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Tax Gap Analysis

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Poverty and Equipty Global Practice
Africa Region

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GOVERNMENT FISCAL YEAR
January 1 – December 31

CURRENCY EQUIVALENTS
Official Exchange Rate Average for 2019
Currency Unit = Ghanaian Cedi (GHS)
USD$1 = GH₵ 5.22

WEIGHTS AND MEASURES
Metric System

CIT	Corporate Income Tax
CT	Corporate Tax
EITR	Effective Import Tax Rate
GCMS	Ghana Customs Management System
GDP	Gross Domestic Product
GRA	Ghana Revenue Authority
GSS	Ghana Statistical Service
HS	Harmonized System
IBES	Integrated Business Establishment Survey
MDA	Ministries, Departments, and Agencies
MOF	Ministry of Finance
NGO	Non-Governmental Organization
NHIL	National Health Insurance Levy
PIT	Personal Income Tax
REP	Random Enquiry Programme
SA	Self-Assessment
TGPG	Tax Gap Project Group
UN COMTRADE	United Nations International Trade Statistics
VAT	Value Added Tax
WITS	World Integrated Trade Solution

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Abstract

The objective of this report is to provide a comprehensive evaluation of the tax gap in Ghana and help the Government of Ghana identify the areas where they can increase tax revenue by improving compliance. Tax gap for corporate income tax, import tax, estimated value added tax, and potential tax revenue from formalization of informal firms were investigated. The main analytical results are summarized below.

Corporate Tax Gap

The financial information collected from a nationally representative sample of 24,719 establishments is used to estimate potential corporate tax revenue in 2014. It was compared with the actual tax revenue to derive the tax gap. The total corporate tax gap was estimated to be range between 81.6 percent and 85.6 percent of potential corporate tax revenue, which is equivalent to 9.4 percent and 12.6 percent of GDP in 2014. The tax gap in Greater Accra is 84.1 percent, lower than the national average. However, Greater Accra alone accounts for at least 84.1 percent of the total corporate income tax gap in amount. Wholesale and retail trade and repairs of motor vehicles account for about 27.8 percent of the total tax gap. About 52.5 percent of total potential tax revenues are due from large firms (firms with 50 or more employees), which comprise only 8.8 percent of total corporate establishments.

Import Tax Gap

The import tax gap is estimated using detailed information on trade between Ghana and trading partners between 2012 and 2016. The estimated gap is around 32.5 percent on average between 2012 and 2016. Import tax gap as a percentage of GDP is relatively low in Ghana with 1.1 percent in 2016 at the highest. Major contributors to the import tax gap are the European Union, Nigeria, China and Thailand. China was the largest contributor to the total import tax revenue gap between 2012 and 2016. The import tax gap for beverages, spirits, and vinegar was the highest amount among all imported items; US$258.9 Million in total from 2012 to 2016.

Value Added Tax (VAT) gap

Actual VAT revenues, the sectorial GDP, and value added at market prices were used to estimate the VAT gap from 2011 to 2016. The VAT compliance gap increased from 18.2 percent to 39.3 percent between 2011 and 2016. Potential VAT revenue as a percentage of GDP has grown from 5.4 percent of GDP to 7.0 percent of GDP during that period.

Potential Tax Revenue from Formalization

Sole proprietorship and partnership establishments are mostly informal. The estimated tax revenue from the formalization of sole proprietorship is over 19.5 billion cedi (15.7 percent of GDP in 2013). Wholesale and retail trade and repairs sub-sectors are the largest contributors to potential tax revenue. Partnership firms are another group of self-employed establishments that can be formalized. The estimated potential PIT revenues from the formalization of self-employed partners amounted to GH¢ 958.3 million in 2013. Partners operating in wholesale and retail trade and repairs and finance and insurance activities sub-sectors are the highest and second highest contributors to the potential tax revenues from partners.

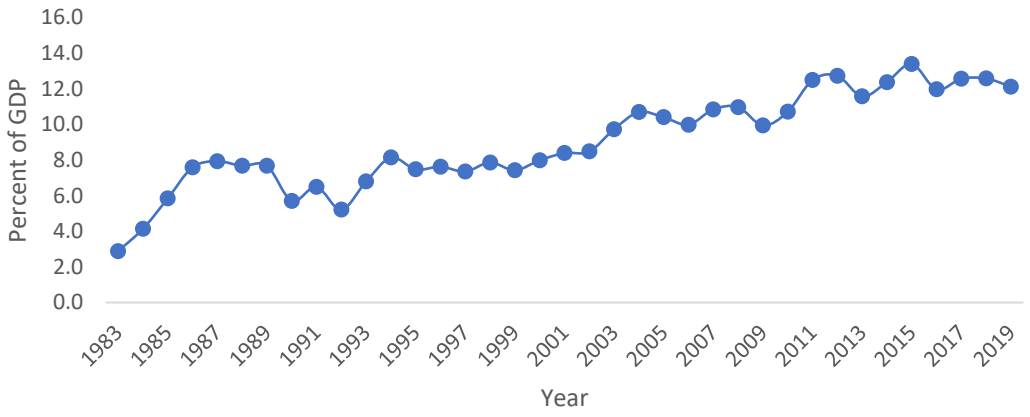
1. Introduction

1. Ghana's tax collection is low compared with other lower middle-income countries in Sub-Saharan Africa. Tax revenue as a percentage of GDP has remained less than 14 percent since 1983. There is an urgent need to improve domestic resource mobilization, as the government has been suffering from a widening fiscal deficit and a rising debt burden. Improvement of domestic resource mobilization requires a clear understanding of the country's tax potentials, i.e., where most tax evasion and avoidance occur. A clear picture of tax potentials on different tax types will serve as a guide for the Government to set appropriate revenue targets and develop strategic long-term fiscal planning.

2. This report presents a comprehensive set of estimates of the tax gap in Ghana for corporate tax, value added tax (VAT), and import taxes. In addition, the report investigates potential tax revenues that can be generated from the formalization of informal firms.

3. Globally, the importance of tax gap estimation has been recognized. This is indicated by an increasing number of countries and regions that have started undertaking comprehensive tax gap studies in recent years[1]. The estimated VAT gap in Ghana ranges from 18.2 to 39.3 percent. An average import tax gap of 32.5 percent is estimated for Ghana from 2012 to 2016. For corporate income tax, gap of at least 81.5 percent is estimated for Ghana using a representative sample of corporate entities in 2013. The high rates of tax gaps are consistent with the persistent low Ghana's tax collection, and that there is a great potential for the Government to expand domestic revenue mobilization.

Figure 1: Tax Revenue as Share of GDP in Ghana (1983-2019), in percent



Source: Authors' computation based on Fiscal Data from Ministry of Finance (several series) Available at https://www.mofep.gov.gh/fiscal-data and "Quarterly Bulletins" by Bank of Ghana (several series) Available at https://www.bog.gov.gh/publications/quarterly-bulletin/

[1] Sierra Leone, Moldova, Uganda, Pakistan, South Africa, Australia, Japan, United Kingdom are some of the countries that have estimated tax gaps of on different tax types.

2. Corporate Tax Gap

4. Corporate Income Tax (CIT) gap is generally defined as the difference between the total amounts of CIT theoretically collectable based on the applicable tax law and the total amounts of CIT actually collected in a given period (Tax Gap Project Group (TGPG), 2016). In this chapter, the theoretical (or potential) corporate tax revenue in Ghana is estimated and compared with the actual revenue collected by the Ghana Revenue Authority (GRA) to estimate the CIT gap in Ghana.

2.1. Data and Methodology

5. Measuring the potential tax revenue remains the critical aspect of tax gap analysis. Corporate income tax (CIT) is a direct tax and its current legal framework in Ghana is contained in the Income Tax Act 2015 (Act 896) (Parliament of Ghana, 2015). However, in 2013—the period of this study—the legal framework for imposition and collection of company income tax was provided by the Internal Revenue Act 2000 (Act 592) and various Amendments over the period (Parliament of Ghana, 2000). The Act prescribes industry or sector and regional specific tax rates in the imposition of tax liability for a given corporate entity. Applicable tax rates are critical for the computation of the potential corporate income tax revenue. Thus, it is important to identify the applicable tax rates at the industry level, as the tax rates depend on sectors. Though the general tax rate is 25 percent, the rate applied to mining and upstream petroleum companies, for example, differs. The applicable rates to mining companies and hotels are 35 percent and 20 percent, respectively. Table 1 below shows the applicable taxes to sectors.

Table 1: Applicable Company Income Tax Rates in 2013

Industry/Sector	Rate (Percent)
General Company Tax	25
Manufacturing: in Accra/Tema	25
Manufacturing: in all other Regional Capitals	18.75
Manufacturing: Elsewhere	12.5
Hotel industry	20
Mining	35
Real Estate: first 5 years	0
Real Estate: after first 5 years	25
Agro-processing: first 5 years	0
Agro-processing: after first 5 years and located in Accra/Tema	20
Agro-processing: after 5 years and located in other Regional Capitals, excluding Tamale, Wa and Bolgatanga	10
Agro-processing: after 5 years and located outside Regional Capitals	0
Agro-processing: located in Northern, Upper East and Upper West Regions	0
Free Zone Enterprise /Developers[2]	0

[2] The Free Zone Programme is designed primarily to promote processing and manufacturing of goods and services through the establishment of Export Processing Zones (EPZs), structured either as enclaves or single-factory enterprise schemes (GFZB, 2013; The Free Zone Act (1995), Act 504). In 2013, about 337 companies operated in Tema Freezone area and did not incur any corporate tax income liability. In our data, we are unable to differentiate free zone firms from the others. Thus, we also compute potential revenue without manufacturing firms in Tema in order to take out such policy gap from compliance gap. We acknowledge that this may reduce the tax base as there other

Source: PWC (2013). Charting tax trends in Ghana: A Quick Guide to taxation in Ghana: 2013 Tax Facts and Figures. https://www.pwc.com/gh/en/assets/pdf/ghana-tax-facts-and-figures-2013-brochure.pdf

6. Income from exports of non-traditional exports and loans to agriculture sector attracted lower income tax rates—chargeable income from non-traditional exports attracted 8 percent and financial intermediaries' chargeable income from loans granted to farming enterprises and leasing companies attracted 20 percent. In addition, listed and companies attracted 22 percent of CIT rates instead of the normal 25 percent. Rural Banks also have lower CIT rate of 8 percent after 10 years of operation and 0 percent for the first 10 years. Tema contains a free zone area where enormous tax incentives are provided specially to promote exports. Our data do not allow us to separate corporate income into these categories in order to apply the correct tax rates as stated in the tax schedule.

7. In the computation of potential revenues, identifying the assessable and chargeable tax bases are critical for tax gap analysis. Various methods are used to compute potential tax revenues depending on the data availability. Generally, two main approaches have been used to estimate corporate income tax—bottom-up approach and top-down approach. For the case of top down approach, a highly aggregated data are used to estimate the size of the potential chargeable income and the potential corporate income tax revenue is obtained as the product of the effective tax rate and potential revenue. The bottom-up approach, on the other hand, uses data from tax returns filed by companies, from enforcement audits and from surveys (random and non-random) of corporate entities, as well as micro-stimulations models to estimate the potential chargeable revenue by employing extrapolation when sample data *in lieu* of the population data is collected. Ahmed and Rider (2008) suggest that bottom up approach is the preferred methodology in estimating tax gap as it could provide an accurate and detailed estimates of tax gap.

8. In this study, a bottom-up approach is employed to estimate the corporate tax revenue and tax gap in Ghana. Data gathered from a represented survey of corporate entities in Ghana is analyzed for this purpose. The method based on survey data is similar to the random audit method employed by Denmark and United Kingdom, which use random samples of corporate income taxpayers to estimate corporate income tax. The results and conclusions drawn from the sample data are grossed-up to the whole population by applying statistical technique of weighting. In Denmark, a Random Audits Survey on small and medium sized companies (up to 250 employees), was conducted on income years on bi-annual basis from 2006 to 2014 (FISCALIS Tax Gap Project Group, 2018). In the United Kingdom, a stratified random sample, based on the size of annual trading turnover, is used to select from the small business population who are issued with a notice to file a corporate tax (CT) return (HRMC, 2019b). The Corporation Tax Random Enquiry Programme (REP) allows HMRC to estimate the extent of under-declaration of liabilities arising from the submission of incorrect CT returns. The results from the CT random survey are weighted by the actual population of each strata to derive the results for the small business population who are issued with a notice to file a CT return. The data used in this study is not audit data but a stratified random sample survey data collected by Ghana Statistical Service (GSS) in 2013. As expected, the focus of the data collection was not for tax auditing and therefore limited in scope in assessing tax liabilities of the sample companies. However, the data and the method apply allow uncovering of both the tax avoidance and tax evasion of corporate income tax in Ghana.

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manufacturing firms in Tema. However, this exercise provides an indicative measure of how large tax gap is even after considering s effect of such tax incentive policy.

2.1.1. Firm Level Data

9. Data from a business establishment census (IBES I) and a business establishment survey (IBES II) are used to estimate the potential corporate tax revenue. IBES I contains the population of all establishments in Ghana, and IBES II is a survey with randomly (stratified) sampled firms from IBES I. IBES I is a baseline business establishment census that was conducted by Ghana Statistical Service (GSS) in 2014. Data collection was carried out with 638,234 business establishments identified at the time of the census. IBES I data contains information such as the legal registration status with the GRA, the number of workers, and the types of ownership. IBES II is a business establishment survey conducted in 2015 with reference to firm level information in 2013. Data were collected from 24,719 business establishments randomly (stratified) sampled from IBES I. IBES II data contain detailed financial information on revenues, assets and production costs, and the locations of establishments.

2.1.2. Sample and Descriptive Statistics

10. IBES II includes data from both firms, which are registered and not registered with the GRA. Our interest is the estimation of theoretical tax payments among firms registered with the GRA for corporate income tax. Although IBES II data has no information on whether firms are registered with the GRA, IBES I has such information. By merging IBES I and IBES II datasets, we can identify firms which are registered with the GRA in the IBES II dataset and are liable to pay corporate income tax. The population of registered corporate firms is needed to estimate the potential corporate income tax. They are the formal sector firms, which are subject to the payment of corporate tax to the GRA.

