Final report

International Growth Centre

Informality and the tax gap: A case of non-farm enterprises in Ghana

Michael Danquah
Eric Osei-Assibey

August 2016

When citing this paper, please use the title and the following reference number: S-33206-GHA-1

DIRECTED BY LSE UNIVERSITY OF OXFORD

FUNDED BY UKaid from the British people

Informality and the Tax Gap: A case of Non-Farm Enterprises in Ghana

By

Michael Danquah

Department of Economics, University of Ghana

mdanquah@ug.edu.gh

&

Eric Osei-Assibey

Department of Economics, University of Ghana

oassibey@yahoo.com / eoassibey@ug.edu.gh

Table of Contents

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Broadening a country's tax base plays a vital role in domestic revenue generation which in turn influences economic growth and development. However, in Ghana greater majority of individuals and businesses within the informal sector do not pay tax. This study attempts to estimate the tax gap within the informal sector and also investigates determinants of the propensity to pay tax among non-farm informal enterprises in Ghana. Using the sixth round of the Ghana Living Standards Survey, the tax gap was estimated by computing the difference between the potential and the actual annual tax payments. A logistic regression method was used to ascertain the determinants of the propensity to pay tax whilst an Ordinary Least Square (OLS) procedure was used to estimate the factors that explain the tax gap.

The study finds that the country's informal sector has the potential to pay GH¢327,899,384.00 as taxes. However, the actual tax paid in a year per our estimation is GH¢ 100,093,092.00. Thus the estimated national tax loss is GH¢ 227, 806,292.00 per annum. Comparing the actual tax paid to the revenue generated by enterprises within the informal sector indicates that the actual tax paid represents just about 0.54% of their total revenue in a year.

The results from the econometric estimations of the study show that several firm owner and firm level characteristics influence the propensity to pay tax as well as the tax gap in the informal sector of Ghana. With regards to the firm owner's characteristics, evidence from the study shows that male firm ownership and having at least primary education qualification significantly increases the propensity to pay tax and reduces the tax gap as expected. Also in line with expectations, our estimates show that firm level variables such as firm sales, bank savings, type of business, urban location as well as experience of the firm significantly increases the propensity to pay tax and reduce the tax gap. The policy implications emanating from the study are as follows: Firstly, there is the need to intensify public education, particularly towards women micro entrepreneurs on their tax responsibilities; secondly, financial inclusion should be vigorously promoted within the informal sector by government or the Bank of Ghana to make more enterprises in this sector bankable, as a firm saving in the bank was found to correlate with its propensity to pay tax.

Key Words: Tax Gap; Tax Propensity; Determinants and Informality

1.0 INTRODUCTION

Broadening a country's tax base plays a vital role in domestic revenue generation which in turn influences economic growth and development. Taxes are the main source of public revenue and economic policies are often based on expected tax revenue. In other words, tax policy is a fundamental component of the economic policies of every country. In order to ensure sustained growth, it is desirable for every government to generate tax revenue to finance essential expenditures without recourse to excessive public sector borrowing, which often crowds out private sector investments. Considering the high tax evasions and avoidance within the informal sector of many developing countries, widening the tax net to generate more revenue without resorting to increasing tax rates (which has been found theoretically to depress growth), will be a catalyst for economic growth. This is because many developing countries like Ghana suffer from huge financing gaps/constraints that inhibit public sector investment expenditures in productive sectors of the economy like roads, energy and educational infrastructure among others.

Ghana continues to record high budget deficit partly on account of low tax revenue which is currently not more than 18 percent of GDP. While low domestic revenue mobilization has been a major concern to government and development partners because of its crippling effect on growth, there is an overarching concern that workers and enterprises within the formal sector are overly being taxed, neglecting the large untapped informal sector. The collection of taxes within the informal sector has always been a herculean task for governments despite the need to broaden the tax nets. This is due to the sheer size and the disorganized nature of the sector. The 2010 Population and Housing census estimates that over 86 percent of the Ghanaian labour force is employed within the private informal sector, which grew by more than 6 percentage points within a decade. The greater majority of these workers are engaged in nonfarm micro/small enterprises that are often not well organized or registered with any government agency. The latest Ghana Living Standard Survey (GLSS 6) estimates that approximately 3.7 million households, representing 44.3 percent of households in the country, operate non-farm enterprises. Many economists, policy commentators and government officials, the Ministry of Finance and Ghana Revenue authority, therefore, believe that the informal sector presents an enormous opportunity to broaden the tax net and increase tax revenue generation if proper policies are put in place. However, this assertion remains a conjecture or anecdotal since to date,

no empirical study has been carried out to gauge the extent of the tax gap within the informal sector and the underlying factors. In this study, we use data from the sixth round of the GLSS to estimate the extent of the tax gap within the informal sector and also investigate the determinants of the propensity to pay tax as well as the underlying factors explaining the tax gap among non-farm informal enterprises in Ghana.

The study is therefore relevant in many respects. Firstly, the findings from the study will give an indication to policy makers about the extent of tax gap within the informal sector. This will help to gauge the prospects of mobilizing tax revenue within the informal sector. Secondly, the findings of the study with respect to factors explaining tax gap in the informal sector, will help policy makers to design a more effective and appropriate policy tool to reduce the tax gap. Finally, the findings and recommendations of the study would create the necessary awareness about the nature and dynamics within the informal sector and the need to transform and gradually formalize it to the greater benefit of all stakeholders in the society.

The remainder of the study is structured as follows: In Section 2, we present an overview of taxation in Ghana. Sections 3 and 4 provide a discussion of the literature and methodology respectively. The results are presented in Section 5. Section 6 focuses on the concluding remarks whilst section 7 discusses the limitations of the study and gives recommendations for further research.

2.0 OVERVIEW OF TAXATION IN GHANA

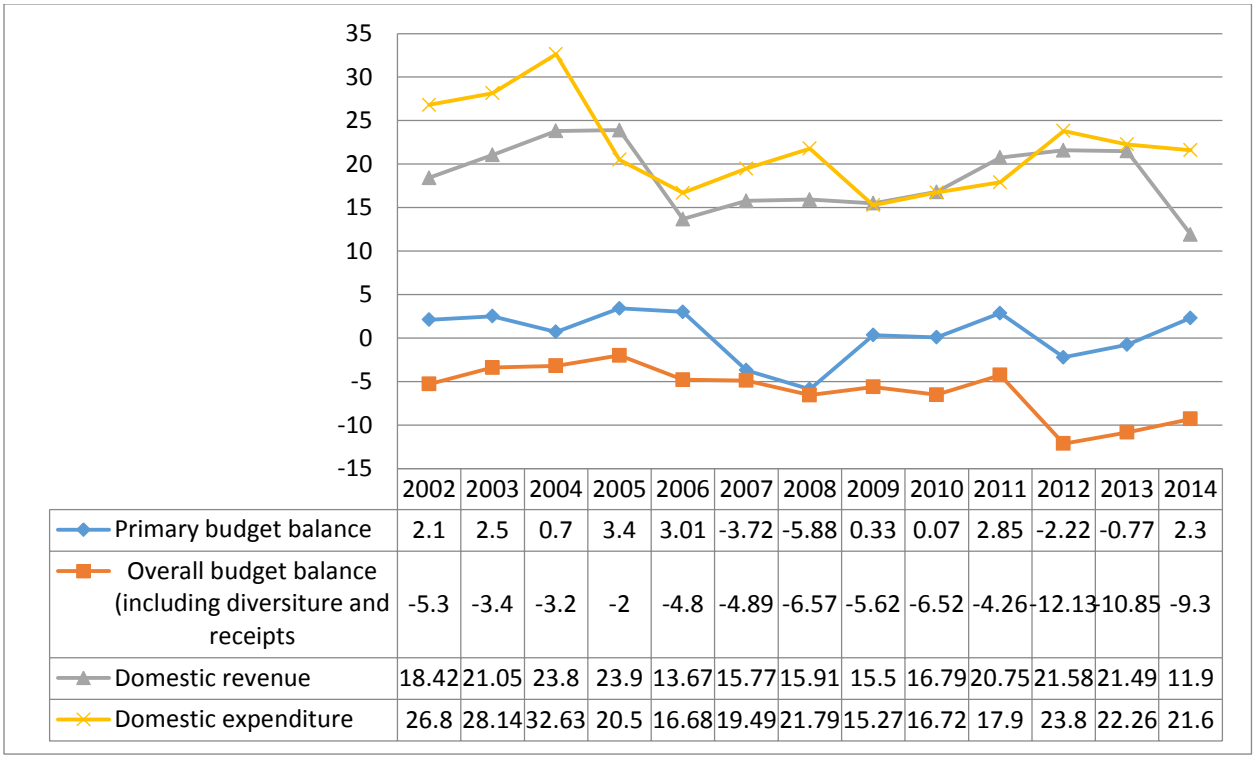
2.1 Introduction

Rising fiscal deficit continues to impede the developmental efforts of the Government of Ghana in recent years. In 2012, Ghana recorded a fiscal deficit to GDP ratio of 11.8 % which is considered to be the highest in recent times. In view of this challenge, the government set itself the target of improving fiscal prudence by continuing with policies to enhance revenue mobilization and the efficiency of public expenditures (ISSER, 2014). The focus of this section of the study is to provide a descriptive overview of the tax policy measures and performance in Ghana. Specifically, the section covers areas such as key fiscal indicators, trends in government revenue, the proportion of households in non-farm enterprises as well as the tax stamp classification in Ghana.

