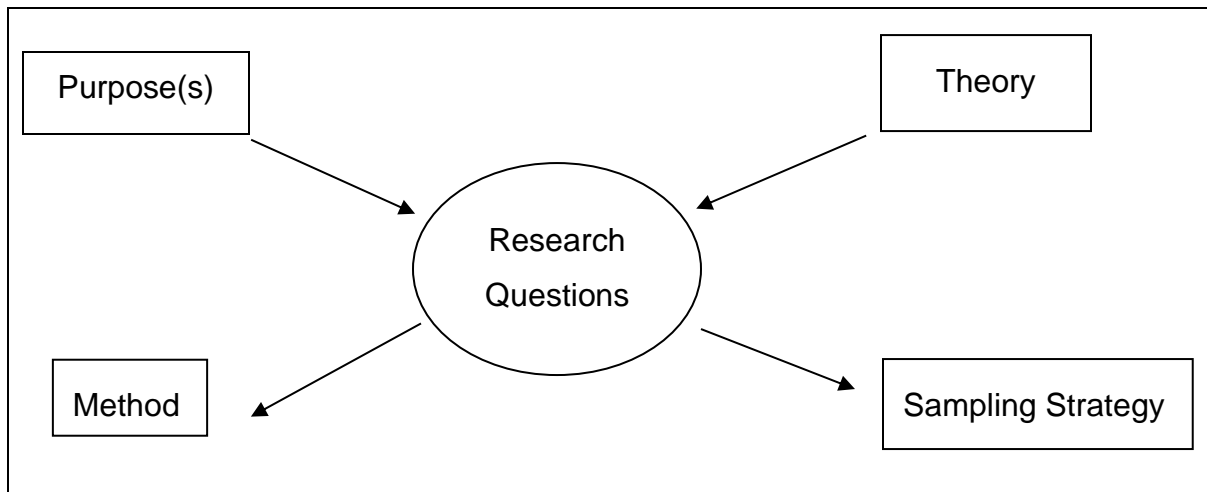
Source: Robson (2002)

Leedy and Ormrod (2015) postulate that quantitative studies can either be experimental designs or non-experimental designs where the experimental designs consist of pre-experimental designs, true experimental designs and quasi-experimental designs, whereas the non-experimental designs consist of the descriptive research designs. The

authors further indicate that there are four types of descriptive research designs. These are observational studies, correlational research, developmental designs and survey research. Observational study is a monitoring approach to collecting data in which the researcher inspects the activities of a subject or the nature of some material without attempting to elicit responses from anyone (Copper and Schindler, 2014). A correlational study examines the extent to which differences in one characteristic or variable relates to differences in one or more other characteristics or exists (Leedy and Ormrod, 2015). A developmental design are methods of research that examine changes over time (Salkind, 2018), whereas a survey research is a method of collecting data from large numbers of individuals in order to gauge attitudes, opinions and intentions, using a questionnaire (McQueen and Knussen, 2013).

This study used a descriptive research design, and specifically adopted the developmental design. There are two types of developmental designs; the cross-sectional design and the longitudinal design. A cross-sectional design is a study conducted only once and reveals a snapshot of one point in time, whilst a longitudinal study is a study that includes repeated measures over an extended period of time. A longitudinal study tracks changes in variables over time, and includes panels or cohort groups (Cooper and Schindler, 2014). The selected design is suitable for this study which investigates the impact of corruption on firm's decision to operate informally using evidence from African countries. The choice of the area of study was largely informed by the growing concerns about the rising informality in Africa and its associated impact on economic development, and poverty. The other key concerns on informality are its impact on labour and the quality of working conditions of the players involved in the sector. Promoting decent work through formalisation of the informal economy and promoting transition from the informal to the formal economy through appropriate policies and programmes is one of the key priorities outlined in the SADC Decent Work Programme (2013-2017) adopted by the SADC Ministers and Social Partners responsible for Employment and Labour (ILO, 2019).

4.6 Population and Sample

A population is the group or collection that a researcher is interested in generalising about and, more formally, it is the theoretically specified aggregation of study elements (Rubin and Babbie, 2016). Similarly, Saunders *et al.* (2016) view a population as comprising the total group to which the study wants to generalise the results of the findings. The current study focuses on Africa in relation to the impact of corruption or quality of institutions on informality. Hence, the population of the study is made up of all African countries. The researcher included the entire population in the study even for countries with information gaps. A country-level study (macro study) was derived from the aggregation assumption of micro-firms explained in the theoretical model of Section 4.9. The macro-level model is a result of aggregation of micro-level firms. A detailed discussion of how the firm-level analysis is translated into country-level analysis is in Section 4.9.

A sample is a group of cases, participants, events or records consisting of a portion of the target population, carefully selected to represent the population (Cooper and Schindler, 2014). Leedy and Omrod (2015) argue that the objective of sampling is to methodically select a smaller group from the population that represents the bigger population. There are two main types of sampling methods, that is, non-probability and probability sampling (Bryman and Bell, 2015). Based on probability sampling, each unit in the population has an equal chance of being selected, whilst non-probability sampling is based on selection of units depending on the assumption of interest, hence some units in the population are more likely to be chosen compared to others (Bryman and Bell, 2015). Given that the study relied on the availability of credible World Bank data on governance indicators, estimates on informality, corruption, GDP per capita and HDI, amongst other key variables and the need to conduct parametric estimations, the choice of countries was mainly based on census. The sample of the study was exhaustive of all African countries.

4.7 Methods of Data Collection

Data collection for a study can rely on primary or secondary sources. Primary data is data which a researcher collects and analyses for a particular research (Saunders *et al.*, 2016). Secondary data, on the other hand, is data that is already available which was collected

by another person or entity for another study or purpose (Tasic and Feruh, 2012). Secondary data sources include books, internet and published journals amongst others. This study relied on country-level secondary data from the World Bank database, and other expert estimations. The country statistics published by World Bank and IMF provide statistical information and measures for economic variables which include the degree of informality, corruption, GDP per capita, public spending, taxation, HDI, and other institutional variables.

Enterprise surveys are administered to a representative sample of firms in the formal non-agriculture sector, and the sample is defined in a consistent manner in all countries. Enterprise surveys includes firms in key sectors of the economy like manufacturing, services, transport and construction sectors. They gather an assortment of qualitative and quantitative information collected through one-on-one interviews with firm managers and owners concerning the business environment in their respective countries, as well as firm productivity. This method enables one to collect a substantial amount of quantitative data that is important for this study. The degree of informality in each country is established on a yearly basis. Corruption and other factors such as GDP per capita are also recorded on a yearly basis for each country. Since informality is a dynamic process, a time series dimension was considered for each country in order to capture period-specific heterogeneity. While it is prudent to assess the drivers of informality in countries such as Zimbabwe which are experiencing serious problems of informality, using time series data, the country, however, has been largely informal over a period of time, thereby providing insignificant heterogeneity over time. There was therefore need to consider variability across countries (cross-sectional units) in order to account for country-specific heterogeneity.

The study, therefore, extracted data from the World Bank database and constructed a panel data set for the African countries. Panel datasets are richer than time series and cross-sectional datasets since they account for both period-specific and country-specific heterogeneity. In addition, panel datasets provide more observations and more efficient estimators, and can solve the problem of multicollinearity in parametric estimations. The degree of informality varies across countries and also changes over time. Countries

exhibit individual-specific attributes such as policy management skills. Moreover, political and business cycles cannot be ruled out in Africa. Such country-specific and period-specific heterogeneity require the use of panel data. Cross-sectional data fails to account for period-specific heterogeneity, while time series contain no information on the effects of country-specific heterogeneity. This problem can be circumvented through the use of panel data, which at the same time allows the researcher to control for individual-specific and times-specific heterogeneity. The advantages of panel datasets over cross-sectional and time series datasets are extensively discussed in Hsiao (1986), Bailer (1989) and Baltagi (1995).

The data from the World Bank and IMF was stored in Excel and other formats, thus we had to import it from Excel into Software for Statistics and Data Science (STATA). In STATA the data was cleaned through the removal of outliers and isolating countries without observations (missing variable analysis). A total of 46 African countries were scientifically analysed after isolating countries without data and outliers. Data from all African countries was collected over 11 years (2005 to 2015). However, only 46 countries, had complete observations, while the remaining 8, had missing observations. In order to reduce sample selection bias, the study included all countries, even those without data. The panel was, however, unbalanced. Countries without data were scientifically isolated from the analysis. After data cleaning, the cleaned data was then used in estimations.

4.8   Reliability and Validity

Reliability is the extent to which a variable or set of variables is consistent in what it is intended to measure (Hair *et el.*, 2014). Data from reputable International Financial Institutions (IFI) such as the World Bank and IMF is deemed to be reliable and credible. Furthermore, most policy makers and researchers have generally accepted indicators published by these institutions. To ensure reliability the researcher documented the procedures of the study and as many of the steps of the procedures as possible as advocated by Yin (2011).

The key quality control issue deals with the validity of a study and its findings. A valid study is one that has properly collected and interpreted its data, so that the conclusions

accurately reflect and represent the real world that was studied (Yin, 2011). According to Leedy and Ormrod (2015), the validity of a measurement instrument is the extent to which the instrument measures what it is intended to measure. The authors posit that they are four types of validity, which are face validity, content validity, criterion validity and construct validity. The current research utilised face validity and content validity. McQueen and Knussen (2013) postulate that face validity is a characteristic of measurement instruments whereby a test seems to be measuring what it claims to be measuring, a feature designed to ensure co-operation and motivation from participants. Content validity, on the other hand, demonstrates when the content of a test in terms of the type and scope of items is a fair and representative reflection of the opinion, attitude or event which is the focus of interest. Face validity was achieved by the supervisor and the researcher ensuring that the objectives of the study were met. Content validity was also achieved by ensuring that the scope of the research subject was fully covered and the instrument was measuring what it is supposed to measure.

4.9 The Theoretical Model

Several models have been utilised by previous researchers to analyse the relationship between corruption and informality. For instance, Elgin and Öztunali (2012) applied a two-sector dynamic general equilibrium model with formal and informal sectors. In the model, households maximise utility as a function of consumption and leisure time, where leisure time is the time in excess of time devoted to both formal and informal activities. The infinite horizon utility maximisation problem was expressed as:

$$max_{\{C_t, K_{t+1}, N_{It}, N_{Ft}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \beta^t \left[\log(C_t) + \emptyset \log(T - N_{It} - N_{Ft}\right]$$

subject to $C_t + K_{t+1} - (1 - \delta)K_t = (1 - \tau)\theta_F K_t^{\alpha} N_{Ft}^{1-\alpha} + (1 - \rho\tau)\theta_I N_{It}^{\gamma}$ (4.9.1)

where C, K, T, N_F and N_I are household consumption, physical capital, total time available for the household, labour devoted to the formal sector and labour devoted to the informal sector, respectively. $\emptyset$ is the weight of leisure in utility, θ_F and θ_I are total factor productivities in the formal and informal sector, respectively, and τ and ρ are respectively, taxes and the degree of tax enforcement.

Utility maximisation with a competitive equilibrium gives the following first order conditions in the form of a standard Euler equation as provided by Elgin and Öztunali (2012):

$$\frac{C_{t+1}}{C_t} = \beta[(1-\tau)\theta_F \alpha K_{t+1}^{\alpha-1} N_{Ft+1}^{1-\alpha} + 1 - \delta] \qquad (4.9.2)$$

$$(1-\tau)\theta_F(1-\alpha)K_t^\alpha N_{Ft}^{-\alpha} = (1-\rho\tau)\theta_I \gamma N_{It}^{\gamma-1} \qquad (4.9.3)$$

By imposing steady state to the two Euler equations, N_F and N_I are obtained in terms of the parameters in the system, and the size of the informal sector can be expressed as a percentage of GDP. The model provides a plausible theoretical measurement of the size of the informal sector and the effect of tax enforcement on the degree of informality. However, despite providing good explanation of the size of the informal sector in a dynamic view, it is important to note that decisions to formalise an enterprise are made by the entrepreneur. In other words, decisions to formalise are micro rather than macro decisions. In order to have a clear explanation of what causes businesses to formalise or remain informal, it is important to consider micro explanations as the building block for macro models in explaining informality. The macro model provided by Elgin and Öztunali (2012) is important for this study especially in terms of its introduction of the degree of tax enforceability, which is a key institutional variable. This study, however, took a micro approach in modelling the informal sector size and introduced corruption as a key institutional variable. However, in empirical analysis, the study relied on the micro model as a building block for macro analysis, and applied the aggregated data making.

Many empirical studies have examined the relationship between corruption and the degree of informality, but without a strong theoretical backing (see Shahab *et al.*, 2015; Schneider, 2010). Only a handful of studies have tried to link corruption and informality. For example, Mishra and Ray (2011) suggest a simple model linking corruption, informality and inequality. They provide a plausible linkage between informality and corruption at a micro level. In their model, informality and corruption are both endogenous. Mishra and Ray (2011) considered a simple model with a set of potential entrepreneurs and imperfect credit markets. The model assumed a situation where each firm is inspected with a certain probability, with an apprehended entrepreneur assumed to lose the entire net profit. Inspectors receive a wage from the regulator in their role of inspecting

the firms. Each inspector is assumed to inspect only one firm, and can detect whether a firm has complied or not. The inspector can be bribed to suppress the information for non-complying firms. However, bribery can be exposed with some probability leading to the firing of the inspector who will lose income and incur other personal costs. The inspector will only choose to report if the wage is greater or equal to the expected benefit of corruption or bribe. Likewise, an entrepreneur will choose to be in the informal sector if the benefit of operating in the underground economy exceeds benefits of operating in the formal sector.

While the proposed model in this thesis largely follows that of Mishra and Ray (2011), there is, however, a slight deviation in that the proposed model is more simplified than that of Mishra and Ray. Our main contribution to literature is the development of a more simplified model linking corruption to informality, and informality to corruption. First, although we reflected a micro approach as in Mishra and Ray (2011), we considered the choice of being in the formal or underground economy as the entrepreneur's entrance decision. Therefore, while the existing models consider a set of potential and existing entrepreneurs, in this thesis we simplified the model by considering only one potential entrant at a time intending to produce good q. But there are several existing producers of good q in both the formal and informal economies. We assume that good q is homogeneous, irrespective of whether it is produced from the formal or underground economy. This is a plausible assumption in terms of quality of the good since the decision to formalise or informalise comes from a single decision maker. The market is competitive and therefore firms are price takers. Therefore, the output of potential entrant j is simply a share of the market output, that is:

$$q_j = \alpha_j Q \qquad\qquad (4.9.4)$$

where q_j is the output to be produced by the new firm, $Q = q_1 + q_2 + \cdots\cdots + q_n$ is the total output produced by all n entrepreneurs, and α_j is the output share or market share of firm j.

Second, the study does not restrict non-compliance to imply loss of the entire net profit as in previous studies. Non-compliers can either bribe inspectors or pay a penalty fee if

apprehended. Third, unlike existing models which largely lump together costs such as bribes, penalties for non-compliance and registration fees with other fixed costs, the study considered these costs separately since they have serious implications on the entrant's decision to formalise or informalise. The study therefore separately considered registration costs ($\bar{c}^r$) as part of the fixed costs incurred by formal enterprises, and bribes ($\bar{c}^b$) and non-compliance penalty fee ($\bar{c}^p$) as part of the fixed costs incurred by non-compliers. As in previous studies, the study considered the decision to produce in the underground economy as non-compliance or simply failure to comply. Registration is considered to be a requirement for formalisation and therefore associated with the registration cost. Failure to register, which is basically non-compliance, is associated with a penalty if one is apprehended.