11. Only corporate entities pay corporate or company income tax (CIT). The study follows GRA and consider subsidiary companies, and corporate groups, irrespective of their affiliations, as separate entities that are prepare accounts and are taxed separately from the parent companies. IBES I has information about the population of all the corporate entities and those that are registered with the Ghana Revenue Authority (GRA). Private and public limited liability companies that have registered with the GRA are classified as corporate taxpayers. These are the formal sector firms, which are subject to the payment of corporate tax to the GRA. Table 2.1 indicates that in 2013, the total number of corporate taxpayers in Ghana was 23,938 firms out of the 638,234 establishments, representing just about 3.75 percent of all establishments. The number of GRA registered corporate firms in IBES 1 of 23,938 compares favourably with the administrative data from GRA, albeit, differences periods: GRA reported a total of 25,708 active filers of corporate income tax in 2014. This suggests that the population of registered corporate income taxpayers reported for the year 2013 by IBES 1 might be close to the register of GRA in 2013 given that active filers are likely to increase every year as a result efforts made to increase registration and compliance among unregistered corporate firms to file their returns.

12. The IBES 2 sample contained 2,953 of corporate income taxpayers representing 12.3 percent of total establishments sampled. GSS collected financial information related to 2013 financial year of these corporate firms and other types of establishments. Comparison with IBES 1 indicates that, corporate firms were over-sampled. The entire sample was based on a stratified sample using region, firm size and activity classification.

Table 2: Distribution of Corporate and non-corporate firms in Ghana

Data Source	Type of Taxpayers	Number of Establishments	Percent
IBES I (CENSUS)	Non-corporate	614,296	96.3
	Corporate Taxpayers	23,938	3.8
	Total	638,234	100
IBES II (SAMPLE)	Non-corporate	21,076	87.7
	Corporate Taxpayers	2,953	12.3
	Total	24,029	100

Source: Authors' own computation based on IBES I and II

13. The regional population distribution of GRA registered corporate firms for corporate income tax in IBES 1 is presented in Table 3. In the 2013 business census (IBES I), 23,938 registered corporate firms were recorded. Many of the registered corporate firms in Ghana located in Greater Accra, with 66.4 percent of the entire corporate entities, followed by Ashanti and Western regions with 10.3 percent and 6.7 percent, respectively.

Table 3: Distribution of GRA Registered Corporate Firms

Region	Frequency	Percent
Greater Accra	15,890	66.4
Ashanti	2,456	10.3
Western	1,596	6.7
Eastern	797	3.3
Central	989	4.1
Brong Ahafo	809	3.4
Volta	536	2.2
Northern	431	1.8
Upper East	242	1.0
Upper West	192	0.8
Total	**23,938**	**100**

Source: Authors' own estimation based on IBES I and II

14. Table 4 presents the sectoral distribution of registered corporate firms in Ghana. About 7,956 corporate firms are in wholesale and retail business constituting about 33.2 percent of the total registered corporate firms in Ghana. Construction, and finance and Insurance follow with 14.42 percent and 11.23 percent respectively. The manufacturing sub-sector contributes about 7 percent of the number of corporate firms in Ghana.

Table 4: Sectoral Distribution of Registered Corporate Firms in Ghana

Activity	Frequency	Percent
Agriculture, Forestry and Fishing	282	1.2
Mining and Quarrying	320	1.3
Manufacturing	1,667	7.0
Electricity, Gas, Stream and Air Condition	94	0.4
Water Supply, Sewerage, Waste Management	101	0.4
Construction	3,451	14.4
Wholesale and Retail Trade	7,956	33.2
Transportation and Storage	1,222	5.1
Accommodation and Food Service Activity	754	3.2
Information and Communication	692	2.9
Financial and Insurance Activities	2,689	11.2
Real Estate Activities	300	1.3
Professional, Scientific and Technical	1,510	6.3
Administrative and Support Service Activities	887	3.7
Public Administration and Defense	90	0.4
Education	864	3.6
Human Health and Social Work Activities	492	2.1
Arts, Entertainment and Recreation	136	0.6
Other Service Activities	423	1.8
Activities of Households as Employers	3	0.01
Activities of Extraterritorial Organization	5	0.02
Total	23,938	100

Source: Authors' own computation based on IBES II

15. As stated above, the Ghana Statistical Service (GSS) collected data on 2,953 registered corporate firms in Ghana. The regional distribution of sample of registered corporate firms surveyed by GSS in IBES II is presented in Table 5. Out of the 2,953 GRA registered firms were surveyed by GSS, 60.1 percent were located in Greater Accra, followed by Western Region and Ashanti region with 9.7 percent and 8.3 percent respectively. The table also compares the sample (IBES II) and census (IBES I) regional distributions of firms.

Table 5: Distribution of GRA Registered Corporate Firms (IBES I and IBES II)

	IBES II (SAMPLE)		IBES I (CENSUS)
Region	Frequency	Percent	Percent
Greater Accra	1,776	60.1	66.4
Ashanti	246	8.3	10.3
Western	286	9.7	6.7
Eastern	109	3.7	3.3
Central	130	4.4	4.1
Brong Ahafo	111	3.8	3.4
Volta	110	3.7	2.2
Northern	85	2.9	1.8
Upper East	37	1.3	1.0
Upper West	63	2.1	0.8
	2,953	100	100

Source: Authors' own computation based on IBES I and II

16. Table 6 also compares sectoral distribution of the CIT registered firms in IBES I and II to ascertain the representativeness of the sample at specific sectors. It can be seen that there are only marginal differences between the IBES I and IBES II. It is clear from Table 6 that the distribution of the sample of CIT registered firms in IBES II represent the population of CIT registered companies with little differences. The test of representative of the sample, shown in Appendix A.8, also indicate that the sample of corporate firms in IBES II represents the population of corporate firms in Ghana. The two-sample Kolmogorov–Smirnov tests of the equality of distributions is adapted to check the representativeness of the corporate firms in IBES II. To make inference about the population of registered corporate firms in Ghana, we compute weights to scale sample results to the population. IBES I was used as the sampling frame to re-estimate sample weights to allow accurate estimation of potential revenues and potential tax revenues for the whole country. The computed sampling weights were used to estimate the number of nationally representative firms in IBES II. Both the number and proportions of registered corporate firms' distributions are similar between IBES I and IBES II.

Table 6: Distribution of Firms by Sector

	IBES II			IBES I
	Sample		Est Popn.	Actual Popn
Activity	Frequency	Percent	Percent	Percent
Agriculture, Forestry and Fishing	19	2.47	0.63	1.18
Mining and Quarrying	38	3.05	1.3	1.34
Manufacturing	227	13.75	7.69	6.96
Electricity, Gas, Stream and Air Condition	9	0.71	0.31	0.39
Water Supply, Sewerage, Waste Management	9	1.05	0.31	0.42
Construction	459	10.23	15.54	14.42
Wholesale and Retail Trade	970	16.86	32.86	33.24
Transportation and Storage	166	8.3	5.63	5.1
Accommodation and Food Service Activities	84	5.32	2.86	3.15
Information and Communication	93	4.03	3.16	2.89
Financial and Insurance Activities	343	12.12	11.63	11.23
Real Estate Activities	24	1.56	0.81	1.25
Professional, Scientific and Technical	205	6.06	6.95	6.31
Administrative and Support Service Activities	111	5.49	3.75	3.71
Public Administration and Defense				0.38
Education	103	4.61	3.48	3.61
Human Health and Social Work Activities	54	2.64	1.83	2.06
Arts, Entertainment and Recreation	10	0.95	0.34	0.57
Other Service Activities	27	0.78	0.91	1.77
Activities of Households as Employers	0.1	0.03	0.0047	0.01
Activities of Extraterritorial Organization				0.02
Total	2,953	100.0	100.0	100

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

2.1.3. Calculation of Sampling Weights

17. To estimate potential corporate tax revenue for the whole country using the financial information collected from sampled 24,719 establishments in IBES II, there is a need to apply sample weights. The IBES II dataset includes official sampling weights. However, due to a considerably high non-response rate (78.2 percent), this report re-estimated sample weights by using IBS I as a sampling framework, so it can accurately estimate potential tax revenues for the whole country.

18. GSS used a stratified sampling method to select firms for IBES II, using IBES I as the sampling frame. The variables used for the stratification are firm size measured by the number of employees, activity areas defined at the two-digit ISIC level, and regions. The weights are calculated so that the total number of firms in each category (after using weights) in IBES II is equal to the known population total in IBES I. Frequencies

by size, activity, and region were first calculated for both IBES I and IBES II. The weight for each firm in the IBES II dataset was then computed as follows:

$$WeightF_{ijk} = \frac{TF_{ijk}\ in\ IBES\ I}{TF_{ijk}\ in\ IBES\ II}$$

Where i, j and k denote size, activity and region, respectively. TF is the number of firms in the group and $WeightF$ is the computed weight of the firm.

2.1.4. Computation of Tax Base

19. Net profit (before tax) is the tax base for the corporate income tax in Ghana. We can estimate the corporate net profit, the base of CIT (corporate income tax), using IBES II, because IBES II includes most categories of firms' revenue and cost, that correspond to items in tax returns (see Table 7). We make the following assumptions for estimating the tax base (net profit) of each individual firm using IBES II:

- There is no non-taxable income (Item 26) and carry-over losses (Item 28).
- The capital allowance (Item 20 of tax return) equals the depreciation of fixed capital based on accounting principles (Column 4 of Line 6.15 in the questionnaire of IBES II).

20. These deductible expenses like carry over losses and capital allowances are needed to accurate estimate the chargeable income, but they are not available in our data. Proxies for these variables are used when available[3].

21. There are no data on capital allowance, which is tax deductible. Therefore, depreciation rates are used as a proxy for capital allowance instead. It is recognized that depreciation is usually not allowable deduction are usually higher than capital allowance. In addition, we do not have information on carry over losses. Hence, they are not considered in the computation of taxable income. The presence of carry over losses will likely overestimate our estimate of taxable income and therefore affect potential tax revenue. However, attempts are made to account for the effect of carry over losses by excluding sectors, which are likely to experience carry over losses. Mining and petroleum sectors have high initial capital, and thus are likely to experience losses during the initial period. Furthermore, we account for tax holidays of free-zone operations by excluding firms operating in free-zone areas.

[3] These and other data limitations stated earlier suggest that our estimates are likely to be biased. Thus, our estimate of the potential tax revenue and therefore tax gap are indicative rates rather than actual potential revenues and tax gaps. In general, our estimates include both compliance and policy gaps. Our general strategy is to try to estimate lower bound of potential corporate income tax by applying feasible tax rates applicable to a sector when disaggregating is not possible.

Table 7: Computation of Net Profit

Item	Item in the tax return (DT 0101)	Corresponding item in the questionnaire of IBES II	Availability in agg_data.dta
Total Business Income	Line 14	Value of sales (12.8)	Available ("totalrev" (Total revenue)
Investment Income	Line 15	Dividend received (13.6)	Available (Included in "Nonindrec")
Other Income	Line 16	Other receipt except for dividend received (13.8 minus 13.6)	Available (Included in "Nonindrec")
Total Company Income	Line 17 (= sum of Line 14, 15, and 16)	Sum of Line 11.11, 11.18, 12.8, and 13.8	Available (If "totalrev" (Total revenue) corresponds to total business income and we assume there is no investment income and other incomes)
Total Operating Expenses	Line 18	purchases (Line 9.7)	Available (9.7 itself is not available, but we can calculate it via sum of 9.1-9.6)
Total General and Administrative Expenses	Line 19	Wages and Salaries (Line 3.3) Supplements to wages and salaries (Line 4.3)	Available ("s2q3p3" (3.3: Total payments) corresponds to it) Available ("s2q4p3" (4.3: Total supplements to wages and salary) corresponds to it)
Depreciation	Line 20	Depreciation of fixed assets (Column 4 of Line 6.15)	Available (we need to sum up 14 Files: "s4q6p41" to "s4q6p414")
Foreign Exchange Losses	Line 21	Exchange rate losses (losses due to currency depreciation) (Line 10.24)	Included in "othopcost"
Other General and Administrative Expenses	Line 22	Other operating cost (Line 10.28)	Available ("othopcost" (Grand Total))
Total Expenses	Line 23 (= sum of Line 18, 19, 20, 21, and 22)	Sum of Line 3.3, 4.3, 6.15 (column 4), 7.11, 8.10, 9.7, and 10.28	Available, once depreciation of fixed assets (Column 4 of Line 6.15) is available
Net Company Profit /Loss	Line 17 minus 23	Sum of Line 11.11, 11.18, 12.8, and 13.8 minus sum of Line 3.3, 4.3, 6.15 (column 4), 7.11, 8.10, 9.7, and 10.28	Available, once depreciation of fixed assets (Column 4 of Line 6.15) is available.

Source: Authors' analysis based on IBES II questionnaire, data and tax return form

2.1.5. Estimation of Potential or Theoretical Ta Revenue and Tax Gap

22. The estimated tax base (net profit of the firm) was multiplied by the tax rate for an applicable sector to ascertain the theoretical tax revenue of each firm. Then, the sampling weights were used to scale up the results to the entire population of corporate establishments subject to corporate tax in the country.

2.2. Results

23. The corporate income tax gap is the difference between revenue actually collected and the potential revenue that could have been collected given the policy framework that was in place during that year. By taking a difference between theoretical tax payment and actual tax revenue, we obtain the tax gap of corporate income tax. The gap is expressed as a percentage of potential revenue and GDP for 2013.

Table 8: Total Corporate Income Tax Gap in Ghana (*GH C 'Million')*

	Ghana	Ghana (Excl. Manufacturing in Tema FZ)
Potential Corporate Income Tax	22,980.7	17,973.6
Actual CIT	3,307.5	3,307.5
CIT Gap	19,673.2	14,666.1
CIT Gap as Percentage of Potential CIT	85.6	81.6
CIT Gap as Percentage of GDP	12.7	9.4

Source: Authors' own estimation based on IBES data, Applicable Tax Rates and GRA Revenue data

24. Total corporate tax gap was estimated to be 85.6 percent of potential tax revenue and was equivalent to 12.7 percent of GDP. Excluding the manufacturing companies located in Tema, the free zone area, the estimated tax gap is 81.6 percent and 9.4 percent of potential corporate tax revenues and GDP, respectively.

Tax Gap by Region

25. Table 9 presents the corporate tax gap by region. Tax gap as percentage of potential revenue is highest in Ashanti Region (97.7 percent) and lowest in Upper West region (82.5 percent). Other regions with high overall tax gaps are Central, Brong Ahafo and Upper East regions with 96.8 per cent, 95.2 per cent and 95.1 per cent, respectively. The tax gap in Greater Accra is at least 84.1 per cent of the potential tax revenues in the region.

26. In terms of contribution to the total tax gap, Greater Accra alone accounts for at least 84.1 percent. Therefore, improvement in tax collection in Greater Accra is very important for reducing the corporate income tax gap. To improve domestic revenue mobilization from corporate income tax, more resources and attention should be focused on Greater Accra to improve compliance in the region. Other regions of importance for corporate income tax are Ashanti and Western Regions, which contributed 5.8 percent and 3.4 respectively to the estimated total corporate income tax in Ghana.

