Bribery And Tax Evasion: Does The Level Of Financial Constraint Matter?

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Bribery And Tax Evasion: Does The Level Of Financial Constraint Matter?

by

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Abstract

Domestically mobilised resources in African countries are low, and the current levels are inadequate to finance projects required to achieve sustainable development goals by 2030. One of the ways by which African governments could increase domestically mobilised revenue is by reducing tax evasion. This study examines the effect of bribery and credit constraints on tax evasion (both the incidence and extent) by firms in SSA, using data from the World Bank Enterprise Survey (WBES) for 26 countries. Instrumental Variable (IV) Probit regression estimation technique was employed to determine the effect of bribery on the incidence of tax evasion. The Instrumental Tobit regression estimation technique was employed to estimate the effect of bribery on the extent of tax evasion. The results emanating from this study show that tax evasion is higher among firms that pay bribes. Also, the positive effect of bribery on tax evasion holds across the different levels of credit constraints. However, the effect is higher among firms that are fully credit-constrained. The results also show that countries with more robust institutional qualities, such as government effectiveness, the rule of law and control of corruption, had a lesser positive effect of bribery on tax evasion. The study findings reinforce the idea that low tax revenue in African countries is self-inflicted by government actions, resulting in weak civil services and institutions. Also, the study's findings indicate that improvement in access to finance goes beyond its role in enhancing economic growth and poverty reduction to include discouragement of tax evasion behaviour by economic agents.

Keywords: Tax evasion, Bribery, Institutional quality, Credit constrained, Africa

1. Introduction

The Financing for Development, Addis Ababa Action Agenda emphasised the importance of resource mobilisation and the effective use of domestic resources to actualise sustainable development (United Nations, 2015). As a result, there has been increased advocacy on the need to reduce financial leakages that contribute to low tax revenue, especially in developing countries. In addition, the realisation of the seventeen goals requires huge finances and exceeds development assistance inflows. The financing gaps explain why there has been an increasing call for developing countries, including sub-Saharan African countries, to raise their current level of domestic revenue mobilisation. The developmental assistance fund is grossly insufficient to finance various programmes necessary to accomplish the SDGs (Addison et al., 2018). The emergence of COVID-19 has further complicated the situation and has brought the need for African countries to expand their fiscal space.

The tax compliance level must improve to improve domestic revenue mobilisation in developing countries. Consequently, government policies should be designed in such a way to curtail tax evasion. Tax evasion is an economic agent's illegal and deliberate action to reduce their tax obligation[1]. This behaviour contributes to lower tax revenue in developed and developing countries (Alm, 2019; Alm et al., 2019; Guo and Hung, 2020). The magnitude of tax evasion is, however, higher in developing countries. In Beck et al. (2014), tax evasion stood at above 40% in nearly all the sampled countries, with significant variation. UNCTAD (2015) shows that in developing countries, a total of about US$100 billion in tax revenue was lost annually due to corporate tax evasion and avoidance.

In addition, sovereign debt has been increasing in sub-Saharan Africa lately. Sovereign debt rose from an average of 34.5% between 2010 and 2017 to 51.5% in 2019. It further increased to 57.8% in 2020 due to the emergence of spending associated with COVID-19 in the face of the limited fiscal space (Berensmann et al., 2021). In 2020, the public debt ratio to GDP exceeded 50% in more than half of SSA countries (IMF, 2021). Consequently, the debt servicing to revenue ratio reached 32.3% in 2020 (Berensmann et al., 2021). These statistics revealed that if the continent's current debt level continues to rise, sovereign debt might reach a level that will be unsustainable[2]. Unsustainable sovereign debt reduces future growth in the continent and limits the current actions towards eradicating poverty (Mustapha and Prizzon, 2018).

Domestically mobilised revenue needs to increase to resolve the issue of growing debt on the continent. Reduction in taxation leakages increases government tax revenue. By implication, tax evasion, both by individuals and firms, needs to be eliminated or reduced. Consequently, the government needs to understand the factors that motivate individuals and firms to evade tax. This study is, however, limited to tax evasion by firms. In Africa, corporate income tax, Value Added Taxes (VAT), and taxes on other goods and services contribute more than three-quarters of total

[1] Tax evasion is different from tax avoidance. Tax avoidance is a legal approach that firms deploy to reduce tax liability. Tax avoidance is closely related to tax aggressiveness. Tax aggressiveness entails the ability of a firm to reduce long-run tax liability. This study focuses on the illegal practices of reducing tax payments, which reduce tax revenues. Hence, the study centered on tax evasion.

[2] In other words, the continent might return to the pre-debt forgiven era.

tax revenues (*OECD/ATAF/AUC, 2021)*. Personal income taxes contribute less than 20 percent. Studies on factors that influence firms' decision to evade taxes are few compared to why individuals evade taxes (Alm et al., 2019). To reduce taxable earnings, sophisticated accounting, manipulation and restatement of earnings, and inflation of capital expenditure have contributed to tax evasion lately.