Consider a potential entrepreneur j making a decision to enter a competitive market by producing output q_j at a given price, p. The product q is produced in either a formal economy or in an underground economy. The entrepreneur can make a decision on whether to formalise or be informal. The profit of the entrepreneur under formalisation will be:

$$\pi^F = pq_j - cq_j - \bar{c}^r - \bar{c}^{oF} \tag{4.9.5}$$

where π^F is profit when the entrepreneur decides to formalise, cq_j is total variable cost, $\bar{c}^r$ is registration fees for formalisation, and $\bar{c}^{oF}$ is other fixed costs. There is a fixed cost associated with formalisation. In addition, formal enterprises are taxed a proportion τ of their profit, that is, part of their profit, $\tau\pi^F$, goes to the government as tax. Addition of this component to the entrepreneur's decision is another contribution from this study. The formal entrepreneur's net profit after all tax deductions ($N\pi^F$) is therefore:

$$N\pi^F = \pi^F - \tau\pi^F = \left[pq_j - cq_j - \bar{c}^r - \bar{c}^{oF}\right] - \tau\left[pq_j - cq_j - \bar{c}^r - \bar{c}^{oF}\right] \tag{4.9.6}$$

If the entrepreneur decides to operate underground then there are two possible outcomes or profits, that is, profit if apprehended and profit if not apprehended. If apprehended, the entrepreneur can bribe the inspector if they are both corrupt, or can pay a penalty fee if

the inspector and entrepreneur are not corrupt. The profit of the entrepreneur if apprehended is therefore given as:

$$\pi^I = pq_j - cq_j - \bar{c}^b - \bar{c}^p - \bar{c}^{oF} \qquad (4.9.7)$$

where the variables are as defined before. It is important to note that $\bar{c}^b$ and $\bar{c}^p$ are mutually exclusive. In other words, if the entrepreneur pays a bribe then there will be zero penalty fee, and if a penalty fee is paid then there will be zero bribe cost. A bribe is only paid if both the inspector and the entrepreneur are corrupt. While existing models only associate corruption with inspectors, this study associated corruption with both the inspector and the entrepreneur. If the entrepreneur is not corrupt then corruption will not be successful even if the inspector is corrupt. The assumption made in this model is that corruption only occurs if both parties agree. Specifically, the model suggested in this study assumes that corruption is initiated by the entrepreneur and can only occur if the entrepreneur is agreeable. This is quite a plausible assumption given that inspectors are always afraid to initiate corruption talks. The entrepreneur is the consumer of the corruption good supplied by the inspectors. The entrepreneur pays a price of purchasing corruption and this price is called a bribe.

If not apprehended, the underground entrepreneur will make the following profit:

$$\pi^I = pq_j - cq_j - \bar{c}^{oF} \qquad (4.9.8)$$

The profit in equation (4.9.8) is larger than the profit under formalisation reported in equation (4.9.5) since there are no registration costs. The net profit is even larger because no profit taxes are paid by firms operating in an underground economy. Operating underground is associated with uncertainty. The entrepreneur will not be certain about the possible outcome. When apprehended, there is a probability of getting profit in equation (4.9.7) and a certain probability of getting profit in equation (4.9.8) when not apprehended. This is a binomial distribution with a probability ρ of getting profit in (4.9.7) and a probability $1 - \rho$ of getting profit in equation (4.9.8). The parameter ρ can equally be regarded as the probability of an entrepreneur being apprehended, and $1 - \rho$ as the

probability of not apprehended. Effective institutions are associated with a larger ρ. The entrepreneur's expected profit in the underground economy is therefore:

$$E(\pi^I) = \rho[pq_j - cq_j - \bar{c}^b - \bar{c}^p - \bar{c}^{oF}] + (1 - \rho)[pq_j - cq_j - \bar{c}^{oF}] \qquad (4.9.9)$$

where the first component of the right-hand side is profit of the underground entrepreneur if apprehended multiplied by the probability of being apprehended, while the second component is profit if not apprehended multiplied by the probability of not being apprehended.

The entrepreneur will only choose to operate in the formal economy if the net profit from the formal economy exceeds the expected profit from operating in the underground economy. Specifically, formalisation is only preferred if the following condition holds:

$$N\pi^F = \pi^F - \tau\pi^F \geq E(\pi^I) \text{ Or}$$

$$[pq_j - cq_j - \bar{c}^r - \bar{c}^{oF}] - \tau[pq_j - cq_j - \bar{c}^r - \bar{c}^{oF}] \geq$$

$$\rho[pq_j - cq_j - \bar{c}^b - \bar{c}^p - \bar{c}^{oF}] + (1 - \rho)[pq_j - cq_j - \bar{c}^{oF}] \qquad (4.9.10)$$

Inserting $q_j = \alpha_j Q$ from (4.9.4) into this inequality and solving the inequality equation in (4.9.10) gives the following condition: $-\bar{c}^r - \tau\pi^F \geq -\rho(\bar{c}^b + \bar{c}^p)$ or equivalently expressed as:

$$\bar{c}^r + \tau\pi^F \leq \rho(\bar{c}^b + \bar{c}^p) \qquad (4.9.11)$$

Since $\bar{c}^b$ and $\bar{c}^p$ are mutually exclusive, inequality 4.8.11 reduces into inequalities, one that holds for corrupt inspectors and entrepreneurs, and the other that holds in the absence of corruption but associated with a penalty. It is important to note that in the presence of corruption, a potential entrepreneur can only choose formal operation over informal if the sum of formalisation costs ($\bar{c}^r$) and profit tax ($\tau\pi^F$) is less than the expected bribery costs associated with corruption in the informal economy. With corruption, an entrepreneur can only formalise operations if the following inequality holds:

$$\bar{c}^r + \tau\pi^F \leq \rho\bar{c}^b \qquad (4.9.12)$$

And in the absence of corruption but with a penalty for apprehended underground entrepreneurs, the following condition holds for formalisation decision:

$$\bar{c}^r + \tau\pi^F \leq \rho\bar{c}^p \tag{4.9.13}$$

Conditions in (4.9.12) and (4.9.13) demonstrate that entrepreneurs prefer to formalise than operating underground if the left hand side is smaller than the right hand side of the equation. In this case, it is clear that high registration fees and large profit taxes discourage potential entrepreneurs from formalising their new operations. In addition, low penalties for apprehended informal entrepreneurs promote informalisation. Some key implications of the theory include the following:

First, governments can promote decent work through formalisation of the underground economy by simply setting the penalty for non-compliers at a level which is at least larger than the cost of registration plus profit tax. Second, a large bribe acts as a large penalty in discouraging potential entrepreneurs from going underground. As such, following the conventional profit theory above, high and punitive bribes demanded by inspectors will increase the cost of doing business in the informal sector, thus making it unviable for firms to continue to operate in the informal sector. This could either push the firms to formalise their operations or push them further underground where inspectors do not easily access them. Third, the conventional profit theory directly links informalisation to the price of corruption, that is, to bribes but not to the level of corruption. The level of corruption is, however, linked to firm profit through bribes or price of corruption.

There exists a market for corruption where corrupt inspectors supply the corruption good and corrupt entrepreneurs purchase corruption and pay $\bar{c}^b$ as the price of corruption. The corruption market is, however, imperfect because of information asymmetry. Corruption is an underground activity; hence information about the operations of the corruption market is not publicly available. At higher prices buyers of corruption purchase less of a corruption good while at lower prices they increase their demand for a corruption good. The maximum price of corruption at which zero corruption good can be demanded is $p^c = maximum\ \bar{c}^b = \bar{c}^r + \tau\pi^F$ and any price below that is associated with some level of corruption and informality.

On one hand, the demand for corruption is downward sloping similar to the demand for an ordinary commodity. This is largely a result of the substitution effect. Given our assumption of an entrepreneur making a choice between producing in formal and informal markets, the two markets are substitutes. A lower cost in the informal market relative to the formal market drives entrepreneurs to convert their formal good into an informal good. Sellers of a corruption good, on the other hand, supply more of the corruption good if it fetches a higher price. There is, however, a minimum price they are willing to receive in order to sell the corruption good. As in Mishra and Ray (2011), the inspector only accepts corruption if the expected benefit from being corrupt is at least larger than the wage. With a wage income of w, a bribe benefit of w^b, a probability θ of corruption exposure and a loss of income due to dismissal of w^d, the inspector can only choose to be corrupt if the following condition holds:

$$(1 - \theta)(w^b + w) - \theta w^d \geq w \qquad\qquad (4.9.14)$$

The inequality in (4.9.14) reduces to the following inequality:

$$w^b \geq \frac{\theta}{1-\theta}(w + w^d) \qquad\qquad (4.9.15)$$

Inspectors can only accept a minimum bribe of:

$$w^b = minimum\ \bar{c}^b = \frac{\theta}{1-\theta}(w + w^d) \qquad\qquad (4.9.15)$$

In addition to previous theoretical literature on the linkage between corruption and informality, this study contributes by further explaining how the operation of the corruption market influences informality. Figure 4.3 illustrates the joint determination of the level of informality, corruption levels and the price of corruption (bribe).

Figure 4.3: The Market for Corruption and Informality
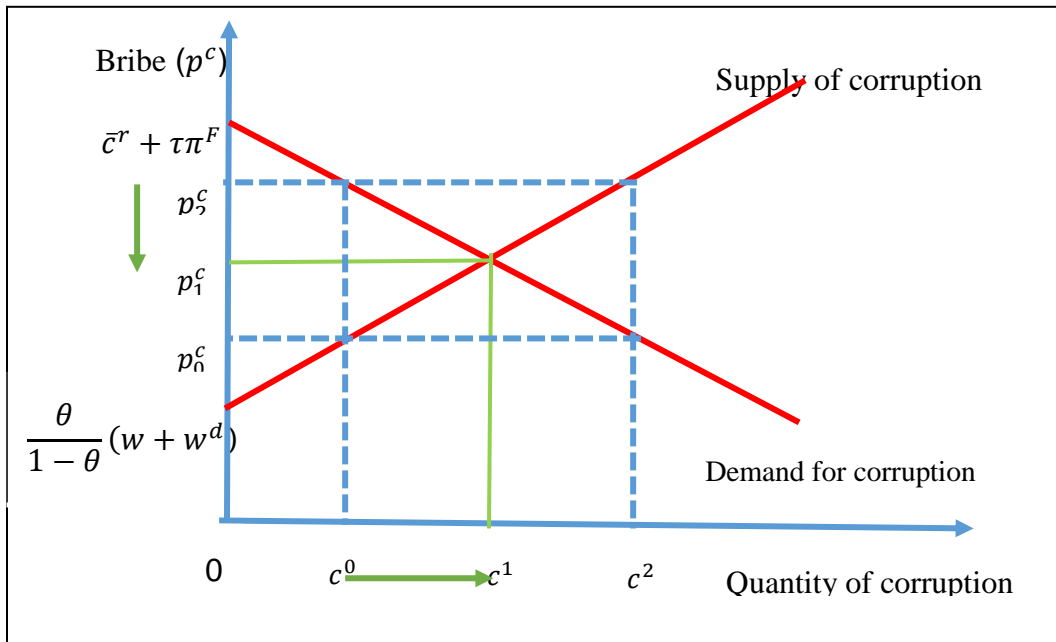
Source: Author's Own Illustration

As long as the inspector's minimum accepted bribe $\frac{\theta}{1-\theta}(w + w^d)$ falls below the entrepreneur's maximum accepted bribe $(\bar{c}^r + \tau\pi^F)$, there will be room for bargaining, that is, bargaining is only possible if the following condition holds:

$$\bar{c}^r + \tau\pi^F > \frac{\theta}{1-\theta}(w + w^d) \tag{4.9.16}$$

A high bribe such as a bribe of p_2^c in Figure 4.2 is associated with c^0 participating or corrupt entrepreneurs in the informal economy, and c^2 corrupt or participating inspectors in the informal sector, leading to excess supply of corruption. This exerts pressure on the price of corruption to go down. The price may be forced to go down until it reaches the equilibrium bribe (p_1^c), and this reduction provides an incentive for additional entrepreneurs to take part in the informal economy. Informal businesses may increase to c^1. Below the equilibrium such as at a bribe level of p_0^c, there will be excess demand for corruption or excess participation in the informal sector by entrepreneurs. The excess demand will exert pressure on corruption price to go up towards an equilibrium. It is

important to note that the market for corruption is usually in disequilibrium due to imperfect information.

Figure 4.2 demonstrates that policy makers can formalise the informal sector through either reducing the costs of registration and profit tax up to the level of $\frac{\theta}{1-\theta}(w + w^d)$, or through increasing inspectors' wages and dismissal costs for exposed corrupt officials up to the level of $\bar{c}^r + \tau\pi^F$, or through a combination of reducing the costs of registration and profit tax and increasing inspectors' wages and dismissal costs for corrupt officials until the two coincide. The number of participants in the informal sector is linked to the level of corruption, and the informal sector is a potential breeding ground for corruption. In this model of informalisation, a bribe is only paid by those in the underground economy. Of note is that excessive bribe demands by inspectors force entrepreneurs to prefer formalising their businesses rather than operating in the underground economy. This is an issue of endogeneity or joint determination of corruption and informality. Corruption influences informalisation, while at the same time informalisation can create a breeding ground for corruption.

One of the implications that can be derived from the model is that low-income countries or poor countries are likely to face a greater problem of informality than rich countries. This is because wages of inspectors are relatively lower in poor countries and the probability of exposure to corruption is also higher in poor countries than rich countries. Hence, it is crucial to aggregate the micro data into a macro data in order to study how informality is linked to the level of the country's development. The current study therefore aggregated individual informal entrepreneurs into an aggregate national measure of informality. An additional underground entrepreneur adds to the national number of informal entrepreneurs. Henceforth, the study applied the size of informal activities as a percentage of the total enterprise activities of each country in the study. The same aggregation approach was applied to corruption and the other variables in the model.

The other lesson derived from the market for corruption is the relationship between control of corruption and the size of the informal sector. Control of corruption reduces supply of corruption, thereby shifting the supply curve in Figure 4.2 to the left. This makes corruption

costlier to the entrepreneur as corrupt inspectors demand higher bribes as a risk premium. The theory therefore suggests a negative relationship between the level of informality and control of corruption. Figure 4.4 illustrates the relationship between corruption control and the size of the informal sector.

Figure 4.4: Corruption Control and Shift of the Supply Curve
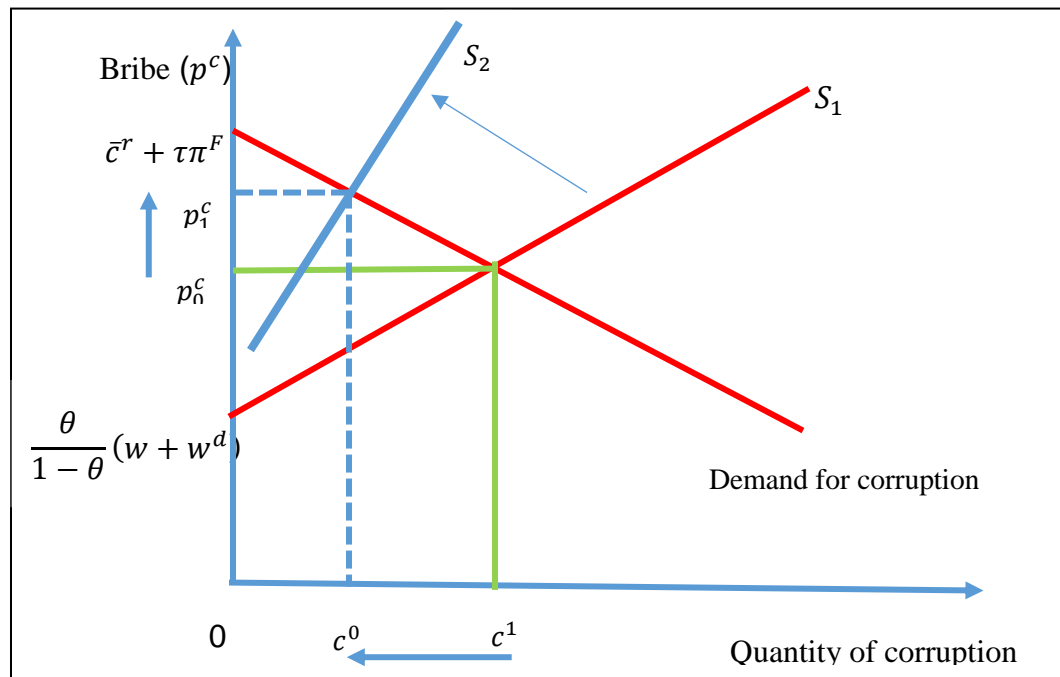
Source: Author's Own Illustration

Control of corruption that shifts corruption supply from S_1 to S_2 increases the bribery cost to be incurred by the entrepreneur from p_0^c to p_1^c, thereby reducing the number of entrepreneurs willing to participate in the informal economy from c^1 to c^0. Countries with effective governance and low levels of corruption are expected to have smaller informal sector sizes compared to countries with poor governance. Consequently, when the size of the underground economy is small relative to the formal sector, it will be easier for the regulators to effectively control corruption. In the next section, this study discusses an empirical method to test these theoretical assertions.

4.10   The Empirical Model

4.10.1   The Model

The empirical model was derived from the theoretical model explained in section 4.8. When studying causes of the informal sector, it is important to consider dynamics (time dimension) and heterogeneity across countries (cross-sectional dimension). Using a time series dimension only may not provide sufficient variability in a single country. For instance, countries such as Zimbabwe have remained largely informal for a long period of time, hence studying Zimbabwe alone may not provide any significant variations in the informal sector over time. Similarly, studies based on cross-sectional data fail to provide information on the state of informal sector dynamics within countries. It is against this background that this study applied panel data in order to account for both time and country-specific heterogeneity.