Table 9: Corporate Tax Gap by Region (Ghc 'Million')

Region	POTENTIAL	ACTUAL	GAP	% GAP	% CONTRIBUTION TO TOTAL GAP
Greater Accra	20,551.7	3,207.3	17,344.4	84.4	88.2
Excl. Tema Manufacturing	*15,544.6*	*3,207.3*	*12,337.3*	*79.4*	*84.1*
Ashanti	1,169.8	26.5	1,143.3	97.7	5.8
Western	714.7	40.1	674.6	94.4	3.4
Eastern	55.8	7.7	48.1	86.2	0.2
Central	136.4	4.4	132.0	96.8	0.7
Brong Ahafo	121.3	5.8	115.5	95.2	0.6
Volta	72.1	6.5	65.6	91.0	0.3
Northern	128.9	7.1	121.8	94.5	0.6
Upper East	24.2	1.2	23.0	95.1	0.1
Upper West	5.7	1.0	4.7	82.6	0.02
TOTAL	22,980.7	3,307.5	19,673.1	85.6	100.0

Source: Authors' own estimation based on IBES data, Applicable Tax Rates and GRA Revenue data

Corporate Tax Gap by Sectors

27. Table 10 presents the tax gap by sector. The tax gap analysis by sector shows that administrative and support service activities; agricultural, forestry and fishing; water supply, sewerage & waste management; wholesale and retail; construction; and information and communication are the sectors with large tax gaps: all with more than 90 percent. Concerning sectorial contribution to the overall tax gap within the country, the table indicates that manufacturing and wholesale and retail trade are two important sectors. Manufacturing, and wholesale and retail trade sub-sectors, together, account for about 51.3 percent of the total tax gap with 23.5 per cent and 27.8 per cent, respectively. However, the inability to isolate the effect of policy gap—free zone area—in the tax gap for the manufacturing sector, suggests a caution in the interpretation and compliance interventions. Indeed, Potential tax revenues from the manufacturing sub-sector in Tema alone accounted for 93 percent of the entire potential corporate income tax revenue from the manufacturing sub-sector in Ghana. Thus, disentangling the gap resulting from free-zone, which is a deliberate tax incentive policy, will be very critical in understanding the corporate income tax gap in the manufacturing to help fashioning compliance intervention. This result suggests that targeting retail trade sub-sectors for improving compliance might help in increasing domestic revenue mobilization from corporate income tax revenues. Financial and insurance; and information and communication sub-sectors are third and fourth contributors of the estimated total corporate tax gap in Ghana, each accounting for 12 percent and 11.9 percent respectively.

Table 10: Corporate Tax Gap by Sectors (Ghc million)

SECTOR	POTENTIAL	ACTUAL	TAX GAP	TAX GAP (%)	% CONTRIBUTION TO TOTAL GAP
Agric, Forestry & Fishing	24.3	21.6	2.7	11.2	0.01
Mining & Quarrying	1,984.4	441.2	1,543.1	77.8	7.8
Manufacturing	5,791.9	1,163.8	4,628.2	79.9	23.5
Manufacturing in Tema	*5,007.2*				
Electric,Gas, Steam & Aircondition Supply	125.8	42.1	83.8	66.6	0.4
Water Supply,Sew. & Waste Management	329.0	13.5	315.5	95.9	1.6
Construction	2,010.9	98.7	1,912.2	95.1	9.7
Wholesale & Retail Services	5,749.4	272.9	5,476.5	95.3	27.8
Transport & Storage	637.2	104.9	532.3	83.5	2.7
Accommodation & Food Services	25.6	15.5	10.1	39.5	0.1
Information & Communication	2,568.1	230.1	2,338.0	91.0	11.9
Financial & Insurance	3,088.6	721.7	2,366.9	76.6	12.0
Real Estate Activities	23.4	27.6	(4.2)		(0.0)
Professional, Science. & Technical Services	82.0	44.8	37.2	45.4	0.2
Admin. & Support Serv. Act.	456.8	16.5	440.3	96.4	2.2
Public Administration & Defense		8.0	-	-	
Education	59.3	14.3	45.0	75.9	0.2
Human Health & Social Work Activities	14.8	14.9	(0.0)	(0.2)	(0.0)
Arts & Entertainment	1.6	1.8	(0.1)	(7.8)	(0.0)
Other Service Activities	7.6	53.3	(45.7)	-	(0.2)
Activities of Households as Employers		0.1	-	-	
Activities of Extra-Territorial Organ.	-	0.4	-	-	
TOTAL	22,980.7	3,307.5	19,673.2	85.6	100.0

Source: Authors' own estimation based on IBES data, Applicable Tax Rates and GRA Revenue data

Tax Gap by Taxpayers Group

28. Table 11 indicates a negative tax gap for small taxpayers' office. These results may be explained by the others factors not related evasion and avoidance. First, GRA classifies companies based on tax revenue for tax paying purposes—Small Taxpayers, Medium Taxpayers and Large Taxpayers. The threshold for the classification has not been reviewed for a long period hence may not reflect the current position of corporate firms. Second, due to the targets set for each taxpayers office, there is the possibility that offices will be unwilling to graduate taxpayers to a different taxpayers' office when turnover conditions are met. Third, some regions have access to only the Small Taxpayers Office to file and pay their taxes.

Table 11: Tax Gap by Taxpayers

Taxpayer Type	Potential Revenue	Actual Tax Revenue	Tax Gap	Percent of Potential
Large Taxpayers	21,850.9	2,667.1	19,183.8	87.8
Medium Taxpayers	1,122.2	360.2	762.0	67.9
Small Taxpayers	7.7	280.3	(272.6)	-3,542.7

Source: Authors' own estimation based on IBES data, Applicable Tax Rates and GRA Revenue data

Potential Corporate Tax Revenue by Firm Size

29. Table 12 presents potential tax revenues by size—measured by the number of employees. We are unable to compute gap by firm size as GRA does not have actual revenues by this classification. However, understanding potential tax revenues across different firm sizes is critical for analytical and intervention targeting purposes. We categorize corporate firms into eight groups depending on the number of employees. About 52.6 percent of total potential tax revenues are due from large firms (firms with 50 or more employees), which comprise only 8.8 percent of total registered corporate establishments in Ghana.

Table 12*:* Potential Corporate Tax Revenue by Size (Ghc 'Million')

Firm Size(# of Employees)	% of Total # of Firms	Potential Tax Revenue	% of Total Potential Tax
1	4.9	1,482.9	6.5
2-4	36.8	2,458.1	10.7
5-9	21.9	1,490.1	6.5
10-19	15.4	1,031.1	4.5
20-30	6.3	1,614.7	7.0
30-39	3.7	2,120.3	9.2
40-49	2.2	709.1	3.1
50 or more	8.8	12,074.4	52.5
Total	100.0	22,980.7	100

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

Potential Corporate Tax Revenues in Greater Accra

30. Greater Accra, Ashanti and Western regions provide the significant proportion of the estimated total potential corporate tax revenues and corporate tax gaps in Ghana—together they account for over 90 percent of the estimated tax gap even when entire manufacturing sub-sector in Tema is excluded. Greater Accra region, in particular, contributes not less than 84.1 percent of the total corporate tax gap. Greater Accra region is the center of economic activities in Ghana, where a large size of tax revenues can be mobilized, and it should be the focus of revenue mobilization intervention Thus, this section deals exclusively with the potential tax gaps in Greater Accra and analyze the areas with high contributions. In this regard, we estimated tax revenues in Greater Accra region by sector. The knowledge of potential tax revenues on sectorial basis could provide a useful analysis for policy interventions.

31. The table below indicates only 10.5 percent of potential revenues generated in the manufacturing sub-sector in Accra originates from other places outside Tema. However, as stated earlier the many manufacturing firms in Tema operate in the free zone area and therefore do not pay corporate income tax.

From the last column in Table 13, wholesale and retail trade and repairs services; information and communication; financial and insurance activities; and construction sub-sectors together account for about 76.3 percent of the total potential corporate tax revenues (excluding potential revenues from manufacturing sub-sector in Tema) in Greater Accra. Thus, these sectors can be targeted with specific policies and interventions aimed to improve mobilization of corporate tax revenue. In particular, minimum tax schemes could be used in these sub-sectors to reduce potential evasions and avoidance.

Table 13: Corporate Tax Revenues by Sectors (GHc 'Million')

	Accra		Accra Excl. Tema Manufacturing	
Sector	Potential	% Potential	Potential	% Potential
Agriculture, forestry and fishing	12.8	0.1	12.8	0.1
Mining and quarrying	1,480.9	7.2	1,480.9	9.5
Manufacturing	5,595.3	27.2	588.1	3.8
Electricity, gas, steam and air	1.2	0.0	1.2	0.0
Water supply; sewerage, waste manage	328.7	1.6	328.7	2.1
Construction	1,904.8	9.3	1,904.8	12.3
Wholesale and retail trade; repairs	4,934.2	24.0	4,934.2	31.7
Transportation and storage	625.9	3.0	625.9	4.0
Accommodation and food service a	20.8	0.1	20.8	0.1
Information and communication	2,563.1	12.5	2,563.1	16.5
Financial and insurance activities	2,451.4	11.9	2,451.4	15.8
Real estate activities	23.1	0.1	23.1	0.1
Professional, scientific and technical	79.0	0.4	79.0	0.5
Administrative and support services	452.3	2.2	452.3	2.9
Education	57.6	0.3	57.6	0.4
Human health and social work act	11.9	0.1	11.9	0.1
Arts, entertainment and recreation	1.2	0.0	1.2	0.0
Other service activities	7.6	0.0	7.6	0.0
	20,551.7	100.0	15,544.6	100.0

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

3. Import Tax Gap

3.1 Data and Methodology

3.1.1 Data

32. The import tax gap is estimated using detailed information on trade between Ghana and major trading partners, measured by country's contribution to total imports. These trading partners collectively account for over 85 percent of import value in Ghana during the period of the analysis.

33. Two main information used for the analysis were import and export data. Data on import and export were sourced from both secondary and tertiary sources— Ghana Customs Management System

(GCMS), World Integrated Trade Solution (WITS) of the World Bank and the United Nations Integrated Trade Statistics Database (UN Comtrade).

34. Reported values of exports by trading partners destined for Ghana are used to estimate the potential taxable value of imports. Whilst domestic firms have an unquestionable incentive to underreport the value of taxable imports, foreign firms exporting to Ghana are not likely to have similar incentive to mis-report export values. Thus, the value reported by foreign countries provides a less-biased potential tax base for import tax. Export (potential) data were obtained from both the World Integrated Trade Solution (WITS) of the World Bank and the United Nations Integrated Trade Statistics Database (UN Comtrade). The WITS data were by commodity classification (HS at 6-digit level) and by country, whereas the UN Comtrade data were only at country level. These were reported exports to Ghana by the trading partners. The data obtained from WITS and UN Comtrade were reported in 1000 US$.

35. Actual import data was extracted from the Ghana Customs Management System (GCMS). The GCMS is the repository of import, export, and transit data electronically processed by Ghana Customs. GCMS data were also converted using monthly exchange rates as reported in the GCMS, and then converted to US$1,000.

3.1.2 Methodology

36. The main approach for estimating the import tax/duty gap is based on measuring the discrepancy in reporting of import and export values between importing and exporting countries. The approach relies on the differences in incentives of exporters and importers to report accurate values of exports and imports. Fisman and Wei (2004) used the method to estimate evasion gap for bilateral trade between Hong Kong and China. Levin and Widell (2007) also used the approaching focusing on Kenya and Tanzania. Ahmed and Rider (2008) looked at import duty gap for imports of Pakistan and six trading countries accounting for about 50 percent of total imports values. Recently, National Revenue Authority (NRA)(2016) also used the approach to estimate import tax gap in Sierra Leone.

37. Import tax gap is calculated by commodity and trading partners. To estimate potential import tax, the effective import tax rate (EITR) by country and HS levels are needed. Effective import tax rates (EITR) at HS level for each country were calculated. The EITR is the weighted ratio of each country or commodity to total import revenue for each reporting year. The EITR represents all import taxes collected by Customs, excluding Import Value Added Tax (Import VAT) and Import National Health Insurance Levy (Import NHIL).

38. This report calculates EIRT for HS level tax gap and country level tax gap analyses. Effective Import Tax Rate (EITR) by Country is estimated as follows:

$$EIRT_c = \frac{IR_c}{CIF_c} * 100 = \frac{\sum_{i=1}^{N} IR_i^c}{\sum_{i=1}^{N} CIF_i^c} * 100$$

Where:

$EIRT_c$ – Represents the EIRT for each country,
IR_c – Represents Actual Import Revenue by country,
CIF_c – Represents Actual CIF that contributed to the Import Revenue by country,
IR_i^c – Represents Actual Import Revenue by HS import from country c,
CIF_i^c – Represents Actual CIF by HS and country,

Effective Import Tax Rate (EITR) by HS is also estimated as

$$EIRT_{hs} = \frac{IR_{hs}}{CIF_{hs}} * 100$$

Where:

$EIRT_{hs}$ – Represents the EIRT by HS grouping,
IR_{hs} – Represents Actual Import Revenue by HS grouping,
CIF_{hs} – Represents Actual CIF by HS grouping,

Given the estimated EIRT, the potential import revenue is estimated by multiplying the calculated EIRT by the value of exported goods to Ghana, as reported by exporting countries for each fiscal year.

39. To reduce measurement errors, imports of motor vehicles under HS Chapter 87 were excluded from the analysis, since Ghana uses a unique valuation method, which differs from the reporting trading partners. Banknotes, cheque forms; stock, share or bond certificates and similar documents of title, as well as petroleum oils (crude and refined) were also excluded.