Firms evade taxes for several reasons, including a weak judiciary system, corrupt tax officials, and financial pressure (Johnson et al. 2000; Mawejje and Okumu, 2016; Guo and Hung, 2020). In a situation where the government cannot enforce penalties or cannot punish those defaulting on their tax payment, the behaviour leads to a culture. The culture enforces tax evasion behaviour and, in turn, undermines government tax revenue. In social contract theory, payment of taxes by individuals and firms promotes and sustains the social contract between them and the government. The contract ensures that the government uses tax revenue to provide public services.

Bureaucrats are individuals with self-seeking tendencies (Alm et al., 2016). As a result, they could exploit their position for personal gain by accepting bribes. Thus, in a situation where existing public institutions cannot uphold good morale among the bureaucrats, unprofessional behaviours such as bribery become the norm. The Grease the wheel hypothesis argues that corruption enhances firm performance by ensuring that efficient firms use bribes to force the government to implement appropriate reforms (Xie et al., 2019). Bribes could also extend to relationship building, which usually happens when firm managers get in touch with bureaucrats willing to receive bribes in return for a favour. It is important to note that the bribe receivers assist the giver of the bribe in rendering service in return (Alm et al., 2016; Cule and Fulton, 2009). Thus, firms leverage relationships to hide their illegal activities, including tax evasion. Hence, in a situation where institutional quality is weak, bribery is likely to encourage tax evasion.

A broken social contract increases the incentives for firms to evade tax, which is further complicated when firms have to spend on infrastructure, such as electricity, due to power shortages to remain in business. McCulloch et al. (2021) argued that community infrastructure provision due to broken social contracts contributes to low tax morale in Nigeria. Thus, the provision of infrastructure by an individual or community indicates an increase in the cost of operation. Firms experiencing a shortage of funds due to their inability to secure external finances are more likely to explore the self-seeking interest of bureaucrats. Concerning other regions of the world, firms in Africa are more likely to be credit-constrained due to the underdevelopment of the financial sector (Allen et al., 2016; Beck et al., 2009; Fowowe and Abidoye, 2013; Otchere et al., 2017). Hence, as reflected in weak institutions, the weak civil service in African countries decreases the chance that firms that evade taxes are caught and punished. As a result, the cost of tax evasion behaviour is low in Africa. The cost is likely lower among firms that give bribes to bureaucrats, and for this category of firms, the benefit of evading taxes is likely to outweigh any potential cost. This study, therefore, aims at addressing the following questions: What is the effect of bribery on tax evasion by firms in sub-Saharan Africa? Is the effect of bribery on tax evasion higher among credit-constrained firms? Do institutional qualities dampen or amplify the effect of bribery on tax evasion? These questions are important in deepening our understanding of why firms evade taxes and the influence of weak public institutions and credit constraints.

The realisation of Sustainable Development Goals in Africa requires huge finance, and the current level of government revenue is grossly inadequate. High tax evasion lowers government revenue. Johnson et al. (2000) identified four main factors why firms evade taxes: (i) high statutory tax rates, (ii) unacceptable behaviours by government workers such as bribe seeking, (iii) existence of criminal gangs within the economy and (iv) poor institutional environment in the form of the weak rule of law and underdevelopment of the financial sector. This study focused on unacceptable behaviours by government workers - bribery and poor institutional environment in the form of credit constraints and the poor institutional qualities, including the control of corruption and the rule of law. The two factors are essential to unlock significant revenues in African countries[3].

The need to actualise SDGs means that all available revenue sources are optimised. Hence, lowering tax evasion is an important first step. Current knowledge on the drivers of tax evasion is still low for African countries. Recent studies on low tax morale, including McCulloch et al. (2021) and Kouame (2021), found that low morale encourages tax evasion. There are still gaps in our understanding of the causes of low tax revenue and the contributory role of unprofessional conduct by tax administrators, especially in a society where the institution is weak. This study aims to deepen our understanding of the contributing role of weak institutions in high tax evasion on the continent. Alm et al. (2016) focused on a set of developing countries, and Payne and Saunoris (2020) focused on transition countries. This study complements Mawejje and Okumu (2016), which focused on the Ugandan economy, the only study on Africa. Since weak institutions promote dishonest tax administrators, which promotes bribery, an exclusive African study is required to show why the low tax revenue is self-inflicted. Furthermore, a new study is also required to document how strong institutions, which demand honesty among tax administrators, are crucial to realising high tax revenues. Hence, the study examined the importance of a strong institution and low credit constraint among firms in lowering tax evasion, which boosts tax revenues.