2.2 Trends in Fiscal Outcomes

Government continues to resource the Ghana Revenue Authority (GRA) to improve its tax collection efficiency. Thus, the government has been embarking on financial reforms in public institutions to keep their budgetary spending within limits. Figure 1 shows that there was excess domestic expenditure over revenue for almost all the years (i.e. between 2002 and 2014). The proportion of domestic expenditure to GDP was just 15.3% at the end of 2009. However, the figure increased to 22.3 percent at the end of 2013 fiscal year. The highest proportion of domestic expenditure to GDP within the period under consideration was recorded in 2004 (32.6%) followed by 2012 (23.8%) while the least share of domestic expenditure in GDP was recorded in 2011 (17.9%). With respect to the revenue pattern, share of government revenue in GDP was just 16.7 percent at the end of 2010 but the figure increased to 21.5 % at the end of 2013 fiscal year. A closer look at the trend shows that 2004 and 2005 recorded the highest proportion of domestic revenue (over 23% each) while the least was recorded in 2006 (13.7%).

Figure 1: Trends in government expenditure and revenue (2002-2014)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Primary budget balance	2.1	2.5	0.7	3.4	3.01	-3.72	-5.88	0.33	0.07	2.85	-2.22	-0.77	2.3
Overall budget balance (including diversiture and receipts	-5.3	-3.4	-3.2	-2	-4.8	-4.89	-6.57	-5.62	-6.52	-4.26	-12.13	-10.85	-9.3
Domestic revenue	18.42	21.05	23.8	23.9	13.67	15.77	15.91	15.5	16.79	20.75	21.58	21.49	11.9
Domestic expenditure	26.8	28.14	32.63	20.5	16.68	19.49	21.79	15.27	16.72	17.9	23.8	22.26	21.6

Source: ISSER (2015)

2.3 General Trends in Government Revenue

Government revenue in Ghana generally consists of tax and non-tax revenue. The discussion in this section focuses on providing an insight into the general trend in government revenue over the past decade. Broadly, government revenue encompasses direct taxes, indirect taxes and international trade taxes.

Table 2.1 Trends in the composition of Government Revenue, 2002-2014 (% of Total)

ITEM	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
TAX REVENUE	80.2	73.84	71.84	70.71	72.87	66.08	89.53	82.09	81.43	83.72	79.89	76.38	81.05
Direct Taxes	30.95	23.67	22.06	23.22	22.5	20.34	26.1	30.26	31.74	34.57	35.7	33.64	36.49
Indirect Taxes	27.16	31.89	33.32	33.05	33.4	28.28	31.92	28.17	25.78	26.7	22.62	25.8	26.98
Domestic Goods & Serv.	1.6	12.61	15.42	15.55	14.98	10.23	9.26	5.82	4.84	5.19	4.71	3.71	3.13
VAT	25.56	19.27	17.9	17.5	18.42	18.04	22.65	22.36	20.93	20.35	17.91	17.71	19.62
O/w VAT (Domestic)	7.87	5.92	6.03	6.43	7.17	7.29	8.69	8.33	8.39	8.46	6.84	7.12	8.02
VAT (Imports)	17.70	13.35	11.88	11.08	11.25	10.75	13.97	14.03	12.54	11.89	11.07	10.59	11.60
International Trade Taxes	22.09	18.28	16.46	14.44	16.97	12.47	14.98	13.44	14.83	12.98	12.83	16.94	17.58
Imports	18.00	13.70	12.39	12.21	13.06	11.75	14.15	13.15	13.6	12.94	12.17	11.91	12.50
Exports	40.08	4.59	4.07	2.23	3.91	0.73	0.83	0.3	1.22	0.04	0.67	0.53	1.33
Import Exemptions						4.99	9.91	5.61	5	5.43	5.02	4.49	3.75
NON-TAX REVENUE	19.68	20.15	25.09	24.41	22.78	25.86	9.04	15.33	15.86	15.60	18.40	22.77	17.92
Income & Fees	2.79	2.1	4.69	6.51	2.89	7.32	6.55	7.21	7.00	9.42	6.85	9.34	6.37
GRANTS	16.88	18.05	20.39	17.9	19.89	18.54	17.09	19.41	13.97	10.06	7.48	2.34	3.35
DIVESITURE & NPART	0.12	2.44	1.18	0.82	0.02	2.49	21.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER REVENUE MEASURES (incl. NHIL)	0.00	3.57	1.89	4.06	4.33	5.57	6.62	8.74	6.8	5.87	5.43	4.39	3.28
GRAND TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: ISSER (2015)

2.3.1 Direct Taxes and Non-tax revenue

Since the year 2008, the contribution of direct taxes to total government revenue has been rising. The only exception was in 2013 where the figure fell to 44.04% as compared to the previous year's figure of 44.69% (see Table 2.2). In 2014 however, direct tax increased to 45.02% which was the highest ever reported in recent times as shown in Table 2.2. The main sub-components of direct taxes are company taxes and Pay As You Earn (P.A.Y.E.). However, company tax on oil is not a major component of direct tax. It is evident from Tables 2.2 and 2.3 that between 2011 and 2014, direct taxes contributed more to total government revenue as compared to indirect taxes. This can be explained by the fact that direct taxes are more convenient to the tax payer and are relatively easy to collect.

Table 2.2: Trends in composition of Direct Taxes-2004-2014 (%)

ITEM	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
(% of Total Tax Revenue):	30.71	32.84	30.88	30.78	29.15	36.86	38.98	41.29	44.69	44.04	45.02
P.A.Y.E. (Personal)	35.71	36.81	43.32	42.7	42.01	45.05	41.35	33.71	39.82	37.57	35.13
Self-Employed	5.35	5.24	4.96	5.52	5.46	4.24	4.08	3.28	2.96	2.88	2.44
Companies	43.79	46.99	41.95	42.52	43.02	38.55	40.25	38.84	42.66	36.75	36.31
Company Taxes on oil	-	-	-	-	-	-	-	-	0.00	6.65	10.14
Others	15.15	10.96	9.78	9.27	9.51	12.16	14.32	24.16	14.57	16.16	15.98
Total	100	100	100	100	100	100	100	100	100	100	100

Source: ISSER (2014& 2015)

2.3.2 Indirect Taxes

Indirect taxes have experienced several fluctuations over the years as depicted in Table 2.3.The contribution of indirect taxes to total revenue witnessed a marginal decline from 45.19% in 2004 to 44.2% in 2005 but recovered slightly to 45.83% in 2006. The contribution of indirect taxes however, decreased substantially from 45.83% in 2006 to 28.31% in 2012. By the end of 2014, indirect taxes accounted for 33.29% which was lower than that of the previous year (33.78%) in

2013. VAT constitutes to be a major component of indirect taxes followed by the National Health Insurance Levy (NHIL). Another component of indirect taxes - excise duties (which is the main focus of this study) obtained the least share. Excise duties declined from 3.5% in 2013 to 2.23% in 2014.

Table 1.3: Trends in the composition of Indirect Taxes-2004-2014 (%)

ITEM	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
(% of Total Tax Revenue):	45.19	44.2	45.83	42.79	35.65	34.32	31.66	30.38	28.31	33.78	33.29
VAT	53.73	52.96	55.16	63.81	70.98	79.35	81.21	80.01	79.18	68.63	72.74
VAT (Domestic)	18.08	19.45	21.47	25.8	27.22	29.56	32.55	30.72	30.26	27.6	29.73
VAT (Import)	35.65	33.51	33.68	38.01	43.76	49.79	48.66	49.29	48.92	41.04	43.01
Petroleum Tax	38.65	39.84	38.19	30.85	25.2	17.44	12.87	14.56	15.52	10.86	9.39
Other Indirect Taxes (Excise)	7.62	7.2	6.65	5.34	3.83	3.22	5.92	5.43	5.3	3.5	2.23
NHIL	-	-	-	-	-	-	-	-	-	13.4	12.17
Communication Service Tax-		-	-	-	-	-	-	-	-	3.6	3.48
Total	100	100	100	100	100	100	100	100	100	100	100

Source: ISSER (2014& 2015)

2.3.3 International Trade Taxes

International trade tax has increasingly become a key component of government tax revenue over the years. As shown in Table 2.4, international trade taxes increased from 16.37% in 2009 to 18.21% in 2010. In 2014, international trade taxes obtained 21.69% of total tax revenue which represents a marginal decrease over the previous year (22.18%) in 2013. The main sub-components of this tax type are import duty and export duty. Import duty constituted 76.96 % of total tax revenue from international trade in 2006 and this increased to 97.8% by the close of 2008. At the end of 2014, import duties recorded 71.10% and this compares with 70.31% for the previous year, 2013. However, export duties and import exemptions are not major sources of government revenue.