3.2 Results

3.2.1 Overall Import Tax Gap

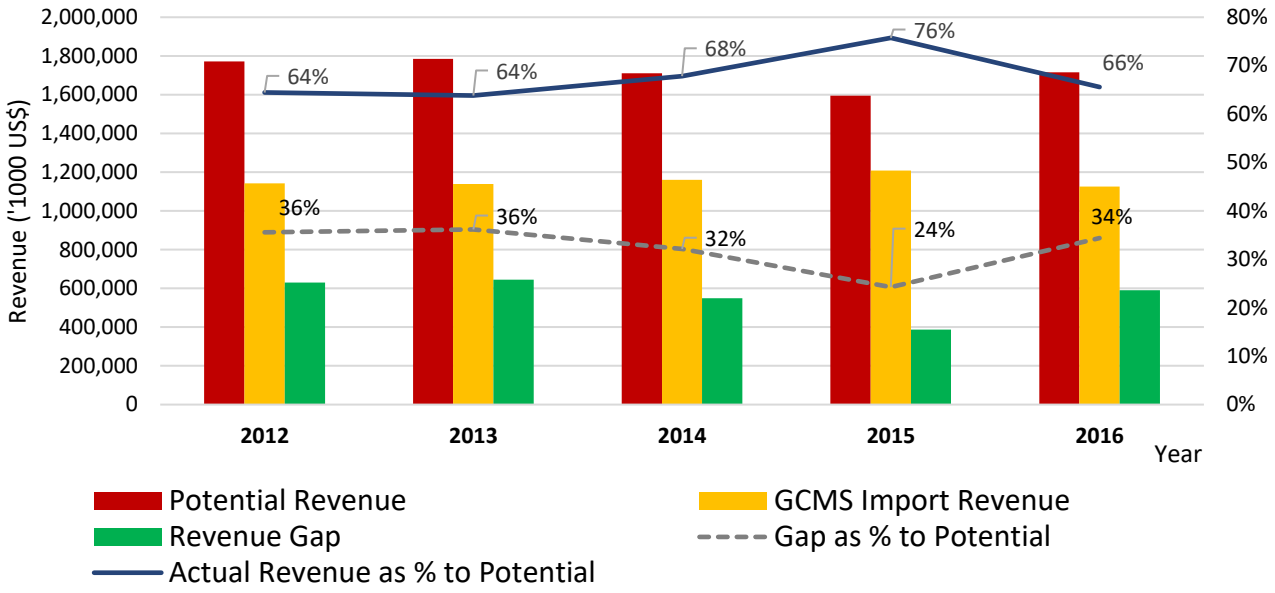
40. Table 14 and Figure 2 present potential import tax revenues, actual import tax revenues, and tax gap. Ghana is collecting a little over two-thirds of potential revenue from imports. Import tax gap in the country is around 32.5 per cent of potential import tax from 2012 to 2016. Except in 2015, the import tax gap as percentage of potential import tax revenues has been relatively stable over the 2012-2015 period, with 35.6 percent and 34.4 percent in 2012 and 2016, respectively.

Table 14: Import Revenue Gap Estimation ('1000 US$)

Year	WITS Export Value	Potential Import Revenue	Import CIF	GCMS Import Revenue	Import Revenue Gap	Revenue Gap as % to Potential	Actual Revenue as % to Potential
2012	16,494,861	1,771,325	11,606,126	1,141,525	629,800	35.6	64.4%
2013	14,787,921	1,785,382	9,969,896	1,139,681	645,701	36.2	63.8%
2014	12,990,525	1,710,088	8,622,579	1,160,199	549,889	32.2	67.8%
2015	13,946,743	1,595,512	11,332,195	1,208,476	387,036	24.3	75.7%
2016	13,228,511	1,716,060	9,217,354	1,125,916	590,144	34.4	65.6%
Total	71,448,560	8,578,367	50,748,150	5,775,797	2,802,570	32.7	67.3%

Source: Estimates by GRA

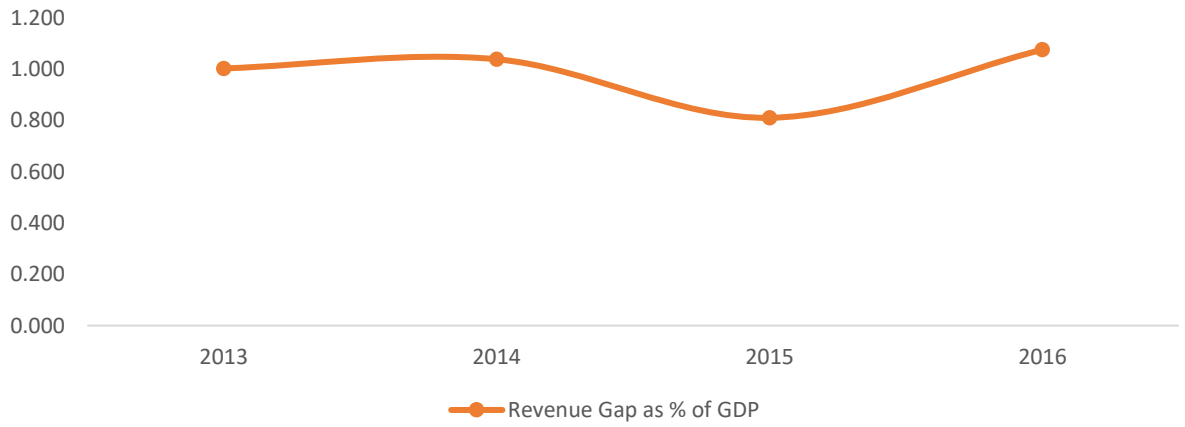
Figure 2: Import Revenue Gap Estimation ('1000 US$)



Source: Estimates by GRA

41. Figure 3 shows import tax gap as a percentage of GDP. Import tax revenue gap as a percentage of revenue is relatively low in Ghana, with 1.1 percent in 2016 as the highest. This suggests that interventions to improve import tax revenue might not be able to generate significant improvement in domestic revenue mobilization. In addition, given the spread of trade liberalization and increasing openness across borders, it is important to consider domestic revenue mobilization rather than international trade taxes.

Figure 3: Import Revenue Gap as a Percentage of GDP



Source: Estimates by GRA

3.2.2 Import Tax Gap by Country

42. Table 15 illustrates import gap as the percent of potential import tax revenue by country from 2012-2016. Nigeria's revenue gap to its potential revenue was the highest. The revenue gap as a percentage

to potential revenue was 85.92 percent in 2012, 84.97 percent in 2013, 23.18 percent in 2014, 83.08 percent in 2015, and 52.92 percent in 2016.

Table 15: Import Tax Revenue Gap as % to Potential

Countries	2012	2013	2014	2015	2016
Argentina	-5.9	9.5	-3.8	-2.8	39.9
Australia	-44.7	-78.8	-93.0	-136.4	-16.1
Brazil	23.7	16.2	-4.9	10.1	-26.6
Canada	-32.5	-39.2	-29.2	-15.8	-21.9
China	51.8	40.8	50.7	57.4	60.7
Europe Union	11.9	35.2	43.0	15.1	23.8
India	13.4	18.8	13.4	-18.2	17.7
Indonesia	15.3	15.3	-11.6	-1.4	43.7
Japan	-46.2	-20.9	-15.8	4.2	2.1
Korea (Republic of)	9.2	-14.6	8.4	11.7	15.0
Nigeria	85.9	85.0	23.2	83.1	52.9
Singapore	92.0	13.5	17.7	-2025.7	-151.3
South Africa	3.7	-10.6	-24.1	-20.0	8.4
Switzerland	-21.1	19.3	19.0	-632.2	-125.1
Thailand	24.1	9.1	28.0	-1.2	24.7
Turkey	-15.9	4.3	-11.2	-81.4	4.1
United Arab Emirates	7.0	49.6	19.7	-39.8	-77.4
United States of America	-21.0	-5.4	10.9	-2.0	-29.5
Viet Nam	17.7	5.3	15.1	8.4	19.1
	35.6	36.2	32.2	24.3	34.4

Source: Estimates by GRA

43. Negative import tax gaps were estimated for importation with many countries across different years. In 2016, for example, Nigeria and Switzerland were among the trading partners with high negative import duty gap. Time for it takes for goods to be transported from the country of origin and to Ghana could be one of the reasons for the import tax gap, especially when the goods are shipped around the end of the year. Thus, while it would be reported in the country of origin to have been exported in that year and it would arrive and be declared in the following year in Ghana. An incentive to reduce corporate income tax and value added tax (VAT) could also lead to overstating the value of exports by exporting firms in order to shift income abroad for corporate income tax and increase zero-rated exports for VAT purposes.

44. Major contributors to the import tax gap were the European Union, Nigeria, China and Thailand (Table 16). China was the largest contributor to the total import tax revenue gap during the period—from its lowest rate of 40.8 percent in 2013 to 66.7 percent in 2016. Thus, consistently Ghana collects less than half of the potential import tax revenue from goods coming from China. Over the period 2012 to 2016, the contribution to the import tax revenue gap from Nigeria averaged 27 percent, hence it was the second largest contributor to the import tax gap. Imports from the European Union (EU) also had significant import tax revenue gaps over the years: the contribution of these gaps to potential revenue were 11.9 percent in 2012, 35.2 percent in 2013, 43.0 percent in 2014, 15.1 percent in 2015 and 23.8 percent in 2016, averaging 22.9 over the 2012-2016 period.

Table 16: Contributions to Revenue Gap

Countries	2012	2013	2014	2015	2016	Average
Argentina	(0.0)	0.1	(0.0)	(0.0)	0.2	0.0
Australia	(0.6)	(0.7)	(0.6)	(1.1)	(0.2)	(0.6)
Brazil	2.3	1.4	(0.3)	0.7	(1.2)	0.6
Canada	(0.8)	(1.0)	(0.6)	(0.9)	(0.7)	(0.8)
China	38.1	28.0	47.7	84.0	68.7	53.3
Europe Union	9.0	29.2	36.9	17.9	21.7	22.9
India	1.8	2.7	2.0	(3.2)	2.0	1.1
Indonesia	0.5	0.8	(0.6)	(0.1)	1.3	0.4
Japan	(0.5)	(0.2)	(0.2)	0.1	0.0	(0.2)
Korea (Republic of)	0.3	(0.3)	0.2	0.6	0.5	0.3
Nigeria	38.9	36.6	10.7	39.9	9.1	27.0
Singapore	9.3	0.2	0.2	(29.5)	(1.5)	(4.3)
South Africa	0.3	(0.6)	(1.9)	(1.7)	0.5	(0.7)
Switzerland	(0.0)	0.1	0.1	(3.3)	(0.4)	(0.7)
Thailand	2.6	0.8	3.0	(0.1)	1.6	1.6
Turkey	(0.5)	0.1	(0.4)	(2.3)	0.2	(0.6)
United Arab Emirates	0.2	3.1	1.0	(2.1)	(1.8)	0.1
United States of America	(2.0)	(0.6)	1.4	(0.3)	(2.5)	(0.8)
Viet Nam	1.2	0.5	1.5	1.3	2.4	1.3
	100.0	100.0	100.0	100.0	100.0	100.0

Source: Estimates by GRA. Note that numbers in parentheses are negative.

3.2.3 Import Tax Gap by Commodity

45. The details of the import tax gap at commodity levels are shown in Table 17. The results were ranked, and the top 10 contributors are shown in the table. Understanding the major commodity contributors to the import revenue gap would help to target interventions to the commodities with high incidence of import tax gap to increase revenue mobilization. Table 17 indicates that beverages, spirits, and vinegar contributed to import revenue gap an aggregate of US$258.9 Million from 2012 to 2016. In 2016, the import tax gap on electrical machinery, equipment, and parts thereof amounted to US$76.7 million.

46. Table 18 shows that articles of apparel and clothing accessories, knitted or crocheted, are more susceptible to import tax evasion, as the import tax gap on the product has averaged 92 percent for the 2012-2016 period. Thus, only 8 percent of potential import tax revenue on the apparel and clothing is collected. Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof, imitation jewelry, and coin are another group of products with a high import tax gap—87.6 percent of the potential import tax revenue. Policies to decrease the import tax gap and increase import tax collections should focus on these product lines with high import tax gaps. The potential revenue that can be accrued from these leading commodities is large. In the case of commodities under HS Heading 22 (Beverages, spirits, and vinegar), more than 40 percent of the value can translate into revenue (excluding Import VAT and NHIL).

Table 17: Import Revenue Gap by Top 10 Contributing Commodities ('1000 US$)

HS Chapter	HS Chapter Description	2012	2013	2014	2015	2016	2012-2016 Total
22	Beverages, spirits, and vinegar	34,762.2	74,622.3	52,704.8	40,455.1	56,390.7	258,935.1
63	Other made up textile articles, sets, worn clothing and worn textile articles, rags	46,290.3	42,343.1	41,780.3	39,604.8	65,747.0	235,765.5
85	Electrical machinery and equipment and parts thereof, sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	31,533.7	45,929.2	44,521.6	29,698.8	76,697.3	228,380.5
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof, imitation jewelry, coin	280.1	15,860.9	111,068.0	86,897.2	3,256.3	217,362.5
39	Plastics and articles thereof	35,673.1	32,750.7	40,988.2	53,607.2	47,229.7	210,248.9
64	Footwear, gaiters and the like, parts of such articles	33,500.5	24,632.1	35,885.1	58,517.2	48,119.7	200,654.7
02	Meat and edible meat offal	29,800.9	42,847.9	34,221.6	31,624.0	57,935.1	196,429.6
84	Nuclear reactors, boilers, machinery and mechanical appliances, parts thereof	28,690.4	31,128.2	33,594.7	31,364.3	57,369.9	182,147.5
61	Articles of apparel and clothing accessories, knitted or crocheted	29,853.9	32,966.6	34,111.1	31,188.2	45,595.9	173,715.7
94	Furniture, bedding, mattresses, mattress supports, cushions and similar stuffed furnishings, lamps and lighting fittings, not elsewhere specified or included, illuminated signs, illuminated name-plates and the like, prefabricated buildings	53,183.3	7,641.7	41,447.6	41,200.7	29,670.5	173,143.9

Source: Estimates by GRA

Table 18: Import Revenue Gap as a Share of Potential Revenue by Commodity (in percent)

HS Chapter	HS Chapter Description	2012	2013	2014	2015	2016
22	Beverages, spirits, and vinegar	32.29	49.08	44.83	46.03	55.81
63	Other made up textile articles, sets, worn clothing and worn textile articles, rags	62.33	60.05	61.58	57.01	68.85
85	Electrical machinery and equipment and parts thereof, sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	28.82	37.93	37.43	31.31	55.40
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof, imitation jewelry, coin	35.60	96.78	99.28	92.02	87.59
39	Plastics and articles thereof	48.57	41.94	47.44	52.98	50.64
64	Footwear, gaiters and the like, parts of such articles	78.77	71.50	79.59	86.71	84.79
02	Meat and edible meat offal	31.01	37.07	37.29	41.62	55.45
84	Nuclear reactors, boilers, machinery and mechanical appliances, parts thereof	25.07	25.87	32.11	30.86	37.72
61	Articles of apparel and clothing accessories, knitted or crocheted	91.31	92.60	92.12	92.41	91.23
94	Furniture, bedding, mattresses, mattress supports, cushions and similar stuffed furnishings, lamps and lighting fittings, not elsewhere specified or included, illuminated signs, illuminated name-plates and the like, prefabricated buildings	74.96	27.07	66.18	69.94	61.84

Source: Estimates by GRA

4. Value Added Tax Gap

4.1 Data and Methodology

47. To estimate VAT gap, potential and actual VAT revenues are required. Actual VAT revenues by sector are sourced from Ghana Revenue Authority (GRA). Other important information such as legitimate deductions, exemptions, and information on applicable tax rate (VAT rate is 17.5 percent) are also provided by the GRA.

