

**KWAME NKRUMAH UNIVERSITY OF SCIENCE OF TECHNOLOGY,
KUMASI**

**COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS**

KNUST

**STUDIES ON TAXATION AND FIRM PRODUCTIVITY IN SUB-SAHARAN
AFRICA (SSA)**

**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES,
KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR
THE AWARD OF DOCTOR OF PHILOSOPHY IN ECONOMICS**

BY

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MAY, 2018

DECLARATION

I declare that this thesis submitted herein is an original work I have personally undertaken under supervision except where due acknowledgement has been made in the text.

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DEDICATION

To Kamasa family

KNUST



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Now unto Him, who make all things possible in its season, be all the Glory, Honour and Praise in the name of Jesus Christ, Amen. God has been so merciful and gracious unto me from the start to the finish of this PhD journey – the night travels, escape from road accidents among others and I am very grateful.

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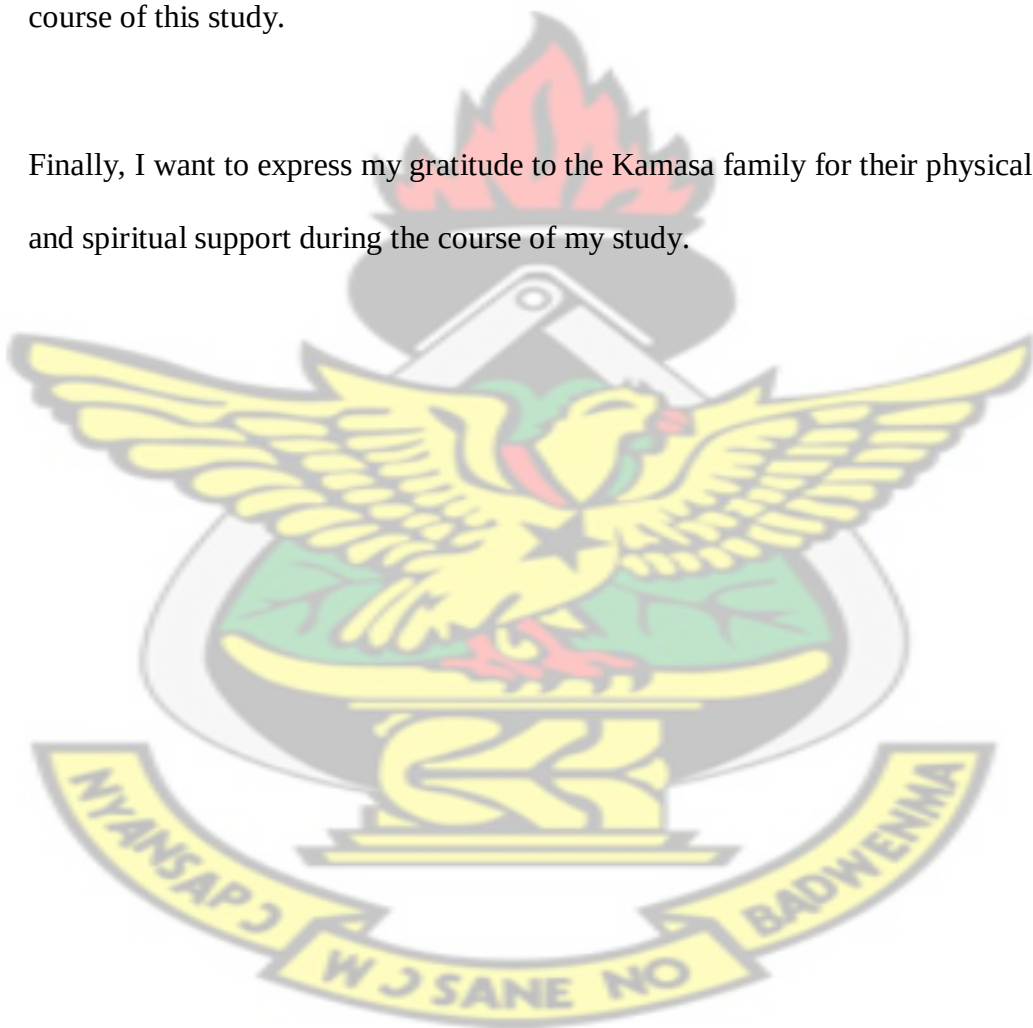
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ABSTRACT

Even though governments in sub-Saharan Africa (SSA) seek to drive growth and development, they are hard pressed with funds. This is because their expenditures are always and mostly outweighing their revenues. Tax revenue is one major solution to their quest to finding enough funds. However, tax revenue generation is not only low in SSA but it is also beset with low compliance and large evasion.

This study therefore sought to contribute to the literature and policy on tax in SSA by looking at how government can increase its tax revenue from three thematic areas. First, this thesis sought to assess the impact of non-pecuniary factors on tax compliance in sub-Saharan Africa (SSA). Using the Round 5 of the Afrobarometer Survey (2015) across 30 countries, the findings of the paper revealed that perceived tax knowledge limitation reduces the probability of tax compliance in SSA by 5%. Perceived non-compliance by others reduces compliance probability by 2%. Similarly, corruption of tax officials reduces the probability of being tax compliant in SSA by 2%. On the contrary, trust in tax department increase the probability of compliance by 5%, while fighting corruption improves compliance by 2%. With respect of fiscal exchange, handling of provision of health, education and road needs, tend to increase the probability of complying with tax laws and obligations in SSA by 2%, 3% and 2% respectively. As far as policy implication is concerned, governments in SSA must complement tax laws which are mainly based on deterrence factors (penalty rate, tax rate and probability of detection) to include non-pecuniary factors.

Second, this thesis sought to identify the effect of business environment on a firms' decision to evade tax in Ghana. Employing the Tobit method of estimation on World Bank Enterprise Survey data, the results revealed that a unit deterioration of business environment increases firms' decision to evade tax by 0.961 in Ghana. In terms of the individual business environment indicators, perceived corruption of tax officials increases evasion decision by 2.716. Public infrastructure (electricity outage) have a positive and significant effect on tax evasion decision with a coefficient of 0.695 while quality of legal environment had a negative effect on firms' decision to evade taxes with a coefficient of 1.246. Business constraints in the form of tax rate (1.389), access to business license (1.622) and transport (1.419) had a positive effect on firms' tax evasion decision. Finally, the results indicated that the type of firm, age and sex of the owner affects tax evasion decisions. In terms of policy implication, punitive action against corrupt tax officials; improving the legal framework; improving infrastructure as well as addressing business constraints to doing business will reduce tax evasion decisions among firms in Ghana.

Lastly, this thesis sought to find out the effect of quality of tax administration on firm productivity in sub-Saharan Africa (SSA). By using the World Bank Enterprise Survey (WBES) data for 6,718 firms across 40 countries in SSA, the study revealed that productivity of firms reduces by 0.140 when quality of tax administration is poor. With positive and significant interaction term coefficient of 0.224 between small firms and quality of tax administration, the findings also revealed that small firms do benefit in the presence of poor quality of tax administration than larger firms. The reason is that new and small firms operating informally (in most cases) are able to under-report and evade taxes. The results were robust even after

controlling for unobserved country and industry heterogeneity; capital, technology, business environment, infrastructure and firm characteristics including the age, size, experience of managers, and ownership among others. The policy implication suggests reforms and improvement in tax administration so as to reduce compliance burden (administrative and financial)

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LIST OF PAPERS FOR PUBLICATION

Publications arising from this thesis are listed as follows.

1. Tax Compliance in Sub-Saharan Africa: How important are Tax Knowledge, Institutions and Fiscal Exchange? (submitted to *South African Journal of Economics*)
2. Business Environment and Firms' Decision to Evade Taxes: Evidence from Ghana (submitted to *Journal of African Business*)
3. Firms Productivity in Sub-Saharan Africa: How relevant is Quality of Tax Administration? (submitted to *African Development Review*)



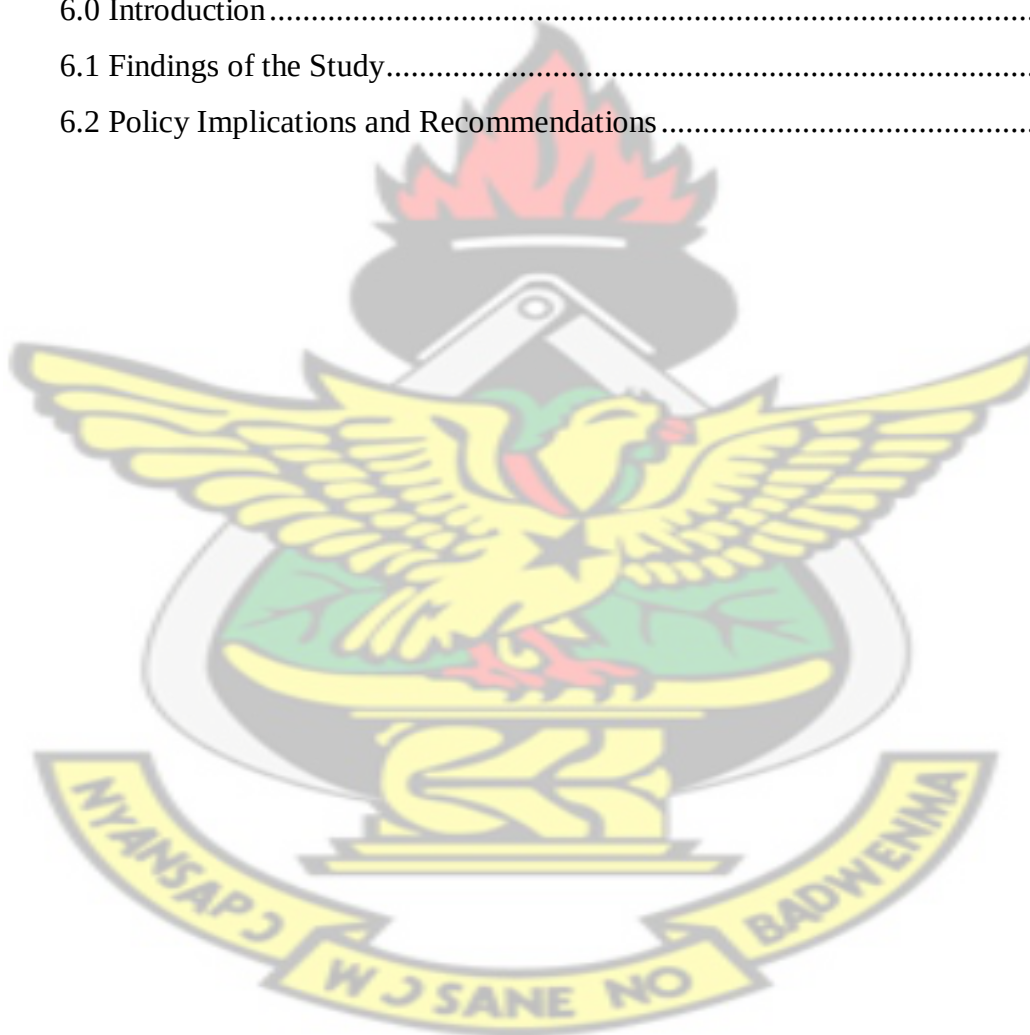
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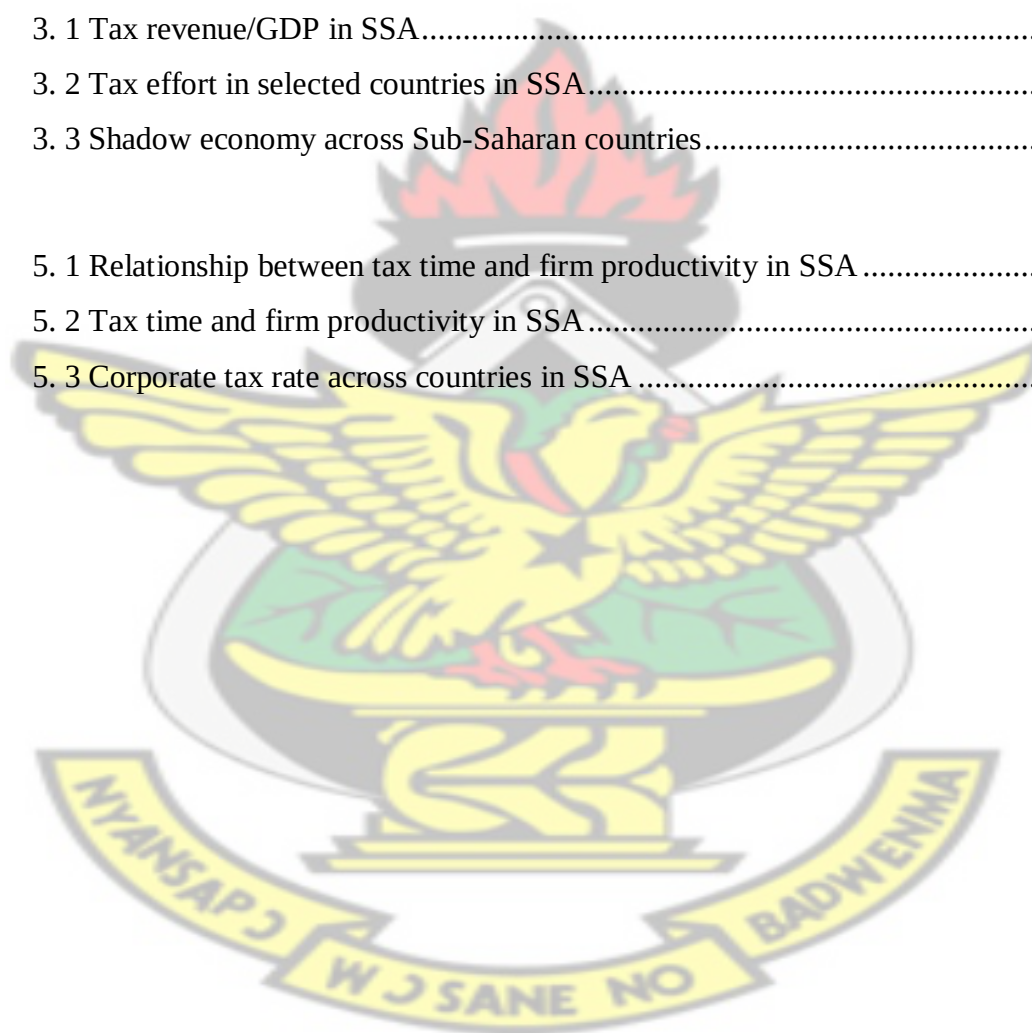


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CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background to the Study

Irrespective of the differences in governance types (democratic and non-democratic), promoting growth and development is one of the main goals governments seek to achieve. The reason is that, economic growth on a sustained path is the most potent mechanism that reduces poverty and improves the quality of life in developing countries. A strong view, which exists within public policy discourse as well as literature, is of the fact that, attaining economic growth is the appropriate means in order to increase societal welfare (see NESDB, 1997; Clayton and Radcliffe, 1996; Cochrane and Shaw Bell, 1956).

A major hindrance that limits growth and development of many developing countries (including those in SSA) however, is limited or inadequate funds to government. Figure 1.1 shows government expense (cash payments for operating activities of the government in providing goods and services) and government tax revenue for SSA from 2003 to 2013. The ratio of Expense/GDP in the year 2003 was 20.93%. Having reduced to 19.66%, 19.33% and 19.29% for the years 2004, 2006 and 2007 respectively, it increased to 20.41 at the end of 2008. It further increased to 21.15% in the year 2009. With a marginal reduction to 20.73% by the end of 2012, it rose again to 21.92% at the end of 2013.

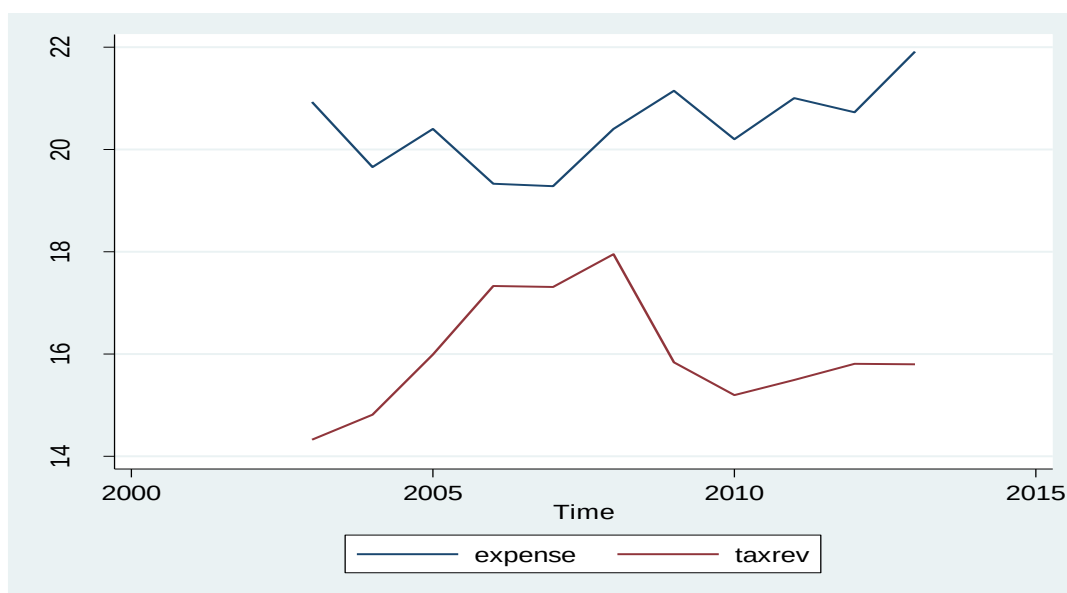


Figure 1. 1 Government expense and tax revenue in SSA

This means that over the period, government expense hovered around a ratio of 20.45% to GDP. On the other hand, tax revenue/GDP increased from 14.32% in the year 2003 to 14.81% in 2004. There was further improvement and by the end of 2008, the tax revenue/GDP was 17.95%. This could however not be sustained, leading to a fall to 15.81% and 15.79% for the years 2012 and 2013 respectively.

It is therefore not surprising that there is a deficit in terms of revenues generated and revenues spent in SSA. Figure 1.2 illustrates the net lending/borrowing (difference between general government revenue and general total expenditure) for SSA from 2000 to 2015. Net borrowing/lending worsened from -0.33% in the year 2000 to -2.048% in 2003. There was an improvement in the net borrowing/lending and by the year 2006, a surplus of 4.887% was recorded. This however could not be sustained and saw a drop to 1.18% by 2008 and subsequent deficit thereafter, reaching as high as -4.143% in the year 2015.

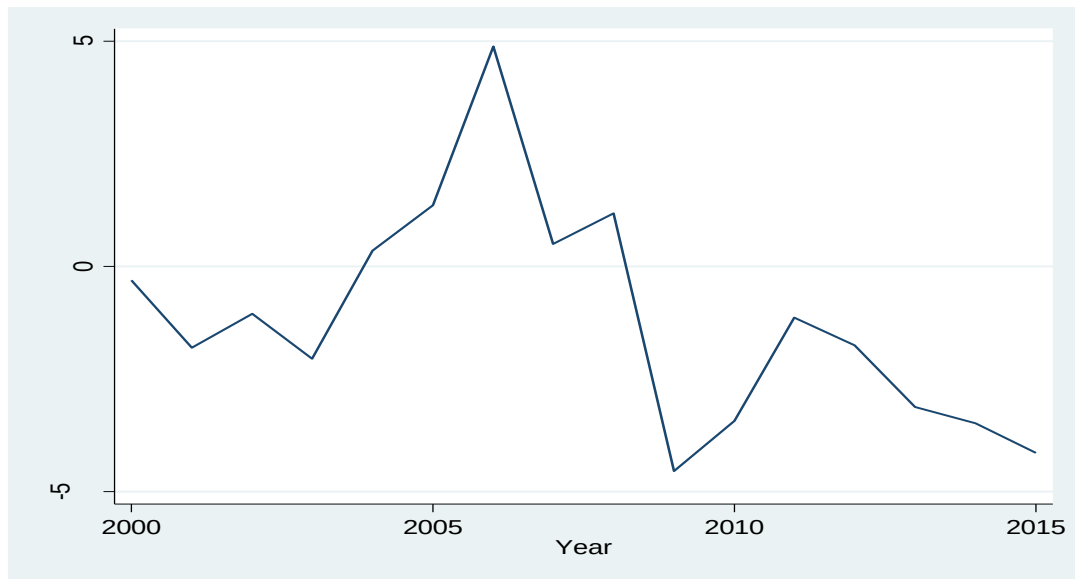


Figure 1. 2 Net lending/borrowing in SSA

In as much as the private sector participation contributes to growth, their activities only thrive when the fundamental structures have been undertaken by government. A crucial example is infrastructure provision – road, electricity, telecommunication, water, among others. This is confirmed by NEPAD (2014), that one of the most significant impediments to sustaining and distributing the trajectory of growth and poverty alleviation on the continent (SSA) has to do with lack of infrastructure.

One option open to governments in SSA, following the consistent and continual deficit is fiscal adjustment. This is basically a reduction in the government primary budget deficit, and it can result from a reduction in government expenditures, an increase in revenues, or both simultaneously. However, cutting down government expenditure may not be feasible because of the deficit in the provision of goods and services such as infrastructure in SSA. This means that the most viable alternative is to increase government revenue. In terms of revenue, tax revenue is argued to be the most important and reliable. This is because there are negative consequences that

come with other sources of government revenue (loan, aid and grant) – burden on future generation, higher interest payment, less economic independence etc.

As far as the economic agents (individual household, firm and government) are concerned, tax revenue actually emanates from firms and individual households activities. Therefore there is the need to know what influences tax compliance at both the household and firm levels since it will have a major impact on the amount of tax revenue generation. The government is the one with the responsibility to implement tax policies in order to generate the revenue and to see to its use to propel growth and development. However, taxpayers' (firms and individual households) behaviour is such that they would not comply with tax laws when given the opportunity. This practice, which is common in both developed and developing countries, poses a great and untoward threat to economic growth and development. That notwithstanding, if we assess economically, the benefit that can be acquired when evasion and non-compliance of taxes are reduced, then what influences individuals and firms to comply with taxes on time as well as the obligated amount becomes a question that needs to be given the needed attention.

On the part of the individual household, tax compliance, which describes taxpayers' willingness to pay their tax, is a major problem for many tax authorities since it is not an easy task to persuade taxpayers to comply with tax requirements even though 'tax laws are not always precise (James and Alley, 2004). The decision to evade taxes and for that matter being tax non-compliant is not only determined by rational cost-benefit considerations such as the tax rate, probability of being caught and penalty rate. This is because the conventional theoretical deterrence have been shown in

evidence not to all the time encourage compliance (see Fatás & Roig, 2004). Rather, it is also determined by social and morale influences which are, in turn, shaped by the (perceived) compliance of other taxpayers. For instance, individuals consider tax evasion to be a less serious wrongdoing; the more widespread they presume it to be (Frey and Torgler, 2007). In line with this, tax compliance is said to be affected by tax morale (Elster, 1989).

From the firms' perspective, complying with paying the right amount of tax and not evading tax may be accounted for by many factors. But one obvious factor that may affect their behaviour will be the business environment (that is institutional, policy, and behavioural environment, both present and expected, which affects the returns, and risks that is associated with investment in a specific location). This is because it may have a direct implication on their cost of operations. Having said that, we know that in as much as the primary motive of firms is to make profit, the specific form it takes varies. Aside raising the unit price of products or services and producing efficiently, firms especially in developing countries also resort to tax evasion to maximize their profits (see Johannesen et al., 2016). This in the end affects the tax revenue that accrues to government. Thus another important question that pops up is what influences firms' decisions and behaviour to evade taxes especially as it is also the case that business environment affects informality and informality tends to affect tax evasion (see Nadirov and Aliyev, 2015).

Moreover, even as governments' implements tax policies to generate revenue to spur growth, to what extent is the quality of its tax administration, and to what extent does the quality of tax administration affect productivity of firms, which in the end have

the feedback effect on tax revenue generation? That is, if tax administration is harmful to firm, then it is also harmful to government revenue generation. This is because the ability to pay tax is dependent on the firms' progress and growth. Moreover, firms pay corporate tax as a percentage of their profit. In that case, if a tax administration is reducing the growth and profit of the firm, then government tax revenue will also fall. Also, income tax paid by workers as well as consumption tax will also fall. Thus knowing how tax administration affect firm performance and productivity, will serve as a basis to reform tax to reduce administrative and financial burden of tax. Thence, the final question that needs to be answered is what is the effect of quality of tax administration on productivity of firms in SSA?

1.2 Statement of Problem

The mobilization of tax revenue is seen as a major channel in which governments can create fiscal space. Moreover, it helps in the provision of essential public services as well as reducing single resource dependence and foreign aid. This notwithstanding, domestic tax base in most African countries is undermined by widespread tax avoidance and evasion (IMF 2011). This is confirmed further when Schneider, et al., (2010) in their study on shadow economy revealed that average informality (shadow economy) in sub-Saharan Africa stood at 40.2%. Moreover, according to OECD (2013), most developing countries face challenges with respect to increasing their revenues domestically. This leads to governments resorting to borrowing from within and external, both of which have negative ramifications to growth – crowding out the private sector and high interest repayment respectively. Cobham (2005) estimated that the overall level of tax revenue lost due to tax evasion in developing countries is in the region of \$285 billion per year. This amount was

more than twice the total inflows of grants and aids to developing countries (\$106.372 billion) in the year 2005 (OECD, 2007). To this effect, studying the pattern of tax evasion and recognizing the means to minimize it is important for all economies, especially in developing economies where tax evasion is most pervasive. Finding avenues or means to increase government revenue will go a long way to help government in its continual quest to improve the welfare of its citizens. This study seeks to contribute to policy and literature in three thematic areas as follows:

1. Tax Compliance in Sub-Saharan Africa: How important are non-pecuniary factors?
2. Business Environment and Firms' Decision to Evade Taxes: Evidence from Ghana.
3. Firms Productivity in Sub-Saharan Africa: How relevant is Quality of Tax Administration?

Since one agent of the economic unit that generates tax revenue to the government is the individual household, the question that arises is, “what determines the level of tax compliance by individuals in sub-Saharan Africa?” This is because it can have a big impact on the amount of revenue generated. Now, having seen that the conventional theoretical deterrence theory (see Allingham and Sandmo, 1972) have been shown in evidence not to all the time encourage compliance (see Fatás & Roig, 2004), the role played by non-pecuniary factors in the form of tax knowledge, culture, institutions, fiscal exchange among others in shaping and improving tax compliance becomes important. This study contributes to the literature on tax compliance in SSA in two stances. First, it employs data based on recent individual-level survey to analyse the impact of non-pecuniary factors (tax knowledge, perceived non-compliance by

others, corruption of tax officials, trust in tax department, trust in courts, fighting corruption, as well as the handling of provision of health, education, road and electricity needs) on tax compliance in SSA. Second, it fills the literature gap by looking at how legal origins (that is, British common law and French civil law) affect these non-pecuniary factors on compliance with tax laws in SSA. This is because with regards to legal origins, the legal framework in a country affects institutions; attitude and how businesses are conducted and thus how compliant people are towards tax regulations. (see Acemoglu et al., 2001).

In the case of firms as tax payers, this study seeks to assess the effect of business environment on firms' decision to evade tax. Moreover, it will identify the business environment factors that influence a firm's decision to evade tax. This is because an "unfriendly" business environment for instance, provides incentive for firms to operate informally. This informal operation makes it difficult for government to obtain tax revenues from them, which in turn leads to pervasive tax evasion (see Nadirov and Aliyev, 2015). At the firm level, relatively few studies have been conducted on tax evasion especially in developing countries (see Mawejje and Okumu, 2016 and Nadirov and Aliyev, 2015). However, since business environment may vary from one country to another depending on the extent and level of legal structures, quality of tax administration, government's commitment to provision of infrastructure among others, country specific studies have to be undertaken so as to recommend policies that will suit a specific country's needs. On that score, Ghana is used in this study. The findings that emerge may suggest recommendations appropriate to other SSA countries.

Moreover, owing to the fact that government generate lots of taxes from firms in the form of corporate taxes, it makes it important for government to implement policies that will enhance firms' productivity. According to Syverson (2011), there have been many policy reforms (particularly in trade policy and market design) that had plausible productivity enhancing effects. This notwithstanding, policies relating to the quality of tax administration although are seen to have a major impact on firm performance (see Dabla-Norris et al., 2017; Kleven, 2016; Aterido and Hallward-Driemeier, 2010), yet research in this stance is very limited especially in the sub-Saharan Africa region. Thus this study would analyse the effect of quality of tax administration as far as firms' productivity is concerned in sub-Saharan Africa. This is mainly because a heavy burden (administrative and financial burden) to adhere to tax usually results in corruption, tax evasion, lower firm entry and less investment (see Dabla-Norris et al., 2008; Braunerhjelm and Eklund, 2014; Djankov et al., 2010). Studies (see Ayyagari et al., 2011; Haltiwanger et al., 2010; Neumark et al., 2009) indicate that small firms do not only generate the most new jobs across country income groups but also have the highest employment growth and sales growth rate. Given that there are many small to medium scale firms dominating in SSA, this study goes a step further to investigate whether the effect of quality of tax administration on firm productivity varies with respect to firms of different ages and sizes.

1.3 Research Objectives

Based on the three major themes, this study relies on the following three specific and key objectives:

1. To examine the importance of non-pecuniary factors on tax compliance in sub-Saharan Africa.
2. To assess the effect of business environment on tax evasion decisions among firms in Ghana.
3. To examine the effect of quality of tax administration on firms' productivity in sub-Saharan Africa.

1.4 Research Questions

In line with the three thematic areas, the study will seek to answer the research questions as follows:

1. To what extent do non-pecuniary factors influence tax compliance in sub-Saharan Africa?
2. How does the business environment affect tax evasion decisions among firms in Ghana?
3. What is the effect of quality of tax administration on firms' productivity in sub-Saharan Africa?

1.5 Justification/Relevance of the Study

In the quest of SSA countries to achieve Sustainable Development Goals, the role played by funds (revenue) becomes paramount. This is because the availability of funds could pave the way for infrastructural and institutional development, which could in turn make it fertile for the private sector to thrive. Unfortunately, the reality is that governments in SSA are faced with limited and inadequate revenue/funds. Owing to the fact that tax revenue serves as the most important (in terms of amount

generated) source of funds for governments, there is no doubt about how critical and relevant the study on taxes becomes; hence this present study.

There are sanctions (deterrence theory) meted out to individuals who may not comply with taxes. That notwithstanding, this deterrence do not always and necessarily result in high tax compliance. This makes it necessary to assess other non-pecuniary factors and how they impact on tax compliance. Findings from this will serve to guide various governments in SSA on the need to complement their existing tax laws with improving non-pecuniary factors to their citizens as a means to boost their tax compliance behaviour.

As far as business environment is concerned, this study will not only contribute to literature on tax evasion in Ghana but more importantly it will help to identify factors that can cause firms to decide to evade tax in Ghana. Such a finding will be of great importance to influencing policy (especially, Ministry of Trade and Industry, Ministry of Finance and Ghana Revenue Authority) in reforming the areas of the business environment to reduce tax evasion in Ghana. This will be instrumental to improving upon tax revenue generation to ease government's tight fiscal balance. This may pave the way for related studies to be undertaken by other SSA countries to identify the aspect of their business environment that is susceptible to promoting tax evasion on the part of firms.