Table 2.4: Trends in the composition of International trade taxes (%)

ITEM	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
(% of Total Tax Revenue):	22.33	19.31	23.29	18.88	16.73	16.37	18.21	15.51	16.06	22.18	21.69
Imports Duties	75.28	84.57	76.96	94.19	97.8	94.55	91.74	99.67	94.82	70.31	71.10
Exports Duties	24.72	15.42	23.04	5.81	2.20	5.45	8.26	0.33	5.18	3.15	7.57
Import Exemptions	-	-	-	-	-	-	-	-	-	26.54	21.33
Total	100	100	100	100	100	100	100	100	100	100	100

Source: ISSER (2014 & 2015)

2.0 LITERATURE REVIEW

This section reviews literature on tax gap and on empirical evidence of the determinants of tax avoidance or tax propensity across the developing countries.

Definition of Tax Gap

The tax gap in broad terms is defined as the difference between tax revenues collected and those that would be theoretically expected to be collected in the absence of any evasion or late payment. This implies that once a theoretical tax base is established, a tax gap can, in principle, be calculated[1]. Tax liability is therefore defined so as to include all tax that is due under either the letter or the spirit of the law. This implies that the tax gap revenue loss equates to the shortfall resulting from fraud, error, non-payment and artificial avoidance schemes (Gemmell and Hasseldine, 2012).

Another approach which is commonly used by authors in identifying the tax gap is by first defining the 'hidden economy' or 'hidden income' - income that is earned but is hidden from the

[1] In the U.S. the 'official' IRS definition is simply the difference between the tax that taxpayers should pay and what they actually pay on a timely basis. According to the HM Revenue and Customs (HMRC) in the U.K, the term "tax gap" refers to the difference between tax collected and that, which in HMRC's view, should be collected.

tax authorities and, usually, official statisticians – and then the hidden income is multiplied by a suitable tax rate to obtain the tax gap. (Giles, 1999; Cobham, 2005)

Usually, a distinction is made between the gross tax gap and the net tax gap. Thus, the gross tax gap is the difference between tax liability in any year and the amount of tax that is paid voluntary and on time whilst the net tax gap is the gross tax gap in any tax year less payments of that year's tax liability that come in later through either voluntary late payments or enforcement activities of the tax authorities. However, payments of interest and penalties associated with late payments or underreported tax liability are not counted in either the gross or net tax gap measures. The gross tax gap has three components — non-filing, underreporting of tax owed, and underpayment. The three components are mutually exclusive and add up to the total tax gap. The non-filing gap is the tax not paid on time by taxpayers who have a legal requirement to file a tax return, but do not file on time. The underreporting gap is the tax owed by taxpayers who file returns on time, but underreport the amount of tax they owe. The underpayment gap is the loss of revenue owed by taxpayers who file returns on time, but do not pay their reported tax due on time (Toder, 2007; Mazur and Plumley, 2007).

Khwaja and Iyer (2014) also distinguished between the revenue potential based on economic fundamentals of countries and that based on what the legal framework prescribes, that is, one related to the intrinsic economic structure and strength of countries that affect revenue potential and the other related to tax policy variables. This suggests that there are two sets of revenue potentials: one can be termed "revenue potential (economic)," and the other "revenue potential (legal).

Therefore, the difference between the revenue potential (legal) and the actual revenue collected is the tax gap whereas the difference between the revenue potential (economic) and the actual revenue collected can be termed the "tax space". Tax space is thereby the amount of revenue that a country can afford to collect, given its economic strength, not based on what the parliament has mandated (Khwaja and Iyer, 2014).

It is also worthy to note that even though the tax gap is usually studied within the context of the underground economy (informal economy), it is not synonymous with the latter; there might be

some overlapping. The underground economy in some respects comprises illegal activities which are not considered in the estimation of the tax gap (Mazur and Plumley, 2007).

Empirical Estimates and Determinants of Tax Gap

Measuring the tax gap is a challenging task due to the fact that the phenomenon is difficult to observe and precise data is inadequate. This challenge is further compounded by the lack of the necessary high-quality data particularly in developing countries (GIZ Sector Programme Public Finance, Administrative Reform, 2010). Moreover, there is a lack of consensus on the appropriate methodology for estimating the extent of the informal sector even though in most countries the existence of the informal sector is incontrovertible (Georgiou, 2007). Thus, numerous studies have attempted to empirically quantify the size of the informal sector and consequently the magnitude of the tax gap. The techniques generally employed can be categorized into macro and micro approaches.

Macro Approaches

The macro approach also known as the top-down approach relies on highly aggregated data to estimate a country's informal economy. Therefore, the effective tax rate of the formal sector can be applied to the estimated informal economy to generate the amount of potential tax that is not being collected by the tax authorities (Ahmed and Rider, 2008). According to Vuletin (2008), the macro approaches which are usually used to estimate the size of the informal sector and consequently the tax gap include: the discrepancy between the national expenditure and income statistics or national accounts method (MacAfee,1980); Currency demand or currency ratio method (Cagan, 1958, Gutmann, 1977; Tanzi,1980, 1983), Transactions method (Feige, 1979); Electricity consumption method (Johnson et al., 1997); Discrepancy between official and actual labour force or Labour market measures (Contini,1981) and MIMIC (Multiple indicators multiple causes) (Frey and Weck-Hanneman,1984).

Micro Approaches

Micro approaches otherwise termed as bottom-up approaches or direct approaches to estimating the shadow economy exploit data on individual tax payers and rely on surveys, questionnaires, interviews or information retrieved from tax audits. Data from these sources are then used to

construct estimates of the shadow economy using microeconomic or micro-econometric methods (Schneider and Williams, 2013).

Empirical Estimates of Tax Gap

Employing an input-output table (I-O) table, Aguire and Shome (1988) estimate the potential VAT revenue for the Mexican economy for the period before and after a change in the VAT structure. The Mexican government first introduced the VAT system in 1980 with a single general rate of 10 percent with a few exceptions (mainly agriculture); a zero rate applied to almost exclusively to exports; and a special tax regime for small businesses. However, in 1983 the rates for the VAT were revised upward and thus the standard rate was pegged at 15 percent while a special rate of 6 percent for agricultural products and medicines was introduced. Also, a special rate of 20 percent was levied on luxury goods like caviar and cable TV. The findings of the estimation indicate a tax gap of 45.1 percent and 48.3 percent for 1980 and 1983 respectively.

Also, relying on the Nepalese Household Budget Survey data and input-output (I-O) tables, Jenkins and Kuo (2000) estimate the sales tax gap for the 1993/94 fiscal year. The results show that the tax gap was 6 percent, ten percent and 48 percent for alcoholic beverages, tobacco products and the remaining taxable commodities respectively. The VAT tax gap in Romania was estimated to be 45.6 percent in 2002. The results were obtained with the aid of the 2002 input-output (I-O) matrices consisting of 34 economic sectors. Thus, the final consumption in each sector was reduced by the amount of exemptions and zero-ratings, increased by the volume of inputs in sectors producing exempted commodities and adjusted for the sales net of inputs purchased by small businesses with gross receipts less than the registration threshold to obtain the taxable base. The potential VAT revenue was obtained by multiplying the computed tax base for each sector by the weighted average VAT rate (Minh, 2007).

Ahmed and Rider (2008) estimate the tax gap for Pakistan with the aid of the 2004/05 Household Integrated Expenditure Survey, the Labour Force Survey and an 81-sector input-output (I-O) matrix for the Pakistani economy for the 2004/2005 fiscal year. The study used micro-simulation models to obtain the potential tax for each federal tax and the results reveal that in the 2004/2005 fiscal year the tax gap was in the region of 45 percent – direct tax gap being approximately 65

percent and the indirect tax gap being 35 percent. Similarly, Martin-Vazquez et al (2008) estimated the individual income tax gap for the Russian Federation to be 45 percent of potential tax liabilities in 1996 using Household Income Expenditure Survey data from the Russian Longitudinal Monitoring Survey.