48. To estimate potential VAT, revenue by sector GDP and value added by sector are needed. The sectorial GDP and value added at market prices is obtained from Ghana Statistical Service. The three main sectors are agricultural, industry, and services. The sectoral GDP figures are at market prices, so the VAT rate is adjusted to reflect the fact that VAT is estimated on the sectoral GDP at factor cost. Specifically, potential VAT revenue is estimated as follows:

$$POTENTIAL\ VAT\ REVENUE_i = \frac{t_{VAT}}{1 + t_{VAT}} * GDP_i$$

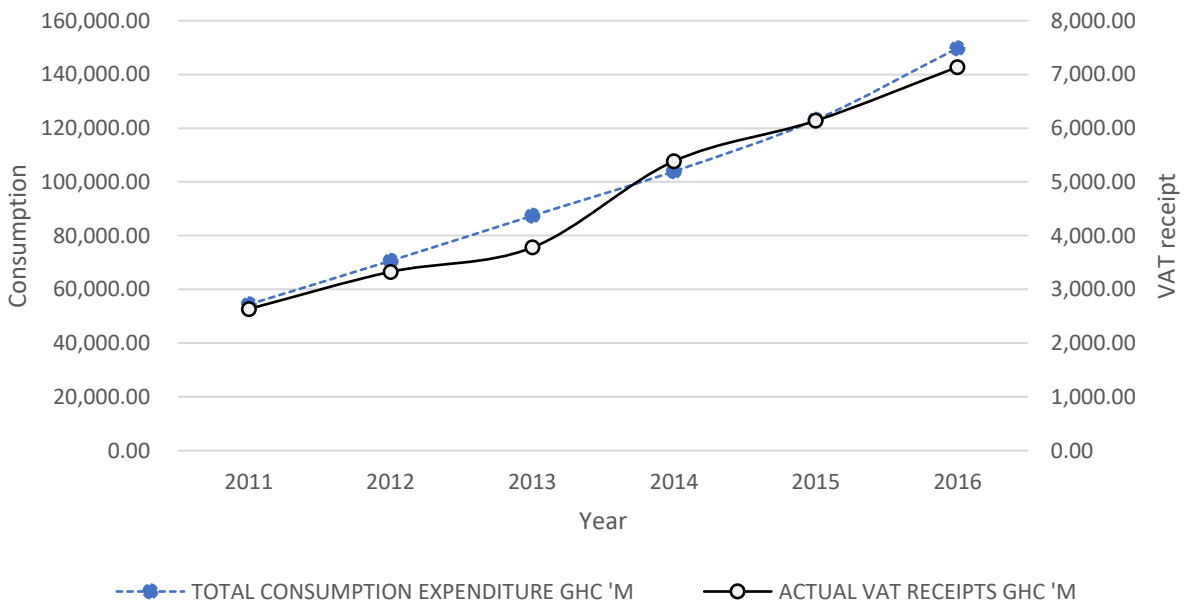
Where i is the sector and t_{VAT} is VAT rate which is 17.5 percent.

49. To obtain VAT revenue gap, actual tax collections are deducted from the adjusted potential VAT revenues, which is calculated by subtracting legitimate deductions and exemptions from the potential VAT revenues. The amount of legitimate deductions and exemptions were provided by GRA at sectorial level.

4.2 Results

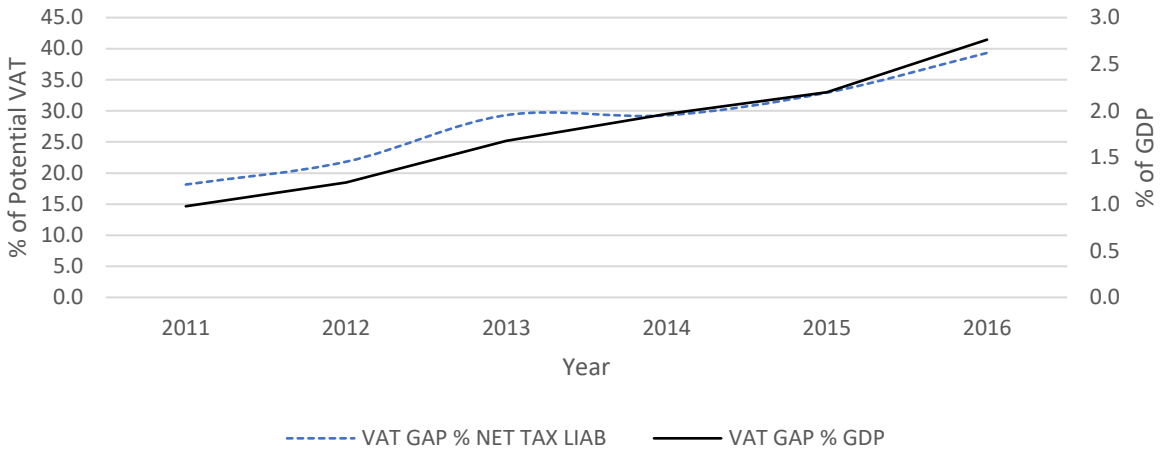
50. Figure 4 shows the trends of total consumption (which reflects tax base of VAT) and VAT receipts from 2011 to 2016. The figure indicates that the growth of VAT receipts has kept pace with consumption growth. The VAT compliance gap is significant and increasing over the period (Figure 5)—it increased from 18.2 percent of potential VAT revenues in 2011 to 39.3 percent in 2016. The Ghana VAT gap compared favorably to other sub-Saharan African countries—Uganda in particular, which averaged 60 percent from 2003 to 2013. In terms of GDP, the VAT gap rose from 1.0 percent in 2011 to 2.8 percent in 2016. Potential VAT revenues have risen faster than actual VAT revenues as a percent of GDP. As a result of the growth of the VAT tax base relative to overall economic activity in Ghana, potential VAT revenues as a percentage of GDP have grown over the period 2011 to 2016 from around 5.4 percent of GDP to around 7.0 percent. However, actual VAT revenues have remained at around 4.4 percent (Figure 6).

Figure 4: Total Consumption and VAT Receipt



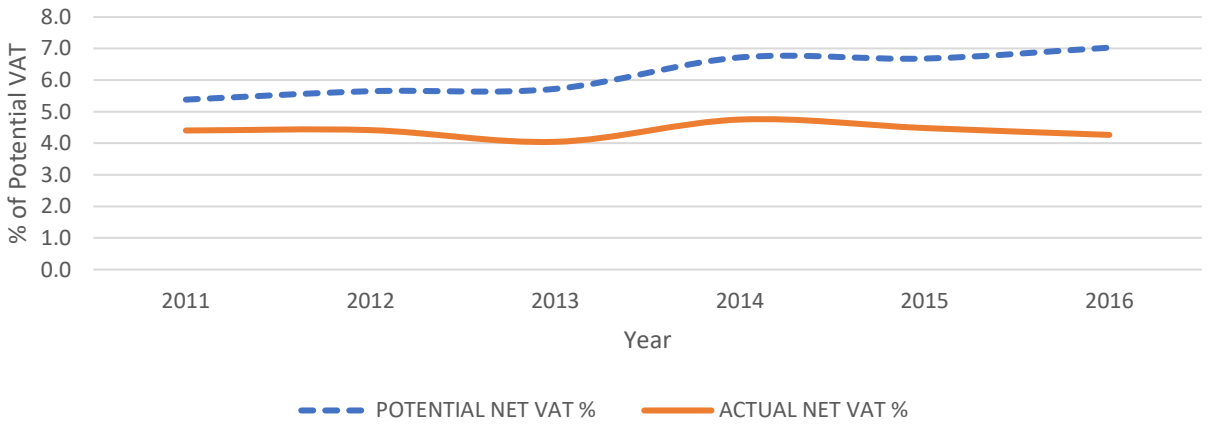
Source: Estimates by GRA

Figure 5: Value-Added Tax Gap Estimates for Ghana



Source: Computed by GRA.

Figure 6: Potential and Actual Value-Added



Source: Estimates by GRA.

5. Potential Tax Revenues from Formalization

51. This chapter reports estimated potential tax revenues from the formalization of informal firms, that is, informal profit-making private establishments— sole proprietorship and partnership.

5.1 Data and Methodology

52. Tax revenues from self-employed and partnerships are forms of direct taxes. Self-employed and partnerships are taxed as personal income tax (PIT). This study uses bottom-up approach to estimate potential tax revenues that can be derived from self-employment, especially the informal firms. A

representative sample of estimated profits by self-employed workers are used to estimate the potential revenue for the entire self-employment workers in Ghana. The HRMC of the United Kingdom employs similar technique to estimate potential tax revenues from self-assessment (SA) individuals and small partnerships (HRMC, 2019b). The method employs random sample of SA taxpayers who have been issued with a notice to file a return. A stratified sampling technique is employed to select the sample of self-assessed business taxpayers— the self-employed and partnerships—for the tax return year. The samples drawn are stratified by taxpayers' turnover. A weighting based on customer groups distribution across the population is used to improve the representative the sample. To compute population estimates for potential tax revenues and total tax gaps, sample estimates of averages of potential tax revenues and tax gaps, are multiplied by the number of taxpayers in the population

53. This study uses data on populations and representative samples of self-employed and partnerships to estimate the potential tax revenues from these taxpayers. The data was collected by GSS relating to 2013 information on establishments in Ghana. It must be emphasized that the data was not collected with the purpose of estimating potential tax revenues and therefore some critical information such as personal reliefs deductions that are critical in accurately estimating chargeable income are not available.

54. IBES I and IBES II provide information on the type of businesses including sole proprietorship/self-employed and partnerships. IBES I was a census of all establishments in Ghana including government, private, public and non-government establishments. Sole proprietorship and partnership firms constitute about 78 percent and 8 percent of total independent establishments in the country (**Error! Reference source not found.**).

Table 19: Forms of Establishments (IBES I)

Type of legal organization	Frequency	Percent
Sole proprietorship	498,067	78.0
Partnership	50,862	8.0
Private limited company by guarantee	27,924	4.4
Public limited company	3,139	0.5
Statutory	2,398	0.4
Other governmental institutions (MDAs)	20,013	3.1
Quasi government	1,614	0.3
Parastatal government	662	0.1
Non-governmental organization (NGOs)	23,783	3.7
Cooperative	836	0.1
Association/groups	8,936	1.4
Total	638,234	100

Source: Authors' own computation based on IBES I

55. This study relies on the populations of self-employed and partnership to estimate potential tax revenues from these taxpayers. The population and sample distributions of sole proprietors and partnerships firms by region, size and sector of activity are shown in Appendix Table A.9 to A.14. To estimate the potential income tax for sole proprietors or self-employed and partnership, there is a need to first estimate the chargeable income for the owners of these establishments. Though the PIT relates to individuals and not businesses, the business incomes of these establishments are used as proxies of incomes of owners.

56. Taxable or chargeable incomes for self-employed and partnership and therefore their owners are estimated with by using profits of enterprises. To estimate profits, the costs and expenditure of these establishments are used to derive chargeable income for self-employed owners given the total business income of enterprises. However, tax authorities allow deductions including relieves and personal social security expenses. Thus, the assessable income (profit) is assumed to be equivalent to taxable/chargeable income due to lack of information on allowable deductions. In addition, the GRA uses the total income for the individuals from all sources as assessable income for estimating tax liabilities. The sample data used in this study, IBES II, contain information about businesses. Thus, we have access to individuals' income from business as owners of self-employed or partnership establishments.

57. Information on cost and revenue from IBES II is used to compute profit (chargeable income) of each establishment. Chargeable income of partnership organizations is assumed to be shared equally among the owners before calculating tax obligations. IBES I provides information on the number of owners of each firm.

58. Sole proprietorship and partnership establishments are mostly informal. Unlike Corporate organization owners, owners of sole proprietors and partners are taxed on personal income tax. Thus, their income (profits) are taxed the same as employment income taxes, according to a progressive tax schedule. Table 20 presents the 2013 applicable tax rate schedule for personal income.

59. Profits of sole proprietors and partners are added to income from other sources, in order to determine the taxable income, important given the progressive tax regime. However, there is no information on other sources of income for individual owners of firms, and therefore the study used only the income from operations of the business. Thus, the taxable income would be underestimated, hence lower bound tax obligation of owners of these firms are reported. The Ghana Revenue Authority (GRA) uses the graduated tax structure to determine the accrued tax liability depending on the amount of chargeable income. Table 20 provides PIT structure in 2013[4].

Table 20: Annual Income Tax Bands

2013	Chargeable Income GHC Million	Rate (%)
First Income	1,584	0
Next income	792	5
Next Income	1,104	10
Next income	28,200	17.5
Exceeding	31,680	25

Source: PWC (2013). Charting tax trends in Ghana: A Quick Guide to taxation in Ghana: 2013 Tax Facts and Figures. https://www.pwc.com/gh/en/assets/pdf/ghana-tax-facts-and-figures-2013-brochure.pdf

[4] Income Tax Act 2015 (Act 896) makes provision for the application of presumptive taxes on income of self-employed persons with turnover not exceeding GHC120,000. Thus, the calculation of potential revenues of PIT for self-employed using Act 896 will be different from the 2013 schedule.

5.2 Results

60. This section presents results from estimates of potential tax revenues from sole proprietors. All sole proprietorship firms—both GRA registered and unregistered sole proprietorship firms—are considered. First, sole proprietorship firms without regard to their registration status are considered. It is important to emphasize that analyses in this section do not reflect possible tax exemptions or tax holidays that might be available to these firms.

5.2.1 Formalizing Sole Proprietorship

61. Total potential Personal Income Tax (PIT) revenue from sole proprietors in 2013 is estimated to be GH¢19.5 billion (15.8 percent of GDP) compared with the actual revenue of 0.15 percent of GDP in 2013, as shown in Table 21. In 2013 and 2014, the total actual tax revenue collections from all self-employed (sole proprietors and partnership) as reported by the Ghana Revenue Authority amounted to GH¢181.6 million and GH¢219.37 million, respectively, suggesting high tax evasion and avoidance by self-employed individuals usually operating in the informal sector. The performance of tax collection from self-employed has not improved and remains abysmal even in recent period. Total actual revenue collections from self-employed in 2018 and 2019 were 0.13 percent and 0.12 percent of GDP, respectively.