This study is also important given the fiscal shock arising from limited fiscal space in most African countries before COVID-19. Consequently, the debt sustainability of most African countries is in distress. The quest for solutions to improve the financial standing of African countries also prompted this study. Evidence that more credit-constrained firms had a higher incidence and extent of tax evasion indicates that an efficient financial sector with efficient loan facilities would boost tax revenues. Therefore, the study finding suggests that an improvement in a firm's access to finance might go beyond its role in enhancing economic growth and poverty reduction, as documented in Beck and Demirguc-Kunt, (2008), Demirguc-Kunt et al., (2017), Honohan, (2008), to include discouragement of tax evasion.

Lastly, this study provides a public policy perspective on why African countries should take the issue of developing institutions and strengthening inclusive financial development more seriously. These factors can foster tax compliance among firms, thereby improving African countries' fiscal space.

[3] Future studies should consider focusing on the remaining two factors.

2. Brief review of bribery and its effect

The evasion of taxes by firms is motivated by several factors; these include high statutory tax rates, unprofessional behaviour by tax administrators, poor public infrastructure and weak institutional framework (Johnson et al., 2000). This study emphasised the role of corrupt government officials in tax evasion. In situations where the existing institutional structure is weak and cannot effectively monitor government officials' activities, there is a high tendency for government officials to abuse their position to accumulate private gains. Tax evasion is a criminal offence (Slemrod, 2007). Consequently, firms are more likely to use the quest to accumulate private gains among government officials to underreport their tax obligations. Mawejje and Okumu (2016) disclosed that the willingness to engage in tax evasion largely depends on the probability of being detected and the penalties involved. Bribe reduces the probability and, in turn, increases tax evasion among firms.

Furthermore, it is assumed that evasion of taxes increases investable funds available to a firm. The importance of these funds depends on the financial position of the organisation and the ability to secure external funds. Credit-constrained firms are more likely to use the funds to finance their working capital due to limited funding. It is important to state that all firms are likely to engage in evasion for several reasons besides the source of additional investable funds. It is expected that more credit-constrained firms are more willing to engage in bribery, especially when the institutions are weak to detect and punish those found to underreport their sales for tax purposes. Their evidence is consistent with the conclusion in Blackburn et al. (2012) and Capasso and Jappelli (2013) on how underdevelopment of the financial sector increases the incentive for firms to evade taxes.

Studies on tax evasion, including this study, are anchored on the social contract (Alm et al., 2019; Mawejje and Okumu, 2016; McCulloch et al., 2021; Kouame, 2021). The contract between the taxpayers and the state stipulates that the state provides public infrastructure such as road networks, security, education, and health. The taxpayers remit appropriate taxes to the states when due (Kouame, 2021). In situations where they default, taxpayers are caught and punished. The decision to default could arise from the taxpayer's observation of weak enforcement or lack of trust in tax authority, which is associated with weak institutions that promote giving and accepting bribes (McCulloch et al., 2021). Although bribes increase the cost of operating a firm, a small fraction of unreported sales translates to a large amount, which is more than the bribe paid. Hence, both the incidence and extent of tax evasion increase with bribery.

Bribery is an illegal activity. From this lens, Qi and Ongena (2019) investigated how bribery influences the ability of firms to access finance. The authors used data from about 12,000 firms from 22 transition countries in Europe, the Baltic States and the Caucasus from 2007 to 2014. The authors found that bribery had a negative and significant effect on access to finance. Their result suggests that banks are more willing to lend money to firms with good practices and are loan averse to those that might expose them to significant uncertainty and enforcement actions. Ullah (2020) also focused on the transition economies. Here, the study employed data from about 10000 firms from 28 developing countries over 2011 and 2014; they find that bribery intensified the negative impact of financial constraints on sales growth and employment growth. Consistent with the hypothesis that corruption stalls the wheels of development, Amin and Soh (2020) used data from

over 40,000 firms from 109 countries from 2006 to 2018. Their results show that employment growth is lower among firms that pay bribes. The impact is, however, higher among financially constrained firms.

Alm et al. (2016) is among the earliest studies that examined the effect of bribery on the tax evasion behaviour of firms. In the study, firm-level data from about 16,000 firms that spanned thirty-two countries were analysed using several methods. Tax evasion was evaluated from incidence and extent perspectives. They found that firms that engage in bribery are associated with a higher incidence and the extent of tax evasion. In a more recent study, Payne and Saunoris (2020) employed data from twenty-five transition economies and found evidence consistent with Alm et al. (2016). Unlike Alm et al. (2016) and Payne and Saunoris (2020), who used data from a collection of countries, Mawejje and Okumu (2016) relied on Uganda data. Also, they submitted that the extent of tax evasion is positively associated with bribery. In addition, their findings show that tax evasion reduces with efficient legal systems and adequate public services. Gauthier et al. (2020) investigated why firms pay bribes from the demand and the supply perspective using data from about 18,000 firms in seventy-five countries; their findings revealed that firms that pay bribes underreport their sales for tax purposes more than those that do not give bribes. The author argued that bribery is mostly demand-driven.