Novysedlák and Palkovičová (2012) present the estimates of the total tax loss and the tax gap for value added tax for the Slovakian economy using calculations based on both output tables and on nominal GDP net of the items not subject to VAT. The results demonstrate that the total VAT loss in 2010 reached €2.3 billion, which represents 3.5% of GDP. From the total VAT loss, the tax administration was able to capture and identify less than 30%. The remaining 70% represents the tax gap, i.e., the tax liability which had not yet been identified. Almost half of the tax loss (1.6% of GDP) was attributable to lower effectiveness of tax collection compared to the EU average. In other words, if the effectiveness of tax collection were on par with the EU average, the basic VAT rate could have been 4.7 percentage points lower (14.3% in 2009) to generate the current level of VAT revenue or, if maintained, it would have increase revenue by 1.6% of GDP (€1.1 billion).

Harremi (2014) estimates the tax gap for the Balkan region for the 2011 and 2012 fiscal years by employing the MIMIC estimation procedure. The findings reveal that the informal economy made up 33% and 32.61% of the GDP of the region in 2011 and 2012 respectively. Also, the tax gap for the 2011 and 2012 fiscal years were 34.89% and 27.35% respectively. Serbia recorded the highest tax gap (46%) whilst Greece had the lowest tax gap (17.6%) in the 2011 fiscal year. In 2012, the tax gap for Serbia was still the highest (44%) whilst Croatia posted the lowest tax gap (17%).

In Ghana, Asante (2012) attempts to provide estimates of the size of the underground economy and estimates of tax evasion between 1990 and 2010. By using the Stock-Watson Dynamic Ordinary Least Squares (DOLS) estimate for currency demand, the paper indicates that on the average, the underground economy accounts for 48% of the official GDP. Also, the estimated evaded tax ranges from 4% to about 14% of the official economy.

Determinants of Tax Evasion

Some authors have also explored the issue of the determinants of tax evasion and tax compliance. Applying a combination of factor analysis and regression techniques, Yalama and Gumus (2013) suggest education and income have negative effects on tax evasion in Turkey. The impact of gender and age are however not statistically significant. Helhel and Ahmed (2014) employ a Likert scale technique to evaluate the tax compliance of individual taxpayers in Yemen. Taking into consideration demographic factors, the responses show that females were found to be more compliant than males to taxation whereas age in general was not a significant factor. However, older group was found to be more compliant compared to young.

Akinboade (2014) in an attempt to assess tax registration and filing compliance by medium size businesses in the Littoral and Central Region of Cameroon shows that business location in Littoral province (a less rurally populated region than Central Province) is associated with registration and filing compliance. However, operating in the manufacturing sector is negatively associated with registration compliance even though it has no effect on filing compliance. Age and gender of business owner; and awareness of their SME status have no impact on tax compliance. Moreover, the higher the educational level of the business owner the higher the probability of being tax registration compliant. However, older businesses are less likely to be filing compliant.

Annan et al. (2013) employs the currency demand model to investigate the determinants of tax evasion in Ghana from 1970 to 2010. Using an Auto-Regressive Distributed Lag (ARDL) technique, the short run model shows that per capita income, the average tax rate, age and inflation are positive and significantly associated with tax evasion while gender (i.e. the proportion of the population that is female) shows an inverse and significant relationship with tax evasion. The error correction term is negative and statistically significant which suggests that 45 per cent of the deviation from equilibrium tax evasion is corrected each year. Moreover, Antwi et al. (2015) investigates the impact of demographic characteristics on the tax compliance of small and medium scale enterprises (SMEs) in the Tamale Metropolis in Ghana. Using questionnaires, the paper reveals that women entrepreneurs are more non-compliant to tax laws and rules than male entrepreneurs; younger entrepreneurs are less compliant as compared to their older counterparts and entrepreneurs with higher education tend to have lower non-compliance rate.

4.0 METHODOLOGY

Estimation Technique/procedure

This study employs a micro approach to examine the tax situation in the Ghanaian non-farm/informal sector. The informal sector in this study includes all non-farm businesses or enterprises that are not registered with the Registrar General. To achieve the objectives of the study, we first compute the tax gap followed by two separate estimations to explain the firms' propensity to pay tax as well as the tax gap respectively. Both estimations use the same explanatory variables (see Table 4.3).

Model 1

The logit regression is employed to explain the firms' propensity to pay tax. It is specified in equation (1) as:

$$\Pr(PT = 1) = \alpha + \beta X + \varepsilon \quad \text{.....1}$$

where:

The dependent variable, $\Pr(PT = 1)$, takes a value of 1 if the firms pays tax and 0 if otherwise; α is the constant term; β is a vector of coefficients to be estimated; X is a vector of explanatory variables; and ε is the error or disturbance term.

Model 2:

The OLS regression is also used to explain the (computed) tax gap in the informal sector. It is specified in equation (2) as:

$$TaxGap = \delta + \phi X + \nu \quad \text{.....2}$$

where:

The dependent variable (*TaxGap*) measures the difference between firms' potential annual tax payment and actual annual tax payment (in GH¢); δ is the constant term; ϕ is a vector of coefficients to be estimated; X is a vector of explanatory variables; and ν being the error or disturbance term.

Measurement of the tax gap

The dataset used for the study is obtained from the round six of the Ghana Living Standards Survey (GLSS 6) which was conducted by the Ghana Statistical Service (GSS) in 2012/2013 across all the 10 regions of Ghana. This is a nationally representative survey data and hence, findings from this study can largely be generalized. The survey collected detailed information on non-farm activities in the country including data on whether a firm pays tax or not and the actual tax (in GH¢) paid by firms. Also, the data contains information on demographic characteristics including gender, education and age. Since the GLSS 6 dataset does not capture the potential tax payment by firms, we relied on the Internal Revenue (Amendment) Regulations, 2011 which provides information on the potential tax of firms who make less than GH¢ 90,000 annual sales.

The activities of non-farm enterprises are generally classified into manufacturing, trading and other activities. In Ghana, nationwide estimates show that more than two-fifths of the households (44.3%) operate a non-farm enterprise (GSS, 2014). Moreover, almost half of the households interviewed operate non-farm enterprises (47.0%). In terms of the gender dimension, it is observed that females operate most of the non-farm enterprises (71.3%) while their male counterparts operate only 28.7%. (Table 4.1)

Table 4.1: Distribution of non-farm enterprises in GLSS 6

	Frequency	**Percentage**
Total number of households	18,000	-
Number of households with non-farm enterprise as a proportion of total households	8,519	47.0
Males operating non-farm enterprise	2,443	28.7
Females operating non-farm enterprise	6,076	71.3
Total (Males and female together)	8,519	100.0

Source: GLSS6, Data

Estimating the Potential Tax Payment by Non-farm Enterprises using Tax Stamp in Ghana

The Tax Stamp is a tax system introduced by the Internal Revenue (Amendment) Regulations in 2004. The system however, took effect in February, 2005. The tax stamp was further revised in February, 2011. The break-down of quarterly rate payable by various categories of enterprises is shown in Table 4.2 as follows:

Table 4.2: Quarterly tax payable by specified small scale enterprises

Category	**Rate Per Quarter (GH¢)**
A-Large	45.00
Medium	30.00
Small	10.00
Table top	3.00
B-Large	35.00
Medium	20.00
Small	5.00
Table top	3.00
C-Large	25.00
Medium	15.00
Small	3.00
Table top	3.00

Source: Ghana Internal Revenue Service (2011)

The tax stamp is implemented by the Small Tax Payer office of the Ghana Revenue Authority (GRA). It must be noted that the Small Tax Office caters for firms whose turn over falls below GH¢ 90,000.00 per annum and operate in permanent structure. GRA opens a file for such firms by registering them to pay the official tax rate. However, among the small firms, there are smaller firms who operate in temporary structures (e.g. containers) and thus are not registered. Therefore, in an attempt to further expand the tax base, GRA introduced the tax stamp to capture these firms which are not registered so they could contribute to revenue mobilization in the country.

From Table 4.2, we observe that the tax stamps are assigned differently according to the size of the enterprise and the category of activities undertaken by the firm. Category A activities comprises retail traders, *susu* collectors, drinking and chop bar owners, bakeries, business centres, estates and accommodation agents, block and terrazzo manufacturers, sand and stone winners and contractors and licensed diamond and gold winners and buyers; category B embraces dress makers and tailors, hairdressers, beautician and barbers, artisans and hiring services, freelance photographers and car washing bays; and category C is made up of butchers, individual undertakers, corn and other millers, charcoal and firewood vendors, vulcanizers and alignment operators, shoe and equipment repairs, traditional healers and other businesses determined by the minister and published in the *Gazzete.*

However, due to the fact that the definition of the size of the enterprise (that is whether it is small, medium or large) is not clearly spelt out in the Regulations, the tax officials – based on experience– subjectively levy the firms. This information regarding how tax officials collect the tax stamp was relayed to the research team through an interview conducted on 24th August, 2015 at the Small Tax Payer Office at Madina.