The empirical model applied in this study took the following form:

$$INF_{it} = k + \gamma_t + \eta_i + \beta_1 Cor_{it} + \mathbf{Z}_{it}\boldsymbol{\varphi} + \varepsilon_{it} \tag{4.10.1}$$

$$\varepsilon_{it} \backsim IID(0, \sigma^2) \tag{4.10.2}$$

$$\mathbf{Z}_{it} \perp \varepsilon_{it} \tag{4.10.3}$$

where INF_{it} is the size of the informal sector in country i at time t, Cor_{it} is the control of corruption in country i at time t, $\mathbf{Z}_{it}$ is a vector of exogenous control variables that include the level of economic development as measured by Human the Development Index (HDI) and other institutional factors such as government effectiveness ($Gvteff$), the size of profit tax as a percentage of GDP ($Protax$), population (Pop), literacy rate ($Literacy$), GDP per capita ($Gdppc$) and economic growth ($GDPgrowth$), γ_t measures period-specific unobservable factors, η_i measures country-specific unobservable factors and ε_{it} is an error term assumed to be identically and independently distributed with a mean of zero and constant variance, that is, $\varepsilon_{it} \backsim IID(0, \sigma^2)$. k, β_1 and $\boldsymbol{\varphi}$ are constants/parameters. The hypotheses stated in Section 1.4 in Chapter 1 are tested by simply testing the

coefficients of the respective variables, that is, the slope coefficients, β_1 and $\varphi.$ Table 4.1 presents the variables applied in this study.

Table 4.1: Empirical Model Variables

Variable Name	Definition
INF	Informal sector size measured as percentage of GDP
Cor	Corruption control measured as an index for the control of corruption
Cor_instr	Control of corruption
HDI	Human Development Index
$Protax$	Profit tax measured as percentage of GDP
$Gdppc$	Gross domestic product per capita
$Gvteff$	An index for government effectiveness
$GDPgrowth$	GDP growth used as a measure for economic growth
Pop	Population

Source: Author's Own Compilation

Control of corruption index ranges from -10, indicating the worst control of corruption to 10, indicating the best level of corruption control. Most African countries are in negative side of corruption control despite having some countries outperforming others in corruption control. Similarly, government effectiveness is an index which is measured the same way as corruption control, ranging from -10 for the least effective government to 10 for the most effective government. While previous studies which investigated the relationship between informality and economic development (Torgler *et al.*, 2011) used GDP per capita as a proxy for economic development, this study instead used Human Development Index (HDI) as a proxy for economic development. HDI is a wider measure of economic development that encompasses GDP per capita, life expectancy, education and other social aspects such as income inequality. As established by Torgler *et al.* (2011), economic development is expected to reduce the size of the informal sector.

The inclusion of corruption and profit tax as potential determinants of informality is informed by the theoretical model presented in Section 4.8. In addition, previous studies identified these variables and the level of economic activity as key drivers of informality (Aidt, 2003, 2009; Jain, 2001). Aidt (2009) established that while corruption causes informality, there is also a possibility of informality breeding corruption. Tax as part of regulation is widely viewed as a major driver of informality (see Loayza *et al.*, 2009; Schneider and Enste, 2000; Vuletin, 2008). Based on these previous studies, the apriori relationship between the size of informality and corruption is positive. Similarly, stiff regulation such as high taxes is assumed to promote informalisation.

Population and literacy rates have been efficiently applied as instruments for corruption by previous researchers (Knack and Azfar, 2003; Tavares, 2003). Following these studies, corruption in this study was also instrumented using demographic factors. Literacy is measured as a percentage of literate population while population is the total number of people in a country.

4.10.2 Data Sources and Description

The research relied on secondary data analysis from reliable sources, namely, the World Bank, the United Nations International Labour Organization (UN-ILO) and the International Monetary Fund (IMF). According to Neuman (2014), secondary data analysis is the statistical analysis of quantitative data that was previously collected and stored (often originally from a survey). The data was exported as Microsoft Excel 2016 spread sheet and cleaned before being exported to STATA version 15 for data analysis. Outlier detection and missing value analysis was done on the data. Hoaglin and Iglewicz (1986) proposed that the best way to identify outliers is by calculating $2.2 * IQR$ (Interquartile range) where any value below $Q1 - 2.2 * IQR$ was an outlier where Q1 is the lower quartile or first quartile, and anything greater than $Q3 + 2.2 * IQR$ was an outlier where Q3 is the upper quartile. There were no outliers but there was one country with no information. This country was dropped from the list of all African countries.

According to Hair, Black, Babin and Anderson (2019), missing data below 10% for an individual case or observation can generally be ignored, except when the missing data

occurs in a specific non-random manner (for example, concentration in a specific set of questions, attrition at the end of the questionnaire etc). Thus, only one country with more than 10% missing data was removed from the analysis. A larger sample with a longer time span was considered in order to achieve normality, and the central limit theorem was applied to the data. The central limit theorem states that the sampling distribution of the mean of a random sample drawn from any population is approximately normal for a sufficiently large sample size. The larger the sample size, the more closely the sampling distribution of $\bar{X}$ will resemble a normal distribution (Keller, 2018).

Data for all the variables presented in the preceding section was recorded for all African countries *over 11 years* (2005 to 2015) while censoring those without information. Only 46 countries had complete information, excluding outliers. The data had both time and cross-sectional dimensions, making it panel. With the same number of years for all countries, the panel data set was balanced. There are several advantages of using such type of data, as identified in literature (see Maddala 1993; Hsiao 2003). First, panel data suggests that countries and periods are heterogeneous, and therefore this type of dataset controls for both period-specific and country-specific heterogeneity. Second, the use of panel datasets can help in reducing estimation biases that may result from omitted variables correlated with the included variables, correlation between lagged dependent variables and the error term and the presence of simultaneity. In addition, it eliminates aggregation bias prevalent in macro models. Third, panel data sets contain richer information and more degrees of freedom that can assist in decomposing the overall variation into variation between countries and variation within a country. Fourth, estimators from panel datasets are more efficient and accurate than those form cross-sectional and time-series data sets. Fifth, unlike cross-sectional data sets, panel data sets allow the study of dynamics of adjustments as well as the study of more complicated behavioural models. Last but not least, panel data can help in correcting the problem of multicollinearity.

In addition to data cleaning, some pre-estimation tests were done on the data. A 16-year time span is long enough to conduct stationarity tests. Using non-stationary series in regression is associated with spurious regressions or regressions with very high but

meaningless coefficient of determination. Panel unit root tests were therefore conducted using the Levin-Lin-Chu test for panel unit-root and the Fisher-type for unbalanced panels. The Levin-Lin-Chu test was applied to variables with balanced panels, namely, the size of the informal sector, GDP growth, GDP per capita, control of corruption and government effectiveness. The Fisher-type unit-root test was applied to variables with some missing observations, namely HDI, population and profit tax. The null hypothesis of these tests suggests that a panel unit root exists, while a rejection of the hypothesis indicates stationarity of the variable. Multicollinearity among the regressors was also tested before estimation.

4.10.3 Addressing Endogeneity and Omitted Variable Biases

As explained in Section 4.8, although corruption is a crucial driver of informality, the informal sector may be a breeding ground for corruption. The possibility of the existence of endogeneity is not only informed by the theory presented in Section 4.8, but also by previous studies on the informal sector and corruption (Dutta, Kar and Roy, 2011). In the presence of simultaneity or endogeneity, β_1 will be biased and can either under-estimate or over-estimate the impact of corruption on informality.

As established by Dutta, Kar and Roy (2011) and verified in the theoretical literature, the corruption variable is also endogenous, the correlation between corruption and the error term is not zero, $Corr(Cor_{it}, \varepsilon_{it}) \neq 0$. A large informal sector implies the existence of unregistered and unaccounted for activities which can be a source of corruption. This is a violation of the Ordinary Least Squares (OLS) assumption that the explanatory variables must be exogenous. The corruption variable was therefore instrumented in this study in order to correct for the potential problem of simultaneity bias.

An instrumental variable for corruption, say X, is a variable which replaces the endogenous corruption variable in the model and must be valid and exogenous. In other words, for X to be a good instrument for corruption, first, it must be correlated with corruption [$Corr(Cor_{it}, X_{it}) \neq 0$]; the property of validity. Second, it must be exogenous in the informal economy model, that is, $Corr(X_{it}, \varepsilon_{it}) = 0$; the property of exogeneity.

It is, however, not easy to get a sound and efficient instrument for corruption. Literature has nevertheless identified socio-demographic factors as the drivers of corruption. The size of population and education are popular determinants of corruption among existing empirical studies (Knack and Azfar, 2003; Tavares, 2003). This study also found these factors to be useful instruments for corruption. A Two Stage Least Squares (2SLS) was applied to operationalise these instruments. The control of the corruption variable was therefore instrumented using the predicted control of corruption given population size. The instrument is Cor_instr.

In addition to the potential problem of simultaneity bias, unobservable country-specific and period-specific variables correlated with the included variables may be omitted, thereby leading to omitted variable bias. This problem was easily circumvented by using panel data as in model (4.9.1). By averaging the variables over time to obtain an equation for $\overline{INF}_{i.}$ and subtracting it from the equation for INF_{it} in (4.9.1) to obtain $INF_{it} - \overline{INF}_{i.}$, we can eliminate all unobservable country-specific variables. Similarly, averaging over cross-sectional units and using the differenced equation eliminates unobservable period-specific factors.

4.10.4 Model Selection and Estimation Techniques

The methodology applied in this study included all the unobservable country-specific and period-specific variables, which were then eliminated statistically using variables measured using deviations from their means. Several tests were conducted to select the most appropriate estimator for model (4.9.1).

In cases where the country-specific features do not vary, that is, $Var(\eta_i) = 0$, a pooled regression (PE) which is based on OLS estimator is more appropriate, and in cases where country-specific variables are heterogeneous but non-random, a fixed effects (FE) model based on the Least Squares Dummy Variable (LSDV) estimator or within estimator is more appropriate. But when η_i is a random term as ε_{it}, a random effects (RE) model based on the GLS estimator is more appropriate. The random effects model is also known as the Error Components Model (ECM) because of its property of having a composite error term. The random effects model took the following form:

$$INF_{it} = k + \beta_1 Cor_{it} + \mathbf{Z}_{it}\boldsymbol{\varphi} + \eta_i + \varepsilon_{it} \qquad (4.10.4)$$

$$\varepsilon_{it} \backsim IID(0, \sigma^2) \qquad (4.10.5)$$

$$\eta_i \backsim IID(k_\eta, \sigma_\eta^2) \qquad (4.10.6)$$

$$\mathbf{Z}_{it} \perp \varepsilon_{it} \qquad (4.10.7)$$

The choice of the most appropriate model was done using a three tests as listed in Table 4.9.2. The three tests presented in Table 4.9.2 are all anchored on testing the nature of country-specific term (η_i). In the first test, fixed vs pooled, I tested the following null hypothesis:

$$H_0: \eta_1 = \eta_2 = \cdots\cdots = \eta_N = \eta$$

The alternative hypothesis is that there is at least one country with different country-specific characteristics from others. Failure to reject the null hypothesis indicates that a pooled effects model is more appropriate than a fixed effects model.

The null hypothesis for the second test, Breusch-Pagan, tested the null hypothesis that country-specific characteristics do not vary across countries against the alternative hypothesis that at least one country varies from others:

$$H_0: Var(\eta_i) = \sigma_\eta^2 = 0$$

A failure to reject the above hypothesis is an indication that the pooled effects is more appropriate than the random effects, while a rejection of the hypothesis indicates that a random effects model is more appropriate than a pooled effects model.

The final test, random versus fixed or the Hausman test, was premised on the null hypothesis that country-specific effects are not correlated with the error term. The Hausman test tested the following null hypothesis:

$$H_0: Corr(\eta_i, \varepsilon_{it}) = 0 \text{ Or random effects is more appropriate}$$

A rejection of this hypothesis indicates that the fixed effects model is more appropriate than the random effects model, while a failure to reject the null hypothesis is an indication of appropriateness of the random effects model.

Table 4.9.2: Choosing the Right Model and Estimator

Test between	Test	Null Hypothesis
Fixed vs. Pooled	F-test	Pooled effects is more appropriate
Random vs. Pooled	Breusch-Pagan	Pooled effects is more appropriate
Random vs. Fixed	Hausman	Random effects is more appropriate

Source: Author's Own Compilation

Although the results from the most appropriate model were discussed, results from the other models were also presented. In addition to presenting results from the RE, FE and PE models, we also considered the potential bias that may be a result of the dynamics inherent in models of the informal sector. The size of the informal sector today may be highly correlated with the historical size of the same sector. In this view, we also estimated a Dynamic Panel Model (DPM) for the informal sector size using the Arrelano-Bond or Generalised Methods of Moments (*GMM*) estimator. The dynamic model took the following form:

$$INF_{it} = k + \lambda INF_{i,t-1} + \beta_1 Cor_{it} + \mathbf{Z}_{it}\boldsymbol{\varphi} + \varepsilon_{it} \tag{4.10.8}$$

$$\varepsilon_{it} \backsim IID(0, \sigma^2) \tag{4.10.9}$$

$$\mathbf{Z}_{it} \perp \varepsilon_{it} \tag{4.10.10}$$

where $INF_{i,t-1}$ is the lagged size of the informal sector and λ is a constant, while the rest of the variables are as defined before. The GMM estimator is efficient even under heteroscedasticity. If λ is accurately estimated, then policy makers can easily predict the future size of the informal sector basing on the known current size.

4.10.5　　　　Diagnostic Tests and Robustness Checks

In addition to stationarity, multicollinearity and model specification tests explained above, a number of diagnostic tests were performed. These include the heteroscedasticity test, the autocorrelation test and the cross-sectional dependence test. The null hypothesis in these three tests suggests the absence of each problem. Robustness checks were carried out to check whether estimates are not sensitive to sample size, region or to the method of estimation. First, robustness checks were carried out by breaking the sample into three regions, namely, Africa, Southern and Eastern Africa, and Northern and Western Africa. Estimates from the three models were then compared to check whether they are sensitive to region or sample size. Second, estimates from different models (PE, FE, RE and DPM) were compared to check whether the relationship between informal sector size and corruption is sensitive to the method of estimation.

4.11　　　　Ethical Considerations

The researcher adhered to the principle of good ethical conduct as defined by the University of South Africa Policy on research and ethics. The researcher received important information on the research ethics of the institution and followed the guidelines to obtain ethical clearance from the institution. The researcher applied for ethical clearance and was granted ethical clearance from the SBL Research Ethics Committee, which is included in Annexure B. According to Leedy and Ormrod (2015), there are six categories of ethical issues, and these include protection from harm, voluntary and informed participation, rights to privacy, honesty with professional colleagues, internal review boards and professional codes of ethics. The researcher used secondary data, thus the ethical issues adhered to was honesty with professional colleagues.

Leedy and Ormrod (2015), further argue that researchers must report their findings in a complete and honest fashion, without misrepresenting what they have done or intentionally misleading others about the nature of the findings. The authors further indicate that under no circumstances should a researcher fabricate any data to support a particular conclusion no matter how "noble" that conclusion might be. In this study, the researcher ensured that all work was referenced and properly cited and credit was given

to previous authors and researchers. Models, formulas, diagrammatic presentations, ideas, charts and diagrams used from other sources were fully acknowledged, including quotations.

4.12   Summary and Conclusion

This chapter focused on the model, research methods and techniques that were used to carry out the study. A detailed account of the research philosophy, research strategy and design, data collection and instruments used, the model and estimation techniques were discussed in detail in this chapter. The chapter provided the important theoretical linkages between informal sector size and corruption. The thrust of the chapter was to ensure that the adopted research method and techniques answer the research questions, and that the findings address the objectives of the study. The chapter provided the "logical plans" and conceptual framework which were used to carry out the study. Ethical considerations were also covered under this chapter to ensure that the study upholds the expected research ethics.

CHAPTER 5: RESULTS PRESENTATION, ANALYSIS AND DISCUSSION

5.1 Introduction

The study investigated the relationship between the informal sector, corruption and economic development in Africa. The study focused on country-level determinants of informality in 46 African countries over a period of 11 years. Owing to data challenges, the study did not include all African countries. The purpose of this chapter is therefore to present, analyse and discuss the findings of the study. Variability of the factors affecting the size of the informal sector is analysed across countries and over time. Section 5.2 of this chapter presents and discusses descriptive statistics of the variables in the model. In addition to the standard measures of central tendency and dispersion, stationarity and multicollinearity tests are also presented in Section 5.3. Section 5.4 presents, interprets and discusses the results of the estimated models, diagnostic tests and robustness checks, while Section 5.5 concludes the chapter.