Finally, it must be noted that tax administration should be effective in the sense of ensuring high compliance by taxpayers. A heavy problem to adhere with tax is associated with corruption, tax evasion, lower firm entry and less investment (see

Dabla-Noris et al., 2008; Braunerhjelm and Eklund, 2014; Djankov et al., 2010). That is to say that poor tax administration increases the compliance cost. This significantly adds to the tax burden faced by firms (see Dabla-Noris et al., 2017). This can in the end impact negatively on firms' productivity. An empirical investigation could pave a way for governments in SSA to reform and improve on their tax administration policies, which would not only improve on its revenue generation but also enhance firms' productivity. Moreover, foreign firms may wish to establish in areas where tax system are effective since it will lower their compliance cost and in the end their operations cost (tax-based theory of FDI). Thus improving the tax system would appeal to foreign firms and attract them.

1.6 Organisation of the Study

This thesis is organised into six major chapters with each chapter comprising relevant subsections. The rest of the study is structured as follows. Chapter two focuses on the general literature review for the study. This comprises both theory and empirics covering all the three thematic areas of the study. Chapter three focuses on the first empirical study - Tax Compliance in Sub Saharan Africa: How important are non-pecuniary factors? Chapter four deals with the second empirical study - Business Environment and Firms' Decision to Evade Taxes: Evidence from Ghana. Chapter five deals with the third empirical study – Firms' Productivity in Sub-Saharan Africa: How relevant is Quality of Tax Administration? In each of the empirical chapters, appropriate methodologies and corresponding results are discussed. The final chapter present the summary of the main findings emanating from the three thematic chapters and suggested recommendations.

CHAPTER TWO

GENERAL LITERATURE REVIEW

2.0 Introduction

This chapter gives an overview of the conceptual framework as well as a comprehensive and general theoretical and empirical review covering the three thematic areas of the study. It is made up of three sections. The first section presents a brief conceptual framework to cover the three thematic areas. The second section covers theoretical literature on concepts of taxation, tax compliance, tax evasion from the firms' perspective as well as tax administration and firms' productivity. The third section presents empirical literature on each thematic area.

2.1 Conceptual Framework

Conceptually, this thesis seeks to look at ways that can enhance government tax revenue generation. This is illustrated in Figure 2.1. The channels to realising this goal are through the activities of the economic units (household, firm and government). Tax revenue basically comes from the activities of the household and firms. On the part of household, their level of compliance with tax obligations affects the amount of tax revenue that could be generated. Thus the issue of compliance becomes important. Compliance can be determined by two approaches. The first is through pecuniary factors, which are explained by the deterrence theory of tax compliance (see Allingham and Sandmo, 1972). The second is through non-pecuniary factors (which are explained by behavioural theories of tax compliance). However given the fact that the deterrence theory has not necessarily resulted in high compliance (see Fatas and Roig, 2014), it becomes imperative to assess the

importance of non-pecuniary factors on compliance. This is the first important research objective this thesis seeks to address. Knowing the influence of these non-pecuniary factors could help tax reforms to improve tax compliance, which will ultimately improve tax revenue generation.

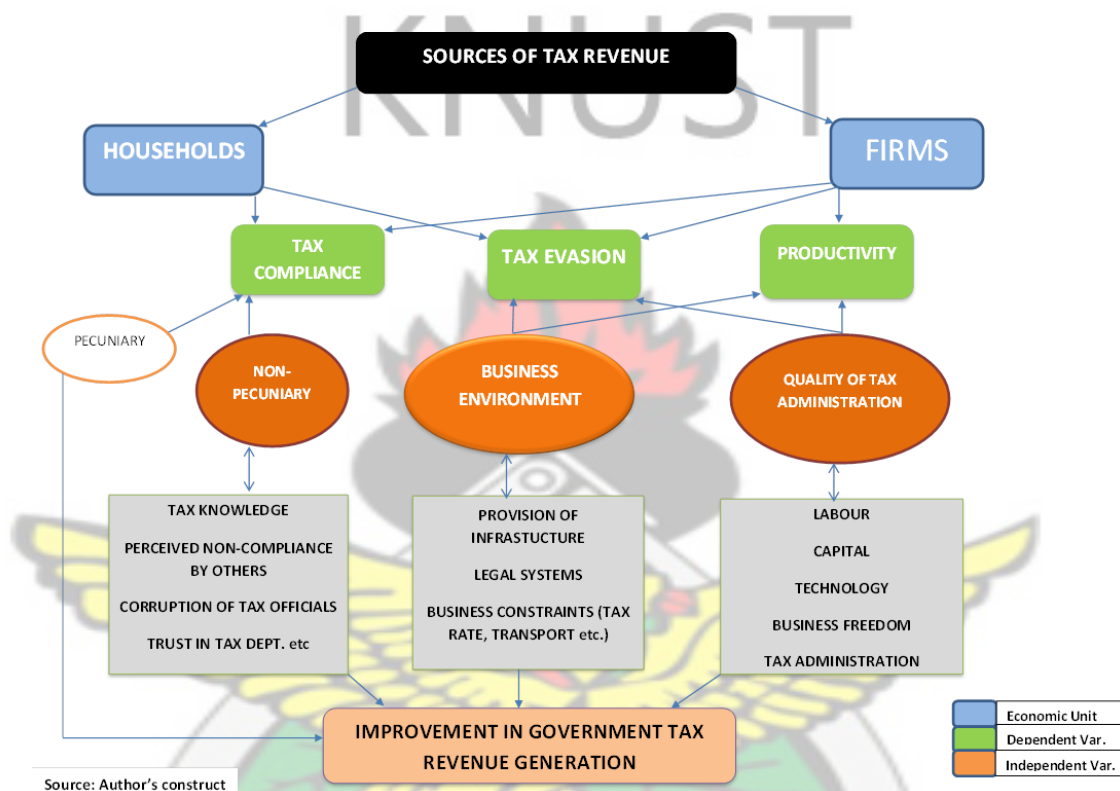


Figure 2. 1 Network of tax sources and government revenue

On the part of the firm, compliance with tax obligations and not evading taxes may be affected by the business environment they operate in, as well as their levels of productivity. Thus the second important research objective of this thesis looks at the effect of business environment on firms' decision to evade taxes (being non-compliant). If the effect of business environment is known, it will influence policy, which would help improve tax compliance. Similarly, government tax policy can affect the productivity of firms. This can in turn affect how much tax to be paid to

government. For instance, a heavy burden to adhere with tax administration may lead to firms remaining informal. This affects their productivity as well as compliance with tax obligations. Thus the third research objective in this thesis is to assess the impact of quality of tax administration on firms' productivity.

2.2 Theoretical Review of Literature

This section presents review of theoretical literature to cover the three thematic areas of the thesis. The first section reviews concepts in taxation – definition, principles, classification and theories of tax. The second section reviews non-pecuniary factors and tax compliance. The third section reviews tax evasion from the firms' perspective. The fourth section reviews tax administration and firm productivity.

2.2.1 Definitions and Concepts in Taxation

2.2.1.1 Definitions of Tax

There have been many definitions of tax. Tax is a compulsory levy made by public authorities for which nothing is received directly in return (James and Nobes, 1996). According to James and Nobes (1996), taxes are therefore transfers of money to the public sector, but may exclude loan transactions and direct payments for publicly produced goods and services. In another definition, OECD (1996) defines tax as compulsory, unrequited payment to general government. The unrequited nature is because benefits provided by governments to taxpayers are not normally in proportion to their tax payments. General government as used in the definition by OECD, 1996 consists of supra-national authorities, the central administration and the agencies whose operations are under its effective control, state and local governments and their administrations, social security schemes and autonomous

governmental entities, excluding public enterprises. Similarly, Lymer and Oats (2009) defined tax as a compulsory levy, imposed by government or other tax raising body, on income, expenditure, or capital assets, for which the taxpayer receives nothing specific in return.

2.2.1.2 Principles of Taxation

Adam Smith in his book '*The Wealth of Nations*' which was published in 1776 suggested that a tax system is based on certain basic principles, namely equity, certainty, convenience and efficiency. Lymer and Oats (2009) briefly defined the principles as follows:

Equity means a tax system should be fair among individuals and taxes should be levied based on taxpayers' capacity. Horizontal equity means that taxpayers with the same income or wealth should pay the same amount of tax (tax burden) while vertical equity means that taxpayers with high income (capacity) should pay higher tax (tax burden).

Certainty is defined as a taxpayer knowing his or her tax liability and when and where to pay the tax. It relates to the simplicity of the tax systems so that the taxpayers are easily understood and capable of calculating their tax liability.

Convenience relates to how people pay their taxes or engage with the tax system. For example, people more conveniently pay tax by it being deducted at source rather than paying a large amount of tax annually. The introduction of electronic filing is another

example of a facility provided by the tax authority to ease the method of filing tax returns.

Efficiency refers to how the tax authority collects the tax revenues and can be divided into two subsections: administrative efficiency and economic efficiency. Administrative efficiency refers to the costs involved when collecting tax revenues. The more a tax costs to administer, the less of the money raised is available to the government to spend. The administrative cost should be as small as possible to achieve desirable economic efficiency. Economic efficiency referring to tax should not interfere with the working of the markets. For example, the introduction of a new tax or increase on the tax rates should not distort or affect taxpayers' behaviour (i.e. from compliant to less compliant).

2.2.1.3 Classification of Taxes

Classification by the Way of Collecting Taxes

Taxes can be classified into two main types: direct and indirect taxes. Direct taxes mean the burden (incidence) of tax is borne entirely by the entity that pays it, and cannot be passed on to another entity; for example, corporation tax and individual income tax. Indirect taxes are typically the charges that are levied on goods and services (consumptions), for example VAT (Value Added Tax), sales tax, excise tax and stamp duties. Indirect taxes are not levied on individuals, but on goods and services. Customers indirectly pay this tax in the form of higher prices. For example, it can be said that while purchasing goods from a retail shop, the retail sales tax is actually paid by the customer. The retailer eventually passes this tax to the respective authority. The indirect tax actually raises the price of the goods and the customer's

purchase by paying more for that product. Unlike indirect tax, direct taxes are based on 'ability to pay' principle but (by being very obvious to the taxpayer) they sometimes work as a disincentive to work harder and earn more because that would mean paying more tax.

Classification by Structure of Tax

The tax structure of an economy depends on its tax base, tax rate, and how the tax rate varies. The tax base is the amount to which a tax rate is applied. The tax rate is the percentage of the tax base that must be paid in taxes. Proportional taxes (flat taxes) apply the same tax rate to any income level, or for any size tax base. A regressive tax is one that is inversely proportional to income — the lower the income, the higher the tax in relation to income. Most regressive taxes are assessed on products and services in which the tax is a percentage of the cost of the product or service. A progressive tax applies a higher tax rate to higher incomes.

Classification by Source of Tax

Based on this criterion, this study focuses on the five most common types of taxes as explained by Gruber (2011). The first type of taxation is the payroll tax, a tax levied on the earnings of workers. Payroll taxes are the primary means of financing social insurance programs, such as those discussed in the preceding chapters (Social Security, unemployment insurance, Medicare, and so on).

The second type of taxation is the individual income tax, a tax paid by individuals on income accrued during the year. Income for income tax purposes includes labour earnings, but the tax is distinguished from the payroll tax by (a) applying to a broader

set of income sources (such as interest earnings from household savings as well), and (b) applying in many cases to the entire income of a family, not just to the income of one individual worker. A form of income taxation that is of particular interest is the taxation of capital gains, the earnings from selling capital assets, such as stocks, paintings, and houses.

In addition to taxing individual income, many countries also separately tax the earnings of corporations through the corporate income tax. The purpose of the separate taxation of corporations, above and beyond taxes on individuals, is to tax earnings of owners of capital that might otherwise escape taxation by the individual - based income tax system

Wealth taxes are taxes paid not on income as it is accrued but on the value of the assets held by a person or family, such as land, jewellery, artwork, real estate, and stocks. Included in this category are state and local property taxes, which are based on the value of land and any structures built on the land, and estate taxes, which are based on bequests (money, property, and so on) left behind when one dies.

The form of taxation that is most common around the world is the consumption tax, which is paid on individual or household consumption of goods (and sometimes on services as well). Consumption taxes are often levied in the form of sales taxes, taxes that are paid by consumers to vendors at the point of sale. These taxes can be applied either to a broad variety of consumption goods or to a particular good alone. When applied to only certain goods, for example cigarettes or gasoline, the sales tax is called an excise tax.

2.2.1.4 Theories of Taxation

The Benefit Theory

According to this theory, the state should levy taxes on individuals according to benefit conferred on them (see Lindahl, 1919). This means that, the more benefits a person derives from the activities of the state, the more he should pay to the government. This theory seeks to ensure that each individual's tax obligations are as far as possible based on the benefits that he or she receives from the enjoyment of public services.

The Sacrifice Theory

This theory attempts to determine the burden that rests upon an individual in virtue of his payment of taxes and how much of his or her income remains for purpose of his own subsistence (see Neil, 2000). According to this theory payment of tax is a sacrifice that an individual makes towards the support of the government. The measure of such sacrifice is found in the giving up of enjoyments, which is, giving up a portion of individuals' means (income) of satisfying wants (consumption).

The Ability to Pay Theory

This theory was developed due to inadequacies in benefit and sacrifice theories of taxation. This is the most popular and commonly accepted principle of equity or justice in taxation, that is, citizens of a country should pay taxes to the government in accordance with their ability to pay (see Pigou, 1947). It appears very reasonable and just that taxes should be levied on the basis of the taxable capacity of an individual. For instance, if the taxable capacity of a person A is greater than the person B, the former should be asked to pay more taxes than the latter.

2.2.2 Theoretical Concepts of Non-Pecuniary Factors and Tax Compliance

2.2.2.1 Meaning of Tax Compliance

Tax compliance has had a plethora of definitions. Andreoni, et al., (1998) defined tax compliance as taxpayers' willingness to obey tax laws in order to obtain the economy equilibrium of a country. In a similar way, Kirchler (2007) defined tax compliance as the most neutral term to describe taxpayers' willingness to pay their taxes. Due to the remarkable aspect of the operation of the tax system in developed countries such as US and that it is largely based on self-assessment and voluntary compliance, Song and Yarbrough (1978) gave a wider definition of tax compliance as the taxpayers' ability and willingness to comply with tax laws which are determined by ethics, legal environment and other situational factors at a particular time and place. Similarly, tax compliance is also defined by several tax authorities as the ability and willingness of taxpayers to comply with tax laws, declare the correct income in each year and pays the right amount of taxes on time (IRB, 2009). Allingham and Sandmo (1972) described tax compliance as an issue of 'reporting an actual income' and also claimed that tax compliance behaviour was influenced by a situation whereby taxpayers have to make a decision under uncertainty (see also Clotfelter, 1983) i.e either taxpayers would enjoy tax savings due to under-reporting income or have to pay tax on the undeclared amount at a penalty rate which is higher than they would have paid had the income been fully declared at the correct time.

2.2.2.2 Types of Tax Compliance

Tax compliance has been segregated into two perspectives, namely compliance in terms of administration and compliance in terms of completing (accuracy) the tax returns (Chow, 2004; Harris, 1989). Compliance in pure administrative terms

comprises registering or informing tax authorities of status as a taxpayer, submitting a tax return every year (if required) and following the required payment time frames (Ming et al., 2005). In contrast, the wider perspective of tax compliance requires a degree of honesty, adequate tax knowledge and capability to use this knowledge, timeliness, accuracy, and adequate records in order to complete the tax returns and associated tax documentation (Singh and Bhupalan, 2001).

Tax compliance can further be divided into two parts on the basis of the way of achieving thereof: voluntary compliance and enforcement compliance (OECD 2008). Measuring solely the enforcement compliance does not provide a clear overview of the level of tax compliance. The rates of auditing and fines are usually so low, that based on rational speculation, most individuals could avoid paying taxes, as they are very unlikely to be checked or penalized. But in spite of this, most people pay their taxes voluntarily. So, what does actually influence the willingness of an individual to pay taxes?

2.2.2.3 Theories of Tax Compliance

Economic Deterrence Theory of Tax Compliance (Pecuniary Factors)

The economic deterrence model has been commonly used to examine tax evasion and compliance from a theoretical perspective. Factors that have been examined in the economic deterrence model include: complexity of the tax system, level of revenue information services, withholding and information reporting, preparer responsibilities and penalties, probability of receiving audit coverage, progressive and actual level of tax rates, and penalties for non-compliance.

The models which have been based on the economic theory of compliance generally focus on deterrence. Deterrence can be achieved through a number of approaches, punitive and persuasive. That is, deterrence may take on the form of increasing the probability of detection, increasing the tax rate or by the imposition of tougher penalties. Alternatively, it may take on the form of better education, increased advertising/publicity and incentives. The focus of this section will be upon the punitive impact of penalties, sanctions and other enforcement factors which shape taxpayer compliance attitudes and behaviour.

The economic definition of taxpayer compliance views taxpayers as ‘perfectly moral, risk-neutral or risk-averse individuals who seek to maximise their utility, and chose to evade tax whenever the expected gain exceeded the cost.’ Thus, a pure ‘cost-benefit’ approach is given for why or why not taxpayers may comply with the tax laws. Some researchers propose that individuals are expected to weigh ‘the uncertain benefits of successful evasion against the risk of detection and punishment.’ Consequently, a penalty structure forms part of the punishment, and is a critical factor in an individuals’ choice to evade tax.

Principles of economic deterrence models were first discovered in the late 1960s from the work of Becker (1968), who analysed illegal behaviour using an economic framework. Becker proposed a narrow argument which implied that deterrents such as the probability of detection and penalties and sanctions, were within the control of society. Becker did admit, however, that there was a point where enforcement became uneconomic and resulted in a social loss. So, even at this very early stage of

compliance research, there was recognition that the pure economic deterrence model had limitations.

Following Becker's model, Allingham and Sandmo (1972), derived a model based on a number of assumptions including taxpayers as utility maximizers who possessed actual knowledge of penalty and detection rates. The formulae they produced, despite also recognising taxpayers' reputation as a variable, were limited and simplistic. While they advocated that increasing the penalty rate and/or the probability of detection was a deterrent and led to greater income declaration, it was still an unproven theoretical model. A potentially salient issue which stems from Allingham and Sandmo's model is the existence of thresholds. The issue here is the certainty of the offender being detected versus the severity of punishment. That is, the deterrents could be used interchangeably. When detection rates are low, penalties should be high and vice versa. Consequently, Allingham and Sandmo's study also indicated that where the probability of detection is certain, mild punishment may be as effective a deterrent as a more severe one. Hence, increasing the penalty level will not necessarily achieve a greater deterrent effect if the offender knows that the chance of being caught is very high.

Yitzhaki (1974) provided the first sign of a real departure from Allingham and Sandmo's model. Yitzhaki examined taxpayers' attitude to risk and indicated that where a taxpayer had an absolute risk aversion that decreased with income, then an increase in the tax rate would result in a decrease in evasion. Hence, it was argued that attitude to risk was determined by the taxpayer's level of income. Although this theory was not tested it did appear more realistic.

Other early studies of criminal behaviour found that the probability of apprehension is more important than the sanctions actually imposed, also questioning the pure economic deterrence model from an enforcement perspective. Following this argument is the issue of the precision of information regarding the probability that punishment will be imposed. Consequently, where there is only vague information about the relatively low probability of detection and punishment, there will be a low deterrent value.

Therefore, despite the positive effect of increased sanction levels on taxpayer compliance having been found to hold where relatively low (and realistic) penalty levels are used, their overall impact has been questionable. Consequently, traditional economic deterrence models which draw upon expected utility theory and deterrence, mainly in the form of sanctions, have been found wanting. Little empirical evidence to support the predictions of economic deterrence models as a whole has surfaced. Researchers have, therefore, summarised the effect of factors that determine the monetary cost of compliance as including the tax rate, detection probability, the level of income and the penalty structure and suggest that, for all of them, existing empirical evidence provides no firm conclusions. Consequently, having considered the economic deterrence model and its deficiencies, it became apparent that further refinements and improvements needed to be developed to address tax evasion and non-compliance.

Behavioural Theory of Tax Compliance (Non-Pecuniary Factors)

The economic models of tax compliance have been subject to harsh criticism. The first reason for this criticism was that they assume taxpayers to be fully rational

utility maximizers whose behaviour is interpreted as a reaction to different financial benefits and losses. As Dean, et al., (1980) express it, ‘To abandon taxation studies to arid suppositions concerning how taxpayers might act if they were condemned to being entirely rational, utility-maximizing automatons can only serve to postpone the emergence of realistic tax theories and useful policy insights’.

The second reason was that the predictions of the economic models were invalidated by a bevy of empirical studies. Unlike the general conclusion of these analyses that most people engage in tax evasion, empirical studies suggest that many people are honest taxpayers (Porcano, 1988; Gordon, 1989; Erard and Feinstein, 1994b; Andreoni, et al., 1998; Elffers, 2000), or there are some people who never evade paying taxes even when the risk is sufficiently low to encourage cheating behaviour (Baldry, 1986). The limitations of such approaches have paved the way for the development of behavioural models of tax compliance. In these latter models, built on the grounds of sociological and psychological determinants, taxpayers are seen no longer as selfish utility maximizers but as human beings motivated to pay taxes on the basis of different attitudes, norms, beliefs, perceptions, feelings, social characteristics, cultural background like age, gender, race, religion etc. (see Schmolders, 1960; Fishbein and Ajzen, 1975; Meier and Johnson, 1977; Lewis, 1978; Jackson and Milliron, 1986; Ajzen, 1991; Bordignon, 1993; Cowell, 1992; Erard and Feinstein, 1994a; Coleman and Freeman, 1997; Frey, 1997; Mumford, 2001; Wenzel, 2004a; Wenzel, 2004b; Wenzel, 2005a; Wenzel 2005b).

One such behavioural model of tax compliance which encompasses these socio-psychological determinants is the ‘slippery slope’ framework proposed by Kirchler,

et al., (2008). According to the ‘slippery slope’ framework, trust in authorities and power of authorities are two main dimensions shaping tax compliance. *Trust in authorities* is defined as ‘the general opinion of individuals and social groups that the tax authorities are benevolent and work beneficially for the common good’ and *power of authorities* is defined as ‘taxpayers’ perception of the potential of tax officers to detect illegal tax evasion [...] and to punish tax evasion’ (Kirchler, et al., 2008). Both trust in authorities and power of authorities increase tax compliance, but the quality of compliance differs: *voluntary tax compliance* is achieved by increasing levels of trust; *enforced tax compliance* is achieved by increasing levels of power.

When talking about tax behaviour, the attitude towards taxpayers is of great importance as it can enhance either compliance or non-compliance. A ‘service and client’ climate between tax authorities and taxpayers is meant to foster trust in authorities and stimulate taxpaying behaviour. Alternatively, a ‘cops and robbers’ climate breeds distrust and resistance, giving birth to cheating behaviour. In the light of these realities, a huge merit of the ‘slippery slope’ framework is that it promotes a more ‘service and client’ approach of tax authorities towards taxpayers.

Torgler and Schneider (2007) argue that values and attitudes can affect individual behaviour. Apart from sanctions, Spicer and Lundstedt (1976) argued that a set of attitudes and norms might have effect on the choice between tax compliance and evasion. Lewis (1982) points out that “it could be that tax evasion is the only channel through which taxpayers can express their antipathy ... we can be confident in our general prediction that if tax attitudes become worse, tax evasion will increase”.

Therefore, we can state that values and attitudes can affect individual's behaviour and hence compliance.

Moreover, the influence of knowledge on tax compliance behaviour has been proven in various research (see Mohamad *et. al.*, 2007; Singh, 2003; Eriksen and Fallan, 1996; Harris, 1989 etc). According to Eriksen and Fallan, (1996), the level of education received by taxpayers is an important factor that contributes to the general understanding about taxation especially regarding the laws and regulations of taxation and hence their ability to comply with them. Studies on the relationship between the specifics of actual government spending and tax compliance, particularly on tax evasion, are very limited (Palil and Ahmad, 2011). According to them, logically, taxpayers, and especially those who pay high amounts of tax, will be sensitive to what the government spends their money on. Although there is limited empirical evidence, it is reasonable to assume that taxpayers will tend to evade tax and for that matter not complies to tax if they perceive that the government spends tax money unwisely.

It must be noted that institutions that respect the preferences of the citizens will have more support by the people than a state that acts as a Leviathan (see Prinz, 2010). Such a supportive behaviour has a positive effect on compliance. Levi (1988) points out that a possibility to create or maintain compliance is to provide reassurance by the government. A government that pre-commits itself with direct democratic rules imposes itself restraints on its own power and thus sends a signal that taxpayers are seen as responsible persons (Torgler, 2003). Furthermore, direct democratic rules signalise that citizens are not ignorant or uncomprehending voters, which might

create or maintain a certain social capital stock. The government signals thus that taxpayers' preferences are taken into account in the political process. The more taxpayers can participate in political decision making by popular rights, the more this contract is based on trust and the higher is tax compliance. As Frey (2003) points out, taxpayers are treated as "*citizens* rather than subjects, and have extensive rights *and* obligations to their state".

2.2.3 Theoretical Concept of Tax Evasion and Business Environment

2.2.3.1 Definition of tax evasion

James and Alley (2004) defined tax evasion as the attempt to reduce tax liability by illegal means. Tax evasion typically involves failing to report income, or improperly claiming deductions that are not authorized.

Some of the most common forms of tax evasion include the following: failing to report the cash income; taking unauthorized deductions for personal expenses on a business's tax return; falsely claiming charitable deductions - or inflating the amount of charitable deductions - when there have in fact been none or there have been significantly less than claimed; overestimating the value of property donated to charity; filing a false tax return, improperly omitting property and knowingly and significantly underreporting the value of an estate.

Lewis (1982) outlined two major distinctions in tax evasion: evasion by commission and evasion by omission. Evasion by commission requires an action by taxpayer, for example claiming deductions or rebates which mean that if a taxpayer is making a false claim, he will get a tax saving (a commission on top of his evading actions).

Conversely, evasion by omission requires taxpayers to do nothing in the tax return (i.e. miss something out deliberately); for example, one would not report his casual income or any cash-basis income.

2.2.3.2 Tax Evasion from Firms' Perspective

According to Allingham and Sandmo (1972) deterrence model of tax evasion, individual tax payers are portrayed to maximize their utility of tax evasion by considering three basic factors: the probability of being caught, the size of the penalty and the degree of their risk aversion. In this model, the assumption of neither moral judgement nor civic duties for tax payments is placed on individuals. On the contrary, individuals choose the optimal level of tax evasion to maximize their expected utility. Tax evasion here is considered a risky choice. Higher payoff that results from tax evasion is offset by penalties that are imposed by tax authority if caught. As a result, individuals should be in favour of tax evasion as long as potential gains are expected to be greater than potential losses, but their choice of tax evasion would be moderated by the degree of their risk aversion. In this case, the asymmetry between utility cost and benefit could restrict individual taxpayers from achieving the optimal level of tax evasion.

However as suggested in Slemrod (2004 and 2007), the deterrence theory may not be applicable to business tax payers, in particular, large publicly traded firms, which are owned by shareholders, but operated by managers. As indicated by Tedds (2007), the theoretical outcomes of the deterrence theory are muddled when the choice is not only the level of evasion but also the level of output, as with most businesses, and when there is no direct link between the owner's income, risk preference, audit

probability, and evasion decisions. This is particularly true for businesses where evasion decisions are made by managers and not the owner(s). Hence, the reasons driving many businesses to evade taxes is likely different from that of individuals and, hence, should be modelled differently. In the context of tax evasion, risk-averse managers can be assumed to carry out detailed plans on behalf of risk-neutral owners (Chen and Chu 2005). Because of complexity arising from multiple parties involved in corporate tax evasion, the deterrence theory for individual tax payers may not be transferred to corporate tax payers. Several studies provide analytical insights into corporate tax evasion based on the agency theory (Chen and Chu 2005; Crocker and Slemrod 2005; Desai and Dharmapala 2006; Desai et al., 2007).

Thus Chen and Chu (2005) provided an extension to the deterrence theory by focusing on how influential or key shareholders could induce managers to engage in tax evasion, which could be an illegal act. In the optimal contract, compensations for managers are associated with positive business outcomes including reduced tax liabilities. However, since any agreement about tax evasion cannot be enforced in court, managers would like to have *ex ante* compensations for promised future tax evasion. This arrangement leads to an incomplete labour contract as the compensation should be made in advance regardless of outcomes. Furthermore, such agreement for managers to perform an illegal act could compromise the quality of a firm's internal control system as its formal records, financial statements, would not represent true business outcomes. Rather, managers would create an internal control system that is opaque enough to hide their illicit methods to reduce tax liabilities. Managers could take advantage of such an opaque internal control system for rent extractions. Accordingly, under the deterrence theory, individual tax payers would

choose tax evasion as long as the expected marginal utility of tax evasion is greater than the expected marginal utility of penalty if caught. On the other hand, corporate shareholders need to have the expected marginal benefits of tax evasion large enough to offset both the expected marginal utility of penalty and efficiency loss in the internal control. This is particularly because tax evasion by a business actually involves the interaction of many agents and is much more complicated than individual income tax evasion.

It is noticed that the model developed by Chen and Chu (2005) does not consider the role of penalties in the tax evasion decision. On their part, Crocker and Slemrod (2005) provided a theoretical analysis of how corporate tax payers are affected by legal penalties. Using a principal-agent model, they suggest that officers in large corporations, rather than shareholders, directly make decision regarding corporate tax avoidance. Therefore, officers have more information about corporate tax reporting than do shareholders. Crocker and Slemrod (2005) compare two types of legal penalties: penalties on corporate officers and penalties on the corporation (i.e., shareholders). Penalties on officers would reduce the expected utility that the officer gains from engaging in aggressive tax avoidance behaviour. Therefore, an increase in the penalty on officers is expected to reduce the level of corporate tax avoidance. In contrast, it is not clear whether penalties on the corporation would affect corporate tax avoidance decisions. Penalties on the corporation would affect shareholders' expected utility.

In extending Desai and Dharmapala (2006) studies on the role of corporate governance in corporate tax, Desai et al., (2007) looks at the relationship between

corporate tax and corporate governance using three stakeholders: tax authorities, insiders and shareholders. In the higher tax regime, insiders should be more motivated to engage in tax avoidance because a larger amount of before-taxable income can be diverted. The diversion would decline with increased tax enforcement. The effect of tax rate increases on government tax revenues would vary depending upon the strength of corporate governance. In a country with weak corporate governance, an increase in the tax rate might reduce tax revenues because of increased rent extractions. However, officers, rather than shareholders, are the direct decision makers on issues related to corporate tax reporting. Therefore, whether civil penalties on shareholders would affect officers' decisions depends on how well the shareholders' and officers' incentives are aligned.