Table 21: Potential Tax Revenue from Sole Proprietor by Sector

Sectors	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
Agriculture, forestry and fishing	364.0	1.87
Mining and quarrying	148.0	0.76
Manufacturing	750.5	3.85
Electricity, gas, steam and air-condition	56.9	0.29
Water supply; sewerage, waste management	13.6	0.07
Construction	1,037.2	5.32
Wholesale and retail trade; repairs	15,466.3	79.30
Transportation and storage	32.6	0.17
Accommodation and food service a	277.0	1.42
Information and communication	63.0	0.32
Financial and insurance activities	296.2	1.52
Real estate activities	4.2	0.02
Professional, scientific and technical	123.5	0.63
Administrative and support services	494.7	2.54
Education	280.6	1.44
Human health and social work activities	41.1	0.21
Arts, entertainment and recreation	12.0	0.06
Other service activities	42.9	0.22
Total	19,504.4	100.00

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

62. Wholesale and retail trade and repairs sub-sector are the largest contributors to the potential tax revenues —about 79.3 percent of the total potential PIT from sole proprietors—amounting to GH¢15.4 billion (Table 21). Sole proprietors operating in the manufacturing sub-sector could have contributed about GH¢ 750.5 million to personal income tax in 2013, if all of them had filed their tax returns and paid the associated tax liabilities. Another sub-sector with substantial amounts of potential tax revenues in the form of PIT is the construction sub-sector that can theoretically contribute about GH¢ 1.1 billion (or 5.3 percent of total potential PIT from sole proprietors) to the country's revenue. Estimated PIT from sole proprietors in the financial and insurance activities subsector amounted to GH¢296.2 million in 2013. The financial and insurance activities sub-sector can also contribute 1.5 percent of potential tax revenues from self-employed.

63. To design interventions or policies to increase tax collection from sole proprietors, the understanding of the distribution of potential tax revenues by firm size is critical. An aggregate potential tax revenue of GH¢ 12.6 billion (64.4 percent of total potential tax revenues from sole proprietors) was estimated for sole proprietorship establishments with only one worker totaling 199,859, as the estimated number of firms in 2013 (Table 22). Large size sole proprietor firms (50 or more employees) estimated to be 1,388 in total could have contributed about GH¢ 2.4 billion (12.2 percent of total potential tax revenues from sole proprietors) in tax revenues to government in 2013, if tax collection, compliance, and enforcement were to be perfect.

64. In terms of regional distribution of potential PIT from self-employed sole proprietors, as shown in Table 23, Ashanti region is the largest contributor and could be an important source of PIT in Ghana, as it could contribute an estimated amount of GH¢ 11.8 billion (60.4 percent of total PIT from sole proprietors). Greater Accra region and Western region could potentially contribute about GH¢ 5.3 billion (26.9 percent) and GH¢ 776.0 million (4.0 percent), respectively.

Table 22: Potential Tax Revenue from Sole Proprietorship by Size

Firm Size (# of Employees)	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
1	12,564.4	64.42
2-4	2,376.4	12.18
5-9	795.1	4.08
10-19	840.0	4.31
20-30	299.4	1.54
30-39	211.8	1.09
40-49	40.1	0.21
50 or more	2,377.3	12.19
Total	19,504.4	100

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

Table 23: Potential Tax Revenue Sole Proprietorship by Region

Region	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
Accra	5,239.6	26.86
Ashanti	11,776.0	60.38
Western	776.0	3.98
Eastern	133.9	0.69
Central	132.5	0.68
Brong Ahafo	517.2	2.65
Volta	125.9	0.65
Northern	506.2	2.60
Upper East	220.4	1.13
Upper West	76.9	0.39
Total	19,504.4	100

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

65. Not all sole proprietors operate in the informal sector—not registered with the tax authority. About 66.1 percent or 343,978 of total sole proprietors in Ghana in 2013 had not registered with the Ghana Revenue Authority. **Error! Reference source not found.** 24 summarizes potential tax revenues of sole p roprietors by sector of activity. Estimated potential tax revenues from informal or unregistered sole proprietors amounted to GH¢ 13.6 billion, constituting about 69.7 percent of total potential revenues from sole proprietors. Again, wholesale and retail trade and repairs sub-sector is the largest contributor to the potential tax revenues of GH¢ 12.9 billion (94.7 percent of total), followed by manufacturing and Accommodation and food service activities sub-sectors, with GH¢ 223.0 million (1.6 percent of total) and GH¢ 207.5 million (1.5 percent of total), respectively.

Table 24: Potential Tax Revenue from Unregistered Sole Proprietors by Sectors

Sectors	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
Agriculture, forestry and fishing	142.9	1.05
Mining and quarrying	2.0	0.01
Manufacturing	223.0	1.64
Electricity, gas, steam and air	5.8	0.04
Water supply; sewerage, waste management	1.0	0.01
Construction	22.1	0.16
Wholesale and retail trade; repairs	12,871.8	94.65
Transportation and storage	7.5	0.06
Accommodation and food service activities	207.0	1.52
Information and communication	32.1	0.24
Financial and insurance activities	6.0	0.04
Real estate activities	0.0	0.00
Professional, scientific and technical	3.4	0.03
Administrative and support services	9.3	0.07

Sectors	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
Education	30.1	0.22
Human health and social work act	4.1	0.03
Arts, entertainment and recreation	5.2	0.04
Other service activities	26.1	0.19
	13,599.5	100.00

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

66. **Error! Reference source not found.** 25 shows the results of potential tax revenues by firm size m easured by the number of employees of unregistered sole proprietorship establishments. The bulk of potential tax revenues in the form of PIT from unregistered sole proprietors is concentrated in single-worker establishments contributing about GH¢ 11.5 billion (or 85.0 percent of total potential tax), followed by establishments with between 2 and 4 workers, providing 10.8 percent of the total potential tax from the unregistered sole proprietors. Thus, tax revenue potential from unregistered sole proprietors is essentially a mini-firms or small-scale establishments phenomenon.

Table 25: Potential Tax by Size of Unregistered Sole Proprietors

Firm Size (# of Employees)	% of Total # of Firms	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
1	42.7	11,555.8	84.97
2-4	46.9	1,466.3	10.78
5-9	8.0	187.6	1.38
10-19	1.8	245.9	1.81
20-30	0.4	36.4	0.27
30-39	0.2	83.4	0.61
40-49	0.0	1.8	0.01
50 or more	0.1	22.3	0.16
Total	100.0	13,599.5	100

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

5.2.2 Formalizing Partnership Firms

67. Partnership firms are another group of self-employed establishments that can be formalized. Table 26 provides potential tax revenues from individuals operating in partnership firms as owners. The estimated potential PIT revenues from self-employed partners amounted to GH¢ 958.3 million in 2013. Partners operating in wholesale and retail trade and repairs and accommodation and food service activities sub-sectors are the highest and second highest contributors to the potential tax revenues from partners with GH¢ 499 million (52.1 percent of total) and GH¢ 116.1 million (12.1 percent of total), respectively. Self-employed partners in manufacturing sub-sectors can also provide GH¢ 69.7 million (7.3 percent of total) of PIT revenue, followed by partners in in agriculture[5], forestry, and fishing sub activities sub-sectors providing

[5] It is importance to state that personal incomes distributed to self-employed or owners of corporate entities in the agriculture sector are subjects to PIT—the sector source of income does not matter for PIT—though the corporate entities in the sector benefits from various forms of exemptions.

GH¢ 54.6 million (5.7 percent of total) of the total potential revenues from self-employed partners in Ghana.

68. Table 27 presents the distribution of potential revenues from self-employed partners by firm size. The table indicates that the most significant firm size is 2-4 employees, followed by firms with 50 or more workers, each with capacity of generating potential PIT revenues of GH¢ 387.7 million and GH¢ 153.6 million, respectively.

69. Table 28 indicates that Greater Accra and Ashanti regions contribute about 50.3 percent of the potential PIT from partners in Ghana. Greater Accra alone contributes 36.9 percent, with Ashanti region accounting for 13.4 percent of the potential PIT from partners in Ghana.

Table 26: Potential PIT Revenue from Partnership by Sector

Sectors	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
Agriculture, forestry and fishing	54.6	5.70
Mining and quarrying	54.5	5.68
Manufacturing	69.7	7.27
Electricity, gas, steam and air-condition	28.2	2.94
Water supply; sewerage, waste management	0.5	0.05
Construction	30.9	3.22
Wholesale and retail trade; repairs	499.5	52.13
Transportation and storage	15.2	1.59
Accommodation and food service	116.1	12.11
Information and communication	1.8	0.18
Financial and insurance activities	47.4	4.94
Real estate activities	1.1	0.11
Professional, scientific and technical	19.3	2.01
Administrative and support service	2.3	0.24
Education	6.4	0.66
Human health and social work activities	3.4	0.35
Arts, entertainment and recreation	5.7	0.59
Other service activities	1.9	0.20
Total	958.3	100.00

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

Table 27: Potential PIT Revenue from Partnership by Size

Firm Size (# of Employees)	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
1	126.5	13.21
2-4	387.7	40.46
5-9	83.0	8.66
10-19	99.8	10.41
20-30	67.0	6.99
30-39	23.6	2.46
40-49	17.2	1.79
50 or more	153.6	16.02
Total	958.3	100

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

Table 28: Potential PIT Revenue from Partnership by Region

Region	Potential Tax (GH¢ Million)	Percent of Total Potential Tax
Accra	353.8	36.91
Ashanti	128.7	13.43
Western	137.7	14.36
Eastern	23.6	2.46
Central	55.4	5.78
Brong Ahafo	145.5	15.18
Volta	16.2	1.69
Northern	69.9	7.29
Upper East	10.1	1.05
Upper West	17.7	1.84
Total	958.3	100

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

70. Out of the total 50,862 partnership establishments in Ghana, 66.1 percent of them are not registered with GRA, hence operating in the informal sector. The potential tax revenues from unregistered partnership firms are estimated and reported in Table 29. As shown in the table, potential PIT from unregistered partners in 2013 is estimated to be GH¢ 214.0 million, where about 62.8 percent of this amount could be generated from the unregistered partners working in the wholesale and retail trade and repairs sub-sector.

Table 29: Potential PIT Revenue from Unregistered Partnership by Sector

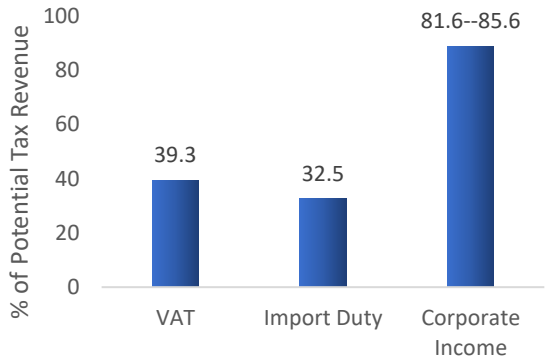
Sectors	Potential Tax (GH¢ Million)	As a % of Total Potential Tax
Agriculture, forestry, and fishing	1.7	0.80
Mining and quarrying	11.8	5.50
Manufacturing	16.8	7.85
Water supply, sewerage, waste management	0.3	0.13
Construction	2.5	1.15
Wholesale and retail trades, repairs	134.3	62.77
Transportation and storage	3.4	1.59
Accommodation and food service	10.3	4.80
Information and communication	0.1	0.05
Financial and insurance activities	25.8	12.06
Real estate activities	0.0	0.01
Professional, scientific, and technical	0.1	0.07
Administrative and support services	0.5	0.22
Education	2.2	1.01
Human health and social work act	0.5	0.24
Arts, entertainment, and recreation	2.0	0.92
Other service activities	1.8	0.82
Total	214.0	100.00

Source: Authors' own estimation based on IBES I and II and Applicable Tax Rates

6. Conclusions

71. Various sources of tax revenues in Ghana continue to underperform, resulting in low levels of tax revenues. Understanding the extent and areas of the tax gap is important for designing effective policies to improve tax revenue mobilization. This study therefore estimated tax gap analysis in both direct and indirect tax collections in Ghana.

72. The figure to the right summarizes the percentage of tax gap of potential tax revenue estimated in Chapters 2 to 4. The corporate income tax gap of at least 81.6 percent is the highest among the estimated tax gaps, followed by Value Added Tax (VAT) gap of 39.3 percent and Import duty tax gap of 32.5 percent. Policies to improve domestic tax mobilization should therefore be targeted at corporate income tax and VAT compliance, especially in an era of increasing trade liberalization.



73. In the case of corporate income tax, our estimation suggests significant regional variations in the tax gap. About 88 percent of corporate tax gap in Ghana results from firms located in Greater Accra, followed by Western and Ashanti Regions with 5.8 percent and 3.4 percent, respectively. This suggests that intervention policies to improve corporate tax revenue mobilization should be more focused on Greater Accra, as the region is very important for reducing the corporate income tax gap in Ghana.

74. There are also disparities in the distribution of tax gaps across sectors. The water and sewerage, wholesale and retail and construction sub-sectors have the largest corporate income tax gaps with 95.9 per cent, 95.3 percent and 95.1 per cent, respectively. With regards to the contribution to the total corporate income tax gaps, three importance sectors are the wholesale and retail trade and repair services, finance and insurance, and information and communication sub-sectors, together contributing about 51.7 percent of at least the total corporate tax gaps. Though, the manufacturing sector is high with about 23 percent, the inaccuracy resulting from exceptions, especially for manufacturing sectors located in Tema may reduce it significantly. This suggests that interventions to reduce the corporate income tax gap or improve corporate tax revenue mobilization could be targeted to the manufacturing and wholesale & retail trade sub-sectors, since it comprises about two-third of the overall tax gap.

75. Regarding import duty tax, gaps are large for some trading partners—China is the largest contributor of the import tax gap followed by Nigeria and the European Union. Products with high tax gaps include articles of apparel and clothing accessories, knitted or crocheted, and natural or cultured pearls, precious or semi-precious stones, and precious metals. These revelations of the tax analysis suggest specific goods and import from certain countries should be inspected and audited with particular attention by custom officers.

76. VAT gaps, both as a percentage of potential VAT revenues and GDP steadily increased over the period from 2011-2016. The Government could consider utilizing enhanced strategies and modern technology, as well as the use of third-party information to increase VAT compliance in Ghana.

77. Potential tax revenues from sole proprietors, who usually operate in the informal sector and constitute about 83 percent of establishments in Ghana, amounted to GH¢19.5 billion (12.6 percent of GDP). Formalizing their activities and ensuring tax payments from them is fundamental to improve revenue mobilization. Considering the scale of potential revenue gain, the wholesale and retail trade and repair sub-sectors, particularly in Ashanti region and the Greater Accra, should be targeted. Thus, while it may be costly and inefficient track all the small firms for imposition of PIT, targeting self-employed firms with large size of employees could be starting point to enroll self-employed and the informal sector into the tax net. This could be part of the general strategy of taxing the high net worth individuals in Ghana.