5.2 Descriptive Statistics

The descriptive statistics, specifically the mean, standard deviation, minimum and maximum for each variable are presented in Tables 5.1 and 5.2. Table 5.2 presents the statistics for measuring variability between countries and within each country. Between and within the variation are important statistics in panel data analysis. As explained in the previous chapter, one advantage of using panel data is its ability to provide country-specific heterogeneity (variation between countries) and period-specific heterogeneity (within variation). The statistics presented in Table 5.1 demonstrate that the degree of informality is very high in Africa. The mean level of informality is 36.59% with standard deviation of 9.21%, a minimum of 19.23% and a maximum of 69.08%. Zimbabwe has the biggest informal economy out of the 46 countries, followed by Benin, Gabon, Nigeria, DRC and Tanzania, among others (see Figure 5.1). South Africa, Algeria, Mauritius, Namibia and Botswana are highly formalised economies.

Figure 5.1: Size of the Underground Economy in African Countries

Graphs by Country

Source: Author's Own Illustration

Corruption control in African countries is still weak as indicated by an average index of -0.68 with a standard deviation of 0.56, a minimum of -1.77 and a maximum of 1.16. A country with good control of corruption must have an index closer to 10. Countries with the worst control of corruption include Equatorial Guinea (-1.57), Chad (-1.38), Democratic Republic of Congo (-1.37) and Zimbabwe (-1.37), among others. Countries

such as Botswana (0.97), Mauritius (0.41), Namibia (0.33), Rwanda (0.24), South Africa (0.15) and Lesotho (0.10) have positive control of corruption indices despite still being far from the best measure of 10.

South Africa, Mauritius, Namibia and Botswana are among the relatively highly formalised economies or economies with the smallest underground economies in Africa. Figure 5.2 illustrates the level of control of corruption in African countries. Most countries underperform in corruption control; they are on the negative side of the index which is measured from -10 for worst corruption control to +10 for best corruption control. Figures 5.1 and 5.2 demonstrate that countries with the biggest informal sector such as Zimbabwe, Nigeria, Democratic Republic of Congo, Gabon and Benin have the weakest control of corruption indices.

Figure 5.2: Control of Corruption in Africa

Graphs by Country

Source: Author's Own Illustration

The African Human Development Index (HDI) is also very low, averaging 0.51 for all countries, with some country having the lowest HDI of 0.28. In most countries, HDI has been rising marginally since 2005, except for a few countries such as Eritrea, Mali and Nigeria which remained constant for a period of time, and Libya whose HDI was falling over the study period.

Figure 5.3: African Human Development Index

Graphs by Country
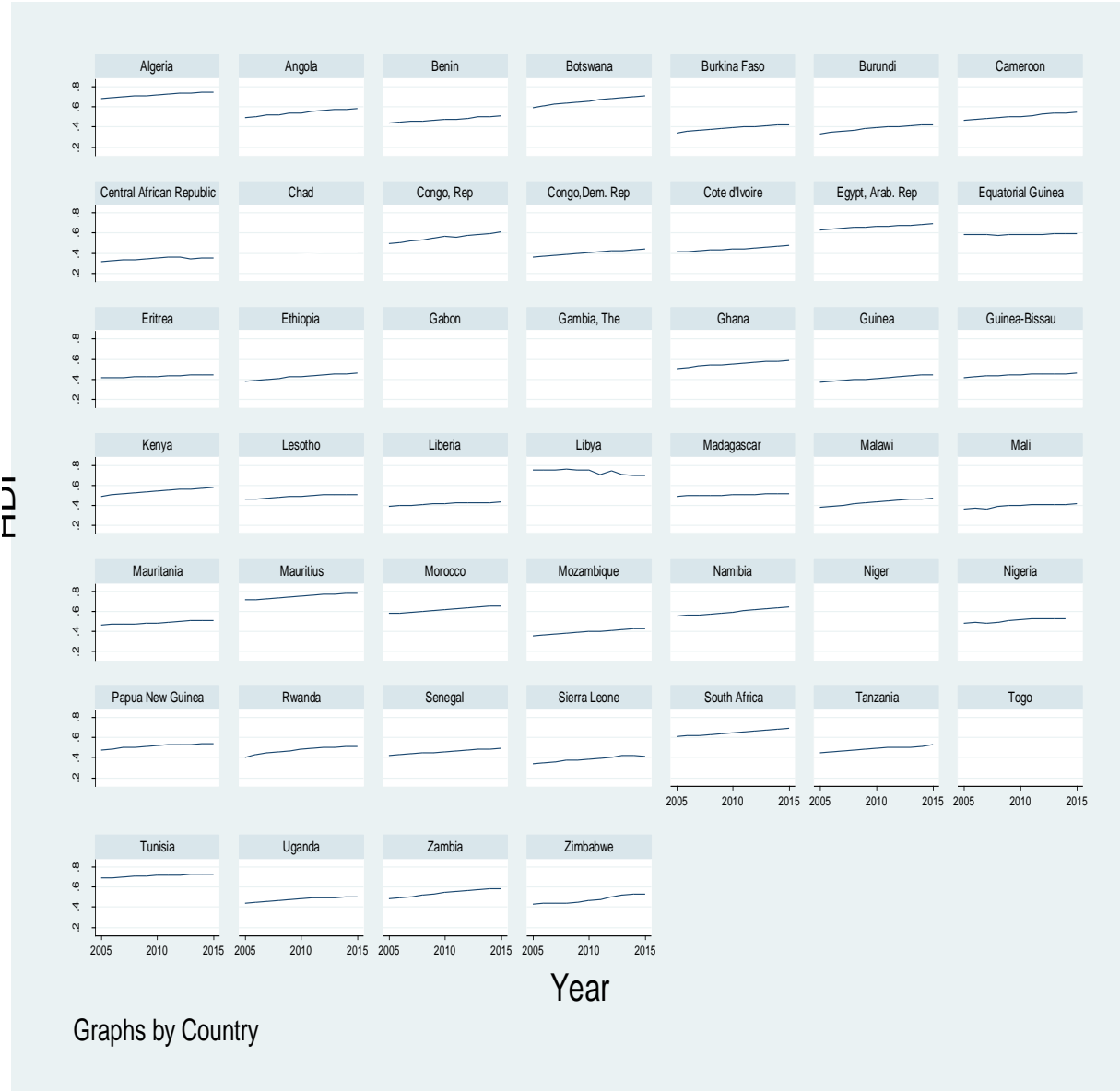
Source: Author's Own Illustration

Profit tax is very high in African countries, averaging 60.25% of Gross Domestic Product (GDP) with a standard deviation of 58.82%. Most countries have been moving towards a reduction of profit tax. For instance, countries which used to have very high profit taxes such as Burundi, DRC, Gambia and Sierra Leone have significantly reduced profit tax rates over the past few years. Countries such as Botswana, Zambia and Lesotho have the lowest profit taxes. Generally, profit tax has remained constant over a period of time

in many African countries. If a variable stays constant for a long time, decision makers will correctly predict its future changes and hence will make it part of their decision making. In this case it will not influence the decision making process of businesses.

Government effectiveness is also weak. The mean government effectiveness index for African countries is negative (-0.74), with a standard deviation of 0.58 and a minimum and maximum of negative 1.85 and 1.05, respectively. The African region is growing and has been recording impressive economic growth rates. The average GDP growth over the study period is 4.92%, which is good with a standard deviation of 7.67. Population averages 21.7 million with a standard deviation of 29.1 million, a minimum of 0.75 million and a maximum of 181 million. A maximum of 123.14 % economic growth, where the average is 4.92%, indicates that this maximum is an outlier. We corrected this outlier using the method explained in Chapter 4.

Table 5.1: Overall Summary Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum	Coef. of variation
INF	36.59	9.21	19.23	69.08	0.25
Cor	-0.68	0.56	-1.77	1.16	-0.82
HDI	0.51	0.11	0.28	0.78	0.22
Protax	60.25	58.82	13.60	339.10	0.98
Gdppc	2364.97	3377.24	151.68	22942.58	1.43
GDPgrowth	4.92	7.67	-62.08	123.14	1.56
Gvteff	-0.74	0.58	-1.85	1.05	-0.78
Pop	21.70m	29.10m	0.75m	181m	1.34m

Source: Author's Own Computations

The findings presented in Table 5.1 demonstrate that there is a huge economic growth variation among African countries. GDP growth has the largest coefficient of variation, followed by GDP per capita and then population. The smallest variations are in HDI and the size of the informal sector. In addition to the statistics in Table 5.1, Table 5.2 presents

within and between countries variation in variables of interest. The results show that there is smaller variation within each country in terms of the size of the informal sector, corruption, HDI and the other variables. Significant variation is between countries. Such findings buttress the importance of using a panel dataset. Time series will not provide significant variability that warrants a study on the informal sector.

Table 5.2: Between and within Country Variation

Variable	Between Country Variation	Within Country Variation
INF	8.80	2.99
Cor	0.54	0.14
HDI	0.11	0.02
$Protax$	48.68	33.33
$Gdppc$	3288.15	898.83
$GDPgrowth$	1.74	7.47
$Gvteff$	0.57	0.14
Pop	29.1m	3.0m

Source**: Author's Own Computations**

Within country variability is only 2.99% for the informal sector size, but 8.8% between country variations. The presence of both between and within country variations requires the use of panel data when modelling the determinants of informal sector growth and size. In Arabic and Islamic countries such as Egypt, Morocco, Tunisia, Algeria and Libya, laws are usually militarily enforced, and as such, there is high compliance and enforcement of regulations. Hence the degree of informality and its determinants in these countries may differ from those in Sub-Saharan countries.

With regards to the possible variability across regions, the study compared means of these variables between Sub-Saharan countries and Islamic and Arabic African countries. The results in Table 5.3 show that informality is 7.25% larger in Sub-Saharan Africa (SSA)

than in Arabic/Islamic African countries. The difference is statistically significant at 1% level.

Table 5.3: Mean Differences between Sub-Saharan Africa and Arabic Africa

Characteristic (Mean)	Africa Arab (N= 55)	SSA (N=451)	Total (N=506)	Difference
INF	30.12	37.38	36.59	-7.25***
Cor	-0.59	-0.69	-0.68	0.09
HDI	0.69	0.48	0.51	0.20***
Protax	55.56	60.75	60.25	-5.19
Gdppc	4673.06	2083.50	2364.97	2589.56***
GDPgrowth	3.89	5.05	4.92	-1.16
Gvteff	-0.46	-0.77	-0.74	0.30***
Pop	33.7m	20.2m	21.7m	13.6m***

Note: ***, ** and * indicate that the difference between Sub-Saharan countries and Arabic/Islamic countries is statistically significant at 1%, 5% and 10% level, respectively. Difference in means was tested using t-tests for equality of means and Levene's test for equality of variances.

Source: Author's Own Computations

The Human Development Index is 0.20 larger in Arab countries than in SSA countries, and government is more effective in these countries than in SSA countries. The government effectiveness index is 0.3 larger for Arab Africa than in SSA and these differences are statistically significant at the 1% level. GDP per capita and population are also significantly larger in Arab Africa than in SSA. Although the difference in the control of corruption and profit tax is not statistically significant, Arab Africa has a better control of corruption than SSA and its average profit tax is less than that of SSA. The differences between the two regions allowed the researcher to carry out robust checks for the relationship between informality and corruption. A division of the sample into two helps to check whether the investigated relationship is not regionally sensitive.

Another useful descriptive tool in econometric modelling is the scatter plot. The scatter graph provides the nature of relationship between two variables. Figure 5.4 presents a scatter plot of the informal sector size and its determinants (corruption, HDI, profit tax and government effectiveness). The data from all the 46 African countries over 16 years supports the theoretical findings that there is a negative relationship between the size of the informal sector and corruption control (refer to Figure 4.9.2 in Chapter 4), and between the size of the informal sector and economic development as measured by HDI.

The findings in Figure 5.4 indicate that the relationship between the size of the informal sector and government effectiveness is just the same as that of the informal sector size and control of corruption. The graphs generally provide a useful implication that the control of corruption is closely associated with government effectiveness. In other words, the two variables measure the same thing, hence cannot be included in the same regression.

Like the control of corruption, the association between government effectiveness and the size of the informal sector is negative. Countries whose governments are very effective, with a government effectiveness index closer to 1, have very small underground economies. Botswana, Tunisia, South Africa, Morocco, Namibia, Ghana and Rwanda are examples of African countries with effective governments and with very small underground economies. Countries such as Zimbabwe, DRC, Nigeria, Equatorial Guinea and Chad have highly ineffective governments. In these countries, the underground economy is also large. When governments are ineffective, they fail to control corruption and when corruption is high, governments become ineffective. Therefore, the two variables measure the same thing.

However, the relationship between profit tax and the informal sector size is positive as buttressed by theory. High profit tax in the formal sector may force entrepreneurs to prefer operating in the underground economy as also proved by theory.

Figure 5.4: Scatter Plots for Informal Sector Size and its Determinants
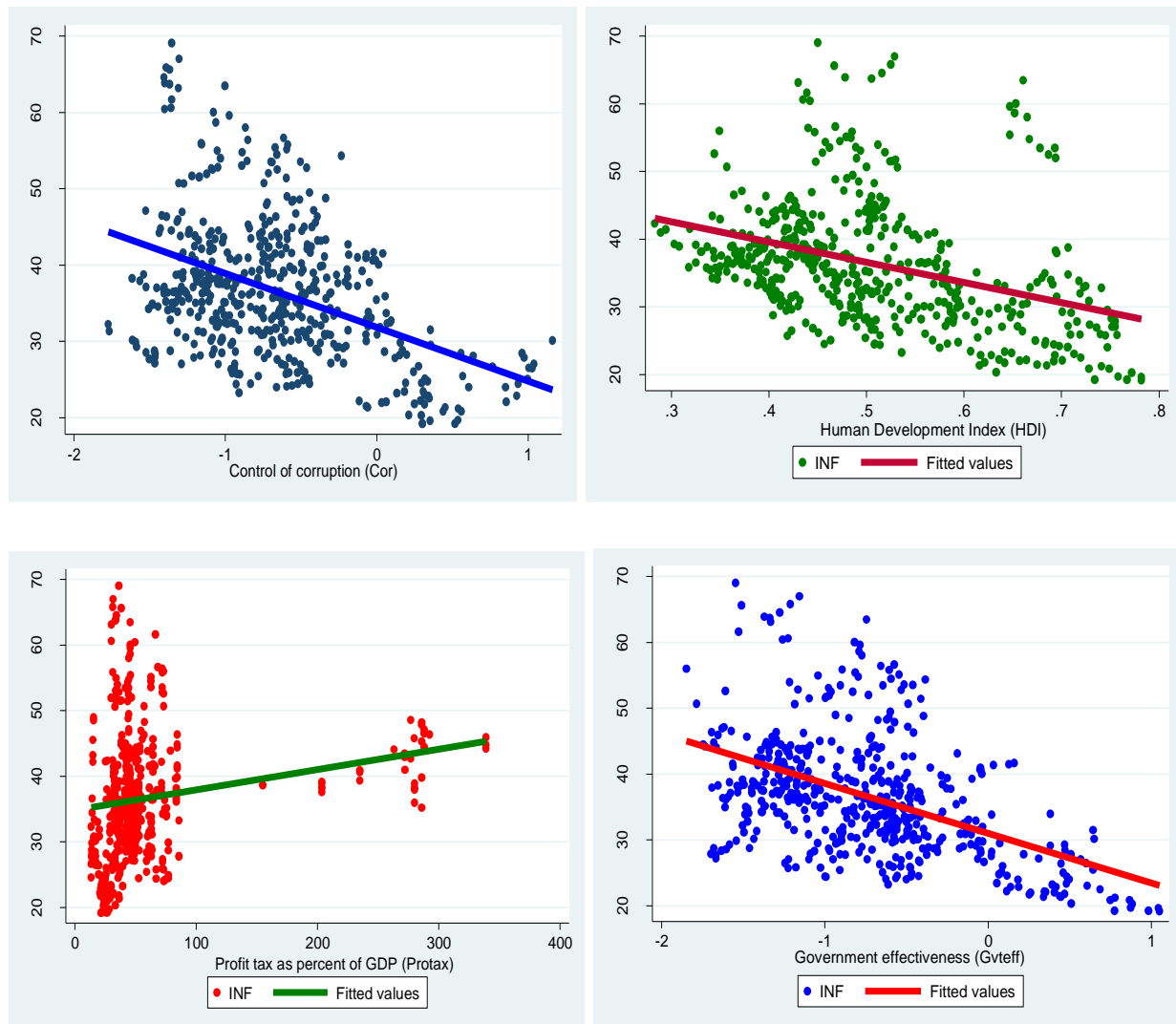
Source: Author's Own Illustrations

The size of population is closely associated with unemployment, which in turn influences the size of the informal sector. High unemployment tends to drive job seekers into informal activities. Countries such as Nigeria, Ethiopia, Egypt and DRC have the largest population in Africa, while Benin, Botswana, Lesotho, Swaziland, Gabon and Zimbabwe, among others, and have smaller populations. These smaller countries (Zimbabwe and Gabon) have very large underground economies. Figure 5.5 presents the relationship between the size of the informal sector and population size.