As mentioned earlier, the Internal Revenue Regulations classifies firms with turnover below GH¢90,000 as small-scale enterprises and thus we exclude all firms that fall outside this threshold in the non -farm enterprise dataset of the GLSS 6 reducing our sample from 8,518 to 7,440 non-farm enterprises. Since the tax officials impose the tax stamps subjectively, we devised a working definition to help us place the firms into the three main enterprise-size type (that is small, medium or large) so as to assign the appropriate tax stamps to the firms. Firstly, we compute the (arithmetic) mean of the firms' annual sales. Then, the firms that had their annual sales less than the mean annual sales (that is, GH¢ 4799.707) were classified as small; firms that had annual sales from the mean (GH¢ 4799.707) up to 175 percent, that is 1.75 times the mean annual sales (thus, GH¢ 8399.4873) were also classified as medium; and firms that had annual sales exceeding GH¢ 8399.4873 were defined as large. After defining firms into small, medium and large, we then apply the tax stamp under each business category (see Table 4.2).

Under category A, an annual tax stamp of GH¢ 40, GH¢ 120 and GH¢ 180 were assigned to small, medium and large firms respectively. An annual tax stamp of GH¢ 20, GH¢ 80 and GH¢ 140 were assigned to small, medium and large firms which are found in category B respectively.

For category C, the annual tax stamp of GH¢ 12 and GH¢ 100 were assigned to small and large firms respectively (this category had no medium firm).

Definition of explanatory variables and the expected sign

Following from the objective of the study and the review of the literature, the explanatory variables employed to explain the tax gap, and propensity of firms' to pay tax include firm ownership, education level of firm owners, location, firms' annual sales, savings, experience, size of firm and age. Table 4.3 provides the definition and expected signs of the explanatory variables that were used in equation (1) and (2).

Table 4.3: Definition of the explanatory variables used in the study

Explanatory Variable	**Definition**	**Expected sign on tax payment propensity**
Male Owner	This is a dummy with a value of 1 if the firm owner is a male and 0 for female owner	Uncertain
At least primary education	This a dummy with a value of one if the owner has at least primary education and 0 otherwise	Positive
Rural Location	This is a dummy variable with the value of 1 if the firm is located in the rural location and 0 for urban location	Negative
Log of Annual Sales	This is a the log of firm's annual sales	Positive
If Firm Does Savings in the bank/has bank account	This is a dummy with the value of 1 if the firm saves part of its income and 0 otherwise	Positive
Firm's Experience in Years	This measure the years of operation of the firm	Uncertain
Firm's Experience Square	This is the square of the experience variable. The purpose	Uncertain

	is to capture the non-linearity effect of firm's experience	
Owner's Age	This is a categorical variable for owner's age. The age cohorts are (15-24), (25-34) and (35 and above). For estimation purpose, each cohort represents a dummy with the last cohort (35 and above) being the reference group	Uncertain
Small Firm	This is a dummy variable with the value of 1 if the firm is small and 0 otherwise	Negative
Business Activity	This is a categorical variable defined into three: Category A, B and C (see details or definitions in the overview); Category C is set as the reference group.	Positive

5.0 ESTIMATION RESULTS AND DISCUSSION

5.1 Descriptive Statistics

The descriptive statistics are reported in the form of frequencies, percentages and a χ^2 test for significant difference. The discussion of the results starts with the general picture of the propensity to pay tax and the tax gap in the informal sector in Ghana. Afterwards, the factors that influence the propensity to pay tax and the tax gap in Ghana's informal sector are considered.

5.1.1 The Extent of Tax Payment and Tax Gap in Ghana

Overall, approximately 80% of the sampled non-farm firms (that is out of 7,440 observations) in Ghana do not pay tax. , Also, we observe that the potential tax revenue that can be collected from the informal non-farm enterprises (as defined by the tax stamp) is approximately GH¢ 801,940.00 per annum. However, the annual actual tax collected by the GRA stood at a low figure of GH¢ 205,589.32, representing just about one-fourth of the potential tax. Based on these

statistics, the informal sector reports an annual aggregated tax gap or loss of about GH¢ 596,350.70, representing almost 75 percent of the potential tax (see Table 5.1).

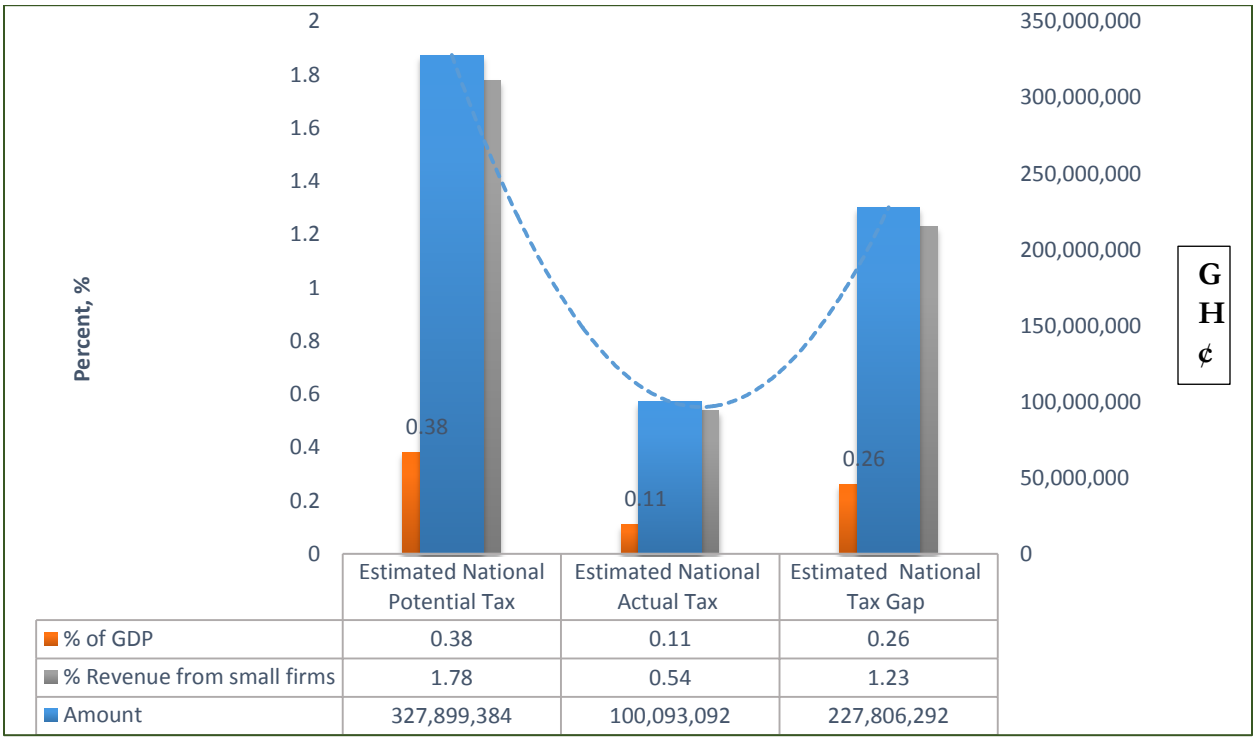
It must be noted that the actual tax, potential tax and tax gap were estimated using the sample of 7440 firms and thus to scale up these estimates to the national level, we apply the sampling weight used in the GLSS 6 data collection.[2] Based on this computation, we arrive at a national potential and actual taxes of GH¢ 327,899,384.00 and GH¢ 100,093,092.00 respectively, resulting in an estimated national tax gap or loss of approximately GH¢ 227, 806,292.00 (see Figure 2). Further, we applied the weight to the annual sales of sampled non-farm firms and found the estimated national sales revenue to be GH¢ 18,454,384,546.00. Therefore, the national potential tax, actual tax and tax gap represent about 1.78, 0.54 and 1.23 percent of the national sales figure respectively. In terms of Ghana's GDP (using the 2013 GDP figure of GH¢ 87,155,400,000 from the budget), the national potential tax, actual tax and tax gap represent 0.38, 0.11 and 0.26 percent respectively. The implications from these results are that there appears to be almost an insignificant proportion of sales revenue (0.54 %) from the informal sector that is realized as tax revenue. This compares with 5% to 25% for Pay As You Earn (PAYE) income tax received by government and also with the rate paid for corporate tax (25%).