Kenyon (2008) investigates the extent of tax evasion among Brazilian manufacturing firms. Tax evasion was measured by asking the question: recognising the difficulties many enterprises face in fully complying with tax and other regulations, what percentage of total annual sales would you estimate the typical establishment in your sector reports? And it was the same question used in Johnson et al. (2000). The authors' results show that a significant fraction of the manufacturing firms evade taxes. In other words, regardless of their size, the author found that most manufacturing firms kept a fraction of their sales undeclared to the tax authority. Also, the manufacturing firms were asked whether or not they make use of equity finance, and their responses were used to construct a variable that was regressed on tax evasion. The author's results show that firms that evade tax have a positive and significant effect on access to finance. Their finding implies that manufacturing firms that evade taxes are less likely to have access to finance.

Capasso and Jappelli (2013) examine the effect of financial development on tax evasion in Italy. The authors used information from 11,781 households. The data were sourced from the Bank of Italy's SHOW dataset from 1995 to 2005. The authors' findings show that an improvement in the level of financial development lowers households' participation in the underground economy. The authors' results mean that financial sector development decreases the incentive for households to keep a fraction of their sales undeclared to the tax authority in Italy. In other words, tax evasion reduces with financial development. The author showed that financial development's impact on tax evasion depends on the level of judicial efficiency. The Southern Region, which is more judicially inefficient, is less financially developed and has higher tax evasion. As a result, the authors concluded that the impact of financial development on tax evasion depends on the level of efficiency of the judiciary system (Capasso and Jappelli, 2013). Using a firm-level data set from 102 countries from Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa and sub-Saharan Africa from 2002 to 2010, Beck et al. (2014) extended Capasso and Jappelli (2013) by examining the effect of financial development on corporate tax evasion.

Tax evasion was measured as the incidence and extent of tax evasion. Unlike Capasso and Jappelli (2013), who used the underground economy to proxy tax evasion, Beck et al. (2014) used a more direct approach. The authors' findings show that financial development, an increase in credit information sharing and branch penetration reduce tax evasion. The effect is higher for smaller firms and firms in small cities. Their finding implies that an improvement in credit information sharing reduces tax evasion at a higher magnitude for small firms compared to large firms because information sharing increases the probability for small firms' financial position to be ascertained.

To investigate the effect of inclusive financial development on tax evasion in developing countries, Ahamed (2016) used the World Bank Enterprise Survey dataset for 42 developing countries from 2003 to 2010. The author measured tax evasion using the same approach as in Beck et al. (2014). Principal component analysis was used to combine different measures of financial inclusion indicators[4] to compute inclusive financial development. Similar to Beck et al. (2014), the author used Tobit and Probit regression estimation techniques to examine the effect of inclusive financial development on the extent of tax evasion and incidence, respectively. The author's findings showed that inclusive financial development helps in lowering tax evasion. In other words, developing countries with a more inclusive financial sector have a lower incidence of tax evasion and a smaller extent of tax evasion by firms. Furthermore, similar to Capasso and Jappelli (2013), Ahamed (2016) found that the positive effect of inclusive financial development on tax evasion is higher when the country has enforced legal rights. Also, the impact is higher when the share of the informal economy is small.

Alm et al. (2019) used data from the Business Environment and Enterprise Performance Survey (BEEPS) for 27 transitional countries from 2002 to 2005 to examine the effect of financial constraints on tax evasion. Tax evasion was computed using the response to the question: What percentage of sales does a typical firm in your area report for tax purposes? The question is used to determine whether the firm is involved in tax evasion, and the extent follows the suggestion provided by Johnson et al. (2000). Financial constraint was measured using the respondent's response to the following questions: (1) How problematic is access to financing for the operation and growth of your business? (2) How problematic is the cost of financing for the operation and growth of your business? The data were analysed using both OLS and IV estimation techniques, and both results show that financial constraints had a positive and significant effect on tax evasion. The authors identified three channels through which access to financial services influences tax evasion behaviours. They are (i) minimal information disclosure at the bank, (ii) engaging in more cash transactions, thereby bypassing the financial institutions, and (iii) lobbying the government for a lower tax auditing probability. Engaging in each of these acts increased the negative impact of access to finance on tax evasion. Alm et al. (2019)'s conclusion is consistent with Oz-Yalaman's (2019) evidence, which used financial inclusion to proxy financial development. Financial inclusion was measured as the share of the adult population with an account and the share of the adult population that owns a credit card. Global Findex was their source of both measures of financial inclusion.