Figure 5.5: Scatter Plot for Informal Sector Size and Population Size
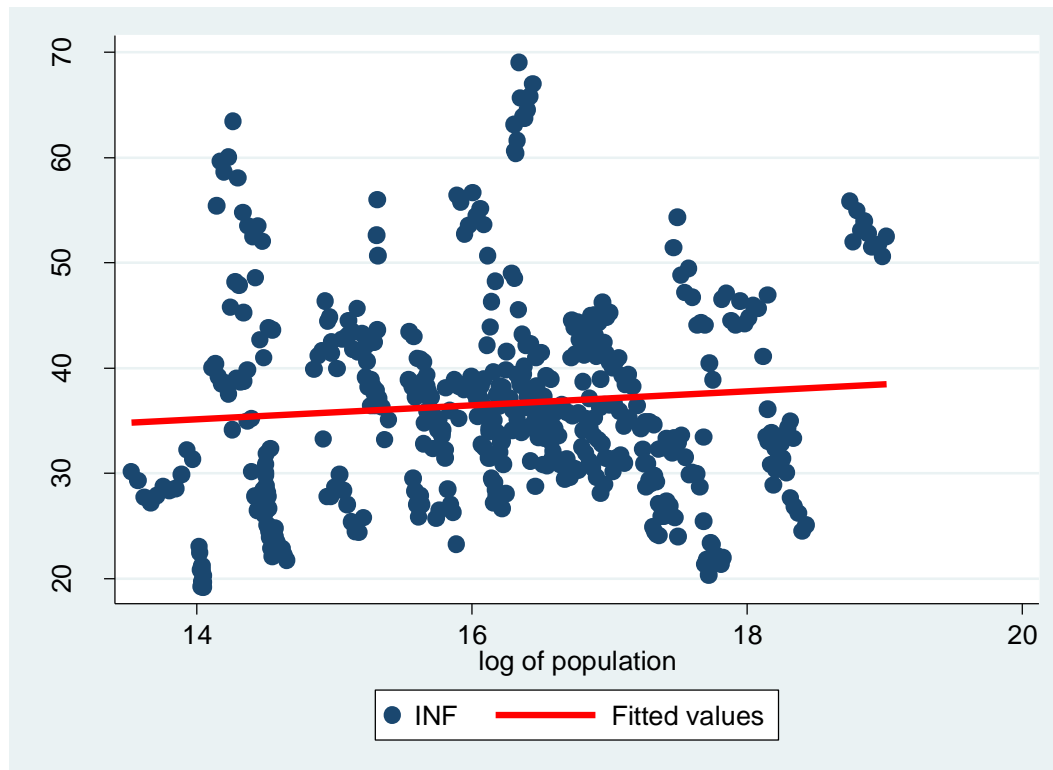
Source: Author's Own Illustration

Despite demonstrating a positive association between the log of population size and the size of the informal sector, Figure 5.5 shows that the relationship is weak. The size of the informal sector seems to be constant with population. Only Nigeria has a very large population and a large underground economy. Countries such as Egypt and Ethiopia have very large populations but with relatively smaller informal sectors.

In summary, the descriptive statistics, in particular the scatter plots, demonstrate that the control of corruption, government effectiveness and economic development as measured by HDI are negatively associated with the size of underground economy. The negative association between the control of corruption and the size of the informal sector entails that corruption increases the size of the underground economy. This finding supports the theoretical arguments derived in Chapter 4 which demonstrate that the control of corruption leads to reduction in the supply of corruption, which in turn reduces the number

of informal economy participants. The other channel in which the control of corruption reduces the number of the informal sector size is through its impact on the price of corruption or bribe. Strict corruption control pushes inspectors to demand a risk premium and hence higher bribes, thereby reducing the number of entrepreneurs who may be willing to participate in corrupt activities. Entrepreneurs will prefer formalised to underground operations when the price of corruption shoots up.

The scatter plots generally substantiate the theoretical assertion that a market for corruption exists and that the price of corruption (bribe) is inversely related to the demand for corruption. Corruption control efforts shift the supply curve of corruption to the left, thereby pushing the bribe up and reducing the number of participants in the informal sector. High corruption from an ineffective government shifts the supply curve of corruption to the right, thereby reducing the price of corruption and increasing the number of participants in the informal sector. In other words, corruption is positively associated with the size of the underground economy.

5.3 Pre-Estimation Tests

Regression data with long time spans must be stationary to avoid spurious regressions as explained in Chapter 4. In addition, one of the regression assumptions is the absence of multicollinearity amongst the explanatory variables. Hence, further data cleaning and testing were carried out. Multicollinearity was checked using a correlation matrix. The results are presented in the correlation matrix in Table 5.4

The results in Table 5.4 show that there is no serious problem of multicollinearity except for the control of corruption (Cor) and government effectiveness ($Gvteff$). The problem of multicollinearity is likely to be present if the magnitude of the correlation coefficient exceeds 80% (see Gujarati, 2008). The correlation between the control of corruption and government effectiveness is way above 80%; at 86%, it is large enough to suggest the presence of multicollinearity. These findings buttress the explanation provided in the scatter plots above. As a result, the two variables were not applied in the same regression.

Table 5.4: Correlation Matrix

	HDI	Cor	Protax	Pop	Gdppc	Gvteff
HDI	1.00					
Cor	0.38	1.00				
Protax	-0.31	-0.33	1.00			
Pop	0.07	-0.11	0.01	1.00		
Gdppc	0.64	0.09	-0.17	-0.11	1.00	
Gvteff	0.56	0.86	-0.38	0.01	0.18	1.00

Source: Author's Own Computations

The Levin-Lin-Chu and the Fisher-type panel unit root results are presented in Table 5.5. The test's null hypothesis under the Levin-Lin-Chu test states that all panels contain unit roots. A rejection of the null hypothesis indicates that at least one panel is stationary. However, the Levin-Lin-Chu does not apply to variables with some missing observations such as HDI, profit tax and population. The Fisher-type was therefore applied to these variables with some missing observations. Both tests show that all variables are stationary.

The results in Table 5.5 demonstrate that for each variable at least one panel is stationary. In this case, there is no problem of spurious regressions even if the variables are applied in their raw form.

Table 5.5: Levin-Lin-Chu and Fisher-type Panel Unit Root Results

Variable	Type of Test	t-Statistic	p-value	Conclusion
INF	Levin-Lin-Chu	-5.037	0.000	Stationary at 1%
Cor	Levin-Lin-Chu	-2.600	0.005	Stationary at 1%
HDI	Fisher-type	-2.857	0.002	Stationary at 1%
Protax	Fisher-type	-5.229	0.000	Stationary at 1%
Gdppc	Levin-Lin-Chu	-7.430	0.000	Stationary at 1%

Variable	Type of Test	t-Statistic	p-value	Conclusion
$Gvteff$	Levin-Lin-Chu	-7.020	0.000	Stationary at 1%
$GDPgrowth$	Levin-Lin-Chu	-10.420	0.000	Stationary at 1%
Pop	Fisher-type	-7.864	0.000	Stationary at 1%

Source: Author's Own Estimations

5.4　　　　Econometric Findings

5.4.1　　　Estimated Models

As explained in Chapter 4, in order to account for endogeneity, control of corruption was instrumented using the predicted values of corruption control given the size of the population. The mean of the instrument is -0.67 just slightly above the mean of control of corruption, which is negative 0.68. The minimum of the instrumented control of corruption is -1.00 while the maximum is -0.63. These statistics do not significantly deviate from the non-instrumented control of corruption variable. The five models presented in Table 5.6 are estimated using different estimators.

The first pooled model in Table 5.6 is estimated using the Ordinary Least Squares (OLS) technique, while the second Fixed Effects (FE) model is estimated using within estimator and with a different measure of economic development. The second model has GDP per capita as a measure of economic development, while the first uses HDI as a measure of economic development. The third model, again the Fixed Effects (FE) model, applies the within estimator or the Least Squares Dummy Variable ($LSDV$) estimator with HDI as a measure of economic development, whereas the fourth model, the Random Effects (RE) model, applies the Generalised Least Squares (GLS) technique.

The coefficient of HDI in the third model is significantly larger than that of GDP per capita in the second model. The major implication of this deviation is that previous studies which applied GDP per capita as a measure of economic development largely underestimated the impact of economic development on the size of the informal sector. Finally, the fifth model, the Arrelano-Bond, applies the Generalised Methods of Moments (GMM)

technique. The Arrelano-Bond model is a dynamic model that takes into consideration the effect of the current size of the informal sector on the future size of the informal sector, or the impact of the size of the informal sector during the previous period on the current size of the informal economy.

Table 5.6: Models of Informality Determinants

VARIABLES	Model 1 (*Pooled*) INF	Model 2 (*FE*) INF	Model 3 (*FE*) INF	Model 4 (*RE*) INF	Model 5 (*Arrelano − Bond*) INF
HDI	-18.34***		-72.30***	-63.99***	-49.36***
	(3.75)		(4.94)	(4.61)	(7.137)
Cor_instr	-5.94***	-2.79***	-2.35***	-2.48***	-1.998*
	(0.73)	(0.95)	(0.80)	(0.76)	(1.070)
$Protax$	-0.003	0.01**	-0.003	-0.002	0.008
	(0.008)	(0.004)	(0.004)	(0.004)	(0.005)
$Gdppc$		-0.001***			
		(0.0002)			
$L.INF$					0.185**
					(0.083)
$Constant$	41.91***	35.98***	71.51***	67.35***	52.74***
	(2.23)	(0.80)	(2.63)	(2.77)	(6.33)
Observations	486	498	486	486	398
R-squared	0.234	0.249	0.352		
Sagan test					134.4***

Note: $L.INF$ means a lag of INF in the dynamic model and the numbers in parenthesis are standard errors. (***), (**) and (*) means statistically significant at 1%, 5% and 10%, respectively. The Sagan test rejects the null hypothesis that over-identifying restrictions are valid in the GMM model.

Source: Author's Own Estimations

The five models in Table 5.6 unanimously show that the association between the control of corruption and the size of the informal sector is negative. In other words, the findings buttress the theoretical findings. This result is independent of estimation technique. Similarly, the findings from the five models show that economic development is negatively associated with the size of the informal sector and GDP per capita. However, the impact of GDP per capita on the size of the informal sector is very small. The results from the five models further show that the impact of profit tax on the informal sector is significantly smaller than the impact of HDI on the size of the informal sector. The implication of such findings is that previous studies which have used GDP per capita as a proxy for economic development grossly underestimated the impact of economic development on the size of the informal sector in Africa.

Economic theory explained in chapters 3 and 4 suggests that on the one hand control of corruption reduces the level of informality while on the other hand, high levels of informality may make it difficult for governments to control corruption. This is the issue of endogeneity explained in the preceding sections. In this regard, this study also examined the impact of informality on the control of corruption in Africa. The results are presented in Table 9. Three models (6, 7 and 8) are estimated using different techniques. Model 6 is fixed effects, model 7 is random effects, while model 8 is fixed effects but estimated using an instrument for INF. INF, like control of corruption, was instrumented using HDI and the size of population.

Table 5.7: Impact of Informal Sector Size on Control of Corruption

VARIABLES	Model 6 FE Cor	Model 7 RE Cor	Model 8 FE with instrumented INF Cor
INF	-0.0110***	-0.0110***	
	(0.00266)	(0.00256)	
HDI	1.418**	0.193	2.189***
	(0.571)	(0.333)	(0.607)
$Protax$	0.000129	0.000148	0.000167

VARIABLES	Model 6 FE Cor	Model 7 RE Cor	Model 8 FE with instrumented INF Cor
	(0.000210)	(0.000211)	(0.000213)
lPop	-0.605***	-0.144***	
	(0.156)	(0.0540)	
INF instrument			-0.0274***
			(0.00711)
Constant	8.837***	1.960**	1.449***
	(2.312)	(0.851)	(0.548)
Observations	482	482	482
R-squared	0.072		0.035
Number of Country code	45	45	45

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: Author's Own Computations

The findings in the three models in Table 5.7 demonstrate that increased informality has a negative impact on corruption control. Countries with larger informal economies find it difficult to control corruption. A percentage growth in the size of the informal sector reduces control of corruption index by 0.011% in models 6 and 7. This magnitude is consistent irrespective of the method of estimation applied. If we instrument the endogenous INF, then the impact of informal economy size on corruption control marginally worsens, but the nature of the relationship remains the same. A percentage growth in the size of the informal sector will therefore reduce the control of corruption index by 0.027 points. In all of the three models, the impact is statistically significant at 1% level.

In the first two models in Table 5.7, a larger population reduces the effectiveness of government in corruption control. A percentage growth in population reduces control of

corruption index by 0.006% in the FE model, and by 0.001% in the RE model. Although the magnitudes of these estimates may not be taken seriously, their sign is crucial. It indicates that population growth implies additional effort by governments in corruption control.

In order to explain the magnitude of the impact, it is important to select the most appropriate models from the models presented in tables 5.6 and 5.7. In addition to selection of the model, the study did robust checks by separating the sample into SSA and Africa-Arab countries. In the model for corruption control presented in Table 5.7, all of the three models suggest the same impact of informal economy size on control of corruption. Hence, the result is unanimous and any of the three models can be used to analyse the impact of informal sector size on control of corruption. However, in this thesis, the model with instrumented INF (model 8) was selected because it is free of endogeneity.

5.4.2 Model Selection

As discussed in Chapter 4, the results of model selection are presented in Table 5.8. All of the three null hypotheses stated in 4.10.4 are rejected. First, the F-test rejects the hypothesis that country-specific terms are similar. In other words, the pooled effects model is rejected in favour of the fixed effects model. Second, the Breusch-Pagan test rejects the null hypothesis that the pooled effects model is more appropriate than the random effects model. Hence, both random effects and fixed effects models are selected over the pooled effects model. Third, the Hausman test rejects the random effects model in favour of the fixed effects model.

Table 5.8: Selection of the Most Appropriate Model

Test	Statistic	p-value	Decision
Pooled vs. Fixed: **F-test**	$F(44, 438) = 107.634$	0.000	Fixed is more appropriate
Pooled vs. Random: **Breusch-Pagan**	Chi-square(1) = 1853.89	0.000	Random is more appropriate

Test	Statistic	p-value	Decision
Fixed vs. Random: Hausman Test	Chi-square(3) = 26.02	0.000	Fixed is more appropriate

Source: Author's Own Estimations

The findings from the fixed effects model are therefore more appropriate than the findings from the pooled and random effects models. The results support the guidelines provided by Maddala (1987), Balestra (1992) and Baltagi (1995) among others that the fixed effects model is a more appropriate specification if the sample is closed or exhaustive. In this case, the sample size is very close to the population size. Hence, the fixed effects model is defined.

5.4.3   Diagnostic Tests

The findings show that there is a problem of heteroscedasticity if the FE results are applied. The summary of heteroscedasticity and cross-sectional dependence or autocorrelation is presented in Table 5.9. The results show that there exists a problem of heteroscedasticity and cross-sectional dependence. The presence of heteroscedasticity is further shown in Figure 5.6. This therefore suggests model (5) or the dynamic specification as the best model.

Table 5.9: Diagnostic Tests

Test	Name	p-value	Decision
Heteroscedasticity	F-test	0.000	Heteroskedastic variances
Cross-sectional Dependence	Pesaran	0.000	There is a problem of dependence

Source: Author's Own Estimations

As explained in Chapter 4, the dynamic specification is the best model in the presence of heteroscedasticity. The GMM estimator from the dynamic specification is efficient even under heteroscedasticity.

Figure 5.6: Heteroscedasticity
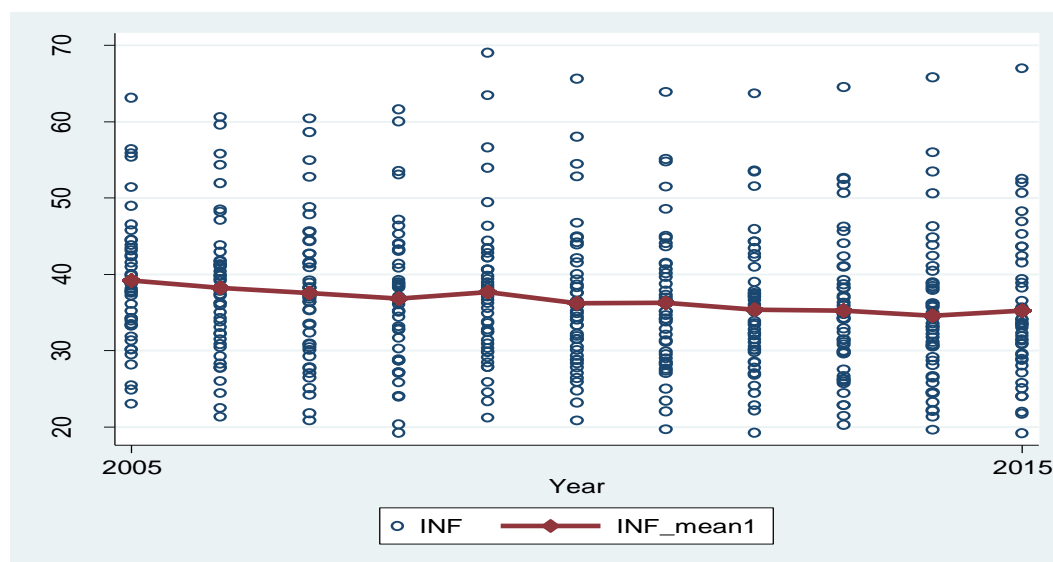
Source: Author's Own Illustration

5.4.4 Controlling for Country-Specific Effects

The Fixed Effects model has the advantage of controlling for country-specific unobservable variables or terms. When country-specific heterogeneity is taken into consideration as in Appendix B, the impact of corruption control and economic development on the size of the informal sector is clearly established. The LSDV estimator provides the findings in Appendix B and these findings control for omitted country-specific variables. The results are similar to those presented in Table 8 in the Fixed Effects model. They are, however, not efficient as those of the Allerano Bond results because of the presence of heteroscedasticity. Nevertheless, the fixed effects (FE) or LSDV results have the same intuition as those from a dynamic model. Hence, without taking into consideration the magnitudes of the coefficients, the effect of control of corruption in the FE model is similar to what is portrayed by the dynamic model.