78. Despite the importance of understanding of various tax gaps estimates and the potential tax revenues in providing tax policy intervention, this study would caution against using the estimated tax gaps and potential tax revenues as the sole basis for fashioning out tax policy and revenue administration. The estimated tax gaps and potential tax revenues, particularly those estimated from survey data—corporate tax gaps and self-employed—lack accuracy caused by data weaknesses as the data was not collected with advice of tax auditing. The estimated tax gap also contains policy gaps as the data could not allow us to estimate only the compliance gaps, though various attempts are made to minimize it (policy gap). In addition, the data used were collected in 2013 and we acknowledge that tax administration has changed during the 7 years period and may limit the usefulness of the estimates in guiding policy. Nevertheless, the structure of tax revenue collection and the economy has not experience any dramatic changes during the

period with tax revenue performance remaining unimpressive. Thus, even though the analysis and findings of this study remains highly indicative, similar analyses with recent data would provide a platform to track changes, if any, in the gaps resulting compliance measures, administration and policy reform. In addition, the analysis by developing better understanding of potential revenues with different dynamics across sectors, firm size and regional locations would help the Government of Ghana set appropriate revenue targets and better manage revenue collections.

References

Ahmed, R. A and M. Rider (2008). Pakistan's Tax Gap: Estimates by Tax Calculation and Methodology. International Studies Program Working Paper 08-11. https://icepp.gsu.edu/files/2015/03/ispwp0811.pdf

Bank of Ghana (Various series). "Quarterly Bulletins," https://www.bog.gov.gh/publications/quarterly-bulletin/

FISCALIS Tax Gap Project Group (2016). The Concept of Tax Gaps: Report on VAT Gap Estimations. https://ec.europa.eu/taxation_customs/sites/taxation/files/docs/body/tgpg_report_en.pdf

FISCALIS Tax Gap Project Group (2018). The Concept of Tax Gaps Report II: Corporate Income Tax Gap Estimation Methodologies. https://ec.europa.eu/taxation_customs/sites/taxation/files/tgpg-report-on-cit-gap-methodology_en.pdf

Fisman, Rand Shang-Jin Wei (2004). Tax Rates and Tax Evasion: Evidence from "Missing Imports" in China. https://users.nber.org/~wei/data/fisman&wei2004/fisman&wei2004.pdf

Ghana Free Zones Board (2013). Annual Report & Audited Accounts 2013. https://gfzb.gov.gh/wp-content/uploads/2018/04/Annual-Report-2013.pdf

HR Revenue and Customs (2019a). Measuring tax gaps 2019 edition Tax gap estimates for 2017-18. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820979/Measuring_tax_gaps_2019_edition.pdf

HR Revenue and Customs (2019b). Measuring tax gaps 2019 edition: Methodological annex. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810116/Measuring_tax_gaps_2019_edition_-_methodological_annex.pdf

Levin, J and L. M. Widell (2007). Tax evasion in Kenya and Tanzania: Evidence from missing imports. Working Paper Series Working Paper No 8, 2007. https://core.ac.uk/reader/6534588

Ministry of Finance (various series). *Fiscal Data*. https://www.mofep.gov.gh/fiscal-data

National Revenue Authority (NRA) (2016). FINAL REPORT: Sierra Leone Tax Gap Estimation

Parliament of Ghana (2015). *Income Tax Act 2015 (Act 581)*.

Parliament of Ghana (2000). *Internal Revenue Act, 2000 (Act 592)*.

Parliament of Ghana (1995). *The Free Zone Act 1995 (Act 504)*. https://gfzb.gov.gh/wp-content/uploads/2018/05/Free-Zone-Act-1995.pdf

PWC (2013). Charting tax trends in Ghana: A Quick Guide to taxation in Ghana: 2013 Tax Facts and Figures. https://www.pwc.com/gh/en/assets/pdf/ghana-tax-facts-and-figures-2013-brochure.pdf

Appendix

Appendix A: Import Tax Gap

Table A.1: GCMS CIF Value ('1000 US$) by Country of Direct Imports (Excluding Transit)

Ctry Code	Countries	2012	2013	2014	2015	2016	Total
AR	Argentina	33,210.72	43,043.57	21,440.31	28,683.84	25,712.81	152,091.25
AU	Australia	213,253.68	165,686.32	86,465.26	96,565.57	88,490.77	650,461.60
BR	Brazil	241,211.46	242,803.87	205,498.61	158,188.52	215,065.09	1,062,767.55
CA	Canada	233,848.94	285,786.65	151,393.43	162,087.94	190,189.97	1,023,306.93
CN	China	2,228,958.46	2,231,491.85	1,984,694.05	2,194,673.02	1,748,134.25	10,387,951.63
EU	Europe Union	4,812,880.59	3,528,159.38	2,613,493.10	4,045,483.24	3,867,928.00	18,867,944.31
IN	India	648,756.79	650,132.94	548,862.12	716,428.55	555,422.92	3,119,603.32
ID	Indonesia	131,071.61	208,411.58	235,650.26	159,674.63	61,467.56	796,275.64
JP	Japan	193,395.22	102,269.77	90,164.36	60,970.97	71,411.91	518,212.23
KR	Korea (Republic of)	164,937.47	296,624.68	151,897.72	147,990.72	143,130.56	904,581.15
NG	Nigeria	184,398.60	209,246.69	739,664.76	147,960.52	197,339.10	1,478,609.67
SG	Singapore	67,750.07	65,690.38	52,470.15	1,287,622.27	143,026.23	1,616,559.10
ZA	South Africa	400,966.45	371,860.03	374,941.67	308,210.22	257,445.44	1,713,423.81
CH	Switzerland	41,361.78	28,982.22	26,557.13	166,520.30	72,302.65	335,724.08
TH	Thailand	257,588.91	259,576.18	204,034.53	173,984.80	147,304.26	1,042,488.68
TR	Turkey	220,797.00	154,458.69	176,644.86	352,720.72	275,150.18	1,179,771.45
AE	United Arab Emirates	231,071.34	163,492.83	182,220.45	218,176.09	181,527.94	976,488.65
US	United States of America	1,133,776.59	728,635.66	570,141.74	688,559.29	741,488.95	3,862,602.23
VN	Viet Nam	166,890.17	233,542.98	206,344.33	217,693.57	234,815.27	1,059,286.32
	Total	13,729,514.06	14,362,211.76	12,268,009.25	14,698,763.83	13,972,352.75	69,030,851.65

Source: GRA estimates based on Ghana Customs Management System (Jun 20 2018)

Table A.2: Export Value ('1000 US$) by Country of Export (Excluding Transit)

Ctry Code	Countries	2012	2013	2014	2015	2016	Total
AR	Argentina	31,354.65	47,558.60	20,657.05	27,897.91	42,792.42	170,260.62
AU	Australia	147,430.54	92,691.19	44,793.09	40,850.48	76,191.95	401,957.25
BR	Brazil	315,989.25	289,652.04	195,855.93	175,922.67	169,842.01	1,147,261.90
CA	Canada	176,461.05	205,361.54	117,184.78	139,941.51	156,064.80	795,013.69
CN	China	4,622,012.09	3,769,197.69	4,024,429.96	5,155,111.22	4,443,439.74	22,014,190.70
EU	Europe Union	5,460,550.24	5,443,704.46	4,585,363.72	4,762,630.10	5,078,038.58	25,330,287.10
IN	India	749,200.90	800,768.26	634,091.38	606,055.06	675,089.54	3,465,205.14
ID	Indonesia	154,827.64	246,073.01	211,107.88	157,499.22	109,172.30	878,680.05
JP	Japan	132,287.72	84,617.34	77,876.20	63,671.74	72,928.38	431,381.38
KR	Korea (Republic of)	181,701.38	258,882.78	165,760.08	167,533.40	168,378.30	942,255.95
NG	Nigeria	1,310,011.14	1,392,343.28	962,811.80	874,522.73	419,134.66	4,958,823.61
SG	Singapore	844,168.80	75,942.46	63,771.43	60,572.86	56,920.30	1,101,375.84
ZA	South Africa	416,393.62	336,309.61	302,053.57	256,892.25	281,046.52	1,592,695.56
CH	Switzerland	34,153.47	35,928.01	32,777.93	22,741.55	32,121.88	157,722.83
TH	Thailand	339,487.80	285,557.50	283,474.80	171,908.83	195,536.10	1,275,965.03
TR	Turkey	190,551.24	161,328.72	158,854.72	194,405.59	286,918.01	992,058.27
AE	United Arab Emirates	248,461.29	324,301.39	226,784.69	156,039.33	102,323.47	1,057,910.17
US	United States of America	937,126.51	691,183.71	639,777.73	674,927.99	572,458.80	3,515,474.74
VN	Viet Nam	202,691.21	246,519.76	243,098.24	237,618.29	290,113.00	1,220,040.49
	Total	17,078,289.02	15,734,513.71	14,312,684.31	15,681,685.91	14,290,561.17	77,097,734.12

Source: GRA estimates based on WITS (Jun 20 2018). *Note: Nigeria (2012-2016) and India 2012 from UN Comtrade (June 20 2018)*

Table A.3: 2012 Import Revenue Gap ('1000 US$) - GCMS Data against WITS data

Ctry Code	Countries	WITS Export Value	EITR (%)	Potential Revenue	Import CIF	EITR (%)	GCMS Import Revenue	Revenue Gap	Gap as % to Potential
AR	Argentina	31,354.65	14.92	4,678.11	33,210.72	14.92	4,955.04	(276.93)	(5.92)
AU	Australia	147,430.54	5.65	8,329.83	213,253.68	5.65	12,048.83	(3,719.00)	(44.65)
BR	Brazil	315,989.25	19.37	61,207.12	241,211.46	19.37	46,722.66	14,484.46	23.66
CA	Canada	176,461.05	9.26	16,340.29	233,848.94	9.26	21,654.41	(5,314.12)	(32.52)
CN	China	4,622,012.09	10.04	464,050.01	2,228,958.46	10.04	223,787.43	240,262.58	51.78
EU	Europe Union	5,460,550.24	8.76	478,344.20	4,812,880.59	8.76	421,608.34	56,735.86	11.86
IN	India	749,200.90	11.58	86,757.46	648,756.79	11.58	75,126.04	11,631.42	13.41
ID	Indonesia	154,827.64	13.12	20,313.39	131,071.61	13.12	17,196.60	3,116.79	15.34
JP	Japan	132,287.72	4.65	6,151.38	193,395.22	4.65	8,992.88	(2,841.50)	(46.19)
KR	Korea (Republic of)	181,701.38	10.37	18,842.43	164,937.47	10.37	17,104.02	1,738.41	9.23
NG	Nigeria	1,310,011.14	21.75	284,927.42	184,398.60	21.75	40,106.70	244,820.72	85.92
SG	Singapore	844,168.80	7.57	63,903.58	67,750.07	7.57	5,128.68	58,774.90	91.97
ZA	South Africa	416,393.62	10.86	45,220.35	400,966.45	10.86	43,544.96	1,675.39	3.70
CH	Switzerland	34,153.47	3.79	1,294.42	41,361.78	3.79	1,567.61	(273.19)	(21.11)
TH	Thailand	339,487.80	19.61	66,573.56	257,588.91	19.61	50,513.19	16,060.37	24.12
TR	Turkey	190,551.24	10.28	19,588.67	220,797.00	10.28	22,697.93	(3,109.26)	(15.87)
AE	United Arab Emirates	248,461.29	8.91	22,137.90	231,071.34	8.91	20,588.46	1,549.44	7.00
US	United States of America	937,126.51	6.53	61,194.36	1,133,776.59	6.53	74,035.61	(12,841.25)	(20.98)
VN	Viet Nam	202,691.21	20.46	41,470.62	166,890.17	20.46	34,145.73	7,324.89	17.66
Total		16,494,860.52		1,771,325.10	11,606,125.85		1,141,525.12	629,799.98	35.56

Source: GRA estimates Note: Numbers in parentheses are negative.

Table A.4: 2013 Import Revenue Gap ('1000 US$) - GCMS Data against WITS Data

Ctry Code	Countries	WITS Export Value	EITR (%)	Potential Revenue	Import CIF	EITR (%)	GCMS Import Revenue	Revenue Gap	Gap as % to Potential
AR	Argentina	47,558.60	15.96	7,590.35	43,043.57	15.96	6,869.75	720.60	9.49
AU	Australia	92,691.19	6.21	5,756.12	165,686.32	6.21	10,289.12	(4,533.00)	(78.75)
BR	Brazil	289,652.05	19.56	56,655.94	242,803.87	19.56	47,492.44	9,163.50	16.17
CA	Canada	205,361.54	7.86	16,141.42	285,786.65	7.86	22,462.83	(6,321.41)	(39.16)
CN	China	3,769,197.69	11.77	443,634.57	2,231,491.85	11.77	262,646.59	180,987.98	40.80
EU	Europe Union	5,443,704.46	9.84	535,660.52	3,528,159.38	9.84	347,170.88	188,489.64	35.19
IN	India	800,768.26	11.44	91,607.89	650,132.94	11.44	74,375.21	17,232.68	18.81
ID	Indonesia	246,073.01	13.31	32,752.32	208,411.58	13.31	27,739.58	5,012.74	15.30
JP	Japan	84,617.34	9.10	7,700.18	102,269.77	9.10	9,306.55	(1,606.37)	(20.86)
KR	Korea (Republic of)	258,882.78	5.37	13,902.01	296,624.68	5.37	15,928.75	(2,026.74)	(14.58)
NG	Nigeria	1,392,343.28	19.98	278,190.19	209,246.69	19.98	41,807.49	236,382.70	84.97
SG	Singapore	75,942.46	9.57	7,267.69	65,690.38	9.57	6,286.57	981.12	13.50
ZA	South Africa	336,309.61	11.44	38,473.82	371,860.03	11.44	42,540.79	(4,066.97)	(10.57)
CH	Switzerland	35,928.01	6.69	2,403.58	28,982.22	6.69	1,938.91	464.67	19.33
TH	Thailand	285,557.50	19.80	56,540.39	259,576.18	19.80	51,396.08	5,144.31	9.10
TR	Turkey	161,328.72	12.86	20,746.87	154,458.69	12.86	19,863.39	883.48	4.26
AE	United Arab Emirates	324,301.39	12.27	39,791.78	163,492.83	12.27	20,060.57	19,731.21	49.59
US	United States of America	691,183.71	10.58	73,127.24	728,635.66	10.58	77,089.65	(3,962.41)	(5.42)
VN	Viet Nam	246,519.76	23.30	57,439.10	233,542.98	23.30	54,415.51	3,023.59	5.26
	Total	14,787,921.36		1,785,381.98	9,969,896.27		1,139,680.66	645,701.32	36.17

Source: GRA estimates Note: Numbers in parentheses are negative.