[4] Financial outreach such as demographic branch/ATM penetration and geographic branch/ATM penetration, and financial usage, including the number of depositors and loan accounts per capita.

The literature on bribery, credit constrained, and tax evasion is small but growing compared to the numerous studies that examined the effect of bribery on firm performance and financial development on economic growth. The literature on African countries is limited. Besides, the low tax morale in African countries, leading to insufficient fiscal space, indicates that more evidence is needed. This study, therefore, amplifies weak institutions in most African countries and their effect on tax evasion. This study examines institutional qualities from three perspectives: unprofessional behaviour among tax authorities, governance structure, and credit constraints by firms in sub-Saharan Africa.

3. Methodology and Data Issues

3.1 The sample

The study combines both firm-level data and country-level data. The mixed nature of the data used is consistent with existing studies that examined why firms engage in tax evasion (Ahamed, 2016; Alm et al., 2019; Beck et al., 2014). The firm-level data were obtained from World Bank Enterprise Surveys (WBES). WBES is innovative data that contains information about firms' business environments in over 120 countries. Collected the data following a standardized methodology and consistent survey instruments, thus making country comparison possible and feasible (Aterido et al., 2011; Kuntchev et al., 2013). The survey has information on the firm's characteristics, sales, finance, crime, tax evasion and ranking of obstacles.

As shown in Table 1, the study comprises 11,312 firms from 26 sub-Saharan African countries. However, the distribution of the firms is unequal across the countries. Data availability for the two key variables: tax evasion and bribery, informed the countries and firms' selection. We restricted the scope of the study to 2006 - 2010 because the information on tax evasion[5], which is our main variable, was discontinued in the survey conducted in 2011. The earliest information on tax evasion was available in surveys conducted in 2006[6].

Table 1: Summary of firms in the sample

Country	No. of firms	Percentage
Angola	126	1.11
Botswana	190	1.68
Burkina Faso	199	1.76
Burundi	261	2.31
Cameroon	266	2.35
Cote d'Ivoire	255	2.25
DRC	288	2.55
Eswatini	265	2.34
Ethiopia	258	2.28
Gabon	156	1.38

[5] The study is not a panel but cross-sectional. As a result, the country-level data were average from 2006 to 2010, which gives a single data point. We then matched the data with the firm-level data.

[6] The reason for excluding the question in recent WBES is that the question weakly provides information on the informal sector, which the question was designed to convey.

Gambia	124	1.10
Ghana	576	5.09
Kenya	556	4.92
Liberia	147	1.30
Madagascar	410	3.62
Mauritania	221	1.95
Mauritius	308	2.72
Mozambique	555	4.91
Nigeria	3146	27.81
Rwanda	176	1.56
Senegal	464	4.10
Sierra Leone	150	1.33
South Africa	946	8.36
Tanzania	366	3.24
Uganda	443	3.92
Zambia	460	4.07
Total	11312	100.00

3.2 Main variables

3.2.1 Tax evasion

This study follows other studies, such as Beck et al. (2014), using the World Bank Enterprise Surveys to examine why firms evade taxes. Tax evasion was measured using the firm manager's response to the question that seeks to ascertain the proportion of sales not reported to the tax authority. The question is very sensitive, and the respondents feel that the information provided will be used against them in the future. Respondents might still have this belief despite prior information that all information gathered through the survey will only be used for research purposes. Hence, the question was asked indirectly. The question was framed: "Recognising the difficulties many enterprises face in complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your area of activity reports for tax purposes?" The response of the firm manager is assumed to reflect the firm's behaviour. The manager's perspective about the behaviour of other firms engaging in the same activities mirrors the firm's behaviour under consideration. The response to this question was then used to construct the incidence and the extent of tax evasion. Given the sensitive nature of this question, we excluded firms that did not respond to this question and those that indicated that they did not know. Following Mawejje and Okumu's (2016) evidence, we exclude firms that did not provide a valid response, as this is not expected to bias the study findings. Hence, the study focused on only firms that estimated the fraction of sales reported for tax purposes.

The incidence of tax evasion reveals whether or not the firm evades tax. Thus, the incidence of tax evasion is in a dummy structure. A value of 1 is assigned when the firm manager indicates that the fraction of total sales reported for tax purposes is less than 100 per cent, and 0 if it is equal to 100 per cent. In other words, if the fraction of sales reported for tax purposes is 0.90, the incidence of tax takes a value of 1. In addition, we computed the extent of tax evasion by subtracting the firm's

response to question 1. If a firm indicated that 0.8, which is 80% of total sales, was reported for tax purposes, then the extent of tax evasion is 0.2. Hence, the value of the extent of tax evasion ranges between 0 and 1. A value of 0 implies that the firm declared all sales for tax purposes, whereas a value of 1 implies that the firm did not declare any sales for tax purposes. Hence, as the value of the extent of tax evasion is higher than 0, it means an increase in tax evasion. While this approach could lead to underestimating the extent of tax evasion, this approach becomes the best option due to the lack of formal, high-quality audited data (Alm et al., 2019). Figure 1 shows the incidence and the extent of tax evasion in the sampled countries. The chart indicates a considerable level of variation in African countries. For instance, nearly all the firms engage in tax evasion in Zambia, whereas less than a quarter evade in Botswana. Furthermore, we conducted a correlation analysis between the incidence and extent of tax evasion and got 83.5 percent, which is statistically significant at 1 percent. The result of the correlation analysis indicates that, on average, the extent of tax evasion is higher in countries with a high incidence of tax evasion.