In addition, the tax revenue from self-employment activities for 2013 (GH¢ 181,562,205) as reported by the Ministry of Finance (MOF) is above our estimated national tax revenue (GH¢ 100,093,092.00) obtained from the non-farm enterprise survey data. The reason for this discrepancy can be ascribed to the fact that: (i) the 'self-employed' as defined by MOF also encompasses those in the formal sector; (ii) our sample is only limited to firms that make less than GH¢ 90, 0000 annual sales, as defined by the Regulations, whereas the self-employment tax figure reported by the MOF does not consider annual sales of the firms. This observation lends credence to the challenges of computing the tax gap alluded to by Georgiou (2007).

The rest of the discussion examines the extent of tax payment as well as tax gap vis-à-vis the underlying factors namely gender, education and location.

[2]The command used in generating the national tax figures in STATA was: tabstat *variable* [aw=weight], stat(sum) format (% 15.0fc), where the *variable* in this case represents either the sample potential tax or actual tax figures

Figure 2: Estimated national amount (in GH¢) and % for potential, actual tax and tax gap



Source: Authors' own computation from GLSS 6, 2012/2013

5.1.2 Firm owner's characteristics and location

Gender

Being a male or female owner of an enterprise is relevant in the understanding or analysis of the tax structure in the informal sector. Significantly, higher proportions of females (81.4%) do not pay tax as compared to male colleague owners (77.6%). Similarly, female owners are associated with a higher tax gap (GH¢490,370.20) than their male counterparts (GH¢105,972.50). This indicates that the tax loss among female owned firms is over 4 times that of male owned businesses in the economy (see Table 5.1). This result may be explained by the fact that more females operate non-farm enterprises (71.3%) as compared to their male counterparts (28.7%) (see Table 4.1).

Education

In analyzing the propensity to pay tax and the tax gap within the informal sector, it is imperative to consider the educational level of the firm owner. The result, as expected, indicates a strong influence of education on tax propensity (Table 5.1). Thus, a significant proportion of firm

owners who have no education do not pay tax (84.7%) as compared to those with at least primary education (77.2%). The same observation is made with regards to the tax gap: firm owners without education have a higher tax gap (GH¢302,840.80) than those with at least primary education (GH¢293,509.90). Education, as a human capital variable, has the chance of improving individuals understanding on the importance and contribution of tax payment to government revenue and hence, economic development in general.

Firm Location

Table 5.1 paints a picture of the influence of location on propensity to pay tax and on tax gap. Among the rural non-farm enterprises, the result show that as low as 14% of them pay tax, representing a little over half of the proportion of urban firms that pay tax (24.6%). It is therefore not surprising to also find that non-farm economic activities in the rural economies account for higher tax gap or loss (GH¢333,359.4) than the urban economies (GH¢262,991.3). Comparatively, the urban economies are in general equipped with formalized tax administration system-in terms of logistics, skilled labour force, among others and thereby these factors may explain the relatively high revenues loss in the rural location.

Table 5.1: Tax Propensity, potential tax, actual tax and tax gap, by owner's characteristics, location and overall outcome

Item	Overall	Gender of Owner		Owner's Education		Location	
		Male	Female	No Education	Primary +	Rural	Urban
Propensity to Pay Tax: in Frequencies, with % in parentheses, ()							
Pays No Tax	5,980(80.38)	1,552(77.56)	4,428(81.41)	2,675(84.65)	3,305(77.22)	3,012(85.98)	2,968(75.39)
Pays Tax	1,460(19.62)	449(22.44)	1,011(18.59)	485(15.35)	975(22.78)	491(14.02)	969(24.61)
Total	7440(100)	2,001(100)	5,439(100)	3,160(100)	4,280(100)	3503(100)	3,937(100)
Potential Tax, Actual Tax and the Tax Gap: figures are reported in Ghana Cedis (GHC)							
Potential Tax	801940	221760	580180	347160	454780	413580	388360
Actual Tax	205589.32	115787.5	89801.8	44319.2	161270	150588.7	55000.6
Tax Gap	596350.7	105972.5	490378.2	302840.8	293510	262991.3	333359.4

Source: Authors' own computation from GLSS 6, 2012/2013

5.1.3 Firm level characteristics

Firm's bank savings

The savings status of firms cannot be ignored in the discussion of the propensity to pay tax as well as the tax gap (see Tables 5.2). The data suggests a strong relationship between tax payment and firm's saving, as expected. Thus, it is found that higher proportion of firms that do not make savings are also more likely not to pay tax (86.1%) whereas 74.4% of firms that make savings are likely to pay tax. Considering the incidence of tax gap among the saving status of firms, firms that make no savings record a higher tax gap (GH¢328,651.10) as compared to firms that make savings (GH¢267,699.60).

To some extent, these significance results may be explained by the fact that firm's savings and tax payment records may both act as "collateral" as these informal firms attempt to access loans particularly from microfinance institutions (where a larger number of these informal firms seek financial assistance).

Firm size

The role of firm size is well acknowledged by our results. The findings show that the size of the firm appears to increase with propensity to pay tax (Table 5.2). In other words, a significant proportion of large firms pay tax (32.6%), followed by medium firms (23.8%), with small-sized firms accounting for the least tax payment (16.0%). It is therefore not very surprising that the tax gap associated small firms is at least 5 times and twice that of medium and large firms respectively. The magnitude of tax loss attributable to small firms may not be unexpected since these firms are "too micro" in their economic activities to be identified or perhaps to be "forced" to be tax compliant or pay the projected or potential tax stipulated by Ghana Revenue Authority. Another plausible explanation to this substantial tax loss could be the fact that these small firms account for as much as 73.5% of the total non-farm enterprises in the country.

Business Activity

The results in Table 5.2 show that the propensity to pay tax significantly varies among the type of business activity. A much higher fraction of firms under category A is found to pay tax (20.5%) followed by category B (18.7%) and C (12.8%) respectively. In Ghana, the low propensity to pay tax among category C activities such as charcoal and firewood vendors, shoe

and equipment repairs, and traditional healers is in line with general expectation since these economic activities are mostly “very informal” and are less likely to be located by tax officers.

In terms of the tax gap, the result from the data reveals that categories A and B which comprise of relatively “less informal” activities such as retail traders, drinking and chop bar owners, business centres, estates and accommodation agents, licensed diamond and gold winners and buyers, dress makers and tailors, hairdressers, beautician and barbers, artisans car washing bays are found to be characterized by relatively higher tax gap than category C.

Table 5.2: Tax Propensity, potential tax, actual tax and tax gap by firm's characteristics

Item	Savings Status of firm		Firm size			Category of Activities		
	Does savings	No Savings	Small	Medium	Large	A	B	C
Propensity to Pay Tax: in frequencies, with percentages, %, in parentheses, ()								
Pays No Tax	2,701(74.43)	3,279(86.04)	4,594(84.03)	490(76.21)	896(67.37)	4,469(79.48)	1,008(81.29)	503(87.18)
Pays Tax	928(25.57)	532(13.96)	873(15.97)	153(23.79)	434(32.63)	1,154(20.52)	232(18.71)	74(12.82)
Total	3,629(100)	3,811(100)	5,467(100)	643(100)	1,330(100)	5,623(100)	1,240(100)	577(100)
Potential Tax, Actual Tax and the Tax Gap: figures are reported in Ghana Cedis (GHC)								
Potential Tax	406700	395240	485320	85500	231120	609040	135200	57700
Actual Tax	139000.4	66588.92	113837.9	14948.8	76802.6	140201	58593.72	6794.6
Tax Gap	267699.6	328651.1	371482.1	70551.2	154317.4	468839	76606.28	50905.4

Source: Authors' own computation from GLSS 6, 2012/2013

5.2 Factors explaining firms' propensity to pay tax and the tax gap

Tables 5.3 and 5.4 present the logit and OLS estimation results for tax propensity and tax gap respectively. Most of the explanatory variables are both rightly signed and significant. In the tax propensity estimation, all the variables were found to be statistically significant apart from the age of the owner and size of the firm. On the other hand, the findings from the OLS model indicate that with the exception of firm experience and type of business activities, all other variables significantly influence the annual tax gap in the informal sector[3].

Firm owner's characteristics

In terms of gender, we observed that male ownership increases the propensity of tax payment (by 4%) relative to female ownership. Further, male ownership significantly contributes to the reduction in the tax gap by almost GH¢ 40 as compared to female ownership. These results are consistent with the descriptive statistics and the findings of other studies (see Antwi et al., 2015; McGee & Tyler, 2006; Boame, 2004) but contradict other works (see Helhel & Ahmed, 2014 and Spicer & Becker, 1980) who argue that females are more tax compliant than males.