The coefficients of country dummies presented in the LSDV model of Appendix B are all negative and statistically significant at 1% level except for that of Gabon, which is positive but still statistically significant at 1%. Since Zimbabwe is presented as the base or reference country in the model, the findings imply that the size of the informal sector is

significantly larger in Zimbabwe compared to other African countries except Gabon. Gabon's informal sector size is 7.6% larger than that of Zimbabwe. In Zambia, the size of the informal sector is 18.4% smaller than that of Zimbabwe. Coefficients of country-specific dummies illustrate the size of the informal sector in the associated country relative to the reference country. The country-specific dummy variable model portrays the same findings presented graphically in Appendix A.

5.4.5　　　　Period Heterogeneity

The findings for period-specific heterogeneity are presented in Table 5.10 and in Appendix C, while the test results (testparm) for period heterogeneity are presented in Appendix D. The results demonstrate that the informal sector started to show a significantly larger size than that of 2005 as from 2009 up to 2015. In model 9, an additional variable (population) is added but the results still demonstrate that the size of the informal sector in Africa started to grow larger than what existed in 2005 as from 2009. These period coefficients are statistically different from zero as also supported by the F-test (testparm) presented in Appendix D, which rejects the null hypothesis that all coefficients of year dummies are simultaneously equal to zero.

Table 5.10: Period Heterogeneity

VARIABLES	(9) INF	(10) INF
HDI	-110.0***	-115.1***
	(13.3)	(13.18)
Cor	-1.828**	-2.731***
	(0.81)	(0.826)
Protax	-0.00302	-0.00247
	(0.00373)	(0.00367)
2006.Year	-0.194	-0.134
	(0.534)	(0.525)

VARIABLES	(9) INF	(10) INF
2007.Year	0.0797	0.214
	(0.564)	(0.556)
2008.Year	0.223	0.411
	(0.609)	(0.602)
2009.Year	2.090***	2.337***
	(0.670)	(0.665)
2010.Year	1.555**	1.866**
	(0.738)	(0.735)
2011.Year	1.702**	2.069**
	(0.804)	(0.803)
2012.Year	1.790**	2.332***
	(0.892)	(0.897)
2013.Year	2.181**	2.755***
	(0.942)	(0.950)
2014.Year	1.983**	2.633***
	(0.997)	(1.009)
2015.Year	3.105***	3.824***
	(1.047)	(1.058)
Pop		-0.000
		(0.000)
Constant	89.52***	91.90***
	(6.383)	(6.329)
Observations	486	482

VARIABLES	(9) INF	(10) INF
R-squared	0.387	0.402
Number of Country Code	45	45

Note: Standard errors in parentheses; *** denotes $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Author's Own Estimations

The findings in Table 5.10 show that informality is an increasing function of time in Africa since 2009. For example, the size of the informal sector significantly increased as from 2009 compared to the levels of 2005. In 2009, the size of the informal sector was at least 2.1 larger than that of 2005 and in 2015 it was at least 3.1 larger than that of 2005. One major issue that may explain growth of the informal sector in Africa as from 2009 is the global financial crisis, which negatively affected many formal firms on the continent. One major implication of this finding is that global developments play a major role in the development of the informal sector, particularly in poor countries. Although previous studies on the causes of informality largely ignored global factors, the findings suggest that the size of the informal sector in Africa increased significantly just after the beginning of the global financial crisis. This may be a coincidence, but the findings indicate that the growth of the informal sector responded to a major event in 2009. There is a significant structural break which occurred in 2009. However, the major event that occurred during this period is the global financial crisis.

The results demonstrate the importance of including global factors when studying drivers of informality in poor countries. Future studies must supplement internal and regional determinants with global determinants.

5.4.6 Robustness Checks

In order to check the robustness of our findings, the study divides Africa into two sub-samples (West and North) to check whether the results remain consistent. The results from the sub-samples and the whole sample are presented in Table 5.11. The findings show that the association between control of corruption and the size of the informal sector

is negative in all sub-sample cases. The same applies to the association between informality and economic development. As in different estimation techniques, the relationship between the degree of informality and control of corruption and that of degree of informality and economic development consistently remain negative despite having varying magnitudes. In all of the three models, a unit improvement in the control of corruption reduces the size of the informal economy by at least 2%. Similarly, the impact of HDI on the size of informal economy is consistently negative, while that of profit tax is also consistently insignificant.

Table 5.11: Comparing Results from Africa and its Sub-Samples

VARIABLES	Model (3) Africa	Model (11) South/East Africa	Model (12) North/West Africa
	INF	*INF*	*INF*
HDI	-72.30***	-70.67***	-73.94***
	(4.94)	(6.00)	(8.15)
Cor_instr	-2.35***	-1.97**	-2.63**
	(0.80)	(0.95)	(1.35)
Protax	-0.003	-0.009	0.007
	(0.004)	(0.007)	(0.006)
Constant	71.51***	70.82***	71.83***
	(2.63)	(3.19)	(4.46)
Observations	486	486	398
R-squared	0.352	0.322	0.323

Note: The numbers in parenthesis are standard errors. (***), (**) and (*) means statistically significant at 1%, 5% and 10%, respectively.

Source: Author's Own Estimations

The implication is that the results are robust and cannot be altered by the type of estimation technique and the sample size. The results in model 3 in Table 13 are the same as those presented in Table 8. Only models (11) and (12) are new models based

on sub-samples of the population. Model (11) is for Southern and Eastern Africa while model (12) is for Northern and Western Africa. Robustness checks therefore support the theoretical assertions that control of corruption reduces corruption supply, thereby pushing the price of corruption up, which in turn reduces the number of informal sector participants.

5.4.7 Findings

First, the findings support the assertion that control of corruption decreases the size of the informal sector in Africa. In addition to this, the results show that control of corruption is endogenous in the model, hence the two are complements as also established by Dreher and Schneider (2006). Hypothesis 1 which states that the control of corruption reduces the size of the underground economy cannot be rejected. This also confirms the theoretical developments by Hindriks *et al.* (1999) as well as the operations of the invisible corruption market explained in Chapter 4.

Second, the second hypothesis that a larger underground economy reduces the control of corruption index cannot be rejected. When the informal sector becomes larger, corruption increases, thereby making it difficult to control it. Thus, the findings support the assertion of joint causality between informal sector size and the control of corruption. Each of the two variables drives the other, that is, both the control of corruption and the informal sector size are endogenously determined. This finding suggests that in any modelling of corruption and the informal sector growth, the issue of endogeneity cannot be taken for granted. Endogeneity must therefore be addressed wherever informality and corruption are related.

Third, since both corruption control and the size of the underground economy are jointly determined as supported by the results of hypotheses 1 and 2, the two variables can be regarded as complements in Africa. Thus, the hypothesis that corruption control and the size of the informal sector are complements cannot be rejected. Unlike in developed countries where the size of the shadow economy and corruption are substitutes (see Dreher and Schneider, 2006), the findings show that the two are complements in Africa.

Fourth, there is no statistical evidence to support the hypothesis that high profit tax discourages entrepreneurs to formalise in Africa. The results show that the coefficient of profit tax is statistically insignificant in all models. This also applies to the impact of profit tax on corruption control in the control of corruption model. The impact of profit tax on control of corruption is statistically insignificant. Therefore, the hypothesis that high profit tax discourages formalisation is rejected and there is also statistical evidence to suggest that profit tax has no impact on corruption control.

Fifth, the hypothesis that economic development reduces the level of informality cannot be rejected. There is strong statistical evidence to support that an increase in economic development significantly reduces the size of the informal sector. In addition, the findings show that countries with a higher level of economic development have a better index for corruption control, hence a smaller size of informality.

Sixth, the findings show that the negative association between the control of corruption and the size of the informal sector is negative for both the Northern and Southern regions of Africa. However, the impact is bigger in the Northern region. In North Africa, a marginal improvement in corruption control has a bigger return in reducing the size of the informal sector compared to the Southern block of Africa.

Finally, the hypothesis that the global financial crisis increased the size of the informal sector in Africa cannot be rejected. There is statistical evidence that before 2009, the size of the informal sector remained fairly constant in Africa. In particular, there is no statistical difference among the sizes of the underground economy in 2005, 2006, 2007 and 2008 in Africa. The results, however, indicate a significant increase in the size of the underground economy as from 2009 during the initial phases of the global financial crisis.

5.4.8 Analysis and Discussion of the Findings

5.4.8.1 Informality and Corruption Control

The findings generally support the theoretical assertions that the size of the informal sector is negatively associated with the control of corruption and the level of economic development. African countries with high levels of corruption or low levels of corruption

control have larger underground economies compared to those with low levels of corruption. Using results from the most efficient dynamic model (5) and the FE models (3) and (4) presented in Table 5.6, an increase in corruption control by one index point will reduce the size of the informal sector by 2 percentage points. The results remain the same even if country heterogeneity is controlled for as in the fixed effects model (3). The findings confirm the theoretical models developed by Johnson *et al.* (1998) and Hindriks *et al.* (1999). The main implication of such findings is that a one-point improvement in the corruption index cannot be taken for granted in the management of the informal sector. African countries facing challenges in controlling the escalating shadow economies can significantly reduce the size of the informal sector through corruption control.

With regards to the relationship between the control of corruption and the size of the underground economy, the findings further support that the two are complements. While, on one hand, a one-point improvement in the control of corruption reduces the size of the informal sector by two percentage points, on the other hand a percentage growth of the size of the underground economy reduces the index of corruption control by 0.027 percentage points in model 8 of Table 5.7. Model 8 is the corruption control model with instrumented underground economy size. Similarly, using the other two models 6 and 7 in Table 5.7, the findings still show that a growing informal sector makes it difficult to control corruption. The results therefore suggest that control of corruption and the size of the underground economy are complements in Africa.

Similar findings showing that corruption and informal economy size are complements in less developed countries were established by Dreher and Schneider (2006). The main policy implications for these findings in Africa is that an effective control of corruption will not only reduce corruption, but will also solve the problem of a growing underground economy in most of these countries. Similarly, policies that effectively formalise the informal activities and reduce the size of the underground economy will not only go a long way in providing decent work, but will also help in corruption control. In some of the countries such as Zimbabwe where the size of the underground economy is extremely large, corruption control is already a major problem. The large underground economy is making it difficult for the government to control corruption. For instance, in 2019 the

Government of Zimbabwe illegalised/banned the use of United States dollars as a local currency, but this did not terminate its use. It is still widely used in the informal markets. The implication is that when the size of the underground economy grows larger, corruption will also increase, and controlling it will require additional effort from regulators. The operations are underground and all payments can be done through informal channels, making it difficult for regulators to control these operations and the associated corruption.

Whereas the findings support previous studies that link corruption to the growth of an underground economy, they refute the transmission mechanism established by Gajigo and Driemeier (2012). Their study established that payment of bribes pushes firms to move away from formality to informality even after start-up. The findings in this study, however, suggest that payment of bribes by firms already in the formal sector simply pushes them to comply and discard corruption. Bribes are directly related to the supply and demand for corruption in the corruption market. Increased bribes for firms that are already operating in the formal sector can simply force them to comply.

A rational entrepreneur registered in the formal sector has already made a decision to enter the formal sector instead of the informal sector based on a cost-benefit analysis. He/she only formalises his/her operations if the benefits from formalisation exceed the benefits from underground operations. This means that an individual who has formalised and is compliant will not find a need to pay a bribe after a start-up. The only reason to pay a bribe when formalised is to avoid the compliance costs and thereby extend the initial gap between benefits from formalisation and benefits from underground operations (greed or appetite for more profit). However, if the bribe remains below the compliance cost, rational entrepreneurs will remain in the formal sector because the benefits from formalisation will still be larger than the benefits from the informal economy. If bribe costs are at least as large as the compliance costs, rational entrepreneurs will simply comply, remain in the formal sector and avoid paying bribes. The benefit will still be larger in the formal sector than in the informal sector unless some structural changes occur later after the decision to formalise has been made.

The findings in this study indicate that high corruption or lack of corruption control increases corruption supply and pushes the price of corruption (a bribe) down, thereby increasing the number of entrepreneurs who participate in the corruption market. These entrepreneurs then decide to operate underground because of the lower bribes they pay relative to compliance costs. One of the contributions of this study, therefore, is the provision of an explanation on how corruption translates to bribes, then to informality. Unlike previous studies, for instance, Gajigo and Driemeier (2012) which suggested than high bribes drive formal operators to the underground economy, this study established that it is low bribes from high corruption levels which drive new entrepreneurs underground. High and punitive bribes have an effect of pushing underground entrepreneurs to go formal. Furthermore, the findings in this study buttress the assertion that entrepreneurs only participate in the corruption market if they do not want to comply. In this case, corruption is more prevalent in the informal economy, and for those in the formal economy, corruption is a result of greed.

Complementarity of corruption control and the size of the underground economy imply that countries can target one of the two in trying to reduce informality and corruption. In countries where corruption is high and the size of the informal sector is also large, it is important to target reducing the number of players in the informal sector. Governments must look at exogenous factors such as population size and components of HDI (education, health and economic growth) in order to reduce the size of the informal sector. Alternatively, additional effort or more resources must be directed towards corruption control in order to reduce both corruption and the size of the informal sector.

In addition, the findings that corruption and informality are complements have some crucial policy implications regarding the awareness of policy makers. When policy makers are faced with a serious problem of informality, they should automatically know that corruption may also be prevalent, and the reverse is true. Countries such as Benin, Gabon, Nigeria and Zimbabwe have very large informal sectors, hence they are associated with high levels of corruption. Control of corruption is made difficult due to the fact that most economic activities are conducted covertly. Generally, the findings

demonstrate that the fight for informality is a double-hurdle, and the same holds for corruption.

A transition from the informal sector to a formalised economy can be done through an effective corruption control. Governments facing serious challenges of informal operations may put in place strong measures that discourage regulators from practising corrupt activities. Although many African governments have set anti-corruption institutions, corruption has continued to be highly prevalent in many of these countries. Anti-corruption commissions have largely remained toothless dogs in many countries. Strict measures such as prohibitive penalties for those involved in informal activities, or improved incentives for regulators that discourage them from being corrupt may equally provide a leeway of formalising large underground economies in Africa. The high regulatory intent but with low capacity has been identified as one of the major drivers of informality in African countries (De Soto, 2000). This low enforcement capacity is a breeding ground for corruption, which in turn propels underground activities.

While a transition from an underground economy to a formalised economy can be done through corruption control, the complementarity of corruption and informal activities makes it an uphill task for countries with large underground economies to formalise them. Corruption is already high in these economies and government effectiveness or capacity to regulate is too low. One of the major implications of this finding is that African countries with large underground economies may continue to experience growing informal economies due to lack of regulatory capacity. Proponents of a developmental state (see De Soto, 1989; Bromley, 1994) argue that one effective way of transition to a formal economy is to reduce regulation. Governments with large informal economies and low regulatory capacities can free themselves from excessive regulation of the business environment. In this way, no registration fees and inspectors are required for business operations. Businesses will freely formalise by simply registering their companies without any additional costs, leading to disappearance of informality and corruption in the informal sector.

Complementarity of corruption and informality in developing countries is an indication of the existence of excessive regulation but with low capacity to regulate. Countries with larger informal economies and high levels of corruption have too much appetite for regulation but they lack capacity to regulate. As long as the appetite to regulate entrepreneurs continue, informality and corruption will continue to increase because of the absence of capacity to control both corruption and informality. The best solution for countries without capacity to regulate is to go the classical or the Smithian way of doing business. These incapacitated countries can simply stop over-regulating businesses and allow free markets to operate. They need to remove all the registration costs and allow new enterprises to register freely. In this case, the concept of informality can be reduced.