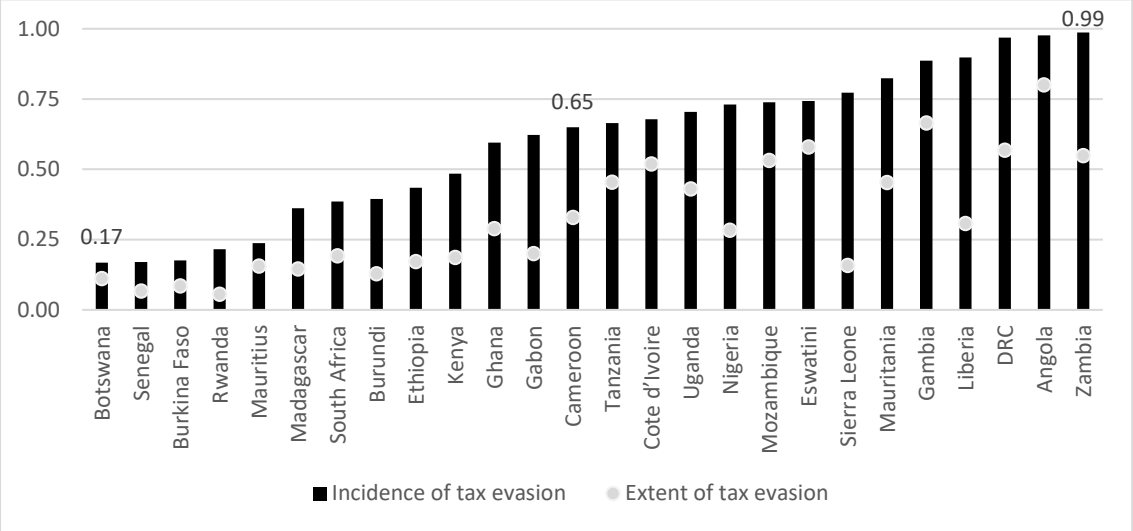


Figure1: The incidence and the extent of tax evasion in African countries

Source: Author computation based on the WEBS dataset

3.2.2 Bribery and institutional quality

The main explanatory factor in this study is bribery. Similar to tax evasion, we used an indirect approach to construct bribery. In the WBES survey, it was stated, "*It is said that establishments are sometimes required to make gifts or informal payments to public officials to get things done about customs, taxes, licenses, regulations, services, etc.*" The follow-up question "*On average, what percentage of total annual sales, or estimated total values, do establishments like this one pay in informal payments or gifts to public officials for this purpose?*" is used to describe whether the firm is involved in bribery. Hence, we used the response to the question to construct bribery. A value of 1 is assigned if the firm indicated a percentage higher than zero, and 0 if otherwise. In

their studies, Alm et al. (2016) and Payne and Saunoris (2020) also used the same approach to measure bribery. Figure 2 shows the preliminary analysis of the nature of the relationship between bribery and the incidence and extent of tax evasion. Figure 2 indicates that countries with high bribery had a high incidence and extent of tax evasion. In the regression analysis section, we will be further exploring these effects.