In line with the descriptive statistics and some studies in the literature (see Yalama & Gumus, 2013; Akinboade, 2014 and Antwi et al., 2015) the estimation results of education indicate that having at least primary education increases the likelihood of tax payment and thus lowers the tax gap by almost GH¢ 16. The findings are however inconsistent with McGee and Tyler (2006).

Unlike the findings by other studies (for instance, Feinstein, 1991), the estimation points out that owner's age does not have any significant effect on propensity to pay tax but does significantly affect the tax gap. In other words, owners in the 15-24 and 25-34 age categories tend to have a similar effect of reducing the tax gap by about GH¢ 19 compared to those who are at least 35 years.

[3] We test for heteroskedasticity using the White and Breusch-Pagan/Cook-Weisberg tests. After detecting the presence of heteroskedasticity, the study used the heteroskedasticity-robust standard error approach to correct for the problem in order to obtain robust estimates and avoid misleading results and recommendations (see appendix).

Firm level characteristics

With respect to firm's sales, the results show that increasing firm's annual sales by 1 percent will increase the likelihood of paying tax and also lead to a significant reduction in the average tax gap by GH¢ 849.9. These findings are also consistent with the general expectation that higher sales may suggest a "better" financial and successful position of the firm and thereby increase the possibility of paying tax that will somehow be close to the potential tax; this finding is similar to that of Mawejje (2013).

Consistent with the descriptive statistics and the findings of others works in the literature (see Akinboade, 2014), the estimation results reveal that being a rural firm decreases the propensity to pay tax and thereby contributing to an increase in the tax gap by approximately GH¢ 27 relative to being an urban firm.

A firm that makes savings significantly improves its probability of paying tax by 8% compared to its counterparts that makes no savings. Furthermore, it is established from the OLS estimation that firm's saving habit can lower the tax gap by about GH¢14. These results are in conformity with our earlier findings from the descriptive statistics.

Also, the findings reveal a non-linear effect of firm experience on propensity to pay tax. Thus, we found that at the initial stages, an increase in firm's experience will increase the chance of paying tax but beyond a certain (optimal) number of years of operation, the probability of paying tax starts falling. Usually, younger firms may tend to honour their tax obligations to avoid been closed down in the early stages by tax official as compared to older firms who are already established or familiar with the existing system and may sometimes hide themselves or possibly bribe corrupt official to avoid tax payment. This finding is similar to that of Mawejje, (2013) and Akinboade (2014) who posits that older firms are more likely to evade tax than younger ones.

The findings on type of business activity from our estimation confirm our earlier findings from the descriptive statistics. Thus, firms in category A and B business activities, which are mostly visible and easily identified by tax officials, are more likely to pay tax as compared to their colleagues in category C (see definition in Table 4.3). This finding is inconsistent with Mawejje (2013) and Akinboade (2014). In particular, Mawejje (2013) shows that firms in the retail and

wholesale sectors (which are mostly under category A and B in our study) tend to be associated with more tax evasion.

Table 5.3 Logistic Estimation of Non-Farm Enterprise Propensity to pay Tax in Ghana

Explanatory Variables	Estimated Coefficients	Marginal Effects
Male Owner	0.274***	**0.0409**
Female Owner (Reference group)	(0.0778)	
At least Primary education	0.349***	0.0492
No Education (Reference group)	(0.0671)	
Rural Location	-0.452***	-0.0643
Urban (Reference group)	(0.0645)	
Log of Annual Sales	0.140***	0.0201
	(0.0154)	
If Firm Does Savings	0.605***	0.0874
No Savings (Reference group)	(0.0622)	
Firm's Experience in Years	0.0413***	0.0059
	(0.0103)	
Firm's Experience Square	-0.000696*	-0.0001
	(0.000293)	
Owner's Age (15-24)	-0.218	-0.0294
At least 35 Years Old (Reference group)	(0.138)	
Owner's Age (25-34)	-0.00452	-0.0006
At least 35 Years Old (Reference group)	(0.074)	
Small Firm	0.0343	0.0049
At least Medium (Reference group)	(0.0896)	
Activity: Category A	0.405**	0.0542
Category C (Reference group)	(0.138)	
Activity: Category B	0.306*	0.0468
Category C (Reference group)	(0.15)	
Constant Term	-3.378***	
	(0.222)	
Number of observations	**7,440**	

Wald chi2(12)	**472.61**
Prob > chi2	**0.00**
Pseudo R2	**0.0729**

NB: Robust Standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001

Table 5.4: OLS Estimation of Non-Farm Enterprise Tax Gap in Ghana

Explanatory Variables	Estimated Coefficients
Male Owner	-39.86***
Female Owner (Reference group)	(8.796)
At least Primary education	-15.57***
No Education (Reference group)	(3.823)
Rural Location	27.26***
Urban (Reference group)	(4.891)
Log of Annual Sales	-8.499***
	(1.385)
If Firm Does Savings	-13.96**
No Savings (Reference group)	(5.064)
Firm's Experience in Years	1.265
	(1.103)
Firm's Experience Square	-0.0177
	(0.0233)
Owner's Age (15-24)	19.68*
At least 35 Years Old (Reference group)	(9.783)
Owner's Age (25-34)	19.01*
At least 35 Years Old (Reference group)	(8.136)
Small Firm	-94.37***
At least Medium (Reference group)	(6.373)
Activity: Category A	-11.84
Category C (Reference group)	(6.911)
Activity: Category B	-18.96
Category C (Reference group)	(12.12)
Constant Term	211.5***

	(14.63)
Number of observations	**7440**
R-sq	**0.028**
Adj. R-sq	**0.026**
RMSE	**231.8**

NB: Robust Standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001

6.0 Concluding Remarks

Broadening a country's tax base plays a vital role in domestic revenue generation which in turn influences economic growth and development. This study has sought to investigate the extent of tax gap within the informal sector in Ghana. More specifically, it estimates the difference between the potential tax and actual tax paid by non-farm enterprises in the informal sector. Second, it investigates the underlying factors that account for the tax gap and the propensity to pay tax by the informal sector enterprises. One key finding of this study is that the national potential and actual taxes in the informal sector are found to be GH¢ 327,899,384.00 and GH¢ 100,093,092.00 respectively, reflecting an estimated national tax gap or loss of approximately GH¢ 227, 806,292.00. Based on these results, we also found that the estimated national potential tax, actual tax and tax gap represented as low as 1.78, 0.54 and 1.23 percent of the national sales revenue of the non-farm enterprise (informal) sector. These figures represent a significant potential tax loss in the informal sector compared to the tax revenue government received from income tax and corporate tax.

Furthermore, the results from the econometric estimation of the study revealed that several firm owner and firm level characteristics influence the propensity to pay tax as well as the tax gap in the informal sector of Ghana. Among the firm owner's characteristics, evidence from the study shows that male firm ownership and having at least primary education qualification are found to significantly increase the propensity to pay tax and reduces the tax gap as expected. With respect to the firm-level variables, our estimates show that firm sales, banking savings, type of business, urban location as well as experience of the firm increase the propensity to pay tax, and significantly reduce the tax gap as expected. The policy implications for these findings are as follows:

- The tax officials subjectively impose the tax stamps due to the fact that the definition of the enterprise-size (that is whether large, medium or small) are not clearly spelt out in the Regulations. This may lead to an under or over estimation of the actual tax payment. Therefore, it is essential for the GRA to devise a standard measure of assessing the size of firms in the informal sector which the Small Tax-Payer Offices across Ghana can use.
- It is recommended that the Ghana Revenue Authority (GRA) should intensify public education, particularly among women micro entrepreneurs on their tax responsibilities using different and suitable educational platforms.

- Financial inclusion should be vigorously promoted within the informal sector by Government or the Bank of Ghana to make more entrepreneurs in the informal sector bankable as saving in the bank was found to correlate with propensity to pay tax.
- Firms located in the rural areas are less likely to pay tax and thus, accounts for higher tax gap. As a way of motivation, Government of Ghana should strengthen the extension of infrastructure and social facilities such as roads, hospitals and electricity to the rural areas for rural residents to experience the benefits of taxation as a tool for their own economic development.
- It is observed from this study that business activities in category C-which is made up of butchers, individual undertakers, corn and other millers, charcoal and firewood vendors, vulcanizers and alignment operators, shoe and equipment repairs and traditional healers- are less likely to pay tax. Therefore, the Ghana Revenue Authorities must focus on designing appropriate policies that would reduce the extent of tax loss to this category.
- There is the need to motivate and equip staff in the small tax offices and rural areas in order to effectively reach out, identify and collect taxes from firms in the informal sector

7.0 Limitations of the study and recommendation for further research

A few weaknesses noted from this study are as follows:

This study has focused on just estimating the extent of tax gap in the informal sector of Ghana. A potential area of extension to this study is to investigate the cost of collecting the tax stamp. This will help us to know whether the tax stamp is the best way to go or there is the need to devise other means of collecting tax within the informal sector e.g. through the use of mobile money

services to ensure cost effectiveness. One of the principles of taxation is that a good tax system should minimize the administrative cost of collection relative to the yield. Thus, a potential research area which can emerge out of this study is to measure the efficiency of taxation in the informal sector and ascertain the most effective method of mobilizing tax revenue from the informal sector.