Deregulation of businesses and removal of business registration costs stop governments from aiding growth of informal businesses and creation of corruption markets. In a number of African countries such as Gabon and Zimbabwe, informal businesses have become an anchor of their economies, hence destroying the informal economy may have detrimental effects on the economy and an attempt to formalise them may also lead to closure of a number of these informal businesses. A proper strategy is therefore required to preserve these businesses while at the same time trying to improve them. Deregulation and free registration are some of the ways to preserve these businesses and persuade them to formalise. In this case, no inspectors are required and businesses can freely conduct their operations, leading to the disappearance of informality-created corruption. The argument on deregulation is widely supported by the new school of thought in a developmental state.

5.4.8.2   Informality and Economic Development

The results show that an improvement from one level to another level of development can significantly reduce the size of the informal sector. The impact, however, varies depending on the measure of economic development. For instance, if HDI is used as a measure of economic development, the size of the informal sector will shrink by over 49 percentage points from an incremental economic development. The informal sector,

however, will shrink by less than one percentage point from an incremental development in cases where economic development is measured using GDP per capita.

Therefore, the lesson derived from these findings is that using GDP per capita as a proxy for economic development in the modelling of drivers of the informal sector can grossly underestimate the impact of economic development on the size of the informal sector. The implication is that previous studies which widely used GDP per capita as a proxy for economic development underestimated the impact of economic development. Countries with better levels of economic development such as Algeria, Botswana, Mauritius, Namibia and South Africa have very relatively small underground economies in the context of African economies. As countries develop, the size of the underground economy declines.

For poor developing countries in Africa with large informal economies, one way of transition to formal economy is to develop their economies. Lessons can be obtained from fellow African countries or other progressing developing nations in order to improve the size of the formal economy. African countries with poor growth trends can change the fortunes of their economies through learning from others. Improving aspects or components of HDI such as education, life expectance and economic growth are crucial in the improvement of HDI, and hence formalisation.

5.4.8.3   Informality and Profit Tax

While previous studies in particular country case studies and cross-sectional studies found a significant association between taxation and the size of the underground economy (De Soto, 1989; Loayza *et al.*, 2005; Ingram *et al.*, 2007; Ali *et al.*, 2013), the findings in this study find no statistical evidence to support the hypothesis that high profit tax discourages entrepreneurs to formalise in Africa. In all of the estimated models except the Fixed Effects model (2) in Table 5.6, there is no other coefficient of profit tax which is statistically significant. Even in the corruption model, the coefficient of profit tax remains statistically insignificant. The findings of this study on the effect of tax rates on informality are consistency with the findings of Friedman *et al.* (2000).

Although very high in some African countries, profit tax has remained fairly stable or constant over the study period. However, in model (2) of Table 5.6 and in the scatter graph in Figure 5.4, profit tax has a positive association with the size of the informal sector. In general, a high profit tax in the formal economy discourages entrepreneurs from going formal as established by previous studies (see Loayza *et al.*, 2005; Ingram *et al.*, 2007; Ali et al., 2013). For model (2), a percentage point increase in the share of profit tax in GDP increases informal sector size by 0.01 percentage points. Nevertheless, using the selected models, there is no statistical evidence to support this association. In most of the models, the coefficient of profit tax is both economically and statistically insignificant. This is because profit tax has remained fairly constant. In the absence of variation, it will not have significant effect on the entrepreneur's decision to go underground.

The results generally suggest that regulating or controlling the surging underground economy requires more than just looking at taxation as the main discouraging factor in formalisation of businesses. Taxation may be important in some countries, but on average it is not a significant driver of informality in Africa. Hence, African countries must direct their efforts to institutional factors such as corruption control if they want to register progress in transition to formalisation.

5.4.8.4 Informality and its Memory

The results as demonstrated in model (5) of Table 5.6 show that the level of the informal sector has a memory. A bigger informal sector today is likely to propel the level of the informal sector in the future. The findings show that a growth of the informal sector by one percentage point today will push the informal sector by about 0.185 percentage points in the following year. Informal activities produce seeds of informality. The main implication from this finding is that once a country becomes largely informal, it will be pushed deeper into the shadow economy. Hence, good institutions such as effective control of corruption and effective governance are required to break the cycle.

The positive association between the current size of the informal sector and its future size is an indication of a persisting informal economy growth. The cycle will continue unless

African governments apply more effort in correcting the institutional problems. Strong institutions are required to stop the ever-growing informal sector. With lack of regulatory capacity, a growing informal sector can continue to expand and create more opportunities for corruption. The main policy implication of such findings is that a failure to control or regulate underground activities in the current period provides a more difficult task of regulating a bigger underground economy in the following years. In this case, it is important for African governments to start thinking about proper policies of formalising the underground activities without wasting any further additional time.

5.4.8.5   Informality and Global Developments

In line with previous studies that indicate that global developments have some implications on the growth of underground economies, the findings demonstrate that the size of the informal sector in Africa started to grow significantly in 2009 during the beginning of the global financial crisis. Previous studies (for example, Standing, 1999; Carr and Chen, 2001) argue that globalisation of economies and structural adjustments in the 1990s contributed significantly to the growth of underground economies in various countries. Similarly, the findings presented in models (9) and (10) of Table 5.10 with time dummies or period-specific terms show that as from 2009, the size of the underground economy in Africa started to grow larger than what is was in 2005.

The results in model (9) show that there are no statistical differences in the size of the underground economy during the years 2005 to 2008 where 2005 was used as a base or reference period. However, the findings show that in 2009, the size of the underground economy in Africa was 2.09 percentage points larger than that of 2005. This difference is statistically significant at 1% level. In 2010, it was 1.56 percentage points larger than that of 2005, and by 2015 it was at least 3 percentage points larger than that of 2005. The size of the informal economy in Africa has continued to increase since the beginning of the global financial crisis. The statistical evidence clearly shows a significant response of the size of the informal sector to the global financial crisis. The coefficients of year dummies and their statistical significance in Table 5.10 show a pattern which clearly

demonstrates the influence of the global financial crisis on the size of the informal economy in Africa.

The finding that the structure of African economies significantly responds to global economic developments and are prone to these changes has some crucial policy implications for African governments. In this surging globalisation, underground economies may continue to sprout and grow in many African countries. African countries are over-reliant on foreign investment for national output growth and employment creation. In this case, most of these countries are going to face more problems and will experience an ever-growing informal sector if inward looking policies are not urgently implemented. The impact of the global financial crisis is a clear indication that if foreign investors fail to invest in Africa, then most African countries will continue to have a large gap between available jobs and job seekers. These excess job seekers will then be forced into the informal sector.

The other implication of these findings is that without mitigation measures to cover global risks in employment creation, many African countries may continue to face the problem of informalisation. Countries must prepare for the impact of global developments on businesses and employment creation. Over-reliance on foreign investment is a breeding ground for a larger underground economy due to shocks from global financial crises. The results therefore demonstrate that efforts to formalise the underground economy does not only require policy makers to make domestic or internal factors right, but it also requires policy makers to prepare against global risks. In a changing global economy, measures must be put in place to protect formal entrepreneurs from being driven into underground operations.

5.5   Summary and Conclusion

This chapter presented the research findings, both descriptive statistics and the estimated models, and also analysed and discussed the findings. The scatter plots support the negative association between the control of corruption and the size of the informal sector. The theoretical assertions demonstrated using graphs in Chapter 4 have been empirically confirmed. Furthermore, the findings from the estimated models support the assertion

that corruption and the size of the underground economy are complements in Africa. In other words, both corruption and the size of the informal economy are endogenously or jointly determined. Solving either one of the two will have implications on solving the other.

A unique finding from the relationship between corruption and the size of the informal sector is in the transmission mechanism. While previous studies found an increase in bribes to increase the size of the informal sector, the findings in this study refute that, but rather establish that bribes are created in the corruption market. Hence, lack of corruption control or an increase in corruption pushes the price of corruption (bribe) down, thereby attracting more entrepreneurs to participate in the corruption market. In this way the size of the informal sector will grow. This study considered the principle of rationality in decision making. A rational entrepreneur registered as formal will not demand the corruption good if the price goes up, but will rather revert to comply.

Other factors that influence the size of the underground economy in Africa include the level of economic development, the previous condition of the size of the underground economy and global developments. Global economic crises increase the size of underground economies in Africa, while economic development reduces the size of the underground economies on the continent. In terms of inertia, a larger underground economy today begets a larger underground economy tomorrow. So, the findings point to a further growth of the underground economy in Africa if no additional effort is put in place to stop this surge.

The results further show that despite propelling the size of the informal economy, profit tax in Africa is not a serious impediment to formalisation. The findings demonstrate that the impact of profit tax on the size of the informal sector is not statistically significant in many of the models. Hence, many African countries must concentrate on other key factors in their attempt to formalise the surging underground economy.

CHAPTER 6: OVERALL CONCLUSIONS

6.1　　　Summary and Conclusion

The study investigated the impact of corruption on the size of the underground economy in African countries using a panel dataset for 46 countries. In addition, the study also investigated the possibility of a feedback relationship between corruption and the size of the informal economy in Africa. In other words, the study examined whether corruption and the size of the underground economy are complements or substitutes in Africa. The study also investigated the impact of other factors which include economic development, profit tax, regional differences, informality inertia and global developments on the size of the underground economy in Africa.

The following hypotheses were tested:

Hypothesis 1: Control of corruption reduces the size of the underground economy;

Hypothesis 2: Size of underground economy negatively impact on control of corruption;

Hypothesis 3: Control of corruption and informality are complements in Africa;

Hypothesis 4: High profit taxes discourage entrepreneurs to formalise in Africa;

Hypothesis 5: In Africa, economic development reduces the size of the informal sector;

Hypothesis 6: Global developments such as the global financial crisis increase the size of underground economies in developing countries.

In addition to these hypotheses, the study presented a model for corruption market, which derived and presented an assertion that lack of corruption control shifts the supply of corruption to the right, thereby pushing the price of corruption or the bribe down. It becomes more attractive for entrepreneurs to participate in the corruption market instead of complying. A decision-making entrepreneur will therefore prefer to go underground instead of incurring the required formalisation costs. The derived assertion states that corruption increases the size of the underground economy through its impact on bribe; a

deviation from some previous studies which argue that an increase in bribes forces formal firms to go underground. This study, however, provides an alternative model based on the assumption that decision-making entrepreneurs are rational. In other words, if an entrepreneur is faced with two choices today (A and B) and he/she prefers A to B, then in any basket with these two choices and additional choices, we expect a rational entrepreneur to select A or any new choice but not B. In economics, this is generally referred to as the axiom of revealed preference.

In making a decision to go formal or underground, an entrepreneur considers the benefits from each choice. If formal is preferred, then it means the benefits from formal are larger than those from informal, hence the entrepreneur will locate operations in the formal. A formally registered entrepreneur will participate in corruption and pay a bribe in order to enlarge the relative benefits of being in the formal sector. As long as the bribe is below the compliance costs, an increase in the bribe demand will not push a rational entrepreneur to operate underground because the initial choice still holds. When the bribe is at least larger than the compliance cost, the rational entrepreneur will comply and still be better off than being underground (the initial decision making status). Previous studies which considered formal entrepreneurs as being driven to operate underground by high bribes considered models with non-rational entrepreneurs. In this study, we therefore considered the decision to go formal or underground as an entry decision. Under rationality, effective corruption is therefore an informal sector activity.

In order to test the hypotheses and assertion explained above, a panel dataset of 46 African countries was applied spanning from 2005 to 2015. The advantages of such a dataset are explained in Chapter 4. The dataset was also sub-divided into two sub-samples to compare regional differences and also for robust checks. Descriptive statistics were carried out to clean the data and to check the nature of some assumed relationships. For instance, the scatter plots confirm the assertion explained in the preceding paragraph. Several panel data models were estimated using different techniques which include PE, RE, FE, Arrelano Bond, Period Heterogeneity and Country heterogeneity. Using different estimation techniques also allowed the researcher to carryout robust checks.

Descriptive findings confirm the theoretically derived assertion that the size of the underground economy is negatively related to the control of corruption and economic development. Scatter plots demonstrate a clear negative association between the control of corruption and the size of the underground economy. In other words, corruption is positively related to the size of the underground economy. The results support the assertion that corruption increases the size of the informal sector through its impact on the bribe. The transmission mechanism is through a black market for corruption. This market exists but is illegal. When bribes are low relative to compliance costs, then entrepreneurs will prefer to operate underground and continue to pay bribes.

While descriptive statistics provide crucial statistics regarding relationships between variables, these statistics cannot measure the impact. In this regard, some econometric analyses were carried out in order to answer the questions or evaluate the hypotheses and assertions. Several panel data models were estimated. In terms of robustness, the findings prove to be robust and endogeneity was corrected. The relationships are not sensitive to the method of estimation and the sample size. In all models, the control of corruption reduces the size of the informal sector despite having differing magnitudes. Whether it is a random effects or a pooled effects or a fixed effects or a dynamic estimation or a restricted model, the control of corruption remains negatively associated with the size of the underground economy. On the other hand, a growing informal sector increases corruption. Generally, the findings show that the size of the underground economy and corruption are jointly determined or they are complements.

Precipitously, the results show that an improvement in the control of corruption or government effectiveness reduces the size of the underground economy in Africa, while a growing underground economy is a breeding ground for corruption. The two variables are complements or jointly determined. Countries with large underground economies possess high levels of corruption and countries with high levels of corruption are associated with large underground economies. The complementarity of corruption and the size of the underground economy imply that policies that target one of the two will also help in tackling the other.

The results show that an increase in economic development reduces the size of the underground economy. The impact, however, varies with the measure of economic development applied. GDP per capita underestimates the impact while HDI provides a broader measure of economic development, and high impact. Countries at better levels of economic development such as Botswana and South Africa have smaller underground economies.

Other factors found to increase the size of the underground economy in Africa include global developments such as the global financial crisis and the current size of the informal sector. However, profit tax was found to have no significant impact on entrepreneurs' decision to go underground in many cases.

The following are the conclusions from the study findings: First, corruption and the size of the underground economy are complements in Africa. The two variables are jointly determined. Control of corruption reduces the size of the informal economy in Africa while larger underground economies promote corruption. Robustness test show that the impact of the control of corruption on the size of the informal economy is larger in West and North Africa and smaller in South and East Africa. Second, rational formal entrepreneurs cannot be forced out of the formal economy by high bribes. There is no incentive for rational entrepreneurs to move out of the formal sector due to increased bribes if the initial decision was done properly. Third, the decision to go formal or underground is an entry decision. Fourth, corruption increases the size of the underground economy through its impact on bribes in the corruption market. In other words, low bribe from high corruption drives entrepreneurs to go underground.

Fifth, global risks such as the financial crisis and globalisation increase the size of the underground economy in Africa. Sixth, a larger informal economy today begets a larger informal economy tomorrow. Seventh, economic development reduces the size of underground economies in Africa. Using GDP per capita in measuring economic development underestimates the impact of economic development on the size of the underground economy. Lastly, in aggregated data, profit tax is not a significant driver of informality in Africa.

Theoretically, the study has generally contributed new knowledge by deviating from previous studies with regards to the point of entry when studying how an entrepreneur makes a decision to either formalise or informalise. The study considered an entrepreneur's decision-making process regarding formalisation as a business entry problem. Previous studies that have considered high bribe demands as a factor driving formal entrepreneurs to go underground have largely ignored the concept of rationality in decision making. A rational and compliant entrepreneur will not be driven out of the formal economy through a bribe, once they have decided to go formal. This study therefore explicitly considered bribes as paid by informal operators rather than formal operators as in previous studies. The study has also contributed new knowledge in its aggregation assumption that allows movement from a micro theoretical analysis to a macro analysis.

In addition, corruption is considered a two-way relationship. Although previous studies emphasise inspectors or regulators as the only corrupt actors, this study also considered entrepreneurs as equally corrupt. Corruption only happens if the two parties agree. Hence, there are consumers or buyers of corruption (entrepreneurs) and sellers of corruption (inspectors).

6.2   Discussion and Policy Recommendations

6.2.1   Underground Economy and Corruption

First, the theoretical derivations suggest a link between corruption and informality. There are suppliers and consumers of corruption. Control of corruption influences participation in the informal economy via its impact on the market price of corruption, generally referred to as the bribe. This market is, however, underground or what is referred to as the black market. Second, corruption and the size of the underground economy are complements, that is, corruption increases informality, while at the same time high informality increases corruption.