(a) Incidence of tax evasion

(b) Extent of tax evasion

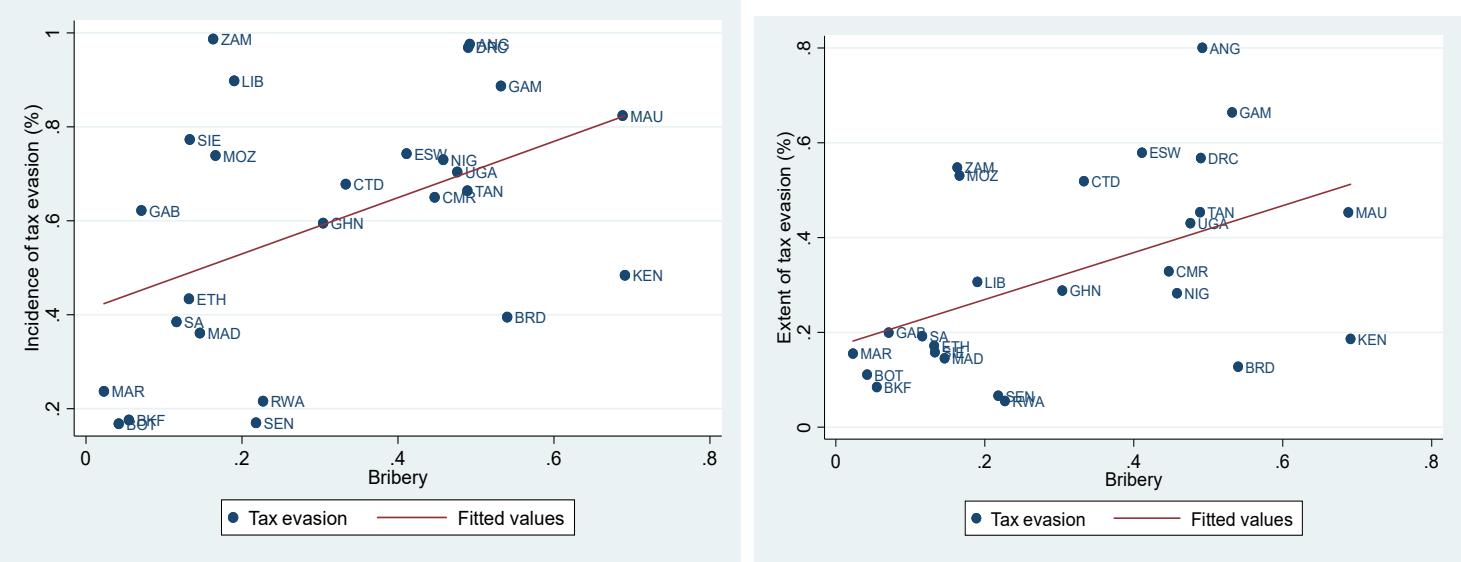


Figure 2: Bribery and tax evasion (incidence and extent)

Source: Author computation based on the WEBS dataset

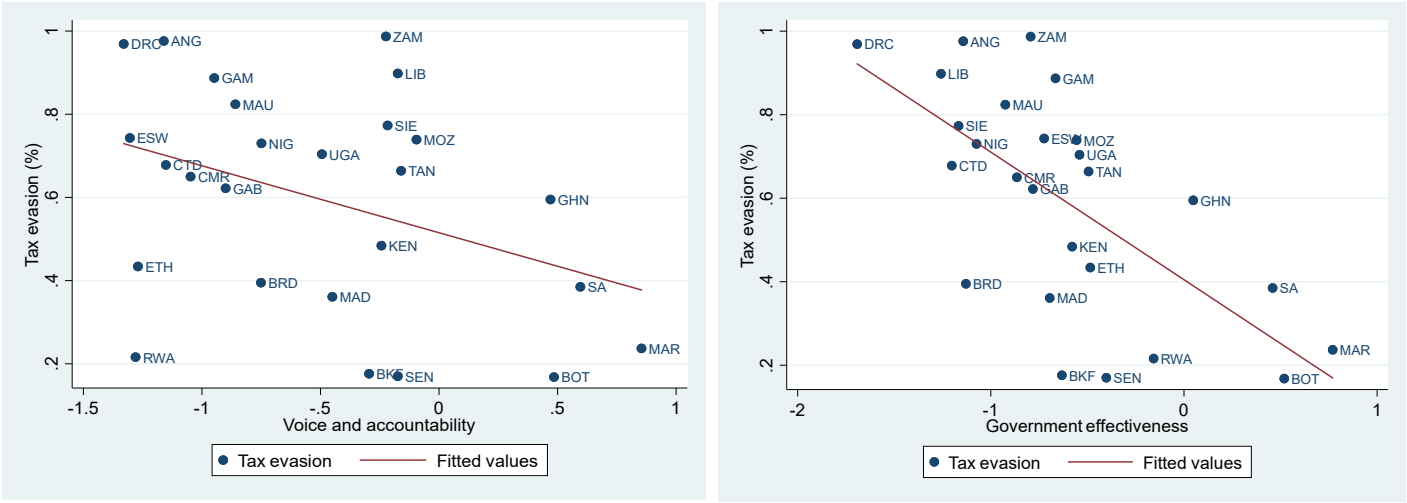
In the study, we used the element of governance developed by Kaufmann et al. (2010) to measure institutional qualities. We considered four governance measures: government effectiveness, voice and accountability, rule of law, and control of corruption. Since underreporting sales for tax purposes is an illegal practice associated with a penalty when caught with evidence, the decision to underreport might indicate that tax authorities will not detect the firm's activities. Hence, in a country with poor institutional qualities, the firm managers have a lower chance of being caught. As a result, there is a higher incentive to evade tax, which, in turn, would encourage tax evasion. The finding is consistent with the evidence in Figure 3, which shows that the incidence of tax evasion in countries with better governance is lower.