2.2.3.3 Behavioural Environment and Tax Evasion

Stern (2002) defines business environment as “policy, institutional, and behavioural environment, both present and expected, that influences the returns, and risks, associated with investment” in a specific location. That is, the business environment encompasses any external factors that affect the returns and risks faced by firms or investors. According to Xu (2010), defining business environment in this way has three broad categories. The first category covers macroeconomic aspects such as fiscal, monetary, and exchange rate policies, which ultimately affects investors' returns—high tax rates, for example, lower return on investment, while inflation increases the variability or volatility associated with such returns. The second category includes governance, institutions, and political stability. For instance, the extent to which the rule of law is upheld (i.e. quality of law and contract enforcement, protection of property rights), affects investors' confidence in the legal

system and thus their decisions on how much to invest and what organizational form to take. Institutions also include informal ones, such as the general level of trust, social capital, and social network (Knack and Keefer 1997; North 1990; Shirley 2008; Zak and Knack 2001), which facilitate new transaction relationships and, therefore, firm expansion. The final category includes infrastructure necessary for productive investment, such as transportation, electricity, and communications.

Miller and Kim (2017) have noted that a free and open investment environment provides maximum entrepreneurial opportunities and incentives for expanded economic activity, productivity increases, and job creation. The benefits of such an environment flow not only to the individual companies that take the entrepreneurial risk in expectation of greater return, but also to society as a whole. It is expected that with effective investment framework characterized by transparency and equity, supporting all types of firms rather than just large or strategically important companies will encourage rather than discourage innovation and competition.

Restrictions on the movement of capital, both domestically and internationally, undermine the efficient allocation of resources and reduce productivity, distorting economic decision making. Restrictions on cross-border investment can limit both inflows and outflows of capital, shrink markets and reduce opportunities for growth. In an environment in which individuals and companies are free to choose where and how to invest, capital will flow to its best use: to the sectors and activities where it is most needed and the returns are greatest. State action to redirect the flow of capital and limit choice is an imposition on the freedom of both the investor and the person seeking capital. The more restrictions a country imposes on investment, the lower its

level of entrepreneurial activity in the open and that could generate more incentive to evade taxes.

Moreover, good infrastructure (road, electricity, communication and custom) allows firms to have lower transport and communication costs, and therefore lower total costs to compete with their rivals and to export. Because of a good infrastructure, a larger extent of the market also facilitates a greater scope for specialization, which further reduces unit production costs. Increasing complexity of transactions enabled by better infrastructure could facilitate the need for new institutions (e.g., courts), which then reduce future agency costs for trade and for that matter tax evasion (Demsetz, 1967).

It must be noted that as long as a firm finds the environment in which it operates un-conducive with negative implications on its profit levels, it also resorts to finding ways to evade taxes as a means of reducing cost.

2.2.4 Theoretical Concept of Tax Administration and Firms' Productivity

2.2.4.1 Meaning and Components of Tax Administration

The core business of Tax Administrations is the levying and collection of taxes imposed by law (CIAT handbook for tax administration, 2000). It is important that Tax Administrations establish a clear definition of their core business from the outset and make it known to their stakeholders. The core functions of a Tax Administration include inter alia: registration of taxpayers, including detection of non-registration and false registration; processing of tax returns, withholdings and third-party information; verification or examination of the correctness and completeness of

received information (including audit activities); process of enforced debt collection; handling of administrative appeals and complaints; provision of service and assistance to taxpayers; and detection and prosecution of tax fraud.

2.2.4.2 The Chain Process of Tax Administration

A good tax administration requires a proper file management, which consists of the following constituent processes: data collection - the (active) collecting and processing of fiscally relevant information from and about taxpayers; registration and management - the registration and management of information on taxpayers with the relevant links between taxpayers; making data available - making information available to the processes of levying and collection; supplying data - supplying information about the registration of taxpayers to other government bodies and the taxpayer himself. The chain processes are discussed as follows.

Tax Levying

The main process of 'levying' consists of the following constituent processes: registration and management - the registration and management of information derived from tax returns for the purpose of selection and treatment; evaluation of contributions - the evaluation of contributions in order to establish tax liability on the basis of the various contributions made (income tax, corporation tax, turnover tax, wage tax, etc.); establishment of treatment strategy - evaluation, assignment and choice of the type of treatment; establishment of the basis of tax assessment- execution of the treatment process, including the establishment of the basis of tax assessment and possibly the application of administrative-legal sanctions; calculation

and conclusion - the process of calculating and producing assessments and other decisions.

Tax Collection

Collection is the main objective of a Tax Administration and the reason for its existence. The collection function consists in collecting the amount of tax calculated from taxpayers' returns or on the basis of other legal evidence. The collection function has two aspects. Firstly, the collection department enters into the accounts the means of payment used for payment of taxes; it is also responsible for the sale of tax values (tax discs, stamps, stamped paper, etc.). Secondly, the collection department is responsible for initiating all necessary procedures to obtain payment of tax by taxpayers who have not voluntarily fulfilled this obligation.

Tax Supervision and Fraud Detection

Voluntary tax compliance is the most efficient and cost effective way to obtain tax revenues. One way to make sure that tax payers voluntarily comply with their obligations is to provide good service. Good service diminishes the need for correction at a later stage and is therefore the best remedy in the fight against fraud. The aim of good service is to make clear to taxpayers what their legal obligations are (the Tax Administration explains what tax laws exactly mean for the taxpayer). Service also enables taxpayers to fulfil their obligations in several ways. Besides service, supervision is another way to ensure that the taxpayer deals with his or her tax matters correctly and in time and that no relevant information is missing. Examples of supervision are visits to starting entrepreneurs, on-site monitoring, audits of the books based on the annual reports compiled by companies, and

electronic declaration procedures. Service and supervision forms the preventative side of fighting fraud. If this is not sufficient, there has to be a repressive method: investigation and criminal prosecution. This has to function as a last resort, only to be used on taxpayers who do not fulfil their obligations

Tax Auditing

The auditing function consists in examining the accuracy of the information declared by taxpayers. A Tax Administration has a legal right to obtain information on taxable revenues from third parties (employers, customers, banks, social security agency, etc.). It must clearly inform the taxpayers about this legal possibility and about the fact that the tax departments can use this information to control their situation.

Service Provision and Communication

The Tax Administration must pay special attention to the maintenance of fluid relationships with the taxpayers, based on the adequate operation of the information and assistance services, as part of a preventive policy of the tax fraud and as an indispensable element for improving voluntary compliance with the tax duties. Furthermore, it must be taken into account the framework in which tax relationships are normally developed, conditioned by the complexity of the tax laws, the generalization in many countries of the self-assessment system and the existence of plentiful obligations for entrepreneurs and companies, such as withholdings on their employees' wages and relevant information supply to the Tax Administration.

Information and assistance constitute unavoidable duties for the Tax Administration, and represent the logical counterpart of the obligations imposed on citizens. In this

context, each obligation assumed by the taxpayer corresponds with a performance of the Administration that tends to favour its compliance. Its purpose is to produce voluntary fulfilment spontaneously and to reduce the degree of controversy within the relationships between the taxpayers and the Tax Administration

2.2.4.3 Tax Administration and Compliance Cost Theory

The primary function of the tax administration is to scrutinize compliance and also to enforce sanctions to offenders as provided in the rules and regulations (Bird, 2004). The major problem that firms face with poor tax administration is seen in terms of compliance cost. Compliance costs cover a wide spectrum of both monetary and non-monetary costs. They include, but are not limited to, the costs of: acquiring the necessary knowledge of relevant aspects of the tax system; compiling records; acquiring and maintaining tax accounting systems and completing tax return forms; evaluating the tax effectiveness of alternative transactions or alternative methods of complying with the requirements of the law; and collecting and remitting taxes levied on employees and turnover (Oliver and Bartley, 2005).

Compliance costs can be further categorised into mandatory costs and voluntary costs. Mandatory costs are those costs that taxpayers must incur to meet their statutory obligations. For example, the law requires that taxpayers report all forms of income identified within the statute and be able to substantiate any claimed deductions, rebates or offsets. Voluntary costs are those additional costs that the taxpayer may choose to incur to determine or minimise their tax liability. For example, taxpayers may choose to evaluate alternative methods of complying with the law to determine which produces the most favourable tax outcome. They may

also seek advice to identify tax-effective ways to structure transactions. Voluntary costs may also be incurred in calculating and applying deductions, rebates and other concessions for which the taxpayer is eligible but not legally required to claim.

The tax compliance burden on firms tends to be higher the more time is required to understand how to comply, and/or if the mechanics of fulfilling obligations is onerous (Dabla-Norris et al. 2017). Braunerhjelm and Eklund (2014) confirm this by noting that compliance with tax codes and tax policies is associated with costs in addition to the pure financial cost of the tax, which may also stifle entrepreneurship. This is because as tax codes differ in their complexity, the time that is required to comply with such taxes also differs. In the end, higher tax compliance burden as a result of poor tax administration diverts resources from productive activities and increases input costs without creating additional output and hence affecting firm productivity. Oliver and Bartley (2005) illustrated how compliance cost affects output by considering an economy that produces two goods - public and private. They show that if a tax system is associated with excessive levels of compliance costs, the economy will not be performing on its production possibility curve. However, reducing the level of compliance costs would allow society to move to a higher level of production and utility.

2.3 Empirical Review of Literature

This section reviews empirical literature on the three thematic areas. The first section reviews studies on tax compliance from the household perspective. The second section reviews studies on business environment and firms' decision to evade taxes. The third section reviews studies on tax administration and firm productivity.

2.3.1 Empirical Studies on Tax Compliance from Household Perspective

Kogler et al., (2013) tested the slippery slope framework of tax compliance with data based on a representative sample of 476 self-employed Austrian taxpayers. Their findings clearly supports the main assumptions of the “slippery slope framework” in the sense that power of authorities and trust in authorities are both relevant factors to influence tax compliance. In addition, the relation between perceptions of both, procedural justice and voluntary compliance as well as distributive justice and voluntary compliance were found to be mediated by trust. Furthermore, similar effects of both, trust and power were observed with regard to retributive justice and deterrence

As far as institutions are concerned, Torgler (2005a) investigated determinants of tax morale using a cross-section of individuals in Switzerland. Employing the World Value Survey (WVS) data of 1996 and International Social Survey Programme (ISSP) data in 1999, the findings suggested that trust in courts and the legal system have a positive impact on tax morale. Similarly, Alm and Torgler (2006) examined the determinants of individuals’ intrinsic willingness to pay taxes using the World Value Survey data for a cross-section of individuals from Spain and the United States of America. Their findings indicated significantly higher tax morale in the USA than Spain. The results indicated that the large difference between the two countries was driven by trust. Furthermore, Torgler and Murphy (2004) sought to identify factors that determined tax morale in Australia. They used the WVS data set for 1981 and 1995, which had a total of 1,228 and 2,048 respondents respectively. Their findings also revealed that trust in government has a positive impact on tax morale in Australia.

In a series of studies Torgler (2003a, 2003b, 2005) has explored the determinants of tax morale. Based on survey evidence from the World Values Survey and the European Values Survey (European Values Study Group and Association, 2006) he finds that tax morale in the Central/Eastern European Countries (CEE) is significantly higher than countries of the Former Soviet Union (FSU) (Torgler, 2006). In explaining both interpersonal and cross-country differences, he finds that all trust variables are highly significant (trust in legal system, trust in government, satisfaction with national officers, and evaluation of the political system) and correlate positively with a higher tax moral, whereas corruption affects tax morale negatively.

Individuals tax compliance behaviour are affected by the behaviour of their neighbours, or those about whom they may have information, whom they may know, or with whom they may interact on regular basis. Using experimental methods to test the role of such information about peer effects on compliance behaviour, Alm et al., (2017) find that providing information on whether one's neighbours are filing returns and/or reporting income has a statistically significant and economically large impact on individual filing and reporting decisions. This result is supported by Ho et al., (2013), who conducted a survey in China with their findings indicating that Chinese taxpayers tend to use relationship based moral reasoning to judge tax compliance issues. Further support for this view is by Jayawardane (2016), who showed that peer influence is one of the most significant factors in tax compliance in Sri Lanka.

D'Arcy (2011) studied on why citizens assent to pay taxes and on what condition do private individuals agree to commit their personal income to a public fund at the disposal of the state. The paper poses these questions in the context of African states

and tests three distinct theoretical perspectives: i) the fiscal exchange thesis that emphasizes the vertical relationship between citizen and state – specifically the services received in return for tax ii) the ‘national political community’ approach, which highlights the horizontal relationship between citizens, in terms of the extent of national identification and iii) the comparative treatment perspective, focused on how the state treats the citizen relative to their compatriots. An ordered probit model was employed to test these theories, using micro data from round 3 of Afrobarometer survey, 2005. The results provided support for certain aspects of the fiscal exchange, no backing for national community approaches and more persuasive support for the comparative treatment thesis. These findings challenge existing accounts, which focus exclusively on fiscal exchange and national community, and suggests new avenues for research, as comparative treatment has to date not been applied in the literature on tax attitudes.

Daude et al., (2013), studied on the drivers of tax morale worldwide, with an emphasis on developing countries. Using data from the World Value Survey as well as the Afrobarometer and Latinobarometer, their findings showed that socio-economic factors such as age, religion, gender, employment status and educational attainment have a significant impact on people’s levels of tax morale. In terms of institutional determinants, satisfaction with democracy, trust in government and the satisfaction with the quality of public services play an important role in increasing tax morale.

Ali et al., (2013) explored factors that determine citizens’ tax compliance behaviour in Kenya, Tanzania, Uganda and South Africa using attitude and perception data from the new round 5 of Afrobarometer survey, 2011. Using a binary logit

regression, they found that increase in the perception of individuals about the difficulty of evading taxes increase the likelihood of tax compliant attitude in Kenya and South Africa. Moreover, it was evidenced that individuals who are more satisfied with public service provision are more likely to have a tax compliant attitude in all the four countries. However, frequent payment to non-state actors, e.g. to criminal gangs in exchange for protection, reduces individual's tax compliant attitude. Tax knowledge was also significantly correlated with tax compliant attitude in Tanzania and South Africa.

The more a government is effective and fair, the more legitimacy that government is likely to attain, and the more it will possess the potential to elicit compliance without excessive monitoring or punitive action. Levi and Sachs (2009) explored this position using the Afrobarometer data, 2005 for sub-Saharan Africa. Employing the multi-level logit estimation procedure, their results revealed that satisfaction with local government, efforts to combat corruption and fair treatment significantly affect government legitimacy to collect taxes.

It can be noted that most of the studies carried out focus on tax morale as well as government legitimacy to collect taxes but not specifically tax compliance. Even though there is a strong association between tax morale and tax compliance, focusing specifically on tax compliance is very necessary. This is because tax morale may not necessarily lead to tax compliance. Moreover, for sub-Saharan Africa, few studies that focused on tax compliance were restricted to specific country level. This study improves upon such studies to look at tax compliance with respect to the SSA sub-region as a whole.

2.3.2 Empirical Studies on Business Environment and Firms' Decision to Evade Taxes

Mawejje and Okumu (2016) developed a model on business climate and its relationship with tax evasion among firms. In their model, firms engage in the production of a final good but must rely on quality public capital provided by the government. Government on the other hand hires bureaucrats to manage the procurement of public goods and collection of taxes. They tested this model using a World Bank firm-level data from Uganda. By adopting an Instrumental Variable (IV) Tobit estimation method, they found that tax evasion is affected positively by an inefficient and quality of legal environment, bribery as well as inadequate provision of capital goods. In another angle, Alm et al., (2014) developed a theoretical model that incorporates the potential for bribery in a firm's tax reporting decisions. By employing the instrumental variable and propensity score matching methods on WBES data, their results revealed that it is corruption that largely drives higher levels of evasion. Additionally, larger bribes result in higher levels of evasion, at least up to some point. These results indicate that governments seeking to increase their tax revenues must work first to ensure an honest tax administration.

It is argued that informality is correlated with tax evasion. To that effect, Nadirov and Aliyev (2015) investigated informality, tax evasion and the quality of business environment from the south Caucasian countries. By adopting instrumental variable OLS, their results indicated a two way effect of informality and tax evasion. Moreover, they found that the business environment has implications for both informal economy and tax evasion. However, the use of OLS was questionable since

the dependent variables (tax evasion and informality) were censored in the responses and as such made OLS inappropriate for estimations.

Now in focusing primarily on informality, Dabla-Norris et al. (2008) investigated on determinants of informality using the survey responses of over 4000 registered (formal sector) firms in a sample of 41 countries. Their findings revealed that for a firm which views financing as a major obstacle, there is a 16% probability that 50% of its sales will not appear on its books. On the contrary, for a firm which views financing as a minor obstacle, the same level of informality occurs with less than half this probability. In addition, their results revealed that the quality of the legal framework affects the size of the informal sector, as well as taxes, regulations and financial constraints. Related to this finding is Ingram et al., (2007), who investigated on why firms choose to be informal among 6 African countries (South Africa, Tanzania, Zambia, Senegal, Uganda and Senegal). By employing the World Bank's enterprise survey, they found that firms' decision to be formal is correlated with the benefits and costs imposed by their investment climate. After controlling for firm-level, sector and country-specific effects, their study found that the incidence of formality is positively correlated with perceptions regarding the availability of electricity supply, access to finance and access to land, and negatively correlated with the rate of taxation and corruption.

The role of government is noted by theory to have a major effect on firms' tax compliance and thus tax evasion. Joulfaian (2009) investigated the determinants of business tax evasion with a special emphasis on the role of governance. It employed data from a sample of businesses in 26 transition economies in Europe and the

Former Soviet Union and Turkey. Results suggested that governance, as measured by the frequency of tax related bribes, is a significant determinant of compliance behaviour and that evasion rises with bribes to tax officials. The findings also suggest that corporations, particularly those listed on an exchange or of foreign nationality, conceal less of their activities than other forms of businesses. The role of government is also evidenced by Tedds (2007) that government corruption has the single largest causal effect on under-reporting; resulting in the percentage of sales not reported to the tax authority being 53.4 percent higher. This was followed by taxes, access to financing, organized crime, political instability and the fairness of the legal system.

Alon and Hageman (2013) on their part investigated into the impact of corruption on firm tax compliance in transition economies. Based on a sample of over 5,000 firms from 22 former Soviet Bloc transition economies, they found that higher levels of corruption and higher levels of particularized trust (reliance on friends and family) are associated with lower levels of tax compliance. Interestingly, it was also found out that the negative relationship between corruption and tax compliance is weakened in situations of higher generalized trust (trust in strangers). Similarly, Alm and McClellan (2012) studied on tax morale and tax compliance from firm's perspective. They used a pooled dataset of firm level data from 79 countries over a period of 8 years and covering approximately 57,000 firms. Their results indicated the crucial role of tax morale in firm tax compliance: improvements in tax morale have a significant and positive impact on reporting.

By exploiting a unique data set containing information on the estimated bribe payments of Ugandan firms, Fisman and Svensson (2007) studied the relationship between bribery payments, taxes and firm growth over the period 1995-97. They found that both the rate of taxation and bribery are negatively correlated with firm growth. In a related study, Reinikka and Svensson (2002) identified that poor public capital, proxied by unreliable and inadequate electric power supply, significantly reduces investment in productive capacity by firms. They found out that when public provision of services and infrastructure is poor, they can invest in complementary capital themselves. The cost of this strategy, however, is that less productive capital is installed.

2.3.3 Empirical Studies on Tax Administration and Firm Productivity

One major channel that tax administration affects firm productivity is through compliance cost. Dabla-Norris et al., (2017) estimated the effects of tax compliance burden on firm performance by constructing an index of tax administration quality and found that stronger and quality tax administration can exert a positive effect on the productivity of small and young firms. They argue that these effects are significant in an economic sense as they may offset a sizeable share of the productivity disadvantage of small and young firms relative to larger and older firms. Braunerhjelm and Eklund (2014) on their part argued that the burden imposed by tax codes and tax compliance constitutes a barrier to entry and growth. Employing data to cover 118 countries over a period of six years, they found that the entry rate is significantly reduced by the tax administrative burden and that this effect is unrelated to general taxes on corporate profits and its robust to the inclusion of several important control variables.

In another sense, poor tax administration tax through compliance costs is argued to be linked to the compliance level and hence could raise the degree of tax evasion (Erard and Ho, 2003). Being outside the regulatory and tax umbrella means that these firms not only become less productive than their competitors in the formal sector, but it also means that they are locked out of markets for finance, technology, and other resources that would enable them to improve on their productivity (see Palmade and Anayiotos, 2005). In a related way, Gaspar and Jaramillo (2017), show that a stronger tax administration reduces the prevalence of cheats. They argue that by getting rid of the implicit subsidy, the less productive “cheats”, unable to compete, will go out of business. This makes room for productive, tax-compliant firms to gain market share and absorb greater amounts of labour and capital, raising aggregate productivity. Also their results show that in emerging market and low income developing countries, closing the productivity gap between tax compliant firms and cheats would add ½ to 1 percentage points to aggregate productivity.

In terms of firm productivity and growth, Lacovone et al., (2014) found that African firms, at any age level, tend to be systematically smaller than firms in other regions of the world. In looking at the impact of business environment measures as well as certain types of firm characteristics including access to as finance, infrastructure, legal rights, availability of skilled labour, access to land, foreign ownership and/or export status, they came to the conclusion these variables do have some explanatory power but cannot fully explain the slower growth of employment in African firms. In a related study, Harrison et al., (2014) used a firm-level data to examine formal firm performance. They found that when controlled for geography, political competition and the business environment, formal African firms lead in productivity levels and

growth. They highlighted that Africa's disadvantages arise from its weak business environment, including the lack of infrastructure, access to finance and political competition.

Moreover, Fisman and Svensson (2007) studied the relationship between bribery payments, taxes and firm growth of Ugandan firms over the period 1995-97 and found that both the rate of taxation and bribery are negatively correlated with firm growth. On the part of Reinikka and Svensson (2002), they identified that poor public capital, proxied by unreliable and inadequate electric power supply, significantly reduces investment in productive capacity by firms. Bartelsman et al., (2000) also explored the dispersion of productivity across firms and establishments, the persistence of productivity differentials, the consequences of entry and exit, and the contribution of resource reallocation across firms to aggregate productivity growth. Their findings revealed important factors correlated with productivity growth, such as managerial ability, technology use, human capital, and regulation.

It can be concluded from the empirical literature that not many studies have focused specifically on the role of quality tax administration on firm productivity especially in sub-Saharan Africa and that justifies the importance of this paper.

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CHAPTER THREE

PAPER I

Tax Compliance in Sub-Saharan Africa: How Important are Non-Pecuniary Factors?

KNUST

Abstract

This paper sought to assess the impact of non-pecuniary factors on tax compliance in sub-Saharan Africa (SSA). Using the Round 5 of the Afrobarometer Survey (2015) across 30 countries, the findings of the paper revealed that perceived tax knowledge limitation reduces the probability of tax compliance in SSA by 5%. Perceived non-compliance by others reduces compliance probability by 2%. Similarly, corruption of tax officials reduces the probability of being tax compliant in SSA by 2%. On the contrary, trust in tax department increase the probability of compliance by 5%, while fighting corruption improves compliance by 2%. With respect of fiscal exchange, handling of provision of health, education and road needs, tend to increase the probability of complying with tax laws and obligations in SSA by 2%, 3% and 2% respectively. As far as policy implication is concerned, governments in SSA must complement tax laws which are mainly based on deterrence factors (penalty rate, tax rate and probability of detection) to include non-pecuniary factors.

3.1 Introduction

Taxpayers' behaviour is such that they are not willing to comply with tax laws when given the opportunity. This practice, which is common in both developed and developing countries, poses a great and untoward threat to economic growth and development. That notwithstanding, if we set aside economically, the benefit that is capable of being acquired with evading taxes, what influences individuals to comply with taxes on time as well as the obligated amount becomes a question that needs a bigger look at. In this regard, understanding the attitude of taxpayers with respect to factors that affect their compliance and how to influence these factors would obviously be very essential to enhancing revenue generation for economic growth and development. The objective of this paper therefore is to assess the importance of non-pecuniary factors on tax compliance in sub-Saharan Africa. Non-pecuniary factors refer to factors that are not determined by rational cost-benefit considerations as argued by the deterrence theory of tax compliance.

It is noted that international donors have become conscious that the most desirable channel to eliminate too much dependence on foreign aid in the long run is taxation (Mascagni et al., 2014). The mobilization of tax revenue is seen as a major channel in which governments can create fiscal space. Moreover, it helps in the provision of essential public services as well as reducing single resource dependence and foreign aid. This notwithstanding, domestic tax base in most African countries is undermined by widespread tax avoidance and evasion (IMF 2011). Moreover, Schneider et al., (2010) estimated the shadow economy in sub-Saharan Africa to be 40.2%. These situations reflect in low tax revenue generation and subsequently deficit in funds to drive development in the sub-region. In this regard, improving and achieving high

compliance levels to tax obligations become necessary. This is because reducing tax evasion does not only lead to improvement in government's revenue, but also, it is a broader issue for the development of a civil order (Knack and Keefer, 1997).

The decision to evade taxes and for that matter being tax non-compliant is not only determined by rational cost-benefit considerations (see for instance Allingham and Sandmo, 1972). Rather, there non-pecuniary factors that are influenced by the perceived compliance of other taxpayers (see Frey and Torgler, 2007; Elster, 1989; Gordon, 1989; Gaechter, 2006 etc), tax knowledge (see Singh, 2003; Mohamad *et al.*, 2007; Harris, 1989; Eriksen and Fallan, 1996 etc), institutions (see Prinz, 2010; Levi, 1988; Torgler, 2003; Frey, 2003 etc) as well as fiscal exchange (Torgler, 2005). Other demographic characteristics such as age, sex, employment status, location etc. also influences tax compliance (see Gaviria, 2007; Hug and Sporri, 2011; Daude and Melguizo, 2010; Torgler, 2005).

There are policies such as high penalty rate and increasing inspection by tax officials. Yet these are not reflecting in high compliance. Also, judging from the fact that the conventional deterrence theory in evidence have not always encouraged compliance (see Fatás & Roig, 2004), it becomes necessary to assess the role played by non-pecuniary factors in the form of tax knowledge, institutions, fiscal exchange among others in shaping and improving tax compliance. For instance, such evidence provides the core basis for reforming institutions, and the tax system. This has the potential of reducing compliance cost, improving tax administration, and accountability of public officials, and hence reduces non-compliance.

This paper contributes to the literature on tax compliance in SSA by employing data based on recent individual-level survey to analyse the impact of non-pecuniary factors (tax knowledge, perceived non-compliance by others, corruption of tax officials, trust in tax department, trust in courts, fighting corruption, as well as the handling of provision of health, education, road and electricity needs) on tax compliance in SSA.

By employing the Probit estimation method and controlling for individual and country characteristics, the findings of the paper revealed that perceived tax knowledge limitation reduces the probability of tax compliance in SSA by 5%. Perceived non-compliance by others reduces compliance probability by 2%. Similarly, corruption of tax officials reduces the probability of being tax compliant in SSA by 2%. On the contrary, trust in tax department increase the probability of compliance by 5%, while fighting corruption improves compliance by 2%. With respect of fiscal exchange, handling of provision of health, education and road needs, tend to increase the probability of complying with tax laws and obligations in SSA by 2%, 3% and 2% respectively.

The rest of the paper is structured as follows. Section 3.2 presents stylised facts on tax revenue, tax effort and shadow economy in sub-Saharan Africa. Section 3.3 deals with the literature review on tax compliance. The baseline model, empirical strategy and data sources are laid out in Section 3.4. The empirical results are presented and discussed in section 3.5. Section 3.6 concludes the paper.

3.2 Stylised Facts on Tax Revenue, Tax Efforts and Shadow Economy in SSA

Tax revenue/GDP has not been sustained on an upward level although there have been many policy measures put in place to boost revenue generation. The ratio of tax revenue to GDP in SSA stood at 14.32% by end of 2003. This figure improved by the end of 2004 to 14.81%. This was sustained and further improved to 17.95% by the end of 2008. Thereafter, sustenance has been a major problem as the ratio has been dropping on a whole and reaching as low as 15.79% by the end of 2013 as shown in Figure 3.1.

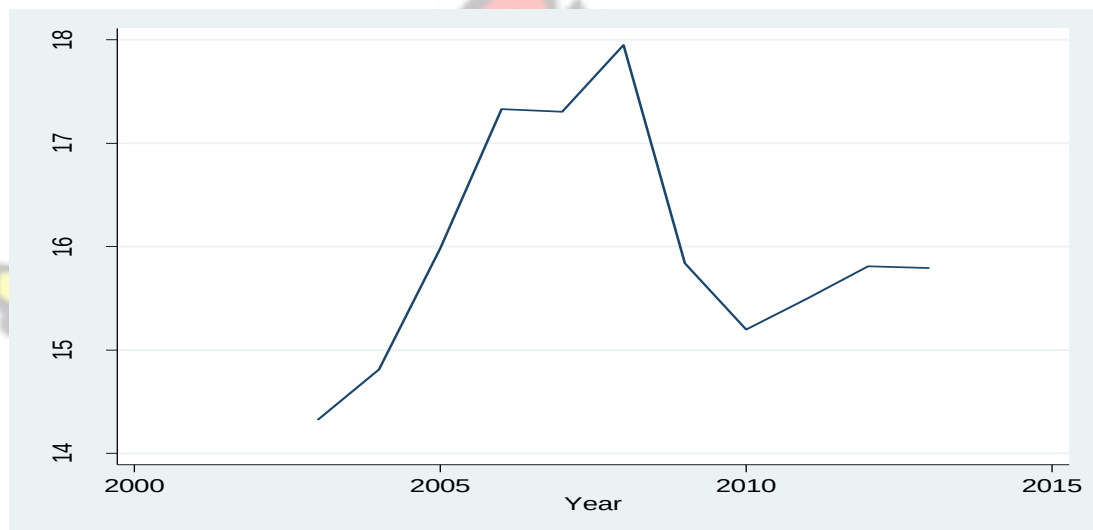


Figure 3. 1 Tax revenue/GDP in SSA

One possible explanation is attributed to tax evasion. According to Global Financial Integrity estimates, sub-Saharan Africa suffers from the biggest loss in terms of tax evasion (Kar and LeBlanc, 2013). The ability to increase tax revenue to a large extent depends on tax effort. Tax effort is the index of the ratio between the share of the actual tax collection to GDP and the predicted taxable capacity (Stotsky, et al., 1997). In this case, “high tax effort” is when the ratio is greater than one (1) - meaning that the country utilizes its tax base very well in order to increase tax

revenues. A “low tax effort” is when the ratio is less than one (1) – meaning that the country may have relatively substantial scope or potential to raise tax revenues. For sub-Saharan Africa, Fenochietto and Pessino (2013) estimated a tax effort of 0.71. It must be noted that majority of countries even had tax effort less than the average of 0.71 as displayed in Figure 3.2. Guinea-Bissau and Nigeria had the lowest of tax efforts of 0.33 and 0.39 respectively. Few countries came close to the achieving tax effort of 1. These include Mozambique (0.85), Namibia (0.91), Malawi (0.98) and Zambia (0.98).