The main implication of these findings is that African countries can target one of the two in order to reduce both the size of the underground economy or corruption. The other implication is that a policy that targets curing one of the problems will have positive

external effects in curing the other unintended problem. Furthermore, the findings imply that African countries with large underground economies may continue to experience growing informal economies due to lack of regulatory capacity. Solving the two problems is a double hurdle for African countries. Complementarity of corruption and informality in developing countries is an indication of the existence of excessive regulation, but with low capacity to regulate. As long as the appetite to regulate entrepreneurs continues, informality and corruption will continue to increase because of the absence of capacity to control both corruption and informality. Countries with ineffective governments have large underground economies which act as breeding grounds for corruption.

In some African countries, the underground economy is now the norm or the anchor of the economy. Attempts to put punitive measures in place in order to force these informal actors to formalise may lead to a closure of these firms. Hence, destroying the underground economy is like destroying the whole economy. In this regard, a proper strategy is required to preserve these businesses while at the same time improving them. In view of the findings regarding corruption and the size of the underground economy, the study recommends the following:

First, African governments with large underground economies can reduce these economies through strict anti-corruption measures. Corruption control can significantly reduce the size of the informal economy;

Second, regulators/inspectors must be well remunerated so that they are not easily attracted to corrupt activities;

Third, prohibitive penalties for offenders must be put in place.

Fourth, governments should always ensure that at any given period, the cost of compliance by entrepreneurs is lower than the cost of bribing an inspector;

 Fifth, governments with large informal economies and low regulatory capacities can free themselves from excessive regulation of the business environment. In this way, no registration fees and inspectors are required for business operations. Businesses will freely formalise by simply registering their names without any additional costs, thereby

leading to the disappearance of informality and corruption in the informal sector. Deregulation of businesses and removal of business registration costs stop governments from aiding growth of informal businesses and the creation of corruption markets. Deregulation and free registration are some of the ways to preserve informal businesses. In this case, no inspectors are required and businesses can freely conduct their operations, leading to disappearance of informality-created corruption.

Deregulation is the best strategy to destroy the corruption market and formalise the underground economy. When governments leave markets to operate without any form of intervention, these informal businesses can formalise without any fear. Proponents of a developmental state argue that informality is a result of excessive regulation. So a reduction in regulation can go a long way in the formalisation of the underground economies in Africa.

6.2.2　　　Informal Sector and the Other Determinants

The findings indicate that countries at higher levels of economic development are more formalised than those at lower levels of economic development. As countries develop, the underground economy declines. Therefore, poorly developed countries in Africa with large informal economies can transition to the formal economy by deliberately implementing strategies that stimulate economic development in their respective economies.　Lessons can be obtained from fellow African countries or other progressing developing nations in order to improve the size of the formal economy. African countries with non-inclusive growth can follow pacesetters. Improving aspects or components of HDI such as education, life expectancy and economic growth are crucial in the improvement of HDI and, hence, formalisation.

On taxation, the results of this study suggest that regulating or controlling the surging underground economy requires more than just looking at taxation as the main discouraging factor in formalisation of businesses. Taxation may be important in some countries, but on average it is not a significant driver of informality in Africa. Hence African countries must direct their efforts towards institutional factors such as corruption control if they want to register progress in transition to formalisation.

Another finding is that a larger informal economy today begets a larger informal economy in the future. Countries with large underground economies are aware that in the near future the underground economy will be larger. In this regard, the study recommends that African countries start acting before the situation explodes. Current efforts to control the informal sector growth must be intensified before the growth of informality has gone out of hand.

From 2009, the size of the underground economy began to grow significantly compared to what existed in 2005. This was a result of the global financial crisis. Global developments influence the size of the underground economy. Many African countries rely on foreign direct investment or foreign sources of finance. Therefore, any developments which negatively affect these sources will have detrimental effects in Africa. The main policy implication for this finding is that African countries must be prepared for external shocks in the global financial markets. Countries must watch out for global and regional risks and stay prepared. Current regional developments such as the African Continental Free Trade Area (AfCFTA) have some implications on the size of the underground economy in some countries. It is therefore crucial for African countries to prepare for a surging underground economy.

One way to prepare for regional and global risks is to stop over-relying on external financing. Countries must utilise domestic resources for investment purposes. In this case, global risks such as the global financial crisis will not significantly increase the size of the underground economy.

6.2.3   Implications of the Theoretical Derivations

In order to reduce both corruption and the size of the underground economy, African governments must either provide incentives to informal entrepreneurs or to inspectors in order to improve regulation. Countries must make an attempt to reduce barriers to transition to formal economy. In this regard, the following are recommended.

Countries should carry out massive business entry reforms. In these reforms, registration costs can be scrapped or reduced to insignificant levels, procedures for registration can

be streamlined, length of registration must be significantly reduced, and there is need to improve access to services through digitalisation of services.

First, countries should also strive to provide incentives for small formal firms such as access to public procurement, and also reduce compliance costs by introducing simplified tax and contributions assessment and payment regimes. Removal of barriers such as registration costs and the development of a computerised database can speed up transition to the formal economy. A computerised database can assist these small informal enterprises in market linkages, financial linkages and procurement linkages.

Second, there is need to strengthen the regulatory capacity by taking appropriate measures against offenders, enforcing law and providing effective sanctions to address tax evasion and avoidance of social contributions. Governments can equally provide better remuneration to inspectors to promote anti-corruption;

Third, countries must implement programmes intended to formalise the underground economy in a social dialogue approach. In designing and implementing policies and programmes relevant to the informal sector including its formalisation, countries must approach these in an inclusive way. Participants in the informal sector must enjoy the right to be heard, freedom of speech, the right to collective bargaining and any other rights enshrined in the national constitution. It will be easier to persuade informal entrepreneurs to formalise if they feel respected and that they are part of the process.

The other general recommendation from this study is the need to record and monitor the informal sector, entrants and exits. Countries must frequently collect disaggregated data by sex, age, sector, education, location and many other relevant characteristics.

6.3　　　　Limitations of the Study and Areas for Further Research

Although great professional care was taken by the researcher to produce a quality thesis that has meaningful contribution to academic discourse regarding the relationship between the informal sector and corruption in Africa, it is equally important to mention the limitations of the research. The study relied on aggregate data and, resultantly, the associations established are at an aggregate level. They are averages for Africa.

Although the findings of the study are robust, there is need to further explore the relationship using micro-level datasets. In view of the limitation of the aggregated data, future studies must focus on using microenterprise data which is disaggregated data by sex, age, education and other demographic characteristics.

Future research should monitor the same sample of informal microenterprises over time, probably one to two years, and collect frequent data on the activities of these firms, and also check the impact of institutional reforms like corruption control and rule of law on their decision to move from the informal to the formal sector. This approach will provide valuable micro-level insights on which policies directly promote transition to formality. It is thus important for future research to consider designing a computerised database for the informal sector in each country. This will provide a good monitoring tool, which will help in checking informal entrepreneurs who manage to graduate into the formal sector.

The focus of this study was primarily Africa, it would, however, be very useful for future studies to investigate the relationship between informality and corruption, comparing countries in different continents, especially moving away from the most used measures of variables of economic development like GDP per capita, to Human Development Index. (HDI)

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APPENDIX A: MODEL SPECIFICATION TESTS

```
. hausman fixed

                 ———— Coefficients ————
                  (b)            (B)            (b-B)        sqrt(diag(V_b-V_B))
                 fixed           .            Difference           S.E.

         Cor    -2.347165      -2.476148       .1289823           .2341433
         HDI    -72.29704      -63.99021      -8.306828           1.76103
      Protax    -.0029024      -.0016809      -.0012215              .

                         b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

      Test:  Ho:  difference in coefficients not systematic

                 chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                         =       26.02
              Prob>chi2 =        0.0000
              (V_b-V_B is not positive definite)

. xtreg INF Cor HDI Protax, re

Random-effects GLS regression               Number of obs      =        486
Group variable: Country_code                Number of groups   =         45

R-sq:                                       Obs per group:
     within  = 0.3512                            min =          4
     between = 0.1490                            avg =       10.8
     overall = 0.1612                            max =         11

                                            Wald chi2(3)       =     222.94
corr(u_i, X)    = 0 (assumed)               Prob > chi2        =     0.0000

         INF       Coef.    Std. Err.       z     P>|z|     [95% Conf. Interval]

         Cor    -2.476148    .7622592    -3.25    0.001    -3.970148   -.9821472
         HDI    -63.99021    4.611768   -13.88    0.000    -73.02911   -54.95131
      Protax    -.0016809    .0037866    -0.44    0.657    -.0091024    .0057407
       _cons     67.3475    2.771556    24.30    0.000     61.91535    72.77965

     sigma_u    7.8766707
     sigma_e    2.4737144
         rho     .91022367   (fraction of variance due to u_i)

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        INF[Country_code,t] = Xb + u[Country_code] + e[Country_code,t]

        Estimated results:
                             Var       sd = sqrt(Var)

                   INF     85.18631       9.229643
                     e     6.119263       2.473714
                     u     62.04194       7.876671

        Test:    Var(u) = 0
                         chibar2(01) =    1853.89
                      Prob > chibar2 =     0.0000

. xtreg INF Cor HDI Protax, fe

Fixed-effects (within) regression           Number of obs      =        486
Group variable: Country_code                Number of groups   =         45

R-sq:                                       Obs per group:
     within  = 0.3518                            min =          4
     between = 0.1426                            avg =       10.8
     overall = 0.1554                            max =         11

                                            F(3,438)           =      79.22
corr(u_i, Xb)   = -0.5048                   Prob > F           =     0.0000

         INF       Coef.    Std. Err.       t     P>|t|     [95% Conf. Interval]

         Cor    -2.347165    .7974097    -2.94    0.003     -3.91439   -.7799406
         HDI    -72.29704    4.936561   -14.65    0.000    -81.99933   -62.59475
      Protax    -.0029024    .0037572    -0.77    0.440    -.0102867    .0044819
       _cons    71.51076    2.633974    27.15    0.000     66.33397    76.68756

     sigma_u    9.5891436
     sigma_e    2.4737144
         rho     .93760371   (fraction of variance due to u_i)

F test that all u_i=0: F(44, 438) = 107.63                    Prob > F = 0.0000
```

APPENDIX B: THE FE MODEL USING LDVS ESTIMATOR
(ZIMBABWE IS THE BASE COUNTRY)

VARIABLES	(1) INF
Cor	-2.347***
	(0.797)
HDI	-72.30***
	(4.937)
Protax	-0.00290
	(0.00376)
1. Algeria	-19.03***
	(1.739)
2. Angola	-21.91***
	(1.112)
3. Benin	-9.243***
	(1.203)
4. Botswana	-19.53***
	(2.291)
5. Burkina Faso	-34.10***
	(1.402)
6. Burundi	-32.25***
	(1.193)
7. Cameroon	-30.59***
	(1.088)
8. Central African Republic	-30.20***
	(1.255)
9. Chad	-36.38***
	(1.140)
10. Congo, Rep	-18.62***
	(1.149)
11.Congo, D. R	-23.39***
	(1.285)
12. Cote d'Ivoire	-22.55***

	(1.120)
13. Egypt	-16.34***
	(1.508)
14. Equatorial Guinea	-27.12***
	(1.215)
15. Eritrea	-24.84***
	(1.227)
16. Ethiopia	-36.21***
	(1.243)
17. Gabon	7.593***
	(1.475)
19. Ghana	-14.89***
	(1.500)
20. Guinea	-28.70***
	(1.121)
21. Guinea-Bissau	-27.90***
	(1.069)
22. Kenya	-26.78***
	(1.141)
23. Lesotho	-30.54***
	(1.579)
24. Liberia	-24.02***
	(1.257)
25. Libya	-11.56***
	(1.856)
26. Madagascar	-16.18***
	(1.284)
27. Malawi	-28.61***
	(1.259)
28. Mali	-34.03***
	(1.271)
29. Mauritania	-33.89***
	(1.176)
30. Mauritius	-19.58***

	(2.183)
31. Morocco	-21.16***
	(1.503)
32. Mozambique	-35.30***
	(1.299)
33. Namibia	-27.18***
	(1.793)
34. Niger	-36.02***
	(1.426)
35. Nigeria	-8.190***
	(1.111)
36. Papua New Guinea	-28.45***
	(1.101)
37. Rwanda	-28.66***
	(1.660)
38. Senegal	-25.25***
	(1.355)
39. Sierra Leone	-32.49***
	(1.227)
40. South Africa	-25.66***
	(1.795)
41.Tanzania	-14.77***
	(1.237)
42. Togo	-28.32***
	(1.108)
43.Tunisia	-13.00***
	(1.836)
44. Uganda	-28.08***
	(1.112)
45. Zambia	-18.41***
	(1.329)
Constant	95.32***
	(2.768)

| Observations | 486 |
| R-squared | 0.935 |

Note: Standard errors in parentheses; *** denotes p<0.01, ** p<0.05, * p<0.1

```
. xtreg INF HDI Cor Protax i.Year, fe

Fixed-effects (within) regression          Number of obs      =         486
Group variable: Country_code               Number of groups   =          45

R-sq:                                      Obs per group:
     within  = 0.3871                                      min =           4
     between = 0.1262                                      avg =        10.8
     overall = 0.1355                                      max =          11

                                           F(13,428)          =       20.80
corr(u_i, Xb)  = -0.7280                    Prob > F           =      0.0000
```

INF	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
HDI	-109.9692	13.29952	-8.27	0.000	-136.1097	-83.8287
Cor	-1.827514	.8099399	-2.26	0.025	-3.419469	-.2355592
Protax	-.0030226	.0037265	-0.81	0.418	-.0103472	.004302
Year						
2006	-.1941948	.533531	-0.36	0.716	-1.242862	.8544721
2007	.0797115	.5638245	0.14	0.888	-1.028498	1.187921
2008	.222801	.6086067	0.37	0.714	-.9734289	1.419031
2009	2.090019	.6704102	3.12	0.002	.7723125	3.407725
2010	1.554951	.738174	2.11	0.036	.1040535	3.005848
2011	1.702454	.8041156	2.12	0.035	.1219467	3.282961
2012	1.790232	.8916705	2.01	0.045	.0376338	3.54283
2013	2.181461	.9420754	2.32	0.021	.3297912	4.033131
2014	1.983418	.996906	1.99	0.047	.0239772	3.942859
2015	3.105171	1.046777	2.97	0.003	1.047707	5.162634
_cons	89.51791	6.382718	14.03	0.000	76.97253	102.0633
sigma_u	12.323107					
sigma_e	2.4332371					
rho	.96247523	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(44, 428) = 108.88                  Prob > F = 0.0000
```

APPENDIX D: TEST FOR PERIOD HETEROGENEITY

```
. testparm i.Year

( 1)  2006.Year = 0
( 2)  2007.Year = 0
( 3)  2008.Year = 0
( 4)  2009.Year = 0
( 5)  2010.Year = 0
( 6)  2011.Year = 0
( 7)  2012.Year = 0
( 8)  2013.Year = 0
( 9)  2014.Year = 0
(10)  2015.Year = 0

      F( 10,   428) =    2.47
            Prob > F =    0.0070
```

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DEPARTMENT OF ECONOMICS ETHICS REVIEW COMMITTEE

Date 30 October 2018

Dear Mr Mupamhadzi

NHREC Registration # : (if applicable)
ERC
2018_DE_009_(SD)_Mr_Mupamhadzi
Reference # •
Name : Mr. Mupamhadzi
Student 57663106
Staff # :

Decision: Ethics Approval from

2018 to 2023

Researcher(s): Name Mr Mupamhadzi

Address 26 Pollet Road Belvedere Harare Zimbabwe

E-mail address david.mupamhadzi@fco.gov.uk, telephone +263772907018

Supervisor (s): Name Dr I Maloma

E-mail address malomi@unisa.ac.za, telephone 012-433-4646

Working title of research:

The Impact of Business Environment on Firms' Decision to Formalise. Evidence from selected African countries.

Qualification: DCom- Economics

Thank you for the application for research ethics clearance by the Unisa Department of Economics Ethics Review Committee for the above mentioned research. Ethics approval is granted for 5 years.

The low risk application was reviewed by the Department of Economics Ethics Review

Committee on 30 October in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment. The decision wi// be tabled at the next Committee meeting on 29 November 2018 for ratification.

The proposed research may now commence with the provisions that:

University of South Africa

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1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.

2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the Department of Economics Ethics Committee.

3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.

4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's Act no 38 of 2005 and the National Health Act, no 61 of 2003.

6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.

7. No field work activities may continue after the expiry date (xxx). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number 2018_DE_009(SD)_Mr_Mupamhadzi should be clearly indicated on al/ forms of communication with the intended research participants, as well as with the

Committee.

Yours sincerely,

Signature   Signature

Chair of Department of Economics ERC   Executive Dean .

E-mail: malomi@unisa.ac.za   E-mail:

Tel: (012) 429-4646   Tel: (012) 429-

URERC 25.04.17 - D   University of South Africa

Decision template (V2) - ApprovedPrefler Street, Muckleneuk Ridge, City of

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