This study also used only secondary data in the analysis hence the inability to study other thematic areas of interest such as cost of tax collection as noted above. Therefore, in the future, we can improve upon the study by undertaking large-scale primary survey at the enterprise level.

Finally, this study has focused just on one component of indirect tax which is the excise tax and thus self–employment tax. In the future, the study can be extended to other components of indirect tax such as communication tax and the VAT.

REFERENCES

Aguire, C.S., and Shome, P., "The Mexican Value Added Tax (VAT): The Methodology for Calculating the Base" *National Tax Journal* 41 (4): 543

Ahmed, R.A., and Rider, M, (2008), "Pakistan's Tax Gap: Estimates by Tax Calculation and Methodology", *International Studies Program Working Paper* No.11.

Akinaboade, O., (2014), "Regulation, SMEs' Growth and Performance in Cameroon's Central and Littoral Provinces' Manufacturing and Retail Sectors", *African Development Review*, Vol. 26, Issue 4, p. 597-609.

Alm, J., and Borders, K, (2014), "Estimating the "Tax Gap" at the State Level: The Case of Georgia's Personal Income Tax", *Public Budgeting & Finance*, Vol. 34, Issue 4, pp. 61-79

Annan, B., Bekoe, W., and Nketiah-Amponsah, E, (2012), "Determinants of Tax Evasion in Ghana: 1970-2010", *International Journal of Economic Sciences and Applied Research* 6 (3): 97-121

Antwi, S.K., Inusah, A.M., and Hamza, K., (2015) "The Effect of Demographic Characteristics of Small and Medium Entrepreneurs on Tax Compliance in the Tamale Metropolis, Ghana", *International Journal of Economics, Commerce and Management* Vol. III, Issue 3

Asante, S., (2012), "Estimating the Underground Economy and Tax Evasion in Ghana", Available at: http://ssrn.com/abstract=2013176

Cagan, P. (1958), "The demand for currency relative to total money supply", *National Bureau of Economic Research Occasional Paper* 62,

Cobham, A., (2005), "Tax evasion, tax avoidance, and development finance", *Queen Elisabeth House Working Paper* No. 129.

Contini, B., (1981), "Labour Market Segmentation and the Development of the Parallel Economy— the Italian Experience," *Oxford Econ. Papers*, 33:4, pp. 401–12.

Feige, E. L., (1979), "How Big is the Irregular Economy?" *Challenge*, November-December, 5-13.

Feinstein, J. (1991), "An econometric analysis of income tax evasion and its detection" *Rand Journal of Economics* 22 (1), 14-35.

Frey, B. S., and Weck-Hannemann, H., (1984), "The Hidden Economy as an 'Unobserved'

Gemmell, N., and Hasseldine, J., (2012), "The Tax Gap: A Methodological Review", *Victoria Business School Working Paper* 09

Georgiou, G.M., (2007), "Measuring the size of the informal economy: A critical review" *Central Bank of Cyprus Working Paper* No.1

Giles, D.E.A., (1999), "Modelling the Hidden Economy and the Tax-Gap in New Zealand", *Empirical Economics*, Vol.24, Issue 4

GIZ Sector Programme Public Finance, Administrative Reform (2010), "Addressing tax evasion and tax avoidance in developing countries", *Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH*

GSS, (2013). Ghana Statistical Service. Ghana Living Standards Survey-Report of the Sixth Round.

Gutmann, P.T., (1997), "The Subterranean Economy*", Financial Analysts Journal(November-December):* 64-66 and 69

Harremi, M., (2014), "A simple analysis of the tax gap Balkan region", *Mediterranean Journal of Social Sciences,* Vol.5, No.19

Helhel, Y., and Ahmed, Y., (2014), "Factors affecting Tax Attitudes and Tax Compliance: A Survey Study in Yemen" *European Journal of Business and Management,* Vol.6, No. 22.

ISSER, (2014). The State of the Ghanaian Economy in 2013. Institute of Social, Statistical and Economic Research. Sundel Printing Services.

ISSER, (2015). The State of the Ghanaian Economy in 2014. Institute of Social, Statistical and Economic Research. Sundel Printing Services.

Jenkins, G.P., and Kuo, C-Y, (2000), "A VAT revenue simulation for tax reform in developing countries", *World Development* 28 (4): 763-774.

Johnson, S., Kaufmann, D., and Shleifer, A., (199) "The Unofficial Economy in Transition," *Brookings Papers Econ. Act.,* 0:2, pp. 159–221.

Keen, M and S. Smith (2007) "VAT fraud and evasion: What do we know, and what can be done?", *IMF Working Paper* 07/31, International Monetary Fund: Washington DC.

Khwaja, M.S., and Iyer, I, (2014), "Revenue Potential, Tax Space, and Tax Gap: A Comparative Analysis" *World Bank Policy Research Working Paper* 6868

MacAfee, K., (1980), "A Glimpse of the hidden economy in the national accounts", *Economic Trends,* 136, pp. 81-87

Martin-Vazquez, J., Rider, M., and Wallace, S, (2008), "Tax Reforms in Russian", *Edward Elgar Publications*: Amsterdam NL.

Mawejje, J., (2013), "Tax Evasion, Informality and the Business Environment in Uganda" *Economic Policy Research Centre Research Series* No. 113

Mazur, M. J., and Plumley, A.H., (2007), ''Understanding the Tax Gap'', A Presentation to National Tax Association Spring Meeting, Washington, DC.

McGee, R.W., and Tyler, M., (2006), "Tax Evasion and Ethics: A Demographic Study of 33 Countries", Available at SSRN 940505.

Minh, T.L., (2007), "Estimating the VAT tax base: method and application", *Tax Notes International*

Novysedlák, V., and Palkovičová, J, (2012), "The estimate of the value added tax revenue loss", *Economic Analysis* 25. Bratislava: Institute for financial policy.

Reckon (2009), "Study to quantify and analyse the VAT gap in the EU-25 Member States", A study commissioned by the European Commission, Directorate-General for Taxation and Customs Union.

Schneider, F. and Williams, C.C., (2013), "The Shadow Economy", Institute of Economic Affairs, London.

Spicer, M. W., and Becker, L.A., (1980), "Fiscal Inequity and Tax Evasion: An Experimental Approach." *National Tax Journal*, June, 33(2): 171–75.

Tanzi, V. (1980), "The Underground Economy in the United States: Estimates and Implications", *Banca Nazionale del Lavoro Quarterly Review*, 135, 427-53.

Tanzi, V., (1983), "The Underground Economy in the United States: Annual Estimates, 1930–1980," *IMF Staff Papers*, 30:2, pp. 283–305.

Toder, E., (2007), "What is the Tax Gap", A Report prepared for the American Bar Association Conference on the Tax Gap.

Variable," *Europ. Econ. Rev.*, 26:1–2, pp. 33–53.

Vuletin, G., (2008), "Measuring the Informal Economy in Latin America and the Caribbean", *IMF Working Paper* WP/08/102.

Yalama, G.O., and Gumus, E., (2013), "Determinants of Tax Evasion Behaviour: Empirical Evidence from Survey Data", *International Business and Management* Vol. 6, No. 2, 2013, pp. 15-23.

www.mofeb.gov.gh/

www.gra.gov/gh/

APPENDIX

Tests for Heteroskedasticity

White's test for heteroskedasticity

Ho: homoskedasticity against Ha: unrestricted heteroskedasticity

chi2(78) = 183.75

Prob > chi2 = 0.0000

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of tax gap

chi2(1) = 3987.30

Prob > chi2 = 0.0000

The International Growth Centre (IGC) aims to promote sustainable growth in developing countries by providing demand-led policy advice based on frontier research.

Find out more about
our work on our website
www.theigc.org

For media or
communications enquiries,
please contact
mail@theigc.org

Subscribe to our newsletter
and topic updates
www.theigc.org/newsletter

Follow us on Twitter
@the_igc

Contact us
International Growth Centre,
London School of Economic
and Political Science,
Houghton Street,
London WC2A 2AE

IGC
International
Growth Centre

DIRECTED BY
LSE
UNIVERSITY OF OXFORD

FUNDED BY
UKaid
from the British people

Designed by soapbox.co.uk