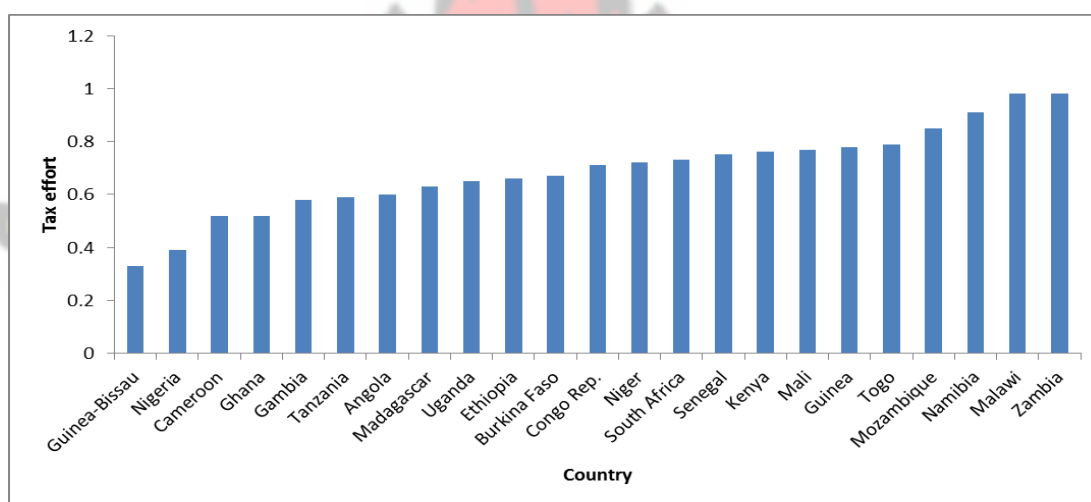


Figure 3. 2 Tax effort in selected countries in SSA

It is clear from the Figure 3.2 that tax revenue generation in SSA is below its potential. A plausible reason that can be given is either low compliance or non-compliance. To support this claim is Schnieder at al., (2010) who estimated the shadow economy as a ratio of GDP for SSA from 1999 – 2007 to be 40.2%. Estimate for countries is illustrated in Figure 3.3.

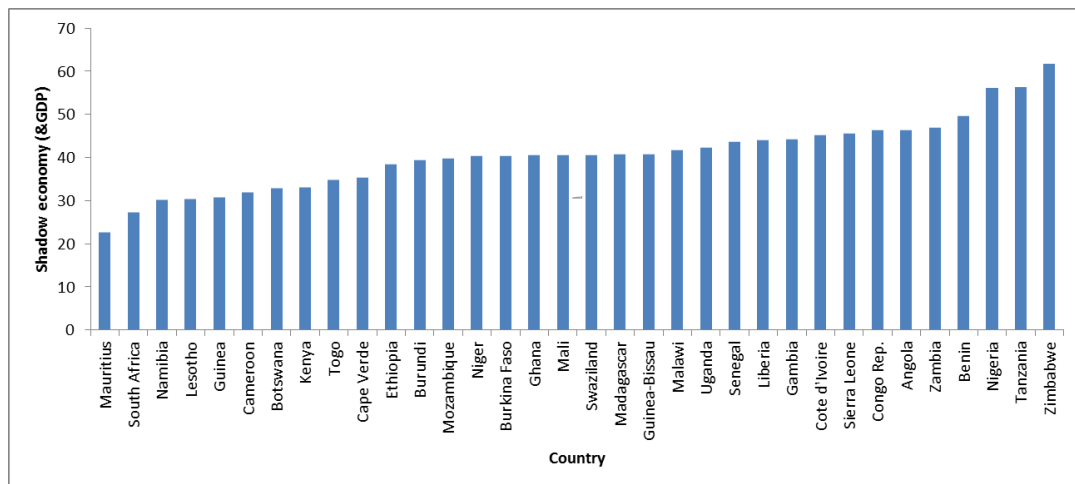


Figure 3. 3 Shadow economy across Sub-Saharan countries

The estimates illustrated in the Figure 3.3 depict a high level of shadow economy across SSA with the exception of few countries whose estimates are less than world's average of 33%. These countries include Mauritius (22.7%), South Africa (27.3%), Namibia (30.3%) and Lesotho (30.5). countries such as Nigeria, Tanzania and Zimbabwe had the worst in terms of estimates with shadow economy estimates of 56.4%, 56.2% and 61.8% respectively.

Thus the important question that arises from the above analysis is, how can tax compliance be improved in SSA? It is for this reason that this paper seeks to assess the importance of non-pecuniary factors such as tax knowledge, perceived non-compliance by others, corruption of tax officials, trust in tax department, trust in courts, fighting corruption, as well as the handling of provision of health, education, road and electricity needs on tax compliance in SSA.

3.3 Review of Related Literature

Tax compliance is a major problem for many tax authorities and it is not an easy task to persuade taxpayers to comply with tax requirements even though 'tax laws are not always precise' (James and Alley, 2004). Tax compliance is probably the most neutral term for describing the willingness of the taxpayer to pay taxes (Kirchler 2007). Essentially it means that a person declares voluntarily and pays in a timely manner all tax liabilities and along with all these, accounting for taxation purposes shall be in compliance with the valid norms pursuant to the tax law (OECD 2008).

The benchmark economic model of tax evasion over the last half century has been the Allingham and Sandmo (1972) model, in which self -interested taxpayers choose how much income to report to the tax authority by trading off the benefits of evasion (lower tax payments) against the costs of evasion (the possibility of being caught and punished). The key policy parameters affecting tax evasion and compliance to that effect are tax rate, the detection probability, and the penalty imposed conditional on the evasion being detected. However, there is an apparent disconnect between much of the academic literature on tax compliance and the administration of tax policy (Luttmer and Singhal, 2014). While tax administrators are obviously concerned about enforcement, they also tend to place a great deal of emphasis on improving "tax morale," by which they generally mean increasing voluntary compliance with tax laws and creating a social norm of compliance.

Torgler and Schneider (2007) argue that values and attitudes can affect individual behaviour. Apart from sanctions, Spicer and Lundstedt (1976) argued that a set of attitudes and norms might have effect on the choice between tax compliance and

evasion. Lewis (1982) points out that “it could be that tax evasion is the only channel through which taxpayers can express their antipathy ... we can be confident in our general prediction that if tax attitudes become worse, tax evasion will increase”. Therefore, we can state that values and attitudes can affect individual’s behaviour and hence compliance. Individuals consider tax evasion (non-compliance) to be a less serious wrongdoing the more widespread they presume it to be (Frey and Torgler, 2007). In line with this, tax compliance is said to be affected by tax morale; with the later been seen as an internalized social norm for the former (Elster, 1989). Specifically, as in Gordon (1989) and Traxler (2010), the strength of the norm depends on an individual specific degree of norm internalization and the endogenously determined share of evaders in the economy (with a higher share inducing a weaker norm). Hence, individual evasion decisions depend on the behaviour of others implying that individuals act conditionally cooperative (Gaechter, 2006).

The influence of tax knowledge on tax compliance behaviour has been proven in various research (see Mohamad *et. al.*, 2007; Singh, 2003; Eriksen and Fallan, 1996; Harris, 1989 etc). According to Eriksen and Fallan, (1996), the level of education received by taxpayers is an important factor that contributes to the general understanding about taxation especially regarding the laws and regulations of taxation and hence their ability to comply with them.

Studies on the relationship between the specifics of actual government spending and tax compliance, particularly on tax evasion, are very limited (Palil and Ahmad, 2011). According to them, logically, taxpayers, and especially those who pay high

amounts of tax, will be sensitive to what the government spends their money on. Satisfaction with public expenditures and services can serve as a measure of how well governments convert taxes into expenditures and that government expenditures may motivate compliance by providing goods and services that citizens prefer (see Torgler, 2005). Although there is limited empirical evidence, it is reasonable to assume that taxpayers will tend to evade tax and for that matter not comply to tax if they perceive that the government spends tax money unwisely.

Kirchler (2007) suggested that social factors should be viewed in a broader sense to include the psychology of the taxpayers. Individual characteristics affect significantly the levels of tax morale and for that matter tax compliance. Those who claim a faith or religious identity are more strongly associated with positive attitudes towards paying taxes. Age also affects tax compliance results in Asia (Torgler, 2005), Eastern Europe (Hug and Sporri, 2011) and Latin America (Torgler, 2005; Gaviria, 2007 and Daude and Melguizo, 2010), with mid and old-age respondents justifying less tax evasion. By contrast, despite conventional wisdom on the higher tax morale of women, the literature is far from being unanimous on the effects of gender, with almost half of the papers finding a negative sign.

The self-perceived economic situation and labour status also matter. Individuals who declare to be satisfied with their financial position and do not report having economic problems justify tax evasion less frequently (OECD, 2012). Most studies show that self-employed exhibit lower tax morale than full-time workers, while retired declare a significantly higher one (Torgler, 2004 for Asia and Hug and Sporri, 2011 for Eastern Europe).

It must be noted that institutions that respect the preferences of the citizens will have more support by the people than a state that acts as a Leviathan (see Prinz, 2010). Such a supportive behaviour has a positive effect on compliance. Levi (1988) points out that a possibility to create or maintain compliance is to provide reassurance by the government. A government that pre-commits itself with direct democratic rules imposes itself restraints on its own power and thus sends a signal that taxpayers are seen as responsible persons (Torgler, 2003). Furthermore, direct democratic rules signalise that citizens are not ignorant or uncomprehending voters, which might create or maintain a certain social capital stock. The more taxpayers can participate in political decision making by popular rights, the more this contract is based on trust and the higher is tax compliance. As Frey (2003) points out, taxpayers are treated as “citizens rather than subjects, and have extensive rights *and* obligations to their state”.

Kogler et al., (2013) tested the slippery slope framework of tax compliance with data based on a representative sample of 476 self-employed Austrian taxpayers. Their findings clearly supports the main assumptions of the “slippery slope framework” in the sense that power of authorities and trust in authorities are both relevant factors to influence tax compliance. In addition, the relation between perceptions of both, procedural justice and voluntary compliance as well as distributive justice and voluntary compliance were found to be mediated by trust. Furthermore, similar effects of both, trust and power were observed with regard to retributive justice and deterrence

As far as institutions are concerned, Torgler (2005a) investigated determinants of tax morale using a cross-section of individuals in Switzerland. Employing the World Value Survey (WVS) data of 1996 and International Social Survey Programme (ISSP) data in 1999, the findings suggested that trust in courts and the legal system have a positive impact on tax morale. Similarly, Alm and Torgler (2006) examined the determinants of individuals' intrinsic willingness to pay taxes using the World Value Survey data for a cross-section of individuals from Spain and the United States of America. Their findings indicated significantly higher tax morale in the USA than Spain. The results indicated that the large difference between the two countries was driven by trust. Furthermore, Torgler and Murphy (2004) sought to identify factors that determined tax morale in Australia. They used the WVS data set for 1981 and 1995, which had a total of 1,228 and 2,048 respondents respectively. Their findings also revealed that trust in government has a positive impact on tax morale in Australia.

In a series of studies Torgler (2003a, 2003b, 2005) has explored the determinants of tax morale. Based on survey evidence from the World Values Survey and the European Values Survey (European Values Study Group and Association, 2006) he finds that tax morale in the Central/Eastern European Countries (CEE) is significantly higher than countries of the Former Soviet Union (FSU) (Torgler, 2006). In explaining both interpersonal and cross-country differences, he finds that all trust variables are highly significant (trust in legal system, trust in government, satisfaction with national officers, and evaluation of the political system) and correlate positively with a higher tax moral, whereas corruption affects tax morale negatively.

Individuals tax compliance behaviour are affected by the behaviour of their neighbours, or those about whom they may have information, whom they may know, or with whom they may interact on regular basis. Using experimental methods to test the role of such information about peer effects on compliance behaviour, Alm et al., (2017) find that providing information on whether one's neighbours are filing returns and/or reporting income has a statistically significant and economically large impact on individual filing and reporting decisions. This result is supported by Ho et al., (2013), who conducted a survey in China with their findings indicating that Chinese taxpayers tend to use relationship based moral reasoning to judge tax compliance issues. Further support for this view is by Jayawardane (2016), who showed that peer influence is one of the most significant factors in tax compliance in Sri Lanka.

D'Arcy (2011) studied on why citizens assent to pay taxes and on what condition do private individuals agree to commit their personal income to a public fund at the disposal of the state. The paper poses these questions in the context of African states and tests three distinct theoretical perspectives: i) the fiscal exchange thesis that emphasizes the vertical relationship between citizen and state – specifically the services received in return for tax ii) the 'national political community' approach, which highlights the horizontal relationship between citizens, in terms of the extent of national identification and iii) the comparative treatment perspective, focused on how the state treats the citizen relative to their compatriots. An ordered probit model was employed to test these theories, using micro data from round 3 of Afrobarometer survey, 2005. The results provided support for certain aspects of the fiscal exchange, no backing for national community approaches and more persuasive support for the comparative treatment thesis. These findings challenge existing accounts, which

focus exclusively on fiscal exchange and national community, and suggests new avenues for research, as comparative treatment has to date not been applied in the literature on tax attitudes.

Daude et al., (2013), studied on the drivers of tax morale worldwide, with an emphasis on developing countries. Using data from the World Value Survey as well as the Afrobarometer and Latinobarometer, their findings showed that socio-economic factors such as age, religion, gender, employment status and educational attainment have a significant impact on people's levels of tax morale. In terms of institutional determinants, satisfaction with democracy, trust in government and the satisfaction with the quality of public services play an important role in increasing tax morale.

Ali et al., (2013) explored factors that determine citizens' tax compliance behaviour in Kenya, Tanzania, Uganda and South Africa using attitude and perception data from the new round 5 of Afrobarometer survey, 2011. Using a binary logit regression, they found that increase in the perception of individuals about the difficulty of evading taxes increase the likelihood of tax compliant attitude in Kenya and South Africa. Moreover, it was evidenced that individuals who are more satisfied with public service provision are more likely to have a tax compliant attitude in all the four countries. However, frequent payment to non-state actors, e.g. to criminal gangs in exchange for protection, reduces individual's tax compliant attitude. Tax knowledge was also significantly correlated with tax compliant attitude in Tanzania and South Africa.

The more a government is effective and fair, the more legitimacy that government is likely to attain, and the more it will possess the potential to elicit compliance without excessive monitoring or punitive action. Levi and Sachs (2009) explored this position using the Afrobarometer data, 2005 for sub-Saharan Africa. Employing the multi-level logit estimation procedure, their results revealed that satisfaction with local government, efforts to combat corruption and fair treatment significantly affect government legitimacy to collect taxes.

It can thus be said that non-pecuniary factors plays major role as far as tax compliance is concerned. Table 3.1 summarizes the empirical findings of selected studies in developing countries.

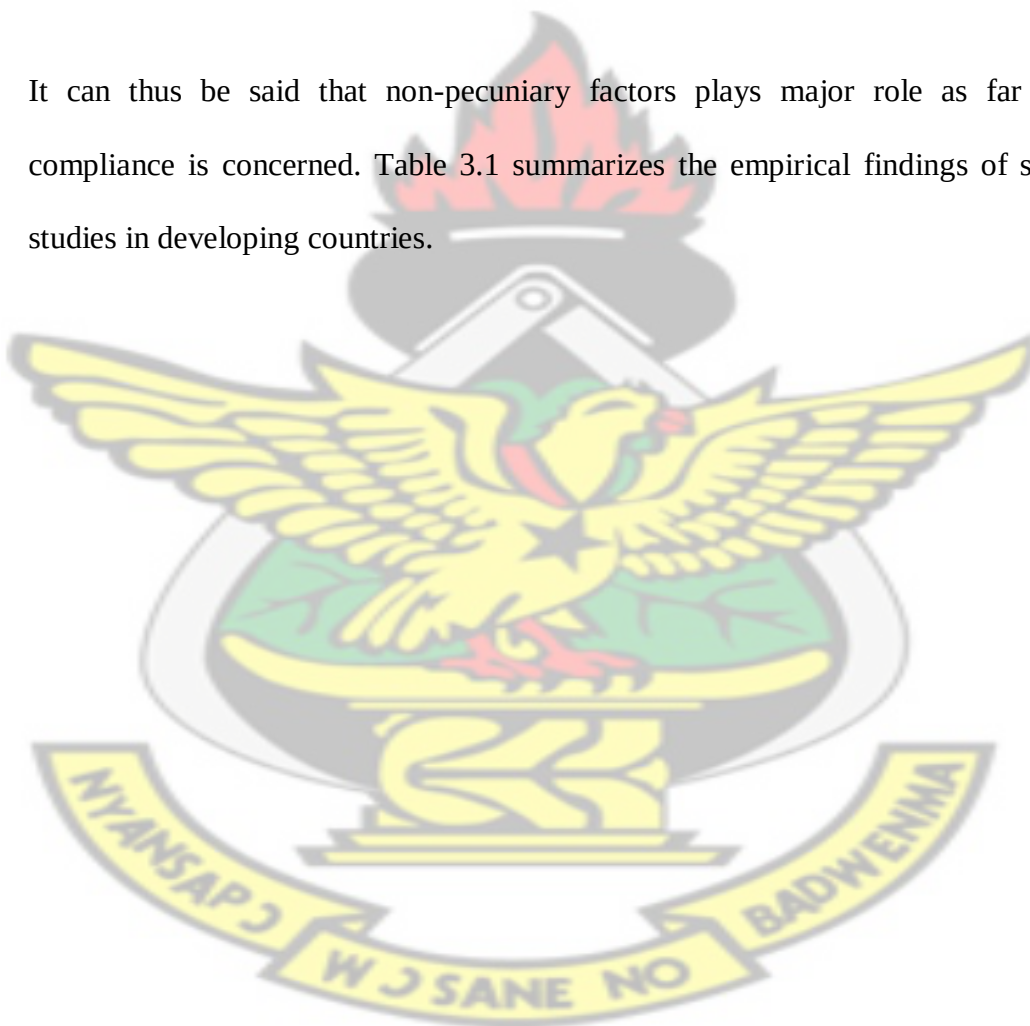


Table 3. 1 Empirical studies on tax compliance in developing countries

Author(s)	Region & Data source	Method used	Findings	
			Individual-based	Policy-based
D'Arcy (2011)	Africa, Afrobarometer (2005)	Ordered Probit	Primary education (+), Female (-), Illiterate (-)	Tax enforcement (+), trust (+), satisfaction with democracy (+), handling and access to: health (+) and education (+)
Hug and Sporri (2011)	World and Easter Europe, World Value Survey (WVS) and Europe Value Survey (EVS), (1995-1997)	Orderd Probit	Married(+), Age(+), female(+), retired(+), self-employed(-)	Confidence in legal system(+), satisfaction in incumbent(+)
Daude and Melguizo (2010)	Latin America, Latinobarometro(LB), (2007 & 2008)	Probit/Orderd Probit	Age(+), female(-), education(+), religion(-)	Satisfaction with democracy(+), services(+), corruption(-)
Levi and Sacks (2009)	Africa, Afrobarometer (2005)	Multi-level Logit	Female(-), wealth, TV, car, radio (-)	Efforts to combat corruption(+), enforcement of taxes(+), fair treatment(+), satisfaction with local government(+)
Torgler (2005)	Latin America and Carribean, WVS & LB (1981-1997, 1998)	Ordered Probit	Age(+), female(-), married(+), religion(+), financial satisfaction(+)	Trust in president(+), trust in democracy(+), satisfaction with national officers(+)
Torgler (2004)	Asia, WVS (1995-1997) India & Japan, WVS (1981, 1990, 1995)	Ordered Probit	Age(+), self-employed(-), unemployed(-), financial satisfaction(+)	Trust in: government(+), in legal system(+), in democracy(+)
Torgler (2003)	Eastern Europe, WVS (1989-1993, 1995-1998)	Ordered Probit	Age(+) female(+), married(+), self-employed(-), retired(+)	Trust in: government(+), in legal system(+), in democracy(+)

NB: only robust and significant results are reported.

3.4 Empirical Strategy and Data

3.4.1 Model Specification

We begin with the baseline model by Allingham and Sandmo (1972), Yitzhaki (1974) and modify it based on Cummings et al., (2009). Assume an individual receives an income Y , which is fixed, and must decide on the amount to declare to tax authorities. Income declared D is being taxed at rate t . Income which is not reported is not taxed. However, with probability ρ , the individual may be audited, in which case a fine of φ would be imposed on each amount of taxes unpaid. If underreporting is detected the individual income Y_c becomes

$$Y_c = Y - tD - \varphi t(Y - D) \quad (3.1)$$

However, in a case where underreporting is not detected, income Y_N becomes

$$Y_N = Y - tD \quad (3.2)$$

The individual chooses D to maximize the expected utility $EU(Y)$ of the evasion gamble;

$$EU(Y) = \rho U[Y_c] + (1 - \rho)U[Y_N] \quad (3.3)$$

where utility $U(Y)$ is assumed to be a function only of income. Optimisation generates the first-order condition:

$$\rho U'[Y_c](\varphi - 1)t - (1 - \rho)U'[Y_N]t = 0 \quad (3.4)$$

Equation (3.4) is the basic model of tax compliance. It can be shown that when there is an increase in the probability of an audit, compliance will increase. The same can be said for an increase in the fine rate. However, the effect of the tax rate is however ambiguous unless the fine is applied proportionally to the tax evaded in which case a tax rate increase results in falling compliance (Yitzhaki, 1974).

Given that the conventional theoretical deterrence does not encourage compliance always, the role played by non-pecuniary factors comes to bear. Thus equation (3.4) is modified as follows:

$$\rho U'[Y_c](\varphi - 1)t - (1 - \rho)U'[Y_N - \delta_i]t = 0 \quad (3.5)$$

Where δ_i denotes the psychic cost associated with evading taxes even if one is not caught (non-pecuniary factors). Thus the greater the non-pecuniary factors, the higher the size of δ .

As noted by Alm and Martinez-Vasquez (2003) in Cummings et al., (2009), the genesis of these non-pecuniary factors is the interesting issue. That is if these non-pecuniary factors evolve from perceptions that the government is trustworthy, that tax mechanisms are fair and that fiscal exchange is beneficial, among others, then we must notice differences in tax compliance that are correlated with these perceptions (Cummings et al., 2009). With these factors in mind, our estimable equation is specified as shown in equation 3.6

$$TC_i = \alpha + \gamma A_i + \delta B_i + \theta T_i + \varepsilon_i \quad (3.6)$$

Where TC_i is tax compliant attitude. The vector A_i is individual level characteristics made up of age, sex, education, employment status and area of residence (rural or urban). B_i encompasses vector of non-pecuniary factors (corruption of tax officials, trust in courts, trust in tax departments, fighting corruption, tax knowledge limitation, perceived non-compliance by others as well as handling health, education, road and electricity needs). Finally, T_i is a vector of control variable for pecuniary factor (difficulty in evading tax) as well as dummy variables capturing country and location fixed effect whilst ε_i is the error term.

3.4.2 Identification Strategy

For the purpose of this paper, the dependent variable is designed to cater for whether an individual is either tax compliant or not compliant. Thus the model of interest for estimation in equation (3.6) has a response variable that is binary by nature (yes/no). The application of the ordinary least squares (OLS) in such situation is inappropriate. This is because results generated with OLS when the dependent variable is discrete would be bias (Collett, 1991 and Agresti, 1990). To overcome this problem of estimation, the Binary Probit is adopted for this paper because Probit analysis developed from the need to analyse qualitative (dichotomous or polytomous) dependent variables within the regression framework. The Probit procedure computes maximum likelihood estimates of the parameters and of the probit equation. In that case, the model will be estimated via the Maximum Likelihood Estimation (MLE), which is a method of estimating the parameters of a statistical model given observations, by finding the parameter values that maximises the likelihood of making the observations given the parameters. That is, when the response variable, Y is binary with values 0 and 1, the probit equation is

$$\rho = Pr(Y = 0) = C + (1 - C)F(X'\beta) \quad (3.7)$$

where;

ρ is probability of response

β is a vector of parameter estimates

F is cumulative distribution function

X is vector of explanatory variables

C is natural (threshold) response rate

The cumulative model has the form

$$Pr(Y \leq 1|X) = F(X'\beta)$$

$$Pr(Y \leq i|X) = F(\alpha_i + X'\beta), \quad 2 \leq i \leq k$$

where $\alpha_2, \dots, \alpha_k$ are $k - 1$ intercept parameters.

3.4.3 Data and Descriptive Statistics

This paper used the Afrobarometer survey data Round 5 (2015) for 30 countries in SSA. Countries covered in this study are shown in Table 3A1 of the appendix. *Afrobarometer* is a pan-African, non-partisan research network that conducts public attitude surveys on democracy, governance, economic conditions, and related issues in more than 35 countries in Africa.

In order to prevent an assumed direct implication of a “*wrongdoing*” on the part of respondent, an indirectly phrased question was adopted. Respondents were asked in the questionnaire to state their opinion about other people who do not pay taxes they owe on their income. On an interval scale of 1 – 3, respondents are asked to state if they think the action of other people who do not pay taxes on their income is [1]“*not wrong at all*”, [2]“*wrong but understandable*” or [3]“*wrong and punishable*”. Given the response, an individual is regarded as having tax compliant attitude if their response is [3]“*wrong and punishable*”. An individual is regarded as having non-compliant attitude if the response is either [1]“*not wrong at all*” or [2]“*wrong but understandable*”. However, it can be argued that those who responded [2]“*wrong but understandable*” may be having compliant attitude. Thus to cater for such cases, Ordered Probit was used to estimate the tax compliance as a measure of checking for robustness.

Interval scale score of 1 – 4 were assigned depending on responses given for variables such as tax knowledge limitation, fighting corruption, difficulty in avoiding tax, health, educational needs, roads and electricity. For variables such as perceived non-compliance by others, corruption, trust in tax department and trust in courts, an

interval scale score of 0 – 3 were assigned to reflect the level of response. Finally, education variable was measured on the interval scale score of 0 – 9. However, the variables are recoded into dummies. Example, for the variable on *perceived non-compliance by others*, the interval scale score is given as 0=never avoid; 1=rarely avoid; 2=often avoid and 3=always avoid. This is recoded into dummy of “1” if the score is either 2 or 3 and “0” if the score is either 0 or 1. Thus the dummy “1” indicates people avoid paying tax. Table 3A4 in the Appendix gives a formal definition and description of the data variables. To further check for robustness, the multi-level probit was estimated so as to ascertain the differences that results from the differences in the scale of responses (only estimated results are displayed at the appendix).

Summary statistics of the variables is shown in Table 3A2 of the appendix. Given a mean value of 0.5008, it indicates that about 50% of respondents comply with tax obligations. About 64% of respondents indicate limitation with regards to tax knowledge with a corresponding standard deviation of 0.479. Mean age of respondents is estimated to be 37years with a minimum of 18years and maximum of 105years. A mean value of 0.506 also indicates that about 51% of respondents are males with 49% being females. Perceived non-compliance by others forms about 29% of respondents with that of corruption by tax officials taking 36%. Also, about 61% of respondents reside in rural areas while about 33% of respondents are employed. Trust in courts and trust in tax department have mean of 0.617 and 0.355 respectively, which also corresponds to 62% and 36% of respondents for trust in courts and trust in tax department respectively. In terms of level of education by respondents, approximately 20% had no schooling, about 32% had basic education,

and 37% had secondary education with remaining 11% having tertiary education. Variables such as fighting corruption, health, educational needs, roads and electricity make up 36%, 60%, 63%, 46% and 37% of respondents respectively.

Table 3A3 in the appendix shows the correlation matrix for variables in the study. There is positive and significant correlation between tax compliance and factors such as difficulty in evading tax, trust in tax department, trust in courts, fighting corruption, handling of provision of needs (health, education, road and electricity) etc. On the other hand there were negative and significant correlation between tax compliance and factors such as tax knowledge limitation, perceived non-compliance by others, corruption and rural dwellers. Most importantly, the table also show evidences that the dependent variable and independent variables are not highly correlated, given the range of correlation between the dependent and independent variables to be between the ranges of 0.006 to 0.53.

3.5 Results and Discussions

3.5.1 Results for Non-Pecuniary Factors of Tax Compliance in SSA

The empirical results for sub-Saharan Africa in identifying the impact of non-pecuniary factors (tax knowledge, perceived non-compliance by others, corruption of tax officials, trust in tax department, trust in courts, fighting corruption, as well as the handling of provision of health, education, road and electricity needs) on tax compliance is displayed in Table 3.2.

Table 3. 2 Probit Results of Tax Compliance in Sub-Saharan Africa

Dependent variable: Tax compliance

Variable	Coefficient	Marginal Effect
Tax knowledge limitation	-0.126*** (0.016)	-0.050
Perceived noncompliance by others	-0.053*** (0.016)	-0.021
Corruption	-0.051*** (0.016)	-0.020
Trust in tax department	0.112*** (0.016)	0.045
Trust in courts	0.012 (0.016)	0.005
Fighting corruption	0.057*** (0.016)	0.023
Health	0.046** (0.018)	0.018
Education	0.065*** (0.018)	0.026
Road	0.052*** (0.017)	0.020
Electricity	0.023 (0.018)	0.009
Difficulty in evading tax	0.071*** (0.017)	0.028
Age	0.002*** (0.001)	0.001
Male	0.056*** (0.015)	0.022
Education primary	0.126*** (0.023)	0.050
secondary	0.161*** (0.024)	0.064
tertiary	0.245*** (0.031)	0.097
Rural	-0.041** (0.016)	-0.017
Employment status	-0.036** (0.016)	-0.014
Country effect	YES	
Region effect	YES	
Weight	YES	
Observations	42,641	
Prob(F-Statistic)	0.000	

NB: Tabulates are regression coefficient. Robust Standard errors are in parenthesis.
 ***, **, * signifies significance level of 1%, 5% and 10% respectively. Regression
 include a constant term (not shown)

Tax knowledge limitation has a negative and significant impact on tax compliance in sub-Saharan Africa as shown in Table 3.2. According to Eriksen and Fallan, (1996), the level of education received by taxpayers is an important factor that contributes to the general understanding about taxation especially regarding the laws and regulations of taxation and hence their ability to comply with them. The marginal effect estimate means that the probability of being compliant to tax obligations decreases by 5% if tax knowledge is perceived to be limited. This finding agrees with other studies such as Palil and Ahmad (2011), Eriksen and Fallan (1996), Mohamad *et al.*, (2007), Singh (2003), and Harris (1989).

Perceived non-compliance by others has a negative and significant impact on tax compliance. Individuals may wish to conform to the behaviour of others, so that peer compliance directly affects the individual's own compliance (Luttmer and Singhal, 2014). Also as indicated by Frey and Torgler, (2007), individuals consider tax evasion (non-compliance) to be a less serious wrongdoing the more widespread they presume it to be. Perceived non-compliance by others has a resulting marginal effect of reducing the compliance behaviour in sub-Saharan Africa by 2%. This finding agrees with others such as Alm *et al.*, (2017); Ho *et. al.*, (2013); and Jayawardane (2016).

Corruption on the part of tax officials negatively affects compliance behaviour in SSA. A significant marginal effect of about 2% means that the probability of being tax compliant reduces by 2% when there is perceived corruption on the part of tax officials. This is not surprising because it is clear that people have low compliance tendencies when they believe that their taxes will not go towards the provision of

public goods or other good courses but to the pockets of corrupt public officials (Uslaner, 2008). Levi and Sachs (2009) confirm this finding when they studied governments' legitimacy to collect taxes.

As far as institutions are concerned, perceived increase in the trust in tax department has 5% increase on the probability of being tax compliant in SSA. Trust in courts surprisingly has insignificant impact both in the case of SSA and the legal origin countries. This suggests that trust in courts do not have a major impact on tax compliance probability in SSA countries. The extent to which government is committed to fighting corruption has positive and significant impact on tax compliance in SSA with a marginal impact of 2%. These confirm studies such as Levi and Sachs (2009); Daude et al., (2013); D'Arcy (2011); Kogler et al., (2013).