Table A.5: 2014 Import Revenue Gap ('1000 US$) - GCMS Data against WITS Data

Ctry Code	Countries	WITS Export Value	EITR (%)	Potential Revenue	Import CIF	EITR (%)	GCMS Import Revenue	Revenue Gap	Gap as % to Potential
AR	Argentina	20,657.05	13.32	2,751.52	21,440.31	13.32	2,855.85	(104.33)	(3.79)
AU	Australia	44,793.09	7.72	3,458.03	86,465.26	7.72	6,675.12	(3,217.09)	(93.03)
BR	Brazil	195,855.93	18.55	36,331.28	205,498.61	18.55	38,119.99	(1,788.71)	(4.92)
CA	Canada	117,184.78	10.41	12,198.94	151,393.43	10.41	15,760.06	(3,561.12)	(29.19)
CN	China	4,024,429.96	12.87	517,944.14	1,984,694.05	12.87	255,430.12	262,514.02	50.68
EU	Europe Union	4,585,363.72	10.28	471,375.39	2,613,493.10	10.28	268,667.09	202,708.30	43.00
IN	India	634,091.38	12.62	80,022.33	548,862.12	12.62	69,266.40	10,755.93	13.44
ID	Indonesia	211,107.88	14.27	30,125.09	235,650.26	14.27	33,627.29	(3,502.20)	(11.63)
JP	Japan	77,876.20	7.71	6,004.26	90,164.36	7.71	6,951.67	(947.41)	(15.78)
KR	Korea (Republic of)	165,760.08	8.76	14,520.58	151,897.72	8.76	13,306.24	1,214.34	8.36
NG	Nigeria	962,811.80	26.30	253,219.50	739,664.76	26.30	194,531.83	58,687.67	23.18
SG	Singapore	63,771.43	10.14	6,466.42	52,470.15	10.14	5,320.47	1,145.95	17.72
ZA	South Africa	302,053.57	14.32	43,254.07	374,941.67	14.32	53,691.65	(10,437.58)	(24.13)
CH	Switzerland	32,777.93	7.47	2,448.51	26,557.13	7.47	1,983.82	464.69	18.98
TH	Thailand	283,474.80	20.90	59,246.23	204,034.53	20.90	42,643.22	16,603.01	28.02
TR	Turkey	158,854.72	11.46	18,204.75	176,644.86	11.46	20,243.50	(2,038.75)	(11.20)
AE	United Arab Emirates	226,784.69	12.65	28,688.26	182,220.45	12.65	23,050.89	5,637.37	19.65
US	United States of America	639,777.73	10.95	70,055.66	570,141.74	10.95	62,430.52	7,625.14	10.88
VN	Viet Nam	243,098.24	22.12	53,773.33	206,344.33	22.12	45,643.37	8,129.96	15.12
	Total	12,990,524.97		1,710,088.29	8,622,578.84		1,160,199.10	549,889.19	32.16

Source: GRA estimates Note: Numbers in parentheses are negative.

Table A.6: 2015 Import Revenue Gap ('1000 US$) - GCMS Data against WITS Data

Ctry Code	Countries	WITS Export Value	EITR (%)	Potential Revenue	Import CIF	EITR (%)	GCMS Import Revenue	Revenue Gap	Gap as % to Potential
AR	Argentina	27,897.91	9.47	2,641.93	28,683.84	9.47	2,716.36	(74.43)	(2.82)
AU	Australia	40,850.48	7.57	3,092.38	96,565.57	7.57	7,310.01	(4,217.63)	(136.39)
BR	Brazil	175,922.67	16.22	28,534.66	158,188.52	16.22	25,658.18	2,876.48	10.08
CA	Canada	139,941.51	15.48	21,662.95	162,087.94	15.48	25,091.21	(3,428.26)	(15.83)
CN	China	5,155,111.22	10.98	566,031.21	2,194,673.02	10.98	240,975.10	325,056.11	57.43
EU	Europe Union	4,762,630.10	9.66	460,070.07	4,045,483.24	9.66	390,793.68	69,276.39	15.06
IN	India	606,055.06	11.08	67,150.90	716,428.55	11.08	79,380.28	(12,229.38)	(18.21)
ID	Indonesia	157,499.22	13.33	20,994.65	159,674.63	13.33	21,284.63	(289.98)	(1.38)
JP	Japan	63,671.74	9.12	5,806.86	60,970.97	9.12	5,560.55	246.31	4.24
KR	Korea (Republic of)	167,533.40	12.58	21,075.70	147,990.72	12.58	18,617.23	2,458.47	11.66
NG	Nigeria	874,522.73	21.28	186,098.44	147,960.52	21.28	31,486.00	154,612.44	83.08
SG	Singapore	60,572.86	9.32	5,645.39	1,287,622.27	9.32	120,006.40	(114,361.01)	(2,025.74)
ZA	South Africa	256,892.25	12.80	32,882.21	308,210.22	12.80	39,450.91	(6,568.70)	(19.98)
CH	Switzerland	22,741.55	8.75	1,989.89	166,520.30	8.75	14,570.53	(12,580.64)	(632.23)
TH	Thailand	171,908.83	18.02	30,977.97	173,984.80	18.02	31,352.06	(374.09)	(1.21)
TR	Turkey	194,405.59	5.62	10,925.59	352,720.72	5.62	19,822.90	(8,897.31)	(81.44)
AE	United Arab Emirates	156,039.33	13.33	20,800.04	218,176.09	13.33	29,082.87	(8,282.83)	(39.82)
US	United States of America	674,927.99	7.60	51,294.53	688,559.29	7.60	52,330.51	(1,035.98)	(2.02)
VN	Viet Nam	237,618.29	24.34	57,836.29	217,693.57	24.34	52,986.61	4,849.68	8.39
	Total	13,946,742.72		1,595,511.66	11,332,194.78		1,208,476.02	387,035.64	24.26

Source: GRA estimates. Note: Numbers in parentheses are negative.

Table A.7: 2016 Import Revenue Gap ('1000 US$) - GCMS Data against WITS Data

Ctry Code	Countries	WITS Export Value	EITR (%)	Potential Revenue	Import CIF	EITR (%)	GCMS Import Revenue	Revenue Gap	Gap as % to Potential
AR	Argentina	42,792.42	6.54	2,798.62	25,712.81	6.54	1,681.62	1,117.00	39.91
AU	Australia	76,191.95	8.41	6,407.74	88,490.77	8.41	7,442.07	(1,034.33)	(16.14)
BR	Brazil	169,842.01	15.72	26,699.16	215,065.09	15.72	33,808.23	(7,109.07)	(26.63)
CA	Canada	156,064.80	11.52	17,978.66	190,189.97	11.52	21,909.88	(3,931.22)	(21.87)
CN	China	4,443,439.74	15.04	668,293.34	1,748,134.25	15.04	262,919.39	405,373.95	60.66
EU	Europe Union	5,078,038.58	10.57	536,748.68	3,867,928.00	10.57	408,839.99	127,908.69	23.83
IN	India	675,089.54	9.89	66,766.36	555,422.92	9.89	54,931.33	11,835.03	17.73
ID	Indonesia	109,172.30	16.20	17,685.91	61,467.56	16.20	9,957.74	7,728.17	43.70
JP	Japan	72,928.38	9.72	7,088.64	71,411.91	9.72	6,941.24	147.40	2.08
KR	Korea (Republic of)	168,378.30	12.49	21,030.45	143,130.56	12.49	17,877.01	3,153.44	14.99
NG	Nigeria	419,134.66	24.34	102,017.38	197,339.10	24.34	48,032.34	53,985.04	52.92
SG	Singapore	56,920.30	10.41	5,925.40	143,026.23	10.41	14,889.03	(8,963.63)	(151.27)
ZA	South Africa	281,046.52	13.33	37,463.50	257,445.44	13.33	34,317.48	3,146.02	8.40
CH	Switzerland	32,121.88	5.99	1,924.10	72,302.65	5.99	4,330.93	(2,406.83)	(125.09)
TH	Thailand	195,536.10	19.97	39,048.56	147,304.26	19.97	29,416.66	9,631.90	24.67
TR	Turkey	286,918.01	7.66	21,977.92	275,150.18	7.66	21,076.50	901.42	4.10
AE	United Arab Emirates	102,323.47	13.33	13,639.72	181,527.94	13.33	24,197.67	(10,557.95)	(77.41)
US	United States of America	572,458.80	8.68	49,689.42	741,488.95	8.68	64,361.24	(14,671.82)	(29.53)
VN	Viet Nam	290,113.00	25.12	72,876.38	234,815.27	25.12	58,985.60	13,890.78	19.06
	Total	13,228,510.74		1,716,059.94	9,217,353.86		1,125,915.95	590,143.99	34.39

Source: GRA estimates Note: Numbers in parentheses are negative.

Table A.8: Test of Representativeness of Sample of Registered Corporate Firms

Two-sample Kolmogorov-Smirnov test
for equality of distribution functions by Region

Smaller group	D	P_value
1:	0.0346	0.002
2:	-0.0375	0.001
Combined K-S:	**0.0375**	**0.001**

Two-sample Kolmogorov-Smirnov test
for equality of distribution functions by Firm Size

Smaller group	D	P_value
1:	0.5366	0.000
2:	0.000	1.000
Combined K-S:	**0.5366**	**0.000**

Two-sample Kolmogorov-Smirnov test
for equality of distribution functions by Sector of Activity

Smaller group	D	P_value
1:	0.1121	0.000
2:	-0.1225	0.000
Combined K-S:	**0.1225**	**0.000**

Source: Authors' Formal testing of representativeness of the sample data

Table A.9: Distribution of Sole Proprietorship Firms by Region

	IBES I		IBES II
REGION	# of Firms	Percent	Percent
ACCRA	141,963	28.5	28.5
ASHANTI	99,993	20.1	20.1
WESTERN	46,871	9.4	9.4
EASTERN	45,175	9.1	9.1
CENTRAl	40,759	8.2	8.2
BRONG AHAFO	38,220	7.7	7.7
VOLTA	32,585	6.5	6.6
NORTHERN	29,574	5.9	5.9
UPPER EAST	12,648	2.5	2.5
UPPER WEST	10,279	2.1	2.1
Total	498,067	100	100

Source: Authors' own computation based on IBES I and II

Table A.10: Distribution of Sole Proprietorship Firms by Sector

	IBES I		IBES II
principal activity)	# of Firms	Percent	Percent
Agriculture, forestry and fishing	1,926	0.39	0.36
Mining and quarrying	179	0.04	0.033
Manufacturing	90,366	18.14	18.18
Electricity, gas, steam and air conditioning	238	0.05	0.043
Water supply; sewerage, waste management	402	0.08	0.071
Construction	2,870	0.58	0.58
Wholesale and retail trade; repair of m	249,716	50.14	50.25
Transportation and storage	627	0.13	0.11
Accommodation and food service activity	49,204	9.88	9.9
Information and communication	2,852	0.57	0.57
Financial and insurance activities	2,306	0.46	0.45
Real estate activities	247	0.05	0.047
Professional, scientific and technical	4,699	0.94	0.94
Administrative and support service activities	4,697	0.94	0.86
Education	10,264	2.06	2.05
Human health and social work activities	2,592	0.52	0.51
Arts, entertainment and recreation	4,602	0.92	0.93
Other service activities	70,208	14.1	14.12
extraterritorial organisations	72	0.01	0
Total	498,067	100	100

Source: Authors' own computation based on IBES I and II

Table A.11: Distribution of Sole Proprietorship Firms by Firm Size

	IBES I		IBES II
Firm Size	# of Firms	Percent	Percent
1	199,859	40.13	40.15
2-4	235,426	47.27	47.34
5-9	43,438	8.72	8.71
10-19	12,604	2.53	2.51
20-30	3210	0.64	0.63
30-39	1566	0.31	0.3
40-49	576	0.12	0.11
50 or more	1388	0.28	0.26
Total	498,067	100	100

Source: Authors' own computation based on IBES I and II

Table A.12: Distribution of Partnership Firms by Region

	IBES I		IBES II
REGION	# of Firms	Percent	Percent
ACCRA	12,181	24.0	23.9
ASHANTI	10,947	21.5	20.3
WESTERN	6,421	12.6	13.2
EASTERN	5,107	10.0	10.5
CENTRAl	3,879	7.6	7.6
BRONG AHAFO	4,204	8.3	8.5
VOLTA	2,614	5.1	5.2
NORTHERN	2,767	5.4	5.4
UPPER EAST	1,622	3.2	3.2
UPPER WEST	1,120	2.2	2.2
Total	50,862	100	100

Source: Authors' own computation based on IBES I and II

Table A.13: Distribution of Partnership Firms by Sector

	IBES I		IBES II
Sector	# of Firms	Percent	Percent
Agriculture, forestry and fishing	325	0.64	0.46
Mining and quarrying	50	0.1	0.08
Manufacturing	6,465	12.71	13.12
Electricity, gas, steam and air conditi	44	0.09	0.057
Water supply; sewerage, waste managemen	84	0.17	0.086
Construction	193	0.38	0.25
Wholesale and retail trade; repair of m	28,337	55.71	57.39
Transportation and storage	223	0.44	0.42
Accommodation and food service activiti	5,939	11.68	11.2
Information and communication	339	0.67	0.68
Financial and insurance activities	821	1.61	1.45
Real estate activities	51	0.1	0.098
Professional, scientific and technical	574	1.13	1.12
Administrative and support service acti	613	1.21	1.18
Education	1,833	3.6	3.2
Human health and social work activities	387	0.76	0.62
Arts, entertainment and recreation	454	0.89	0.82
Other service activities	4,129	8.12	7.76
extraterritorial organisations	1	0	0
Total	50,862	100	100

Source: Authors' own computation based on IBES I and II

Table A.14: Distribution of Partnership Firms by Firm Size

	IBES I		IBES II
Firm Size	# of Firms	Percent	Percent
1	7,022	13.81	10.48
2-4	32,857	64.6	67.78
5-9	6,848	13.46	13.73
10-19	2,703	5.31	5.3
20-30	723	1.42	1.43
30-39	266	0.52	0.48
40-49	128	0.25	0.18
50 or more	315	0.62	0.63
Total	50,862	100	100

Source: Authors' own computation based on IBES I and II