Satisfaction with public expenditures and services can serve as a measure of how well governments convert taxes into expenditures and that government expenditures may motivate compliance by providing goods and service that citizens prefer (see Torgler, 2005). This is confirmed with a positive and significant impact on the probability of tax compliance behaviour in SSA when there is a perceived improvement in the extent to which government handles the provision of health, education and road (marginal effect of 2%, 3%, 2% respectively). Studies which confirm this finding includes D'Arcy (2011) and Ali et al., (2013).

As a control for pecuniary factors, difficulty in evading tax payment on the part of citizens impacts positive and significant compliance behaviour in sub-Saharan Africa. There is an approximately 3% increase in the probability of being tax

compliant when evading tax payment is perceived to be difficult. As noted by Ali et al., (2013), this provides an evidence for the economic deterrence theory, which posits that the perception of increased enforcement makes evasion difficult and eventually lead to an increased in compliance attitude.

On demographic factors, age has a positive and significant impact on tax compliance in SSA. This agrees with Tittle (1980) that older people who have acquired more social capital may feel a stronger attachment to the community, which might in turn induce additional restrictions that lead to positive correlation between age and tax compliance (Pommerehne and Weck- Hannemann, 1996). Surprisingly, males tend to have probability of being more tax compliant in SSA. This is contrary to the social psychological position that women are more compliant than men (e.g., Tittle, 1980).

Higher education has a positive and significant impact on compliance probability in SSA. It is evidenced that the marginal effect increases as the education level increases from primary to secondary and also to tertiary (5%, 6% and 10% respectively). Furthermore, rural areas are evident to comply less with tax as compared to those in urban areas in SSA. This may be argued that most rural areas are deprived of basic social amenities and infrastructure.

3.5.2 Robustness Check

The paper conducted a number of robustness checks to support the results from the baseline estimates. Firstly, given the responses for the tax compliance variable - [1]“*not wrong at all*”, [2]“*wrong but understandable*” or [3]“*wrong and punishable*”, it can be argued that those who responded [2]“*wrong but*

understandable” may be having compliant attitude. Thus to cater for such cases, Ordered Probit was used to estimate the tax compliance. Results are presented in Tables 3.3. The ordered probit results are not statistically different from the baseline results. There is a negative and significant impact for tax knowledge limitation, perceived non-compliance by others, corruption and rural dwellers on tax compliance probability. This result is similar to the baseline case except for slight differences in the coefficients. Moreover, positive impact can also be said for fighting corruption, difficulty in evading tax, trust in tax department, handling of education needs, road and electricity needs. This result is also similar to the baseline results except for slight differences in terms of coefficients.

Secondly, there could be the argument that pooling all countries may produce bias estimates because there are differences with respect to institutional reforms, macroeconomic management among others, which can affect compliance behaviour differently from one country to the other. Thus the paper controlled for country-level factors such as GDP per capita and inflation (data obtained from World Development Indicators, WDI) as well as institutional reform indicators such as government efficiency, rule of law and regulatory quality (data from World Governance Indicators, WGI). Results are displayed in Table 3.4 in five (5) columns. Column 1 of Table 3.4 controlled for GDP per capita and as expected, there is a positive and significant relationship between GDP per capita and the probability of being tax compliant. Column 2 catered for inflation and result indicate that inflation reduces compliance probability.

Table 3. 3 Ordered Probit Results for Determinants of Tax compliance in Sub-Saharan Africa

Dependent variable: tax compliance

Variable	Coefficient
Tax knowledge limitation	-0.123*** (0.015)
Perceived noncompliance by others	-0.054*** (0.015)
Corruption	-0.051*** (0.014)
Trust in tax department	0.099*** (0.014)
Trust in courts	0.019 (0.015)
Fighting corruption	0.046** (0.015)
Health	0.025 (0.016)
Education	0.068*** (0.016)
Road	0.053*** (0.015)
Electricity	0.017 (0.016)
Difficulty in avoiding tax	0.096*** (0.016)
Age	0.002*** (0.000)
Male	0.046*** (0.013)
Education	
Primary	0.139*** (0.021)
Secondary	0.181*** (0.022)
Tertiary	0.288*** (0.028)
Rural	-0.047*** (0.015)
Employment status	-0.039** (0.015)
Fixed effects	YES
Weight	YES
Observations	42,641
Prob(F-Statistic)	0.000

NB: Tabulates are regression coefficient. Robust Standard errors are in parenthesis. ***, **, * signifies significance level of 1%, 5% and 10% respectively. Regression include a constant term (not shown)

Columns 3 – 5 of Table 3.3 captured institutional reforms ranging from government efficiency, rule of law and regulatory quality. The results indicate that these have positive impact on tax compliance probability. The most significant thing to note is that even after controlling for these individual country-level variables, the associated results with respect to tax knowledge, institutions and fiscal exchange variables does not differ statistically from the baseline results and hence confirming the robustness of the results.

Thirdly, since the dependent variable is binary, an equally important estimator that could be used is the logistic regression. Thus to check for robustness, the paper estimated the results using logit and results are presented in Tables 3A5 of the appendix. It is seen that the results confirm those of the baseline, since there is no difference statistically with respect to the significance and signs of the variables.

Fourth and finally, to check for robustness on the dummies created for estimation, the multi-level probit is estimated. This can let us see how differences in the responses along the scale impact on the tax compliance probability. Results for this robustness are displayed in Table 3A6 of the appendix. It must be noted that estimation for the multi-level only displays result for the case of sub-Saharan Africa. It indicates clearly that there is no statistical significant difference between dummies created for the baseline estimation and regressing with all the responses along the scale.

Table 3. 4 Regression Results for Control of Country-Level Effects

Dependent variable: tax compliance

Variable	(1)	(2)	(3)	(4)	(5)
Lngdp per capita	0.063*** (0.008)				
Inflation		-0.007*** (0.001)			
Government efficiency			0.109*** (0.015)		
Rule of law				0.062*** (0.015)	
Regulatory quality					0.196*** (0.015)
Tax knowledge limitation	-0.142*** (0.016)	-0.145*** (0.016)	-0.142*** (0.016)	-0.148*** (0.016)	-0.135*** (0.016)
Perceived noncompliance by others	-0.078*** (0.016)	-0.081*** (0.016)	-0.077*** (0.016)	-0.078*** (0.016)	-0.078*** (0.016)
Corruption	-0.037** (0.015)	-0.043*** (0.015)	-0.031** (0.015)	-0.036** (0.015)	-0.022 (0.015)
Trust in tax department	0.123*** (0.015)	0.122*** (0.016)	0.118*** (0.016)	0.122*** (0.016)	0.115*** (0.016)
Trust in courts	-0.017 (0.016)	-0.014 (0.016)	-0.022 (0.016)	-0.018 (0.016)	0.020 (0.016)
Fighting corruption	0.060*** (0.016)	0.061*** (0.016)	0.058*** (0.016)	0.056*** (0.016)	0.060*** (0.016)
Health	0.075*** (0.017)	0.073*** (0.017)	0.076*** (0.017)	0.074*** (0.017)	0.080*** (0.017)
Education	0.071***	0.070***	0.071***	0.074***	0.075***

	(0.018)	(0.018)	(0.017)	(0.018)	(0.018)
Road	0.109***	0.111***	0.106***	0.107***	0.096***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Electricity	0.038**	0.060***	0.033*	0.046***	0.016
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Difficulty in avoiding tax	0.072***	0.066***	0.070***	0.070***	0.071***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Age	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male	0.056***	0.052***	0.055***	0.053***	0.055***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Education					
Primary	0.035	0.053**	0.044**	0.040*	0.048**
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Secondary	0.083***	0.108***	0.101***	0.105***	0.109***
	(0.023)	(0.022)	(0.022)	(0.022)	(0.022)
Tertiary	0.185***	0.207***	0.206***	0.208***	0.218***
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Rural	-0.031**	-0.039**	-0.029*	-0.035**	-0.025
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Employment status	-0.052***	-0.035**	-0.055***	-0.049***	-0.062***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Regional effect	YES	YES	YES	YES	YES
Weight	YES	YES	YES	YES	YES
Observations	42,641	42,641	42,641	42,641	42,641
Prob(F-Statistic)	0.000	0.000	0.000	0.000	0.000

NB: Tabulates are regression coefficient. Robust Standard errors are in parenthesis. ***, **, * signifies significance level of 1%, 5% and 10% respectively. All regressions include constant term (not shown)

For instance, in Table A6 of the appendix, for the case of tax knowledge limitation, respondents who answered *easy* (*P-value of 0.476*) were statistically not different from those who answered *very easy*. However, there is a negative and statistically significant difference when we compare those who answered *very easy* with those that responded *difficult* as well as *very difficult*, which confirms our baseline result that perceived limited knowledge in tax reduces the tax compliance probability. The same can be said for almost all the other variables and thus justifies the robustness of the baseline results.

3.6 Conclusion and Policy Implications

This paper assesses the impact of non-pecuniary factors on tax compliance in sub-Saharan Africa (SSA). Using the round 5 of the Afrobarometer data, the paper revealed that perceived tax knowledge limitation reduces the probability of tax compliance in SSA by 5%. Perceived non-compliance by others reduces compliance probability by 2%. Similarly, corruption of tax officials reduces the probability of being tax compliant in SSA by 2%. On the contrary, trust in tax department increase the probability of compliance by 5%, while fighting corruption improves compliance by 2%. With respect of fiscal exchange, handling of provision of health, education and road needs, tend to increase the probability of complying with tax laws and obligations in SSA by 2%, 3% and 2% respectively.

The negative relationship between tax knowledge limitation and tax compliance serves as a basis for the revenue collection institutions in SSA to increase awareness for taxpayers with respect to tax matters and also as an input in the designing of tax education programs to target taxpayers and potential taxpayers. Having been

revealed that corruption by tax officials discourages tax compliance, punitive action against corrupt officials can have an important deterrent effect. The role of the media is important in publicizing the punishment of corrupt officials. The least the governments in SSA could do is to continue with the provision of basic infrastructure/needs as health, education, roads and electricity since these have been evidenced to have positive effect on tax compliance. Providing such needs give taxpayers a feel of having back the taxes paid and are willing to comply even more.

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Appendix

Table 3A1: List of Countries

Benin	Mali
Botswana	Mauritius
Burkina Faso	Mozambique
Burundi	Namibia
Cameroon	Niger
Cape Verde	Nigeria
Cote d'Ivoire	Senegal
Ethiopia	Sierra Leone
Ghana	South Africa
Guinea	Swaziland
Kenya	Tanzania
Lesotho	Togo
Liberia	Uganda
Madagascar	Zambia
Malawi	Zimbabwe

Table 3A2 Descriptive Statistics of Variables

Variable name	Number of observations	Mean	Standard deviation
Tax compliance	42,641	0.501	0.500
Tax knowledge limitation	42,641	0.643	0.479
Perceived non-compliance by others	42,641	0.288	0.453
Corruption	42,641	0.363	0.481
Trust in tax department	42,641	0.447	0.497
Trust in courts	42,641	0.617	0.486
Fighting corruption	42,641	0.355	0.479
Health	42,641	0.602	0.489
Education needs	42,641	0.629	0.483
Roads	42,641	0.458	0.498
Electricity	42,641	0.372	0.483
Difficulty in avoiding tax	42,641	0.712	0.453
Age	42,641	37.069	14.519
Male	42,641	0.506	0.500
No school	42,641	0.196	0.397
Primary	42,641	0.320	0.467
Secondary	42,641	0.366	0.482
Tertiary	42,641	0.116	0.321
Rural	42,641	0.614	0.487
Employment status	42,641	0.331	0.471

Table A3: Correlation Matrix for Dependent and Independent Variables

	TC	KN	DF	PNA	COR	TTD	TIC	FC	HE	EN	RD	EL	AGE	M	EDU	RUL	EMP
TC	1.00																
KN	-0.068	1.00															
DF	0.008	0.338	1.00														
PNA	-0.003	-0.006	-0.035	1.00													
COR	-0.035	0.081	0.042	0.077	1.00												
TTD	0.072	-0.060	0.011	-0.035	-0.178	1.00											
TIC	0.021	-0.044	-0.008	-0.065	-0.133	0.364	1.00										
FC	0.058	-0.043	-0.018	0.009	-0.098	0.174	0.154	1.00									
H	0.058	-0.049	-0.008	-0.046	-0.066	0.109	0.134	0.248	1.00								
EN	0.058	-0.044	-0.018	-0.044	-0.063	0.115	0.134	0.223	0.535	1.00							
RD	0.079	-0.039	0.006	0.017	-0.045	0.119	0.095	0.254	0.285	0.268	1.00						
EL	0.075	-0.073	-0.010	0.019	-0.085	0.143	0.091	0.251	0.263	0.251	0.427	1.00					
AGE	0.036	-0.034	-0.003	-0.038	-0.054	0.045	0.030	-0.003	-0.022	-0.011	-0.022	-0.017	1.00				
M	0.027	0.001	0.025	0.026	0.033	0.043	0.011	0.015	-0.001	-0.008	-0.003	0.004	0.109	1.00			
EDU	0.042	-0.125	-0.076	0.103	0.064	-0.090	-0.107	-0.086	0.020	-0.008	0.060	0.060	-0.246	0.118	1.00		
RUL	-0.052	0.053	0.012	-0.111	-0.032	0.019	0.072	-0.001	0.001	0.010	-0.118	-0.137	0.069	0.005	-0.333	1.00	
EMP	-0.004	-0.015	0.031	0.028	0.021	0.016	0.005	-0.023	0.020	0.008	0.038	0.074	-0.005	0.116	0.246	-0.109	1.00

TC
 KN
 DF
 PNA
 COR
 TTD
 TIC
 FC
 H
 EN
 EL
 AGE
 M
 EDU
 RUL
 EMP

Tax compliance
 Tax knowledge limitation
 Difficulty in avoiding tax
 Perceived compliance by others
 Corruption
 Trust in tax department
 Trust in courts
 Fighting corruption
 Health
 Educ needs
 Electricity
 Age
 Male
 Education
 Rural
 Employment status

Table 3A4: Definition of Variables

Variable Name	Definition
Tax compliance	The action of people who do not pay taxes on their income. Measured on a scale of 1 – 3, where 1 represents <i>not wrong at all</i> , 2 is <i>wrong but understandable</i> and 3 is <i>wrong and punishable</i> . Recoded as dummy of “1” if the score is 3 and “0” if otherwise
Non-Pecuniary Factors	
Tax knowledge limitation	Difficulty to find out what taxes to pay measured on a scale of 1 – 4, where 1 represents <i>very easy</i> , 2 is <i>easy</i> , 3 is <i>difficult</i> and 4 is <i>very difficult</i> . Recoded as dummy of “1” if the score is either 3 or 4 and “0” if the score is either 1 or 2
Perceived non-compliance by others	The extent to which people avoid paying taxes they owe to the government measured on a scale of 0 – 3, where 0 represents <i>never avoid</i> , 1 represents <i>rarely avoid</i> , 2 represents <i>often avoid</i> and 3 is <i>always avoid</i> . Recoded as dummy of “1” if the score is either 2 or 3 and “0” if the score is either 0 or 1
Corruption	Corruption by tax officials measured on a scale of 0-3, where 0 represents <i>none</i> , 1 is <i>some of them</i> , 2 is <i>most of them</i> and 3 is <i>all of them</i> . Recoded as dummy of “1” if the score is either 2 or 3 and “0” if the score is either 0 or 1
Trust in tax department	To what extent do respondent trust the tax department measured on a scale of 0 – 3, where 0 represents <i>not at all</i> , 1 is <i>just a little</i> , 2 is <i>somewhat</i> and 3 is <i>a lot</i> . Recoded as dummy of “1” if the score is either 2 or 3 and “0” if the score is either 0 or 1
Trust in courts	To what extent do respondent trust in the courts measured on a scale of 0 – 3, where 0 represents <i>not at all</i> , 1 is <i>just a little</i> , 2 is <i>somewhat</i> and 3 is <i>a lot</i> . Recoded as dummy of “1” if the score is either 2 or 3 and “0” if the score is either 0 or 1
Fighting corruption	The extent to which government is committed to fighting corruption measured on a scale of 1 – 4, where 1 represents <i>very badly</i> , 2 is <i>fairly badly</i> , 3 is <i>fairly well</i> and 4 represents <i>very well</i> . Recoded as dummy of “1” if the score is either 3 or 4 and “0” if the score is either 1 or 2

Health	To what extent is the government handling the provision of health needs measured on a scale of 1 – 4, where 1 represents <i>very badly</i> , 2 is <i>fairly badly</i> , 3 is <i>fairly well</i> and 4 represents <i>very well</i> . Recoded as dummy of “1” if the score is either 3 or 4 and “0” if the score is either 1 or 2
Educ needs	To what extent is the government handling provision of educational needs measured on a scale of 1 – 4, where 1 represents <i>very badly</i> , 2 is <i>fairly badly</i> , 3 is <i>fairly well</i> and 4 represents <i>very well</i> . Recoded as dummy of “1” if the score is either 3 or 4 and “0” if the score is either 1 or 2
Roads	To what extent is government handling provision of roads measured on a scale of 1 – 4, where 1 represents <i>very badly</i> , 2 is <i>fairly badly</i> , 3 is <i>fairly well</i> and 4 represents <i>very well</i> . Recoded as dummy of “1” if the score is either 3 or 4 and “0” if the score is either 1 or 2
Electricity	To what extent is the government handling the provision of reliable electric supply measured on a scale of 1 – 4, where 1 represents <i>very badly</i> , 2 is <i>fairly badly</i> , 3 is <i>fairly well</i> and 4 represents <i>very well</i> . Recoded as dummy of “1” if the score is either 3 or 4 and “0” if the score is either 1 or 2
Control Variables	
Difficulty in evading tax	Difficulty to evade paying taxes measured on a scale of 1 – 4, where 1 represents <i>very easy</i> , 2 is <i>easy</i> , 3 is <i>difficult</i> and 4 is <i>very difficult</i> . Recoded as dummy of “1” if the score is either 3 or 4 and “0” if the score is either 1 or 2
Age	Age of respondent
Male	Dummy=1 if respondent is a male
Education	The highest level of education measure on a scale of 0 – 9, where 0 represents <i>no formal schooling</i> and 9 is <i>postgraduate</i> . Recoded as “1” if score is 0 or 1, “2” if score is 2 or 3, “3” if score is 4 or 5 and “4” if score is 6-9
Rural	Dummy=1 if respondent is located in a rural area
Employment status	Dummy=1 if respondent is employed
Regional Fixed Effect	
WA	Dummy=1 if respondent is located in West Africa

EA	Dummy=1 if respondent is located in East Africa
SA	Dummy=1 if respondent is located in Southern Africa

Country-level variables

Rule of law	Captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Data from World Governance Indicators (WGI)
Regulatory quality	Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Data from WGI
Government effectiveness	Captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Data from WGI
GDP per capita	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in constant 2010 U.S. dollars. Data from World Development Indicators (WDI)
Inflation	Measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. Data from WDI

Table 3A5: Logistic Regression Results for Determinants of Tax Compliance in Sub- Saharan Africa

Dependent variable: tax compliance

Variable	Coefficient
Tax knowledge limitation	-0.205*** (0.026)
Difficulty in avoiding tax	0.114*** (0.027)
Perceived noncompliance by others	-0.087*** (0.026)
Corruption	-0.082*** (0.025)
Trust in tax department	0.180*** (0.026)
Trust in courts	0.018 (0.026)
Fighting corruption	0.091*** (0.026)
Health	0.074** (0.029)
Education	0.105*** (0.029)
Road	0.083*** (0.027)
Electricity	0.038 (0.028)
Age	0.004*** (0.001)
Male	0.092*** (0.024)
Education	
Primary	0.203*** (0.037)
Secondary	0.259*** (0.039)
Tertiary	0.395*** (0.050)
Rural	-0.068*** (0.026)
Employment status	-0.059** (0.027)
Fixed effects	YES
Weight	YES
Observations	42,641
Prob(F-Statistic)	0.000
NB: Tabulates are regression coefficient. Robust Standard errors are in parenthesis. ***, **, * signifies significance level of 1%, 5% and 10% respectively. Regression includes constant (not shown)	

Table 3A6 Multi-Level Probit Estimation (SSA)

Dependent variable: tax compliance

Variable	Coefficient	Robust Stan. Error	p-value
Tax knowledge limitation			
Very easy			
Easy	-0.031	0.043	0.476
Difficult	-0.161	0.042	0.000
Very difficult	-0.222	0.043	0.000
Perceived noncompliance by others			
Never			
Rarely	-0.159	0.022	0.000
Often	-0.106	0.024	0.000
Always	-0.155	0.038	0.000
Corruption			
None			
Some of them	-0.014	0.031	0.651
Most of them	-0.027	0.033	0.422
All of them	-0.122	0.039	0.002
Trust in tax department			
Not at all			
Just a little	0.033	0.027	0.227
Somewhat	0.081	0.029	0.005
A lot	0.195	0.033	0.000
Trust in courts			
Not at all			
Just a little	-0.111	0.031	0.000
Somewhat	-0.135	0.032	0.000
A lot	-0.063	0.033	0.000
Fighting corruption			
Very badly			
Fairly badly	0.033	0.024	0.172
Fairly well	0.056	0.025	0.027
Very well	0.046	0.039	0.239
Education			
Very badly			
Fairly badly	-0.005	0.035	0.882
Fairly well	0.088	0.033	0.008
Very well	0.131	0.041	0.001
Health			
Very badly			
Fairly badly	0.080	0.033	0.017

Fairly well	0.099	0.032	0.002
Very well	0.085	0.043	0.047

Road

Very badly			
Fairly badly	-0.018	0.028	0.514
Fairly well	0.077	0.027	0.005
Very well	0.138	0.037	0.000

Electricity

Very badly			
Fairly badly	-0.032	0.026	0.207
Fairly well	0.015	0.026	0.566
Very well	0.022	0.040	0.579

Difficulty in avoiding tax

Very easy			
Easy	-0.072	0.055	0.148
Difficult	-0.017	0.051	0.733
Very difficult	0.103	0.051	0.046

Age	0.005	0.001	0.000
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Male	0.064	0.018	0.000
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Education level

No school			
primary	0.123	0.029	0.000
secondary	0.160	0.029	0.000
tertiary	0.280	0.036	0.000

Rural	-0.041	0.020	0.036
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Employment status	-0.030	0.019	0.123
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Fixed effects	YES
Weight	YES
Observations	26,848
Prob(F-Statistic)	0.000

NB: Tabulates are regression coefficient. Robust Standard errors are in parenthesis. Regression include a constant term (not shown)

CHAPTER FOUR

PAPER II

Business Environment and Firms' Decision to Evade Taxes: Evidence from Ghana.

KNUST

Abstract

This paper sought to identify the effect of business environment on a firms' decision to evade tax in Ghana. Employing the Tobit method of estimation on World Bank Enterprise Survey data (2013), the results revealed that a unit deterioration of business environment increases firm's decision to evade tax by 0.961. In terms of the individual business environment indicators, perceived corruption of tax officials increases evasion decision by 2.716. Public infrastructure (electricity outage) have a positive and significant effect on tax evasion decision with a coefficient of 0.695 while quality of legal environment had a negative effect on firms' decision to evade taxes with a coefficient of 1.246. Business constraints in the form of tax rate (1.389), access to business license (1.622) and transport (1.419) had a positive effect on firms' tax evasion decision. Finally, the results indicated that the type of firm, age and sex of the owner affects tax evasion decisions. In terms of policy implication, punitive action against corrupt tax officials; improving the legal framework; improving infrastructure as well as addressing business constraints to doing business will reduce tax evasion decisions among firms in Ghana.

4.1 Introduction

Tax evasion, although increases the amount of resources accumulated by entrepreneurs, it reduces the amount of public services supplied by the government, and therefore exerts detrimental effects on economic growth. According to Abbey (2015), more than 120,000 companies have been found by the Economic and Organised Crime Office (EOCO) to have evaded tax. In terms of quantum, Ghana News Agency (2016) reports that Ghana loses nearly US\$2.1 billion dollars to tax evasion and incentives annually as revealed by a study carried out by the Integrated Social Development Centre (ISODEC). To this effect, explaining the patterns of tax evasion, identifying its determining factors and appropriate measures to curb it is an important concern.

The objective of this paper is to identify the effect of business environment on firms' decision to evade tax in Ghana. Business environment as defined by Stern (2002) is the policy, institutional, and behavioural environment, both present and expected, that influences the returns, and risks, associated with investment. Business environment can affect a firm's tax evasion decision because an "unfriendly" business environment for instance, increases the cost of doing business. This provides incentive for firms to operate informally, which in turn leads to pervasive tax evasion (see Nadirov and Aliyev, 2015). This in the end will affect government revenue generation because when a firm remains informal, its activities are not brought into the limelight and thus escape from tax liabilities. Reinikka and Svensson (2002) evidenced that, when firms face poor provision of public capital (such as electricity), they reduce investments in productive capacity and instead invest in less productive capital as a coping mechanism. Mawejje and Okumu (2016) confirms this

position by explaining that frequent outage of electricity imply that firms' investment in own electricity generation is only possible at the expense of investments in reproducible capital, which may lead to tax evasion to the extent that it decreases firm profitability. Other studies has evidenced the implications of the investment and business climate on firm productivity (see Dabla-Norris et al., 2008; Ingram et al., 2007; Dollar et al., 2002) and growth (Dollar et al., 2003). Also, Johannesen et al., (2016) noted broader concern that weak governance in developing countries, which is reflected in high levels of corruption, weak law enforcement, and a lack of political accountability, may foster an environment with low tax compliance.

In the case of Ghana, estimates by Schneider et al., (2010) indicated a shadow economy of 40.7% over the period of 1999 to 2007. The relatively high informal economic activities seem to suggest tax evasion might equally be relatively high, given that government obtains tax revenue mainly from officially declared sources in the form of income tax, property tax, corporate business tax and sales tax among others. Moreover, many indicators of doing business as measured by the World Bank's *Doing Business* have deteriorated since 2010. In its report for 2015/2016, Ghana dropped by eight places in the World Economic Forum's Global Competitiveness Report compared to that of 2014/2015. Ghana went down from 111 to 119, out of 140 countries assessed in the report. The report shows the country's decline was influenced by some challenges with its macroeconomic environment, and infrastructure. Based on the Global Competitiveness Index (GCI) score of 1 to 7 for 2015/2016, Ghana scored 3.6. This score is a drop in its previous level of 3.7 in 2014/2015 and even further worse compared to 3.8 in 2013/2014. The question that

arises is whether this poor business environment affects firms' decision to evade taxes.

The primary motive of firms is to make profit. However, the means it takes for this profit to be realised varies. Aside raising the unit price of products or services and producing efficiently, firms especially in developing countries also resort to tax evasion to maximize their profits (Johannesen et al., 2016). Determining the business environment factors accounting for firms decision in evading taxes is thus of profound importance.

For Ghana, there is virtually no study (to the best of my knowledge after review of literature) that investigates empirically how the country's business climate encourages (or dissuades) firms to evade taxes. This paper fills this important gap in the literature, by providing country specific evidence necessary to inform policy makers on the measures required to improve business environment in order to boost domestic tax collections.

Employing the Tobit method of estimation on World Bank Enterprise Survey data, the results revealed that a unit deterioration of business environment increases firm's decision to evade tax by 0.961. In terms of the individual business environment indicators, perceived corruption of tax officials increases evasion decision by 2.716. Public infrastructure (electricity outage) had a positive and significant effect on tax evasion with a coefficient of 0.695 while quality of legal environment had a negative effect on firms' decision to evade taxes with a coefficient of 1.246. Business constraints in the form of tax rate (1.389), access to business license (1.622) and

transport (1.419) had a positive effect on firms' tax evasion decision. Finally, the results indicated that the type of firm, age and sex of the owner affects tax evasion decisions.

The rest of the paper is structured as follows. Section 4.2 reviews the theoretical and empirical literature for the study. Issues relating to data, model specification and econometric methodology are covered in section 4.3. The empirical results are presented and analysed in section 4.4. Section 4.5 concludes the paper with a summary of principal findings and policy implications.

4.2 Review of Related Literature

4.2.1 Review of Theoretical Literature

According to Allingham and Sandmo (1972) deterrence model of tax evasion, individual tax payers are portrayed to maximize their utility of tax evasion by considering three basic factors: the probability of being caught, the size of the penalty and the degree of their risk aversion. In this model, the assumption of neither moral judgement nor civic duties for tax payments is placed on individuals. On the contrary, individuals choose the optimal level of tax evasion to maximize their expected utility. Tax evasion here is considered a risky choice. Higher payoff that results from tax evasion is offset by penalties that are imposed by tax authority if caught. As a result, individuals should be in favour of tax evasion as long as potential gains are expected to be greater than potential losses, but their choice of tax evasion would be moderated by the degree of their risk aversion. In this case, the asymmetry between utility cost and benefit could restrict individual taxpayers from achieving the optimal level of tax evasion.

However, as suggested in Slemrod (2004 and 2007), the deterrence theory may not be applicable to business tax payers, in particular, large publicly traded firms, which are owned by shareholders, but operated by managers. As indicated by Tedds (2007), the theoretical outcomes of the deterrence theory are muddled when the choice is not only the level of evasion but also the level of output, as with most businesses. The theory is also muddled when there is no direct link between the owner's income, risk preference, audit probability, and evasion decisions. This is particularly true for businesses where evasion decisions are made by managers and not the owner(s).

Hence, the reasons driving many businesses to evade taxes is likely different from that of individuals and, hence, should be modelled differently. In the context of tax evasion, risk-averse managers can be assumed to carry out detailed plans on behalf of risk-neutral owners (Chen and Chu 2005). Because of complexity arising from multiple parties involved in corporate tax evasion, the deterrence theory for individual tax payers may not be transferred to corporate tax payers. Several studies provide analytical insights into corporate tax evasion based on the agency theory (Chen and Chu 2005; Crocker and Slemrod 2005; Desai and Dharmapala 2006; Desai et al., 2007).

Thus Chen and Chu (2005) provided an extension to the deterrence theory by focusing on how influential or key shareholders could induce managers to engage in tax evasion, which could be an illegal act. In the optimal contract, compensations for managers are associated with positive business outcomes including reduced tax liabilities. However, since any agreement about tax evasion cannot be enforced in court, managers would like to have *ex ante* compensations for promised future tax

evasion. This arrangement leads to an incomplete labour contract as the compensation should be made in advance regardless of outcomes. Furthermore, such agreement for managers to perform an illegal act could compromise the quality of a firm's internal control system as its formal records, financial statements, would not represent true business outcomes. Rather, managers would create an internal control system that is opaque enough to hide their illicit methods to reduce tax liabilities.

Managers could take advantage of such an opaque internal control system for rent extractions. Accordingly, under the deterrence theory, individual tax payers would choose tax evasion as long as the expected marginal utility of tax evasion is greater than the expected marginal utility of penalty if caught. On the other hand, corporate shareholders need to have the expected marginal benefits of tax evasion large enough to offset both the expected marginal utility of penalty and efficiency loss in the internal control. This is particularly because tax evasion by a business actually involves the interaction of many agents and is much more complicated than individual income tax evasion.

It is noticed that the model developed by Chen and Chu (2005) does not consider the role of penalties in the tax evasion decision. On their part, Crocker and Slemrod (2005) provided a theoretical analysis of how corporate tax payers are affected by legal penalties. Using a principal-agent model, they suggest that officers in large corporations, rather than shareholders, directly make decision regarding corporate tax avoidance. Therefore, officers have more information about corporate tax reporting than do shareholders. Crocker and Slemrod (2005) compare two types of legal penalties: penalties on corporate officers and penalties on the corporation (i.e.,

shareholders). Penalties on officers would reduce the expected utility that the officer gains from engaging in aggressive tax avoidance behaviour. Therefore, an increase in the penalty on officers is expected to reduce the level of corporate tax avoidance. In contrast, it is not clear whether penalties on the corporation would affect corporate tax avoidance decisions. Penalties on the corporation would affect shareholders' expected utility.

In extending Desai and Dharmapala (2006) studies on the role of corporate governance in corporate tax, Desai et al., (2007) looks at the relationship between corporate tax and corporate governance using three stakeholders: tax authorities, insiders and shareholders. In the higher tax regime, insiders should be more motivated to engage in tax avoidance because a larger amount of before-taxable income can be diverted. The diversion would decline with increased tax enforcement. The effect of tax rate increases on government tax revenues would vary depending upon the strength of corporate governance. In a country with weak corporate governance, an increase in the tax rate might reduce tax revenues because of increased rent extractions. However, officers, rather than shareholders, are the direct decision makers on issues related to corporate tax reporting. Therefore, whether civil penalties on shareholders would affect officers' decisions depends on how well the shareholders' and officers' incentives are aligned.

4.2.2 Review of Empirical Literature

Mawejje and Okumu (2016) developed a model on business climate and its relationship with tax evasion among firms. In their model, firms engage in the production of a final good but must rely on quality public capital provided by the

government. Government on the other hand hires bureaucrats to manage the procurement of public goods and collection of taxes. They tested this model using a World Bank firm-level data from Uganda. By adopting an Instrumental Variable (IV) Tobit estimation method, they found that tax evasion is affected positively by an inefficient and quality of legal environment, bribery as well as inadequate provision of capital goods. In another angle, Alm et al, (2014) developed a theoretical model that incorporates the potential for bribery in a firm's tax reporting decisions. By employing the instrumental variable and propensity score matching methods on WBES data, their results revealed that it is corruption that largely drives higher levels of evasion. Additionally, larger bribes result in higher levels of evasion, at least up to some point. These results indicate that governments seeking to increase their tax revenues must work first to ensure an honest tax administration.

It is argued that informality is correlated with tax evasion. To that effect, Nadirov and Aliyev (2015) investigated informality, tax evasion and the quality of business environment from the south Caucasian countries. By adopting IV least squares, their results indicated a two way effect of informality and tax evasion. Moreover, they found that the business environment has implications for both informal economy and tax evasion. However, the use of OLS was questionable since the dependent variables (tax evasion and informality) were censored in the responses and as such made OLS inappropriate for estimations.

Now in focusing primarily on informality, Dabla-Norris et al. (2008) investigated on determinants of informality using the survey responses of over 4000 registered (formal sector) firms in a sample of 41 countries. Their findings revealed that for a

firm which views financing as a major obstacle, there is a 16% probability that 50% of its sales will not appear on its books. On the contrary, for a firm which views financing as a minor obstacle, the same level of informality occurs with less than half this probability. In addition, their results revealed that the quality of the legal framework affects the size of the informal sector, as well as taxes, regulations and financial constraints. Related to this finding is Ingram et al., (2007), who investigated on why firms choose to be informal among 6 African countries (South Africa, Tanzania, Zambia, Senegal, Uganda and Senegal). By employing the World Bank's enterprise survey, they found that firms' decision to be formal is correlated with the benefits and costs imposed by their investment climate. After controlling for firm-level, sector and country-specific effects, their study found that the incidence of formality is positively correlated with perceptions regarding the availability of electricity supply, access to finance and access to land, and negatively correlated with the rate of taxation and corruption.

The role of government is noted by theory to have a major effect on firms' tax compliance and thus tax evasion. Joulfaian (2009) investigated the determinants of business tax evasion with a special emphasis on the role of governance. He employed data from a sample of businesses in 26 transition economies in Europe and the Former Soviet Union and Turkey. Results suggested that governance, as measured by the frequency of tax related bribes, is a significant determinant of compliance behaviour and that evasion rises with bribes to tax officials. The findings also suggest that corporations, particularly those listed on an exchange or of foreign nationality, conceal less of their activities than other forms of businesses. The role of government is also evidenced by Tedds (2007) that government corruption has the

single largest causal effect on under-reporting; resulting in the percentage of sales not reported to the tax authority being 53.4 percent higher. This was followed by taxes, access to financing, organized crime, political instability and the fairness of the legal system.

Alon and Hageman (2013) on their part investigated into the impact of corruption on firm tax compliance in transition economies. Based on a sample of over 5,000 firms from 22 former Soviet Bloc transition economies, they found that higher levels of corruption and higher levels of particularized trust (reliance on friends and family) are associated with lower levels of tax compliance. Interestingly, it was also found out that the negative relationship between corruption and tax compliance is weakened in situations of higher generalized trust (trust in strangers). Similarly, Alm and McClellan (2012) studied on tax morale and tax compliance from firm's perspective. They used a pooled dataset of firm level data from 79 countries over a period of 8 years and covering approximately 57,000 firms. Their results indicated the crucial role of tax morale in firm tax compliance: improvements in tax morale have a significant and positive impact on reporting.

By exploiting a unique data set containing information on the estimated bribe payments of Ugandan firms, Fisman and Svensson (2007) studied the relationship between bribery payments, taxes and firm growth over the period 1995-97. They found that both the rate of taxation and bribery are negatively correlated with firm growth. In a related study, Reinikka and Svensson (2002) identified that poor public capital, proxied by unreliable and inadequate electric power supply, significantly reduces investment in productive capacity by firms. They found out that when public

provision of services and infrastructure is poor, they can invest in complementary capital themselves. The cost of this strategy, however, is that less productive capital is installed.

4.3 Empirical Strategy and Data

4.3.1 Model Specification

The basic empirical model in equation (4.1) is a modified version of an analytical framework developed by Mawejji and Okumu¹ (2016) in which firms, government and bureaucrats interact strategically.

$$TE_i = \alpha + \beta X_i + \delta Y_i + \theta Z_i + \varepsilon_i \quad (4.1)$$

where TE is tax evasion among firms. The vector, X , encompasses the indicators/measures of business environment, sequenced as the following: *corruption of tax officials, electricity outage, legal system, inspection, tax rate obstacle, business license obstacle, labour regulation obstacle, finance obstacle and transport obstacle*. Y consist of vectors of firm characteristics sequenced as: *age of firm, size of firm, type of firm, manager and owner characteristics (female owner)*. Finally, Z is made up of dummies to control for geographical location effects of variables sequenced as: Accra, Takoradi, Tema, Kumasi and Tamale; and ε_i representing the error term.

4.3.2 Identification strategy

The study used the Tobit model because the dependent variable for this study is censored (firms who choose not to evade taxes and those who choose to evade taxes,

¹ The detailed interaction between firms, government and bureaucrats is explained in 4A3 of the appendix.

ranging from 0% to 100%). This is because Tobit models are developed for continuous dependent variables that vary between zero and a certain positive value, which can be said to be the case of this study (ranging from 0% to 100%). For this study in particular, for participating firms who chose not to evade taxes, some may even be against tax evasion such that their response for the question of how much a firm pays to get things done might actually be “negative”. However, it is unobservable and we can only observe zero(0). Thus, the distribution of the dependent variable does not follow the normal distribution, and so the use of the ordinary least squares (OLS) in estimation can potentially lead to bias estimates and wrong inference. As argued by Amemiya (1984), the value of the observation destroys the linearity assumptions. In this case, the least squares method is inappropriate. Thus, the Tobit model is employed to describe the discontinuous distribution and to explain the conditional distribution of the dependent variable. In that case, the model will be estimated via the Maximum Likelihood Estimation (MLE). The Tobit regression coefficients are interpreted in the similar manner to OLS regression coefficients; however, the linear effect is on the uncensored latent variable, not the observed outcome.

The structural equation in the Tobit model is:

$$y_i^* = X_i\beta + \epsilon_i \quad (a)$$

where $\epsilon_i \sim N(0, \sigma^2)$. y^* is a latent variable that is observed for values greater than τ and censored otherwise. The observed y is defined by the following measurement equation:

$$y_i = \begin{cases} y^* & \text{if } y^* > \tau \\ \tau_y & \text{if } y^* < \tau \end{cases}$$

In a typical Tobit model, we assume that $\tau = 0$, that is, the data are censored at zero(0), as is the case in our data for the study. Thus we have

$$y_i = \begin{cases} y^* & \text{if } y^* > 0 \\ \tau_y & \text{if } y^* < 0 \end{cases}$$

Thus the likelihood function for the censored normal distribution is:

$$L = \prod_i^N \left[\frac{1}{\sigma} \phi \left(\frac{y - \mu}{\sigma} \right) \right]^{d_i} \left[1 - \Phi \left(\frac{\mu - \tau}{\sigma} \right) \right]^{1-d_i} \quad (b)$$

where τ is the censoring point. In the traditional Tobit model, we set $\tau = 0$ and parametrize μ as $X_i\beta$. This gives us the likelihood function for the Tobit model as:

$$L = \prod_i^N \left[\frac{1}{\sigma} \phi \left(\frac{y - X_i\beta}{\sigma} \right) \right]^{d_i} \left[1 - \Phi \left(\frac{X_i\beta}{\sigma} \right) \right]^{1-d_i} \quad (c)$$

The log-likelihood function for the Tobit model becomes:

$$\ln L = \sum_{i=1}^N \left\{ d_i \left(-\ln \sigma + \ln \phi \left(\frac{y - X_i\beta}{\sigma} \right) \right) + (1 - d_i) \ln \left(1 - \Phi \left(\frac{X_i\beta}{\sigma} \right) \right) \right\} \quad (d)$$

The overall log-likelihood is made up of two parts. The first part corresponds to the classical regression for the uncensored observations, while the second part corresponds to the relevant probabilities that an observation is censored. It must be noted that tobit regression coefficients are interpreted in the similar manner to OLS regression coefficients; however, the linear effect is on the uncensored latent variable, not the observed outcome.

4.3.3 Data Source

The study uses a survey data from the World Bank Enterprise Survey (2013) for Ghana in which 720 firms were surveyed across its major cities (Accra, Tema, Takoradi, Kumasi and Tamale. Included in the survey was information on Ghanaian

firms' perceptions about the quality of government delivered public goods, the strength of the legal framework, bureaucratic red tape, corruption and bribery as well as other constraints to doing business. For the purposes of this study, the survey has information on the tendency of firms to evade and avoid taxes. It must be noted that there are potential measurement errors with tax and bribery data as it is likely prone to misreporting.

To circumvent these challenges, the World Bank Enterprise Survey makes use of an indirect approach to collect information on tax evasion and bribe payments. For example, the WBES uses the following question: *“We have heard that establishments are sometimes required to make gifts or informal payments to public officials to “get things done” with regard to taxes, customs, licenses, regulations, services, etc. On average what percentage of the total annual sales, or estimated annual value, do establishments like this one pay in informal payments/gifts to public officials for this purpose?”* This question is used as a proxy to measure tax evasion for this study since there is no direct question to measure tax evasion and the fact that firms would not respond since they are aware that evasion is an illegal activity. The proxy is used because research has shown that companies pay bribes to evade taxes or to avoid excessive compliance costs.

As noted by Goodspeed et al., (2013), “...in principle, bribery payments and tax payments could be substitutes such that firms would have to pay less than the full tax on a combination of bribery and tax payments when the bribe payments go directly to tax bureaucrats”. Thus when the response to the question is greater than zero (between 1% - 100%), it is said that the firm engages in informality and hence an

indication of the presence of some form of tax evasion. On the contrary, when a response to this question is zero (0%), then it indicates the firm does not evade tax. A formal definition of variables is displayed in Table 4A2 of the appendix.

4.3.4 Descriptive Statistics and Summary of Data

A total of 440 firms that responded to the tax evasion question was used for the study. In terms of the distribution of firms who responded to the evasion question according to the strata areas (regions), Accra had the highest with 214(48.6%). Kumasi and Tamale together had 111(25.2%), Tema, 79(18.0%) and Takoradi having the least with 36(8.2%). With respect to firms that avoided the evasion question, Accra constituted 137(54.3%), Kumasi and Tamale 29(11.5%), Tema 69(27.4%) and Takoradi with the least of 17(6.8%). Finally, as of the 440 firms who responded to the tax evasion questions, 360 representing 81.8% answered “No evasion” while 80 representing 18.2% answered evasion according to various percentages. A summary of the descriptive statistics of the variables is illustrated in Table 4.1

Table 4A1 in the appendix illustrates the Pearson correlation matrix for the dependent variable and independent variables for the study. There are a number of significant correlation between tax evasion and the business environment determinants. The table also provides evidence that the dependent variable and independent variables are not highly correlated, given the range of correlation between the dependent and independent variables to be 0.002 to 0.27

Table 4. 1 Descriptive Statistics of Variables

Variable name	Number of observations	Mean	Standard deviation	Min	Max
Tax evasion	440	0.397	0.942	0	4.615
Corruption (tax officials)	440	0.066	0.248	0	1
Electricity outage	440	2.109	0.871	0	4.595
Legal system	440	0.368	0.483	0	1
Tax rate obstacle	440	0.680	0.487	0	1
Inspection	440	0.961	0.715	0	3.912
Manufacturing	440	0.552	0.498	0	1
Age	440	2.580	0.707	0.693	4.654
Female	440	0.300	0.459	0	1
Small	440	0.656	0.476	0	1
Medium	440	0.263	0.440	0	1
Large	440	0.082	0.274	0	1
Labour regulation obstacle	440	0.177	0.382	0	1
Finance obstacle	440	0.750	0.434	0	1
Transport obstacle	440	0.491	0.500	0	1
License obstacle	440	0.343	0.475	0	1

Variables such as the age of the firm, the size of the firm, experience of the firms' manager, firms owned by females as well as the firms' total cost of production were tested using ANOVA to ascertain whether they differed in one region from the other. Table 4.2 tabulates the results and it indicates clearly that there is no significant difference in all the selected firm characteristics (age of firm, size of firm, experience of firm managers, female owned firms and labour cost) among the regions (Accra, Kumasi, Tamale, Takoradi and Tema). This means that all the firms under study possess similar characteristics across the regions.

Table 4. 2 ANOVA for mean of firms' characteristics

Variable	F-Statistic	P-value
Age	1.81	0.1435
Size	1.83	0.1407
Experience	1.72	0.1611

Female owners	0.71	0.5469
Total labour cost	1.65	0.1766

4.4 Results and Discussions

4.4.1 Result for missing observations

It would be noted that the missing tax evasion data raise concerns about the possibility of selection bias, which has the potential of rendering inferences drawn from regression results spurious. Specifically, missing data is a problem to the extent that it is generated through a non-random process. In as much as knowledge is not known as to why some firms chose not to provide any information on tax evasion, the study follows Mawejji and Okumu (2016) as well as Svensson (2003) to check whether the group of responders and non-responders differ on some observable characteristics such as age of the firm, size of the firm, managerial experience, labour costs as well as sales. In order to achieve this, the study estimated a set of regressions using the observable characteristics described above with results shown in Table 4.3

Table 4. 3 Comparison of Firms who Responded and Those who did not Respond to Tax Evasion Question

Dependent variable: Dummy=1; Firms missing tax evasion data

Variable	Coefficient	Standard error	P-value
Age	-0.119	0.079	0.136
Size	0.014	0.060	0.812
Female owner	0.010	0.053	0.849
Experience	0.032	0.074	0.669
Labour cost	-0.066	0.44	0.136
Sales	0.041	0.038	0.286

The dependent variable is a dummy taking the value 1 if a firm has missing data and 0 otherwise. Clearly, it is evidenced that the group of firms missing tax evasion data do not differ significantly with respect to the observable characteristics (age of the firm, size of the firm, managerial experience, labour costs as well as sales) when compared to the group of firms that report information on these variables. It can be

deduced that the available sample used in estimation is unbiased and therefore representative.

4.4.2 Results for Overall Business Environment on Firms' Tax Evasion Decision

Having determined that the sample is representative and unbiased, the estimable equation in equation 4.1 was estimated using Tobit. However, since business environment encompasses several indicators, principal component procedure is employed first to construct an overall business environment index. This overall indicator captures the maximum variation in all the indicators (*corruption of tax officials, electricity outage, legal system, tax rate obstacle, inspection obstacle, business license obstacle, labour regulation obstacle, finance obstacle, transport obstacle*) in a single equation. Results of the principal component analysis are reported in Table 4.4

Table 4. 4 Principal Component Analysis Results

Component	Eigen value	Difference	Proportion	Cumulative
Comp1	2.056	0.871	0.229	0.229
Comp2	1.185	0.030	0.132	0.360
Comp3	1.155	0.176	0.124	0.449
Comp4	0.979	0.052	0.109	0.597
Comp5	0.927	0.118	0.103	0.700
Comp6	0.807	0.036	0.090	0.790
Comp7	0.772	0.174	0.086	0.876
Comp8	0.598	0.080	0.066	0.942
Comp9	0.518		0.058	1.000

Principal components (eigenvectors)										
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	U
Inspection	0.172	0.023	0.629	0.168	-0.420	0.567	0.089	0.189	-0.062	0
Court	0.138	0.105	0.439	0.506	0.681	-0.204	0.109	0.005	-0.064	0
Outage	0.142	0.468	-0.408	0.438	-0.249	-0.003	0.578	-0.008	0.082	0
Corruption	0.110	0.621	0.307	-0.433	-0.089	-0.406	-0.053	0.308	0.224	0
License	0.525	0.102	-0.019	-0.297	0.017	-0.040	0.106	-0.296	-0.725	0
Lab. Reg	0.296	0.351	-0.337	0.0004	0.348	0.548	-0.455	0.190	0.106	0
Finance	0.424	-0.426	-0.179	0.086	-0.058	-0.237	0.041	0.731	-0.064	0
Transport	0.403	-0.023	0.034	0.377	-0.364	-0.311	-0.536	-0.364	0.212	0
Tax rate	0.463	-0.262	0.059	-0.315	0.179	0.130	0.369	-0.282	0.592	0

Based on the eigenvalue-greater-than-one criteria, the first three components of Table 4.4 qualify as index for business environment with eigenvalues of 2.056, 1.185 and 1.155 respectively. These three components together, account for almost 50% of the total variation in the business environment indicators. However, the nine indicators load better on the first principal component than the second and third components. Intuitively, these eigenvectors show that almost all the nine dimensions of business environment are relatively influential in forming the first principal component. Thus the first principal component is adopted as the index for business environment. The result following from the use of the business environment index on tax evasion is shown in Table 4.5.

Table 4. 5 Results for Overall Business Environment and Firms' Tax Evasion Decision

Dependent variable: tax evasion

Variable	Coefficient	Robust standard error
Business environment	0.961***	0.199
Manufacturing	2.188**	1.018
Age	-1.020**	0.488
Female owner	-1.158	0.712
Large	2.216**	1.058
Regional fixed effect	Yes	
Weight	Yes	
Pseudo R ²	0.115	

NB: Tabulates are regression coefficient. Robust Standard errors are in parenthesis. ***, **, * signifies significance level of 1%, 5% and 10% respectively. All regressions include constant term (not shown)

A positive and significant coefficient of the business environment index in Table 4.5 indicates that the business environment promotes firm's decision to evade taxes. In other words, the business environment firms faces in Ghana, encourages their tax evasion decisions. This finding of business environment leading to tax evasion is not surprising, taking into consideration the trend in Ghana's Doing Business DTF Scores (Doing Business database, World Bank Group) from 2010-2016 for selected

indicators. The DTF scores are as shown in Table 4.6. It is noted that almost all the indicators of doing business as measured by the World Bank's *Doing Business* has deteriorated since 2013. Example, with *getting electricity*, the DTF score after seeing an increase from 74.42 in 2013 to 76.16 in 2014 saw a huge drop to 58.72 and 59.48 in 2015 and 2016 respectively.

Table 4. 6 Trends in Ghana's Doing Business DTF Scores, 2010-2016

Indicator	Year			
	2013	2014	2015	2016
Getting electricity	74.42	76.16	58.72	59.48
Registering property	79.09	79.15	66.09	66.12
Getting credit	81.25	81.25	65.00	65.00
Protecting minority investors	63.33	63.33	56.67	56.67
Trading across borders	64.85	65.51	36.48	36.48
Enforcing contracts	65.76	57.59	54.00	54.00
Resolving solvency	28.93	28.16	22.45	21.88
Overall DTF	67.34	66.57	57.65	57.69

Note: The distance to frontier (DTF) score shows how far on average an economy is from the best performance achieved by any economy on each *Doing Business* indicator.

Source: Compiled from *Doing Business* database, World Bank Group

With *enforcing contract indicator*, a DTF score of 65.76 in 2013 decreased to 57.59 in 2014. This saw a further decline to 54.00 for the years 2015 and 2016. As far as *trading across borders* is concerned, its score of 64.85 in 2013 improved up to 65.51 by the year 2014. However, it saw a sharp decline to a score of 36.48 for both 2015 and 2016. It clearly indicate that the business environment has not been the very best to enhance private investments, which might account for evasion decision by firms.

4.4.3 Results for Individual Indicators of Business Environment on Firms' Tax Evasion Decision

Now, in order to know the individual effects of the business environment indicators on tax evasion, equation 4.1 is estimated. Results are shown in Table 4.7. Corruption of tax officials has a positive and significant impact on tax evasion. That is firms' decision to evade tax increase by 2.715 given that tax officials are corrupt. This is in line with a priori and theoretical expectations. Intuitively, if tax officials become corrupt by accepting and asking for informal payments from firms, it prevents them from making sure that the right amount of taxes are paid. Moreover, firms evade taxes as a form of compensation of having paid bribes to tax officials. This result is in line with the studies of Alm et al., (2014) who developed theoretical model that incorporates the potential for bribery in a firm's tax reporting decisions. Their findings demonstrated that it is corruption that largely drives higher levels of evasion. It also shares with findings in studies as Uslaner (2007), Ingram et al (2001), Fisman and Svensson (2007).

Electricity outage as a proxy for public provision of service and infrastructure has the expected apriori sign of positive and significant. A unit increase in electricity outage increase firms' decision to evade taxes by 0.695. This suggests that when firms are faced with many electricity outages, their level of tax evasion increases. When public provision of services and infrastructure is poor, they can invest in complementary capital themselves. The cost of this strategy, however, is that less productive capital is installed coupled with high tax evasion as a means of reducing their cost of production. Mawejje and Okumu (2016) confirms this position by saying that frequent outage of electricity imply that firms' investment in own electricity

generation is only possible at the expense of investments in reproducible capital. This may lead to tax evasion to the extent that it decreases firm profitability. This result is also consistent with studies such as Reinikka and Svensson (2002); Ingram et al., (2001); Nadirov and Aliyev (2013).

Table 4. 7 Regression Results for Individual Indicators of Business Environment on Firms' Evasion Decision

Dependent variable: tax evasion

Variable	Coefficient	Robust standard error
Corruption of tax officials	2.716***	0.638
Electricity outage	0.695**	0.286
Legal system	-1.246**	0.08)
Inspection	-0.006	0.423
Tax rate obstacle	1.389**	0.699
License obstacle	1.622***	0.575
Labour regulations obstacle	-0.765	0.759
Finance obstacle	-2.083**	0.715
Transport obstacle	1.419***	0.498
Manufacturing	1.507*	0.796
Age	-1.282**	0.402
Female owner	-2.013**	0.814
Medium	-0.754	0.644
Large	0.235	0.881
Regional fixed effect	YES	
Weight	YES	
Pseudo R ²	0.184	
Number of observation	440	
Prob(F-Statistic)	0.000	
NB: ***, **, * signifies significance level of 1%, 5% and 10% respectively. All regressions include constant term (not shown)		

Efficient and quality legal environment is expected to lead to reduction in tax evasion. This is because firms that are found cheating would be punished impartially and justly by the courts. Firms are motivated to evade taxes when they know that the

legal environment is loose and impartial. The coefficient for legal system is negative and significant as expected. That is, firms' evasion decision reduces by 1.246 if the legal system is perceived to be fair and just. Studies that also attained negative relationship between legal environment and tax evasion includes Alm and McClellan (2012) and Hanousek and Palda (2004).

Inspection, which is used as a proxy for the probability that a firm is audited though exhibit negative impact on tax evasion, it is not statistically significant. The insignificance may be attributed to the fact that tax officials often do not visit firms for tax audit. Thus even though firms are aware of the penalties that may be imposed on them when caught, they still evade taxes. It is also the case that most times, tax officials are not provided with adequate logistics to make them able to conduct visits to most firms. Moreover we can attribute the insignificance to corruption on the part of tax officials, who connive with firm managers.

It is evidenced that tax rate obstacle, transport obstacle as well as business license and permit obstacle has a positive and significant impact on tax evasion. Firms' decision to evade tax increase by 1.389, 1.419 and 1.622 when there are constraints with tax rate, transport as well business and license permit respectively. Intuitively, as noted by Mawejje and Okumu (2016), constraints in the business environment increases cost of doing business and thus incentivise firms to evade taxes. In agreement with this finding is Nadirov and Aliyev (2013). Surprisingly, finance and labour regulation constraint showed a negative impact on tax evasion. This is said to be implausible since it is expected that financial and labour regulation constraint would increase the cost of doing business and hence lead to tax evasion.

The coefficient of the dummy for manufacturing is positive and significant. This is measured against firms in the retail sector. This result implies that firms' decision to evade tax increases by 1.507 when it is in the manufacturing sector. This could be justified on the grounds many firms in the manufacturing sector face problems such as electricity, transport, competition from foreign imports, high import duties etc. It is no surprising that the Association of Ghana Industries (AGI) often releases press statements to highlight the challenges they go through. All these mean a higher cost of production, which increases the probability of such firms evading taxes. It must however be noted that one would have expected firms in the retail sector to evade taxes more than their counterpart in the manufacturing on the grounds that most retail firms are informal in nature and thus records of book keeping are not properly done as pertains in the manufacturing sector.

Age has a negative and significant effect on tax evasion. This suggests that as firms' age increase by a unit, their evasion decision reduces by 1.282. This result sound implausible, coming from the angle that as firms grow in age, they become aware of the loopholes in the tax system and take advantage to evade taxes. It is also expected that they become conversant with tax officials with time and thus increases tax evasion. However the negative impact can be argued that firms are tempted to evade taxes at their early years as a result of insufficient knowledge in tax laws as well as higher initial operational cost. But as these firms grow in operation, they become aware of the tax laws and increasing returns to scale results in them reducing tax evasion. Moreover as firms grow, they acquire higher social stake such as brand name, having goodwill, larger customer base among others. In that regard, they tend

to refrain from any action which can hamper this social stake built and hence tax evasion reduces. This position is supported by studies from Tittle (1980).

Moreover, tax evasion decision reduces by 2.013 if a firm is owned by female. This implies firms with female owners evade less tax than their male counterparts. This is in line with social psychological theories. As argued by Tittle (1980), females are more risk averse than their male counterparts and as such tend to be more tax compliant. The result is consistent with others such as Kasipillai and Jabbar (2006), Aitken and Bonneville (1980).

With respect to the effect of size of the firm on evasion, a dummy variable for medium and large firms as against small firms indicate an insignificant negative and positive impact respectively on evasion. It can therefore be said that size of firms do not affect their evasion decision significantly as far as the study is concerned.

4.4.4 Robustness Check

The study carried out a number of robustness checks to verify the results obtained. First, it employed the Probit estimation procedure. That is, all firms that indicated not to have engaged in any informal payment in order to get things done were recoded as “0” (meaning no evasion) and “1” otherwise (meaning evasion). Second, due to the possibility of the results being driven by outliers, the study discarded all firms that reported tax evasion in excess of 90% and the corresponding result was estimated using tobit. The results for robustness is displayed in Table 4.8

Table 4. 8 Regression Results for Robustness Check

Dependent variable: tax evasion		
Variable	Column 1 (Probit)	Column 2 (outlier of >90%)
Corruption	1.355*** (0.368)	2.680*** (0.585)
Electricity outage	0.270** (0.127)	0.672** (0.268)
Legal system	-0.539** (0.238)	-1.008** (0.493)
Tax rate obstacle	0.516** (0.267)	0.053* (0.598)
Inspection	-0.053 (0.170)	-0.093 (0.310)
License obstacle	0.793*** (0.257)	1.627*** (0.530)
labour regulations obstacle	-0.358 (0.317)	-0.483 (0.692)
Finance obstacle	-0.975** (0.316)	-1.601* (0.616)
Transport obstacle	0.669*** (0.241)	1.629*** (0.461)
Manufacturing	0.546* (0.322)	1.074 (0.700)
Rest	0.905*** (0.338)	2.960*** (0.963)
Age	-0.471*** (0.175)	-1.236*** (0.355)
female owner	-0.905*** (0.338)	-1.067* (0.557)
Medium	-0.321 (0.275)	-0.397 (0.579)
Large	0.225 (0.419)	0.445 (0.754)
Regional fixed effect	YES	YES
Weight	YES	YES
Pseudo R ²	0.327	0.229
Number of observation	440	440
Prob(F-Statistic)	0.000	0.000
NB: Tabulates are regression coefficient. Robust Standard errors are in parenthesis. ***, **, * signifies significance level of 1%, 5% and 10% respectively. All regressions include constant term (not shown)		

Estimates from the Probit model (column 1 of Table 4.8) shows that the results are not very much different from the original results. Corruption of tax officials, outage, transport and license were positive and significant at 5%. Tax rate was positive and

significant at 1%. Moreover, courts systems had a negative and significant impact on tax evasion while inspection was negative and insignificant just as obtained in the baseline results. Results of the firm's characteristics did not also differ much since manufacturing firms are noted to evade more taxes than retail firms. Moreover the medium and larger firms did not seem to differ from the smaller firms in terms of evading tax; confirming to the results of the original model.

The result from the outlier model (column 2 of Table 4.8) is also not statistically different from the original results as most of the variables retained both the expected sign and significant levels as the original. That is corruption, outage, tax rate, license, age, female ownership are all significant. Thus results from the baseline estimation is said to be robust.

4.5 Conclusion and Policy Implications

Business environment may vary from one country to another depending on the extent and level of legal structures, quality of tax administration, government's commitment to provision of infrastructure, among others and as such, country specific studies has to be undertaken in order to recommend policies that would suit the needs of a particular country. The objective of this paper was to assess the effect of business environment on a firms' decision to evade tax in Ghana. Employing the Tobit method of estimation on World Bank Enterprise Survey data, the results revealed that a unit deterioration of business environment increases firm's decision to evade tax by 0.961. In terms of the individual business environment indicators, perceived corruption of tax officials increases evasion decision by 2.716. Public infrastructure (electricity outage) had a positive and significant effect on tax evasion with a

coefficient of 0.695 while quality of legal environment had a negative effect on firms' decision to evade taxes with a coefficient of 1.246. Business constraints in the form of tax rate (1.389), access to business license (1.622) and transport (1.419) had a positive effect on firms' tax evasion decision. Finally, the results indicated that the type of firm, age and sex of the owner affects tax evasion decisions.

As far as policy implication is concerned, punitive action against corrupt officials can have an important deterrent effect. The role of the media is important in publicizing the punishment of corrupt officials. Pecuniary penalties for corrupt behaviour should be harsh enough to discourage officials from engaging in wrongdoing.

Electricity outage was found to promote tax evasion, since it increases cost of production in the sense that firms resort to alternate means of generating power for their production activities. Measures that would ensure sufficient and stable electricity must be taken seriously by the government. This would go a long way to reduce the unintended additional cost of operation on the part of firms.

The courts should be empowered so as to be able to work efficiently and impartial. Judges found to have indulged in bribery should be removed and prosecuted. Business constraints such as tax rate, transport and business license were also found to causes tax evasion. It is recommended that government continue its review of corporate taxes while also making sure that infrastructure is improved.

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Appendix

Table 4A1. Correlation Matrix for Dependent and Independent Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
[1]Taxevasion	1.000												
[2]Corruption	0.272***	1.000											
[3]electricity outage	0.087	0.038	1.000										
[4]Legal system	-0.099**	0.033	0.025	1.000									
[5]Tax rate obstacle	0.085**	-0.028	-0.037	-0.054	1.000								
[6]Inspection	0.027	0.088**	0.119**	0.169***	-0.067*	1.000							
[7] Manufacturing	0.038	-0.019	0.065	0.029	-0.047	0.114***	1.000						
[8]Age	-0.095**	-0.018	-0.034	0.036	-0.018	0.074*	0.052	1.000					
[9]Female	-0.107**	0.008	-0.035	0.043	0.012	0.022	-0.009	0.031	1.000				
[10]License obstacle	0.196***	0.003	0.129***	-0.106***	0.362***	-0.037	-0.002	-0.085**	-0.067*	1.000			
[11]Labour Reg, obstacle	0.031	0.036	0.175***	0.032	0.089**	0.059	0.052	0.033	0.003	0.215***	1.000		
[12]Finance obstacle	0.026	-0.125***	0.08	0.012	0.301***	-0.067	0.006	-0.090**	-0.017	0.226***	0.050	1.0000	
[13]Transport obstacle	0.107**	-0.036	0.036	-0.113***	0.200***	-0.045	0.002	0.012	-0.054	0.230***	0.110***	0.249***	1.000

***, **, * represents 1%, 5% and 10% significance level respectively

Table 4A2: Definition of variables

Variable Name	Definition
Tax evasion	Log of (percentage of total annual sales firms pay in informal payments to get things done with regard to taxes, customs etc)
Corruption of tax officials	Dummy=1 if informal payment was requested by tax official
Electricity outage	Log of number of days without electricity
Legal system	The extent to which courts are perceived to be fair, impartial and uncorrupted on a scale of 1 – 4, strongly disagree (1), disagree (2), agree (3), strongly agree (4). Recoded as dummy “1” (agree and strongly agree) and “0” (otherwise)
Tax rate obstacle	The extent to which tax rate is a major obstacle in doing business on a scale of 0 – 4, no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), severe obstacle (4). Recoded as dummy “1” (major and severe obstacle) and “0” (otherwise)
Inspection	Log of frequency of inspection by tax officials
Manufacturing	Dummy=1 if firm is engaged in manufacturing
Retail	Dummy=1 if firm is engaged in retail
Rest	Dummy=1 if firm is engaged in others apart from manufacturing and retail
Age	Log of firm’s age
Female	Dummy=1 if firm is owned by female
Small	Dummy=1 if firm size is small
Medium	Dummy=1 if firm size is medium
Large	Dummy=1 if firm size is large
Accra	Dummy=1 if firm is located in Accra

North	Dummy=1 if firm is located in Kumasi or Tamale
Takoradi	Dummy=1 if firm is located in Takoradi
Tema	Dummy=1 if firm is located in Tema
Labour regulation obstacle	The extent to which labour regulation is a major constraint to doing business on a scale of 0-4, no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), severe obstacle (4). Recoded as dummy “1” (major and severe obstacle) and “0” (otherwise)
Finance obstacle	The extent to which access to finance is a major constraint to doing business on a scale of 0-4, no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), severe obstacle (4). Recoded as dummy “1” (major and severe obstacle) and “0” (otherwise)
Transport obstacle	The extent to which transportation is a major constraint to doing business on a scale of 0-4, no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), severe obstacle (4). Recoded as dummy “1” (major and severe obstacle) and “0” (otherwise)
License obstacle	The extent to which business license and permit is a major constraint to doing business on a scale of 0-4, no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), severe obstacle (4). Recoded as dummy “1” (major and severe obstacle) and “0” (otherwise)

4A3: Analytical Framework

The study follows a simple analytical framework by Mawejji and Okumu (2016) in which firms, government and bureaucrats interact. Firms engage in the production of a final good but must rely on quality public capital provided by the government. The government hires bureaucrats to manage the procurement of public goods and collection of taxes. The detailed interaction between firms, government and bureaucrats is detailed below:

A3.1.1 Firms

We assume a perfectly competitive market structure in which there is M number of firms engaged in the production of a final good. Firms produce the final good using constant returns to scale production technology as below;

$$Y_i = AK_i^\alpha L_i^{1-\alpha} G \quad (3.1)$$

The production function is assumed to be twice differentiable with positive marginal products and diminishing marginal rate of substitution. L_i is the amount of labour employed by the i_{th} firm, K_i is the private capital investment, G is the amount of public capital supplied by government and A is a measure of a firm's productivity from other sources. The return to labour is a wage w_i , and the return on private capital investment is the rate of return r_i . G is a catalyst to firm productivity which could among others include the quality of: public transport infrastructure; legal and regulatory framework; electricity and water supply, among others. G could therefore proxy the quality of business environment. Otherwise profit maximisation implies that;

$$r_i = \alpha K_i^{\alpha-1} L_i^{1-\alpha} G, \text{ while}$$

$$w_i = (1 - \alpha) K_i^\alpha L_i^{-\alpha} G$$

Each firm reports a fraction ψ of its output for tax purposes such that the level of informal activity or untaxed output is $(1 - \psi)$. Each firm faces a uniform tax rate τ on its profit that is positively related to the fraction of output the firm declares for tax purposes, such that each firm pays a tax equivalent to $t = \tau\pi$. We assume that G is financed through taxes.

Furthermore, let the cost of regulation be denoted as γ and is positively related to the fraction of output the firm declares for tax purposes, γ and the probability of detecting tax evasion or the share of hidden output, ρ . It then follows that each firm's expected profits can be expressed as:

$$\pi = \psi[Y - wL - rK - \gamma\psi] + (1 - \psi)[Y - wL - rK][\rho(\psi)] \quad (3.2)$$

Firms choose a desirable level of tax evasion in period $t + 1$ conditional on their perceptions about the probability of detection, ρ and observed government's commitment to providing complementary capital, G in period t . Otherwise, firms will be unwilling to reveal their actual output so as to avoid fulfilling their tax obligation. Specifically, firms choose to hide a proportion of output in order to evade taxes in period $t + 1$ if their perceptions of government's commitment to providing complementary capital in period t are unfavourable. It therefore follows that the business environment is exogenous to firm decisions. Conversely it could also be the case that with tax evasion governments are constrained to provide quality public services due to inability to mobilise adequate resources. In this case the business environment cannot be treated as exogenous to firm level decisions.

A3.1.2 Government

We assume that government hires $N^G + N^\tau = N < \psi M$ number of bureaucrats to engage in the procurement of public services and collection of taxes in return for a competitive wage. Where N^G is the number of bureaucrats who engage in the procurement of public services while N^τ is the number of bureaucrats employed to collect tax.

A3.1.3 Bureaucrats

We assume that each bureaucrat is endowed with 1 unit of labour which they inelastically supply in return for a competitive wage, w_t . There are N^G number of bureaucrats engaged in the procurement of public services and N^τ number of bureaucrats engaged in the collection of taxes. The sum of bureaucrats engaged in the procurement of public services and collection of taxes is N . There is a fraction μ and $1 - \mu$ of corruptible and non-corruptible bureaucrats respectively.

A3.1.4 Public Service Procurement

Public services can be of high or low quality. Government is interested in high quality public services which are financed by tax collection from firms. Government as such hires procurement officers with instructions to procure high quality public services. Following Okumu (2014), we assume that the government however does not have full information about the prices of high quality public services since the cost of a high quality public service is a random variable costing 1 unit of output with probability q and $\phi > 1$ units of output with probability $1 - q$. As such corruptible bureaucrats exploit the government's lack of full information about the price of high quality public services to siphon off public funds.

High quality public services yield 1 unit of productive service implying that the real value of high quality public services is 1 and $\frac{1}{\phi}$. Poor quality public services on the other hand cost $\theta < 1$ units of output with certainty while yielding $\chi < 1$ units of productive service. We assume that the real value of a poor quality public service, $\frac{\chi}{\phi}$ is less than that of a high cost and high quality public service $\frac{1}{\phi}$.

A non-corruptible procurement officer will procure $\frac{g}{NG}$ quantity of public services at a cost $[q + (1 - q)\phi]\frac{g}{NG}$. A non-corruptible procurement officer as such delivers $(1 - \mu)\frac{g}{NG}$ quantity of productive services. Assuming a probability s and $1 - s$ of detection and avoiding detection, respectively, an undetected corruptible procurement officer will deliver $\frac{g}{NG}$ quantity of public services at a cost $\phi\frac{g}{NG}$. This implies that an undetected corruptible procurement officer nets an extra income amounting $(\phi - \theta)\frac{g}{NG}$ while at same time delivering $\chi\mu[1 - s]\frac{g}{NG}$ quantity of productive services. A detected corruptible officer loses his wage and the government is able to redeem $\frac{g}{NG}$ quantity of public services at a cost $[q + (1 - q)\phi]\frac{g}{NG}$. The corresponding quantity of productive services is $(s\mu)\frac{g}{NG}$.

The aggregate quality of productive services with corruption is $1 - \mu + \chi\mu[1 - s] + s\mu]g = \tilde{G} < G$, implying that the aggregate quality of public services given corruption is less than the aggregate quality of public services in the absence of corruption. As a result of poor quality public services factor productivity is compromised such that $r > \tilde{r} = \alpha AK^{\alpha-1}L^{1-\alpha}\tilde{G}$ and $w > \tilde{w} = (1 - \alpha)AK^{\alpha-1}L^{-\alpha}\tilde{G}$.

A3.1.5 Incentive to Engage in Corruption Among Procurement Officers

Without corruption, a procurement officer earns w with certainty. With corruption however, his expected income is $[\phi - \theta]\frac{g}{NG} + w](1 - s)$. Therefore, a corruptible procurement officer will engage in corruption if and only if $[\phi - \theta]\frac{g}{NG} + w](1 - s) > w$. That is,

$$\frac{(1 - s)}{s} [\phi - \theta]\frac{g}{NG} > w \quad (3.3)$$

A corruptible procurement officer will engage in corruption if and only if his expected income from embezzlement is strictly greater than his wage.

A3.1.6 Tax Evasion

Firm owners observe the quality of business environment and decide whether to fulfil their tax obligation or engage in tax evasion. When the business environment is good (that is when quality of public services is high) a firm owner fulfils their tax obligation. As such the payoff to the government is a tax collection, t , while that of the firm owner is the gross profit less of taxes, that is $\pi - t$. When the business environment is compromised, a firm owner will decide whether to evade tax or not. Where the business owner chooses to evade tax payment, he will have to pay a bribe, β to the tax official. The tax evader avoids being detected with a probability $1 - \rho$ otherwise he will be detected with a probability ρ . When the tax evader avoids detection, his payoff is $\pi - \beta$; while that of the government is $t = 0$. When the tax evader is detected however, he incurs a penalty v_i besides being forced to fulfil his tax obligation. As such upon detection, the tax evader's payoff is $\pi - t - \beta - v_i$ while that of the government is t .

A firm owner will engage in tax evasion if and only if his expected net profit upon evading tax is greater than the expected net profit if he fulfils his tax obligation that is, $\pi - t - \beta - v_i > \pi - t$. Therefore, a firm owner will engage in tax evasion if and only if the expected tax saving upon evading tax is greater the cost of being caught when evading tax that is,

$$\frac{t(1 - \rho) - \beta}{\rho} > v_i \quad (3.4)$$

A3.1.7 Tax Official Bribe Determination

We assume that corruptible tax collectors engage in a Nash bargaining process with firm owners to determine the amount of bribe payable. The agreement payoff to a corruptible tax collector is β bribe income while his disagreement payoff is 0 bribe income given his bargaining power λ . On the contrary, the agreement payoff to a tax evader is $\pi - \beta$ while his disagreement payoff is a fixed proportion of the profit in the current location, that is $\delta\pi$ less the fixed cost of relocation, κ given his bargaining power $1 - \lambda$.

$$\max_{\beta} \lambda \log \beta + (1 - \lambda) \log [(\pi - \beta) - (\delta\pi - \kappa)] \quad (3.5)$$

The Nash bargaining maximisation problem implies that the optimal bribe $\beta = \lambda[(1 - \delta) + \frac{\kappa}{\pi}]\pi$. Taking the term $\lambda[(1 - \delta) + \frac{\kappa}{\pi}] \equiv \theta(\pi)$ as the effective bargaining power of the tax official, the bribe payable is given by $\beta = \theta(\pi)\pi$. The bribe payable is a fraction $\theta(\pi)$ of a firm's profit. Upon defining the bribe payable, an entrepreneur will engage in tax evasion if and only if,

$$\frac{t(1 - \rho) - \theta(\pi)\pi}{\rho} > v_i \quad (3.6)$$

There is, therefore, a threshold penalty level, m_* above which engaging in tax evasion is costly and below which engaging in tax evasion is worthwhile, that is

$$\frac{t(1 - \rho) - \theta(\pi)\pi}{\rho} > v^* \quad (3.7)$$

Assuming that v_i is uniformly distributed between 0 and v , therefore the fraction of tax evaders is given by $\psi = \frac{v}{v^*}$. In principle, $\psi(t, \pi)$ gives us the fraction of firms that engage in tax evasion, while $1 - \psi = \frac{v^* - v}{v^*}$ defines the fraction of firms that fulfil their tax obligation irrespective of the quality of public services. Note that the threshold penalty level of engaging in tax evasion is increasing (decreasing) in the

tax rate (the profitability of the firm). This implies that the higher is the tax rate the higher is the fraction of firm owners whose individual specific penalty cost level falls below the threshold cost level to engage in tax evasion. Implying that the higher is the tax rate, the higher is the fraction of firm owners that prefer to engage in tax evasion. On the contrary, the higher is the profitability of a firm, the lower will be the threshold cost level to engage in tax evasion. Implying that the higher is the profitability of a firm, the lower will be its incentive to engage in tax evasion.

Assuming that the probability of avoiding detection by a corruptible tax official is $1 - s$, while the probability of being detected is s therefore, the expected income of a tax corruptible official is $(1 - s)[\beta + \tilde{w}]$. While the income of a non-corruptible tax official is $\tilde{w}$. Therefore, a tax official will engage in corruption if and only if $(1 - s)[\beta + \tilde{w}] > \tilde{w}$. Thus the tax official will engage in corruption if his expected bribe income is greater than his wage without corruption that is,

$$\frac{\beta(1 - s)}{s} > \tilde{w} \quad (3.8)$$

In conclusion, their analytical framework implies that: (i) the lower is the quality of public services the more likely that firms prefer to engage in tax evasion; (ii) the more profitable (bigger) a firm is, the less likely it will engage in tax evasion and thus informal entrepreneurship; (iii) the higher is the bribe (corruption) the higher is the likelihood that a firm would engage in tax evasion; 4) tax evasion decreases in the probability detection.

CHAPTER FIVE

PAPER III

Firm Productivity in sub-Saharan Africa:

How relevant is Quality of Tax Administration?

Abstract

This paper sought to find out the effect of the quality of tax administration on firm productivity in sub-Saharan Africa (SSA). By using the World Bank Enterprise Survey (WBES) data for 6,718 firms across 40 countries in SSA, the study revealed that productivity of firms reduces by 0.140 when quality of tax administration is poor. With positive and significant interaction term coefficient of 0.224 between small firms and quality of tax administration, the findings also revealed that small firms do benefit in the presence of poor quality of tax administration than larger firms. The reason is that new and small firms operating informally (in most cases) are able to under-report and evade taxes. The results were robust even after controlling for unobserved country and industry heterogeneity; capital, technology, business environment, infrastructure and firm characteristics including the age, size, experience of managers, and ownership among others. The policy implication suggests reforms and improvement in tax administration so as to reduce compliance burden (administrative and financial).

5.1 Introduction

Although the productivity of an economy influences its ability to maintain a high income level, it is also a key determinant with respect to the rates of return on investment in the economy and to a large extent on revenue generation of government. This, in the end affects the economy's growth potential. Therefore, boosting the growth in productivity must remain as one major priority for all countries if high growth rates are to be sustained (see Dabla-Norris et al., 2013).

This paper seeks to assess the effect of quality of tax administration on firm's productivity in sub-Saharan Africa. This is because a heavy burden to adhere with tax obligations usually results in corruption, tax evasion, lower firm entry and less investment (see Dabla-Norris et al., 2008; Braunerhjelm and Eklund, 2014; Djankov et al., 2010). Moreover, poor tax administration increases the compliance cost (administrative and financial burden), which significantly adds to the tax burden faced by firms (see Dabla-Norris et al., 2017) and thus can impact negatively on firm's productivity. For instance, poor tax administration in the form of high compliance cost can result in firms choosing to be informal (see Woodruff, 2013; Levy, 2008; and De Soto, 1989). This informality prevents firms from getting access to credit; opportunities to engage with larger firms and gaining improved access to training and support programmes, which inhibits their productivity growth (see Joshi et al., 2014).

From the government revenue generation perspective, if tax administration is harmful to firms' operations, then it is also harmful to government revenue generation in three ways. First, the ability to pay tax is dependent on the firms'

growth. Given that firms pay corporate tax as percentage of their profit, it means if tax administration reduces growth and profit of firms, then government revenue will also fall. Second, consumption tax (example VAT) will fall owing to the fact that output by firms have reduced as a result of harmful tax administration. Finally, income tax by workers will also fall as a result of lower wages/salaries, which emanate from lower output and profit of the firm. Thus knowing how tax administration affect firm productivity will serve as a basis to reform tax system to reduce administrative burden.

Studies (see Ayyagari et al., 2011; Haltiwanger et al., 2010; Neumark et al., 2009) indicate that small firms do not only generate the most new jobs across country income groups but also have the highest employment and sales growth. Given that there are many small to medium scale firms dominating in SSA, this study goes a step further to investigate whether the effect of quality of tax administration on firm productivity varies with respect to firms of different ages and sizes.

In industrial organisation, productivity levels have been linked to factors such as market structure, technology and demand. See for instance, the effect of competition (Syverson 2004a and Schmitz, 2005), the size of sunk cost (Collard-Wexler 2010) and the integration of product market rivalry and technology spill-overs (Bloom et al., 2007). The role of government policies on firm's productivity has however received a lot of attention in the literature recently (see Bourles et al., 2013; Barone and Cingano, 2012; Griffith and Simpson, 1998). Notwithstanding the difficulties associated with the assessment of government policies on firms' performance, a growing agreement exist that reforms at both micro and macro levels can result in

improving resource allocation, productivity and growth. For instance, improving the quality and quantity in terms of infrastructure, appropriate tax and expenditure policies among others have been variously identified to surge growth in productivity (Dabla-Norris et al., 2013).

Policies relating to the quality of tax administration although are seen to have a major impact on firm performance (see for instance Dabla-Norris et al., 2017; Kleven, 2016; Aterido and Hallward-Driemeier, 2010), yet research in this stance is very grey especially in the sub-Saharan Africa region. There is virtually no study (to the best of my knowledge after review of literature) that investigates empirically the effect of quality of tax administration on firms' productivity in sub-Saharan Africa. This underscores the importance of this paper, since the findings emanating can serve as a basis for reforms in tax administration in SSA.

By using the WBES data for over 6,718 firms in 40 countries in SSA, the study revealed that productivity of firms reduces by 0.140 when quality of tax administration is poor. With a positive and significant interaction term coefficient of 0.224 between small firms and quality of tax administration, the findings also revealed that small firms do benefit in the presence of poor quality of tax administration than larger firms. The reason is that new and small firms operating informally (in most cases) are able to under-report and evade taxes. The results were robust even after controlling for unobserved country and industry heterogeneity; capital, technology, business environment, infrastructure and firm characteristics including the age, size, experience of managers, and ownership among others.

The rest of the paper is structured as follows. Section 5.2 presents brief stylised fact on tax administration and firm productivity in SSA. Section 5.3 provides theoretical and empirical literature for the study. Issues relating to data, model specification and estimation strategy are covered in section 5.4. The empirical results are presented and analysed in section 5.5. Section 5.6 concludes the paper.

5.2 Brief Stylised Facts on Tax Administration and Firm Productivity in SSA

One area of tax administration that affects firms is the *time to prepare and pay taxes*, which is reported by the Doing Business database. It measures the time, in hours per year it takes to prepare, file, and pay (or withhold) three major types of taxes: the corporate income tax, the value added or sales tax, and labour taxes, including payroll taxes and social security contributions. In SSA, the figure stood at 343.47 in 2005. This reduced further reaching 315.64 in 2010. It then increased to 318.21 in 2011 and has been falling thereafter reaching a figure of 304.23 as at the end of 2016. Though this is an improvement, it is noted that it is still higher compared to the world's average of 250.9.

Figure 5.1 shows the relationship between tax time and firm productivity in SSA. The linear trend line indicates a negative relationship. This means that increase in *time to prepare and pay taxes* is associated with lower firm productivity. This buttresses the argument that much time spent in preparing and paying taxes is associated with high compliance cost and to diversion of resource from productive activities. This in the end affects the productivity of firms.

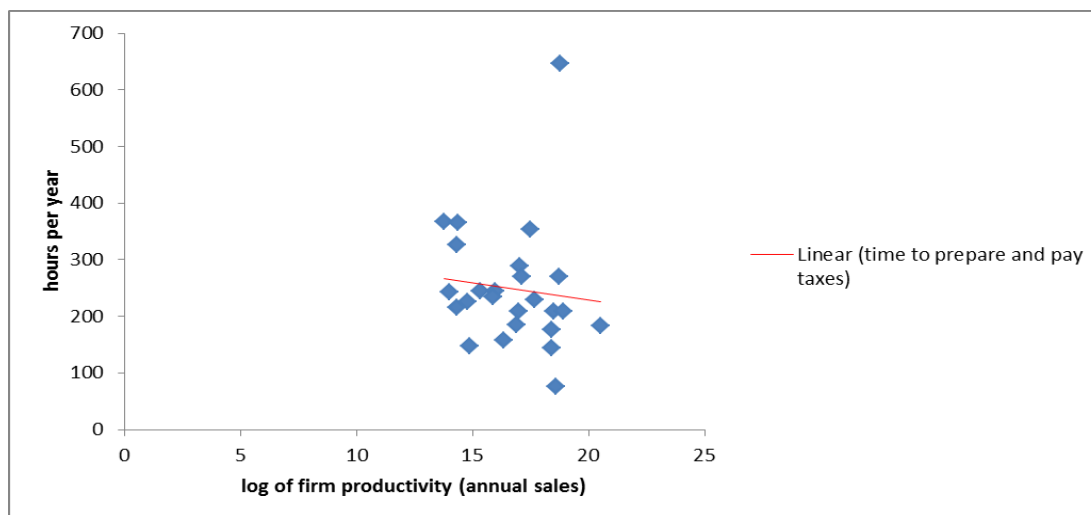


Figure 5. 1 Relationship between tax time and firm productivity in SSA

In terms of countries within SSA, Djibouti, Rwanda, Botswana, Mauritius as well as Zambia has the best tax administration with respect to time taken to prepare and pay taxes with values corresponding to 76, 144.4, 147, 158 and 183.4 respectively. Countries with worse tax administration with respect to time taken to prepare and pay taxes include Cameroon (646), Gambia(367.7) and Lesotho (365.5) as shown in Figure 5.2. It is noted that generally, countries with best tax administration with respect to time taken to prepare and pay taxes are associated with higher productivity. For instance Zambia, Djibouti and Rwanda are among countries with high productivity whilst Gambia and Lesotho are among countries with low productivity.

Related to administrative burden (measured by the time to prepare and pay tax) is the financial burden of tax system. Financial burden can be seen in the area of corporate tax paid by firms. Figure 5.3 illustrate the corporate tax rate across section of countries in SSA. As far as individual countries are concerned, Mauritius has the lowest corporate tax rate of 15%. Botswana was the next country with low corporate

tax rate of 22%. Countries such as Cape Verde, Cote D'Ivoire, Ghana, Guinea-Bissau, Lesotho and Zimbabwe all have a corporate tax rate of 25%. Countries with high corporate tax rate include Zambia (35%), Eritrea (34%), Cameroon (33%) and Namibia (32%).

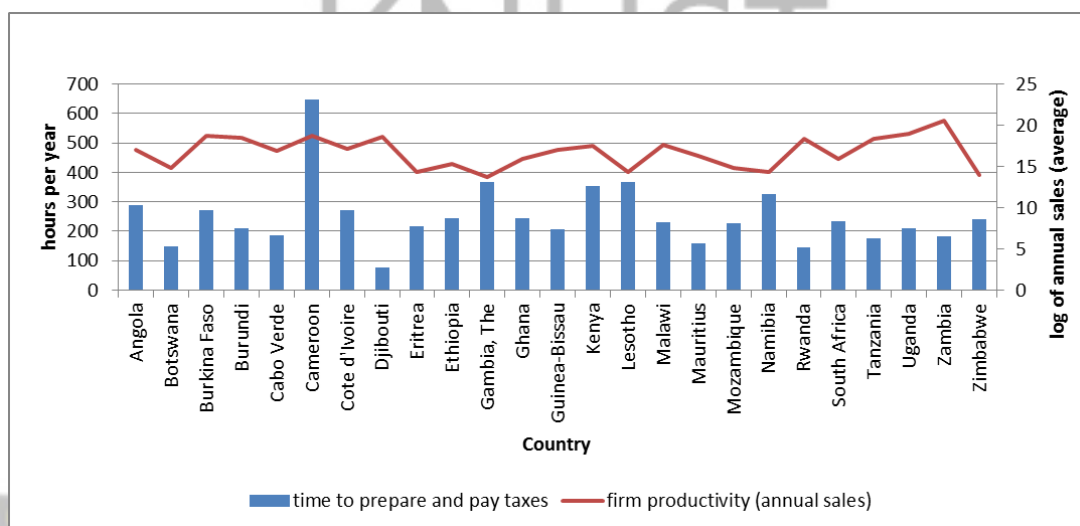


Figure 5. 2 Tax time and firm productivity in SSA

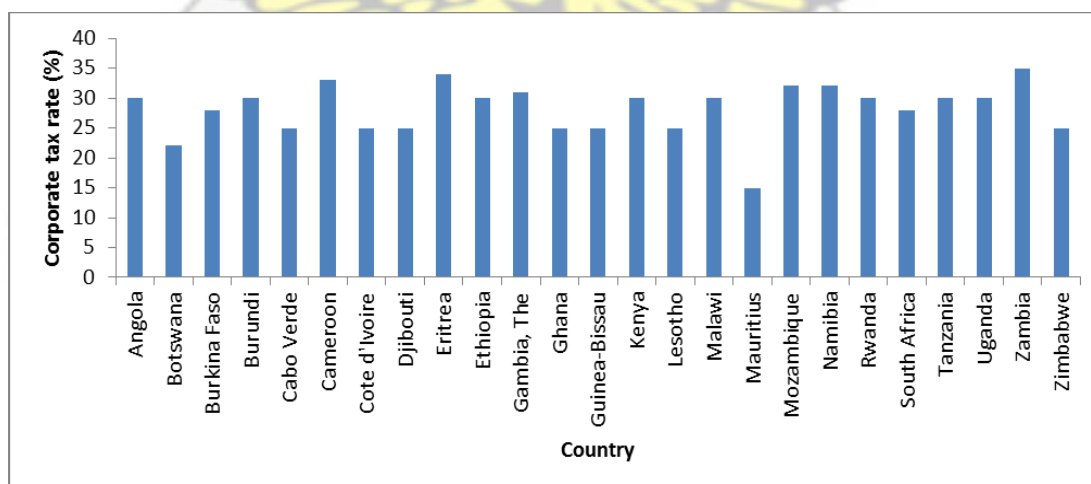


Figure 5. 3 Corporate tax rate across countries in SSA

5.3 Review of Related Literature

The primary function of a tax administration is to scrutinize compliance and also to enforce sanctions to offenders as provided in the rules and regulations (Bird, 2004). The major problem that firms face with poor tax administration is seen in terms of compliance cost. Compliance costs cover a wide spectrum of both monetary and non-monetary costs. They include, but are not limited to, the costs of: acquiring the necessary knowledge on relevant aspects of the tax system; compiling records; acquiring and maintaining tax accounting systems and completing tax return forms; evaluating the tax effectiveness of alternative transactions or alternative methods of complying with the requirements of the law; and collecting and remitting taxes levied on employees and turnover (Oliver and Bartley, 2005).

The tax compliance burden on firms tends to be higher the more time is required to understand how to comply, and or if the mechanics of fulfilling obligations is onerous (Dabla-Noris et al., 2017). Braunerhjelm and Eklund (2014) confirm this by noting that compliance with tax codes and tax policies is associated with costs in addition to the pure financial cost of the tax, which may also stifle entrepreneurship. This is because as tax codes differ in their complexity, the time that is required to comply with such taxes also differs. In the end, higher tax compliance burden as a result of poor tax administration diverts resources from productive activities and increases input costs without creating additional output and hence affecting firm productivity. Oliver and Bartley (2005) illustrated how compliance cost affects output by considering an economy that produces two goods - public and private. They show that if a tax system is associated with excessive levels of compliance costs, the economy will not be performing on its production possibility curve.

However, reducing the level of compliance costs would allow society to move to a higher level of production and utility.

It can thus be argued that quality tax administration has the potential to reduce compliance cost faced by firms, which could lead to productivity gains. Dabla-Norris et al., (2017) estimated the effects of tax compliance burden on firm performance by constructing an index of tax administration quality and found that stronger and quality tax administration can exert a positive effect on the productivity of small and young firms. They argue that these effects are significant in an economic sense as they may offset a sizeable share of the productivity disadvantage of small and young firms relative to larger and older firms. Braunerhjelm and Eklund (2014) on their part argued that the burden imposed by tax codes and tax compliance constitutes a barrier to entry and growth. Employing data to cover 118 countries over a period of six years, they found that the entry rate is significantly reduced by the tax administrative burden and that this effect is unrelated to general taxes on corporate profits and its robust to the inclusion of several important control variables.

In another sense, poor tax administration is argued to be linked to the compliance level and hence could raise the degree of tax evasion (Erard and Ho, 2003). Being outside the regulatory and tax umbrella means that these firms not only become less productive than their competitors in the formal sector, but it also means that they are locked out of markets for finance, technology, and other resources that would enable them to improve on their productivity (see Palmade and Anayiotos, 2005). In a related way, Gaspar and Jaramillo (2017), show that a stronger tax administration reduces the prevalence of cheats. They argue that by getting rid of the implicit

subsidy, the less productive “cheats”, unable to compete, will go out of business. This makes room for productive, tax-compliant firms to gain market share and absorb greater amounts of labour and capital, raising aggregate productivity. Also their results show that in emerging market and low income developing countries, closing the productivity gap between tax compliant firms and cheats would add ½ to 1 percentage points to aggregate productivity.

In terms of firm productivity and growth, Lacovone et al., (2014) found that African firms, at any age level, tend to be systematically smaller than firms in other regions of the world. In looking at the impact of business environment measures as well as certain types of firm characteristics including access to as finance, infrastructure, legal rights, availability of skilled labour, access to land, foreign ownership and/or export status, they came to the conclusion these variables do have some explanatory power but cannot fully explain the slower growth of employment in African firms. In a related study, Harrison et al., (2014) used a firm-level data to examine formal firm performance. They found that when controlled for geography, political competition and the business environment, formal African firms lead in productivity levels and growth. They highlighted that Africa’s disadvantages arise from its weak business environment, including the lack of infrastructure, access to finance and political competition.

Moreover, Fisman and Svensson (2007) studied the relationship between bribery payments, taxes and firm growth of Ugandan firms over the period 1995-97 and found that both the rate of taxation and bribery are negatively correlated with firm growth. On the part of Reinikka and Svensson (2002), they identified that poor

public capital, proxied by unreliable and inadequate electric power supply, significantly reduces investment in productive capacity by firms. Bartelsman and Doms (2000) also explored the dispersion of productivity across firms and establishments, the persistence of productivity differentials, the consequences of entry and exit, and the contribution of resource reallocation across firms to aggregate productivity growth. Their findings revealed important factors correlated with productivity growth, such as managerial ability, technology use, human capital, and regulation.

It can be concluded from the empirical literature that not many studies have focused specifically on the role of quality tax administration on firm productivity especially in sub-Saharan Africa and that justifies the importance of this paper.

5.4 Empirical Strategy and Data

5.4.1 Model Specification

Following studies on firm-level performance such as Dollar et al., (2002) and Griliches and Mairesse (1984), the first equation for estimating the effect of quality of tax administration on firms' productivity is given in equation 5.1

$$P_{ijkl} = \beta + \phi tadm_{ijkl} + \delta X_{ijkl} + \varepsilon_{ijkl} \quad (5.1)$$

where i, j, k, l denotes firm, industry, country and year respectively. P is a measure of firm productivity (proxied by labour productivity and annual sales, both in logs). $tadm$ is the measure of quality of tax administration. X is a vector of labour and capital input while ε is the error term.

However, there are other factors that affect firm productivity according to theory. Thus in order not to suffer from misspecification, equation 5.1 is augmented to include factors such as infrastructure, technology, business freedom, as well as certain firm characteristics such as age of the firm, managers' experience.

Infrastructure affects firms cost of production. When faced with poor provision of public infrastructure, firms significantly reduce investments in productive capacity and instead invest in less productive capital as a coping mechanism (see Reinikka and Svensson, 2002). Through process improvement, developing worker skills and product development, technology tends to increase productivity in business operations. Technologies like email make communication about business operations considerably faster and easier, increasing the overall productivity of workers (see for instance Thatcher and Oliver, 2001). Business freedom, which reflects individual (firms) right to establish and run an enterprise without interference from the State affect productivity. In an environment in which individuals and companies are free to choose where and how to invest, capital will flow to its best use: to the sectors and activities where it is most needed and the returns are greatest. Investment climate has implications on firm level productivity (see Dabla-Norris et al., 2008; Ingram et al., 2007; Dollar et al., 2002).

Thus the first estimable equation for estimating the effect of quality of tax administration on firms' productivity is finally given in equation 5.2

$$P_{ijkl} = \beta + \phi tadm_{ijkl} + \delta X_{ijkl} + \varphi_j + \omega_k + \gamma_l + \varepsilon_{ijkl} \quad (5.2)$$

where X is now augmented to include set of control variables such as labour (number of employees), capital, infrastructure, technology, business freedom as well as firm

characteristics (age, experience of top managers and foreign owners). φ_j , ω_k and γ_l represent industry, country and year fixed effect respectively while ε is the error term. It is noted that the main parameter of interest is $\emptyset$, which measures the impact of tax administration on firm productivity. All regression results are based on Huber-White robust standard errors.

Second, in finding how quality of tax administration affect the productivity of small versus large and young verses old firms, equation 5.3 is estimated following Dabla-Norris et al., 2017.

$$P_{ijkl} = \beta + \emptyset tadm_{ijkl} + \gamma_0 SMALL_{ijkl} + \emptyset_0 YOUNG_{ijkl} + \gamma_1 (SMALL_{ijkl} * tadm_{ijkl}) + \gamma_2 (YOUNG_{ijkl} * tadm_{ijkl}) + \delta X_{ijkl} + \varphi_j + \omega_k + \gamma_l + \varepsilon_{ijk} \quad (5.3)$$

where SMALL and YOUNG are dummy variables that represent firm size (“1” if the firm has less than 20 employees) and firm age (“1” if firm is less than 10 years) respectively. The parameters of interest here are γ_1 and γ_2 , which reflects the impact of quality of tax administration on small and young firms respectively. All other notations have same meaning to that specified in equation 5.2

5.4.2 Identification and Estimation Strategy

Two main issues that may arise in estimating the models in equation (5.2) and (5.3) are those of heteroskedasticity and endogeneity with the variable of interest (tax administration quality). Heteroskedasticity poses a challenge because the data is of cross-country type coupled with different industry types and data gathered at different years. Endogeneity may result in the inability to assess the true causal impact of the explanatory variable (tax administration quality) on the dependent

variable. This notwithstanding, the model specification in equations (5.2) and (5.3) by design, control for all country-level and time-invariant covariates. Again results are estimated using Huber-White robust standard errors while controlling for country, industry and time effect. As a result, it is unlikely to suffer from heteroskedasticity. Moreover, the results to be estimated are unlikely to be affected by endogeneity as tax administration policies are planned by government and are seen as exogenous to the individual firm. From the foregoing, the paper adopts the ordinary least square method of estimation because results generated will be unbiased and consistent.

5.4.3 Data and Descriptive Statistics

The main data source is the survey of over 6,718 firms in 40 countries in sub-Saharan Africa conducted by the World Bank between 2006 and 2015 (World Bank Enterprise Survey, WBES). Countries covered for this study is shown in the Table 5A1 in the appendix. It must be noted that the survey is designed to be a representative of the non-agricultural private economy at the firm level and contains a mixture of manufacturing and service firms, small and large firms as well as young and old firms.

The survey provides information on a wide range of firm characteristics and firm performance measures including tax administration. For instance firms were asked on a scale 0 – 4 on how severe tax administration is an obstacle to their operations: *no obstacle* (0), *minor obstacle* (1), *moderate obstacle* (2), *major obstacle* (3), and *severe obstacle* (4). This is used as measure of the quality of tax administration. However, almost every firm will concede to some form of obstacle with respect to

tax administration because given the chance, they will not pay tax. On that score, the emphasis is on how severe tax administration poses as a major obstacle to firm operation. In this paper, poor tax administration is defined as whether the tax system poses major or severe constraint to firms' operations. Thus the tax administration responses are recoded as dummy "1" (if response is *major* and *severe* obstacle) and "0" (if otherwise).

Furthermore, the survey has information on sales made by firms. This is used as a proxy for firm productivity since there is no direct information on actual productivity. The justification is that, given prices, higher sales mean higher output and productivity. That is if there are rigidities in prices, then growth in sales could mean growth in output. Thus in fact, this proxy is more of revenue productivity. The other proxy used for productivity is labour productivity. This and other variables in the WBES data are complemented with country-level data (business freedom data from Heritage Foundation). Formal definition of variables used is provided in Table 5A2 of the appendix.

About 60% of the firms are small with about 20% being young. Nearly 18% of the firms are private foreign owned. Business freedom has a mean value of 53.9 with a minimum of about 18 and a maximum of about 79 (the higher the value, the better the business freedom). A mean value of 0.680 indicates that about 70% of firms see tax administration as a challenge on their operations. The rest of the descriptive statistics is shown in Table 5A3 of the appendix. Correlation results are also displayed in Table 5A4 of the appendix. It can be seen in that table that there is no high correlation among the variables. Except for annual sales and labour

productivity, which has a very high correlation coefficient of about 91%, the correlation among the variables varies from 0.01 to 0.48. It must be noted that annual sales and labour productivity are used separately as dependent variables.

5.5 Results and Discussions

5.5.1 Effect of Quality of Tax Administration on Firm Productivity

Column 1 of Table 5.1 presents result using annual sales as proxy for firms' productivity. Column 2 presents results using labour productivity as proxy for firms' productivity. Result in column 1 reveals a negative and significant relationship between poor quality of tax administration (Tadm) and firm productivity in SSA. That is firms' productivity reduces by 0.140 when quality of tax administration is poor. This confirm the position that, a heavy burden to adhere with tax is associated with corruption, tax evasion, lower firm entry and less investment (see Dabla-Noris et al., 2008; Braunerhjelm and Eklund, 2014; Djankov et al., 2010). That is to say that poor tax administration increases the compliance cost, which can add significantly to the tax burden (administrative and financial) firms face (see Dabla-Noris et al, 2017) and thus impact negatively on firm's productivity. Administrative burden diverts resources (time and workers) from productive activities to complying with tax system. This increases input costs without creating additional output and hence affecting firm productivity. Financial burden makes it difficult for firms to employ more factors of production to expand as a result of higher corporate taxes.

The coefficients of firm size (employment) and age in column 1 of Table 5.1 are 1.023 and 0.160 respectively. They are both statistically significant implying that growth in employment and age by a unit are associated with increased productivity

of firms in SSA by 1.023 and 0.160 respectively. In other words, bigger and older firms tend to be more productive than smaller and younger ones. This somehow confirms the theory on the positive relationship between productivity and firm size, which may arise as a result of sunk costs or learning (see for instance Asplund and Nocke, 2006; Melitz 2003). The positive relationship between firm size and productivity may also be due to economies of scale as well as specialisation, which a firm enjoys as it expands in its operation.

Table 5. 1 Regression Results for Quality of Tax Administration on Productivity

Dependent variable:	Annual sales[1]/ Labour productivity[2]	
	[1]	[2]
Tadm	-0.140*** (0.045)	-0.150*** (0.044)
Lncapital	0.063*** (0.005)	0.061*** (0.004)
Lnemployee	1.023*** (0.023)	0.151*** (0.018)
Lnage	0.160*** (0.050)	0.169*** (0.049)
Technology	0.472*** (0.062)	0.486*** (0.060)
Lnbusfreedom	0.121*** (0.009)	0.121*** (0.009)
Lninfrastructure	-0.057* (0.031)	-0.056* (0.031)
Dprivate	0.457*** (0.065)	0.447*** (0.064)
Lnexperience	-0.005 (0.030)	-0.008 (0.030)
Industry	Yes	Yes
Country	Yes	Yes
Year	Yes	Yes
R ²	0.689	0.593
Observations	6,718	6,718
Number of countries	40	40
Prob(F-Statistic)	0.000	0.000

Standard errors in parenthesis. All regressions include a constant term (not shown). Significance level is denoted by ***(1%), **(5%) and *(10%). All standard errors are Huber-White robust. Sample sizes changes due to missing observations

Capital is also evidenced to play a positive and significant impact on productivity. A unit increase in capital increases productivity by 0.063 as shown in column 1 of Table 5.1. This finding conforms to theory, in that an increase in capital in the form of machinery and building increases capital per labour ratio and thus improves efficiency. Technology, which is proxied by whether a firm uses website to promote sales and products, reveals positive and significant impact on productivity. That is productivity increases by 0.472 given that a firm uses website. Technologies like email make communication about business operations considerably faster and easier, increasing the overall productivity of workers (see for instance Thatcher and Oliver, 2001).

Business freedom, which reflects individual (firms) right to establish and run an enterprise without interference from the State, is positive and significant. That is an improvement in business freedom by a unit improves productivity by 0.121 as shown in column 1 of Table 5.1. This signifies the importance of an enabling environment on firms' productivity. In an environment in which individuals and companies are free to choose where and how to invest, capital will flow to its best use: to the sectors and activities where it is most needed and the returns are greatest. Investment climate has implications on firm level productivity (see Dabla-Norris et al., 2008; Ingram et al., 2007; Dollar et al., 2002).

Also, infrastructure, which is proxied by electricity outages (number of days in a typical month without electricity) has negative and significant effect on firms' productivity. That is a unit increase in electricity outage reduces productivity by 0.057. This result confirms the study of Reinikka and Svensson (2002), who

provided early insights into the implications of inadequately supplied public goods (such as electricity), which is an integral part of the business environment in which firms operate. They show that, when faced with poor provision of public capital, firms significantly reduce investments in productive capacity and instead invest in less productive capital as a coping mechanism.

As far as firm characteristics are concerned, results in column 1 of Table 5.1 show that a dummy variable for foreign owned firms has a positive and significant impact. That is productivity improves by 0.457 if a firm is foreign owned. This implies that foreign owned firms tend to be more productive than domestic owned firms. Also there is a negative and insignificant relationship between experience of managers and productivity.

Column 2 of Table 5.1 displays the results using labour productivity as a measure of firms' productivity. It is noted that the results are not statistically different from the case of using annual sales as a measure of firms' productivity. It is evident that poor quality of tax administration quality reduces productivity of firms. That is, firm productivity reduces by 0.150 given a poor quality of tax administration. Again, results in column 2 shows that larger and older firms tend to be more productive than smaller and younger firms. That is, a unit increase in the size and age of firm have a positive (0.151 and 0.163 respectively) and significant increase on productivity, which may be attributed to gains from specialisation and economies of scale. Capital has a positive and significant impact on productivity. A unit increase in capital increases productivity by 0.061. For technology, an indication of the use of website increases productivity by 0.486 while a unit improvement in business freedom

increases productivity by 0.121. Infrastructure (electricity outage) also has negative and significant impact on productivity. That is a unit increase in outage decreases productivity by 0.056. With respect to firm characteristics, result indicates that foreign owned firms tend to be more productive with a positive and significant coefficient of 0.447. Finally, experience of managers did not have significant impact on productivity just as the case when annual sales were used. Thus the result indicating a negative effect of poor quality of tax administration on firms' productivity can be said to be robust.

5.5.2 Interaction between Firm Size, Firm Age and Tax Administration

To test whether effect of poor quality of tax administration on firm productivity is different for *small* and *large* firms, an interaction term is introduced. A dummy of 1 indicate *small* firm and a dummy of 0 indicate *large* firm. From result presented in column 1 of Table 5.2, the coefficient of the interaction term between poor quality of tax administration and *small* firm is positive (0.224) and significant. Thus the total effect of poor quality of tax administration on firm productivity is $-0.244 + 0.224SMALL$. Given that $SMALL = 0$, which means that a firm is *large*, the effect of poor quality of tax administration on firm productivity is $-0.244 + 0.224(0) = -0.244$. However, given that $SMALL = 1$, which means that a firm is *small*, the effect of poor quality of tax administration on firm productivity is $-0.244 + 0.224(1) = -0.02$. This means that even though poor tax administration affects firms' productivity in general, the negative impact on large firms is bigger than the negative impact on smaller firms. In other words, smaller firms benefit in the presence of poor tax administration than larger firms in SSA. It may well be the case that in the presence of poor tax administration, smaller firms are able to easily remain

informal and thus are able to avoid tax obligations (which may offset some of the effects) than bigger firms since most of the attention are on the few larger firms. This result means that firms are not incentivised to operate on large scale. This may account for the many small informal firms in SSA as well as the difficulty faced by authorities in trying to formalise informal firms in SSA. On the other hand, larger firms suffer the most in the sense that, they might have acquired social capital and goodwill, which might in turn induce additional restrictions that lead to their inability to resort to other means (for instance, evading taxes by remaining informal) of reducing some of the negative burden imposed on them by the poor quality of tax administration.

To check the robustness of this finding (that is smaller firms benefit the most in the presence of poor quality of tax administration), columns 1 and 2 of Table 5.3 shows the impact of poor quality of tax administration on small and large firms respectively and it is clearly shown that bigger firms suffer much than smaller firms. For instance, column 1 in Table 5.3 shows a 0.067 decrease in productivity given a perceived poor tax administration quality for smaller firms. However, with respect to larger firms as shown in column 2, perceived poor tax administration quality reduces productivity by 0.255.

Given that informality restrict firms' productivity and growth, an improvement in tax administration will help curb this informality and improve firm productivity. Studies such as Ayyagari et al., 2011; Haltiwange et al., 2010; Neumark, et al., 2009 indicate that small firms do not only generate the most new jobs across country income groups but also have the highest employment growth and sales growth rate. In this

case, given that most informal firms are small, and also the fact that most firms in SSA are small and medium scaled, it suggests that an improvement in tax administration quality will not only impact positive on firms' productivity but also boost employment.

Table 5. 2 Regression Results for Interaction between Firm Size, Age and Tax Administration

Dependent variable: annual sales(log)		
	Firm size [1]	Firm Age [2]
Tadm	-0.244*** (0.076)	-0.101** (0.051)
Lncapital	0.090*** (0.005)	0.090*** (0.005)
Technology	0.996*** (0.066)	0.999*** (0.066)
Lnbusfreedom	0.111*** (0.009)	0.111*** (0.009)
Lninfrastructure	-0.059* (0.035)	-0.060* (0.035)
Small	-1.897*** (0.078)	-1.744*** (0.052)
Young	-0.346*** (0.092)	-0.226*** (0.144)
Lnextperience	0.524* (0.031)	0.051* (0.031)
Dprivate	0.833*** (0.072)	0.828*** (0.072)
Small*tadm	0.224*** (0.091)	
Young*tadm		0.177 (0.171)
Industry	Yes	Yes
Country	Yes	Yes
Year	Yes	Yes
R ²	0.621	0.621
Observations	6,718	6,718
Number of countries	40	40
Prob(F-Statistic)	0.000	0.000

Standard errors in parenthesis. All regressions include a constant term (not shown). Significance level is denoted by ***(1%), **(5%) and *(10%). All standard errors are Huber-White robust.

Table 5. 3 Regression Results for Impact of Poor Tax Administration on Small and Large Firms respectively

Dependent variable: annual sales(log)		
	Small firms only [1]	Large firms only [2]
Tadm	-0.067* (0.041)	-0.255*** (0.080)
Lncapital	0.066*** (0.005)	0.116*** (0.010)
Technology	0.933*** (0.135)	0.888*** (0.079)
Lnbusfreedom	0.084*** (0.012)	0.163*** (0.017)
Lninfrastructure	-0.068 (0.047)	-0.053 (0.049)
Young	-0.303** (0.119)	-0.234 (0.147)
Lnexperience	0.036 (0.039)	0.073 (0.047)
Dprivate	0.530*** (0.130)	0.956*** (0.086)
Industry	Yes	Yes
Country	Yes	Yes
Year	Yes	Yes
R ²	0.554	0.584
Observations	3,499	3,219
Number of countries	40	40
Prob(F-Statistic)	0.000	0.000
Standard errors in parenthesis. All regressions include a constant term (not shown). Significance level is denoted by ***(1%), **(5%) and *(10%). All standard errors are Huber-White robust.		

Also, to test whether effect of poor quality of tax administration on firm productivity is different for *young* and *old* firms, an interaction term is introduced. A dummy of 1 indicate *young* firm and a dummy of 0 indicate *old* firm. From result presented in column 2 of Table 5.2, the coefficient of the interaction term between poor quality of tax administration and *young* firm is positive (0.224) but not significant. This suggest

that, with respect to the negative impact that poor quality of tax administration imposes on firm productivity in SSA, the effect on younger firms is not statistically different from the effect on older firms.

5.5.4 Robustness Check

As a measure of robustness check, the quality of tax administration was recoded in other two ways. First, it is argued that tax administration is of quality only when the response to the question is *no obstacle* (0). And so, all other responses indicating various levels of severity of tax administration are taken as poor tax administration quality. In that sense, then the dummy for tax administration quality is recoded as “1” if response is any other apart from 0 (*no obstacle*). Second, it is coded as “1” (if response is *moderate, major and severe obstacles*) and “0” (if otherwise). The results as displayed in columns 1 and 2 of Table 5.4. indicate that it is not any different from the baseline specification, except for marginal variations in the coefficients. Annual sales are being used as a proxy for firm productivity. There is a negative and significant relationship between poor tax administration and firm productivity. Technology, capital and business freedom have positive and significant impact on firm productivity. Infrastructure has negative effect whiles managerial experience still remains insignificant as in the case of the baseline specification. Moreover, firms’ size and age has a positive impact on productivity. Finally foreign owned firms are also seen to be more productive than their counterparts domestically. This indicates that the baseline results are robust.

Table 5. 4 Regression Results for Robustness Checks

Dependent variable: annual sales(log)		
	[1]	[2]
Tadm	-0.119** (0.050)	-0.150*** (0.051)
Lncapital	0.062*** (0.005)	0.062*** (0.005)
Lnemployee	1.022*** (0.022)	1.023*** (0.023)
Lnage	0.159*** (0.050)	0.160*** (0.050)
Technology	0.472*** (0.062)	0.472*** (0.062)
Lnbusfreedom	0.121*** (0.009)	0.120*** (0.009)
Lninfrastructure	-0.058* (0.031)	-0.057* (0.031)
Dprivate	0.457*** (0.065)	0.457*** (0.065)
Lnexperience	-0.004 (0.030)	-0.004 (0.030)
Industry	Yes	Yes
Country	Yes	Yes
Year	Yes	Yes
R ²	0.689	0.689
Observations	6,718	6,718
Number of countries	40	40
Prob(F-Statistic)	0.000	0.000
Standard errors in parenthesis. All regressions include a constant term (not shown). Significance level is denoted by ***(1%), **(5%) and *(10%). All standard errors are Huber-White robust.		

5.6 Conclusion and policy implications

This paper sought to find out the impact of the quality of tax administration on firm productivity in sub-Saharan Africa (SSA). By using the World Bank Enterprise Survey (WBES) data for over 6,718 firms in 40 countries in SSA, the study revealed that productivity of firms reduces by 0.140 when quality of tax administration is poor. With positive and significant interaction term coefficient of 0.224 between

small firms and quality of tax administration, the findings also revealed that small firms do benefit in the presence of poor quality of tax administration than larger firms. The reason is that new and small firms operating informally (in most cases) are able to under-report and evade taxes. The results were robust even after controlling for unobserved country and industry heterogeneity; capital, technology, business environment, infrastructure and firm characteristics including the age, size, experience of managers, and ownership among others.

As shown by the results, quality of tax administration has a major role to play as far as firms' productivity is concerned. In that regard, there should be improvement in tax administration so as to reduce compliance cost which in the end affects firms' productivity. This may be through the improvement of payment, taxpayer information, filing, post-filing processes as well as tightening the accountability and transparency on the part of the tax officials. It can be said that this move would not only improve the productivity of firms but most especially the bigger firms to expand. This may serve as a good indicator for foreign direct investment to thrive since the results highlighted a higher productivity for larger firms in the presence of good quality tax administration. Moreover, improving the quality of tax administration has the chance of reducing informality, which is more pronounced in small and medium scale firms to be able to expand their operations with its spill-over effects on improved tax revenue generation and employment growth.

As far as the control variables are concerned, governments need to continue to put measures in place to further improve the business environment since it improves

productivity. This includes infrastructure provision (particularly power generation), creating the enabling environment for telecoms to thrive, roads among others.

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Appendix

Table 5A1: List of Countries

Angola	Lesotho
Benin	Liberia
Botswana	Madagascar
Burkina Faso	Malawi
Burundi	Mali
Cameroon	Mauritania
Cape Verde	Mauritius
Central African Republic	Mozambique
Chad	Namibia
Congo, Republic	Niger
Congo, DR	Nigeria
Cote d'Ivoire	Rwanda
Djibouti	Senegal
Eritrea	Sierra Leone
Ethiopia	South Africa
Gabon	Swaziland
Gambia	Togo
Ghana	Uganda
Guinea	Zambia
Guinea Bissau	Zimbabwe
Kenya	



Table 5A2: Definition and Sources of Variables

Variable	Description and Source
lnannualsales	Log of last complete fiscal year's sales. <i>Source: ES</i>
Lnlabpro	Log of sales per employee. <i>Source: ES</i>
Tadm	Response of firms on a scale 0 – 4 on how severe tax administration is an obstacle to their operations: no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), severe obstacle (4). Recoded as dummy “1” (major and severe obstacle) and “0” (otherwise). <i>Source: ES</i>
Lncapital	Log of net-book value machinery, vehicles and equipment in last fiscal year. <i>Source: ES</i>
busfreedom	Average level of the “business freedom” score of economic freedom as measured by the Heritage Foundation's Index of Economic Freedom, where the average is taken over 2006 – 2015. <i>Source: Heritage Foundation</i>
Lninfrastructure	Log of average number of power outage per month. <i>Source: ES</i>
lnemployee	Log of total number of permanent full time employees at the firm. <i>Source: ES</i>
Lnage	Log of 2015 minus the year the firm began operations. <i>Source: ES</i>
lnexperience	Log of the number of years of manager's experience. <i>Source: ES</i>
technology	Dummy for firms using website for business related activities, i.e. sales, product promotion etc. “1” if firm uses its own website. <i>Source: ES</i>
Dprivate	Dummy (1 if firm owned by private foreign individuals, companies or organisations at the time of the survey. <i>Source: ES</i>
SMALL	Dummy (1 if firm has less than 20 employees). <i>Source: ES</i>
YOUNG	Dummy (1 if firm is less than 10 years). <i>Source: ES</i>
Industry fixed effect	Dummy variables that capture the sector within manufacturing, service, core and indicator. <i>Source: ES</i>
Country fixed effects	Dummy variables that capture the countries involved in the study. <i>Source: ES</i>

Table 5A3: Descriptive Statistics					
	Observations	Mean	Std. Deviation	Min	Max
Lnannualsales	6,718	16.921	2.949	0	34.105
Lnlabpro	6,718	14.142	2.623	4.083	29.002
Lncapital	6,718	13.041	6.212	0	30.984
Busfreedom	6,718	53.891	10.615	17.957	78.68
Lninfrastructur	6,718	2.231	0.993	0	7.601
Lnage	6,718	2.799	0.598	0	7.578
Lnemployee	6,718	2.785	1.198	0	11.067
Lnexperience	6,718	2.348	0.797	0	5.442
Technology	6,718	0.243	0.429	0	1
Dprivate	6,718	0.179	0.383	0	1
Tadm	6,718	0.680	0.467	0	1
SMALL	6,718	0.600	0.490	0	1
YOUNG	6,718	0.188	0.390	0	1

Table 5A4: Correlation between Variables											
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
[1] lnannualsales	1.00										
[2] lnlabpro	0.913	1.00									
[3] lncapital	0.404	0.284	1.00								
[4] busfreedom	-0.098	-0.150	0.489	1.00							
[5] lninfra	-0.090	-0.031	-0.083	-0.215	1.00						
[6] lnage	0.193	0.072	0.048	-0.014	-0.057	1.00					
[7] lnemployee	0.447	0.045	0.004	0.084	-0.093	0.306	1.00				
[8] lnexperience	0.131	0.054	-0.047	0.006	-0.067	0.433	0.196	1.00			
[9] technology	0.224	0.077	0.205	0.087	-0.079	0.113	0.386	0.091	1.00		
[10] dprivate	0.198	0.105	0.018	0.032	-0.073	0.061	0.259	0.034	0.330	1.00	
[11] tadm	0.049	0.050	-0.146	-0.185	0.010	0.008	0.007	0.029	0.002	0.001	1.00

CHAPTER SIX

GENERAL FINDINGS, POLICY IMPLICATIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter summarizes the entire study by giving a summary of the major findings from the three thematic areas of research. Based on the findings, policy implications and recommendations are outlined.

6.1 Findings of the Study

The first paper sought to assess the importance of non-pecuniary factors on tax compliance in Sub-Saharan Africa. The findings revealed that perceived tax knowledge limitation reduces the probability of tax compliance in SSA by 5%. Perceived non-compliance by others reduces compliance probability by 2%. Similarly, corruption of tax officials reduces the probability of being tax compliant in SSA by 2%. On the contrary, trust in tax department increase the probability of compliance by 5%, while fighting corruption improves compliance by 2%. With respect of fiscal exchange, handling of provision of health, education and road needs, tend to increase the probability of complying with tax laws and obligations in SSA by 2%, 3% and 2% respectively.

The second paper sought to assess the effect of business environment on a firms' decision to evade tax in Ghana. Employing the Tobit method of estimation on World Bank Enterprise Survey data, the results revealed that a unit deterioration of business environment increases firm's decision to evade tax by 0.961. In terms of the

individual business environment indicators, perceived corruption of tax officials increases evasion decision by 2.716. Public infrastructure (electricity outage) have a positive and significant effect on tax evasion decision with a coefficient of 0.695 while quality of legal environment had a negative effect on firms' decision to evade taxes with a coefficient of 1.246. Business constraints in the form of tax rate (1.389), access to business license (1.622) and transport (1.419) had a positive effect on firms' tax evasion decision.

The third paper sought to find out the effect of the quality of tax administration on firm productivity in sub-Saharan Africa (SSA). By using the World Bank Enterprise Survey (WBES) data for over 6,718 firms in 40 countries in SSA, the study revealed that productivity of firms reduces by 0.140 when quality of tax administration is poor. With positive and significant interaction term coefficient of 0.224 between small firms and quality of tax administration, the findings also revealed that small firms do benefit in the presence of poor quality of tax administration than larger firms.

6.2 Policy Implications and Recommendations

The negative relationship between tax knowledge limitation and tax compliance serves as a basis for the revenue collection institutions in SSA to increase awareness for taxpayers with respect to tax matters and also as an input in the designing of tax education programs to target taxpayers and potential taxpayers.

Having been revealed that corruption by tax officials discourages tax compliance, punitive action against corrupt officials can have an important deterrent effect. The

role of the media is important in publicizing the punishment of corrupt officials. The least the governments in SSA could do is to continue with the provision of basic infrastructure/needs as health, education, roads and electricity since these have been evidenced to have positive effect on tax compliance. Providing such needs give taxpayers a feel of having back the taxes paid and are willing to comply even more.

Electricity outage was found to promote tax evasion, since it increases cost of production in the sense that firms resort to alternate means of generating power for their production activities. Measures that would ensure sufficient and stable electricity must be taken seriously by the government. This would go a long way to reduce the unintended additional cost of operation on the part of firms.

The courts should be empowered so as to be able to work efficiently and impartial. Judges found to have indulged in bribery should be removed and prosecuted. Business constraints such as tax rate, transport and business license were also found to causes tax evasion. It is recommended that government continue its review of corporate taxes while also making sure that infrastructure is improved.

Finally, there should be improvement in tax administration so as to reduce compliance cost which in the end affects firms' productivity. This may be through improving of payment, taxpayer information, filing, post-filing processes as well as tightening the accountability and transparency on the part of the tax officials. It can be said that this move would not only improve the productivity of firms but most especially the bigger firms to expand. This may serve as a good indicator for foreign direct investment to thrive since the results highlighted a higher productivity for

larger firms in the presence of good quality tax administration. Moreover , improving the quality of tax administration has the chance of reducing informality, which is more pronounced in small and medium scale firms to be able to expand their operations with its spill-over effects on improved tax revenue generation and employment growth.

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