A low value indicates weak governance for each governance measure, and a high value indicates strong governance. A closer look at Figure 3 indicates that the degree of the inverse relationship between governance and the incidence of tax evasion depends on how governance is measured. When we measure governance using voice and accountability, the reported inverse relationship is flatter than other governance measures, such as government effectiveness and the rule of law.

Voice and accountability entail seeking transparency in government spending. In contrast, government effectiveness and the rule of law entail the extent to which citizens experience effective discharge of government and existing law enforcement. We will examine these observations further in the study.

a. Voice and accountability

b. Government effectiveness



c. Rule of laws

d. Control of corruption

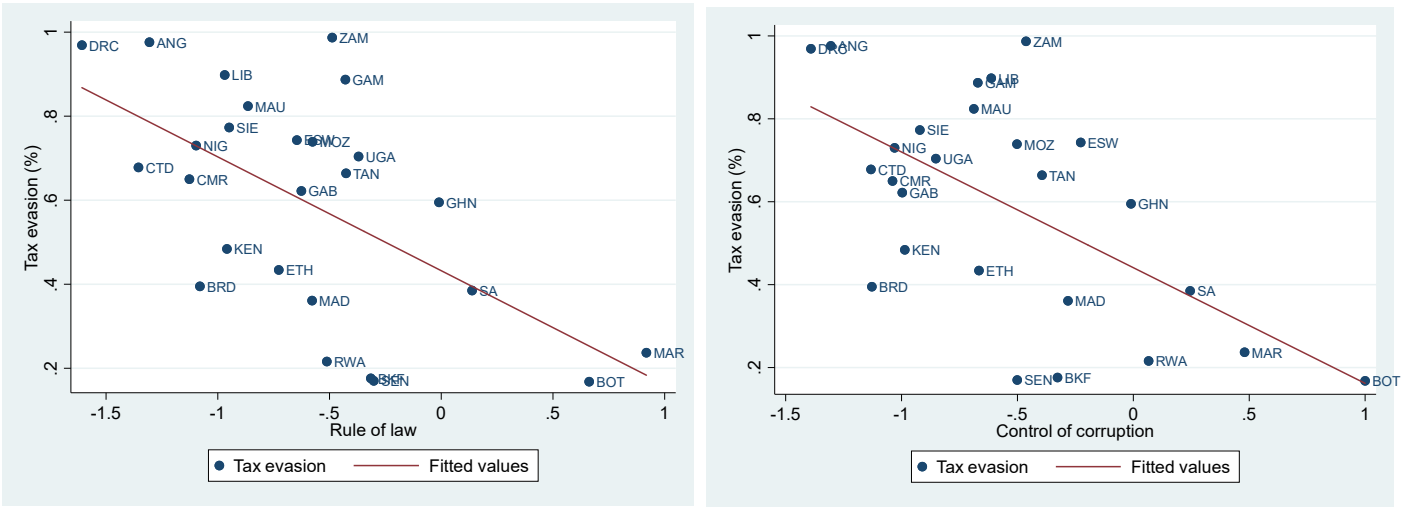


Figure 3: Institutional quality and tax evasion

Source: Author's computation based on the WEBS dataset

3.2.3 Access to finance

In this study, we employed an objective measure of access to finance. Using an innovative approach developed by Kuntchev et al. (2013). Fowowe (2017) also used the approach. The

approach reflects the severity in the degree to which firms lack access to finance. According to Kuntchev et al. (2013), firms are classified into fully credit-constrained, partially credit-constrained, maybe credit-constrained, and non-credit-constrained.

A. Fully credit-constrained

A firm falls within the fully credit-constrained category when the following conditions are satisfied:

(i) Did not use external sources of finance for both working capital and investment during the previous year;
(ii) Applied for a loan during the previous year;
(iii) Did not have a loan outstanding at the time of the survey, which was disbursed during the last fiscal year or later.

When a firm meets the above three requirements, it means that either of these conditions. First, the firm does not have access to external loans because its loan applications were rejected. Second, the firms did not bother to apply even though they needed additional capital.

B. Partially credit-constrained

A firm falls within the partially credit-constrained category when the following conditions are satisfied:

(i) Used external sources of finance for working capital/or investments during the previous fiscal year and/or have a loan outstanding at the time of the survey, and either:
(ii) Did not apply for a loan during the previous fiscal year, and the reason for not applying for a loan was other than having enough capital for the firm's needs. These reasons may indicate that firms may self-select out of the credit market due to prevailing terms and conditions; thus, some degree of rationing is assumed or
(iii) Applied for a loan but was rejected.

Firms that satisfy the above condition have some forms of external finance; hence, they are partially credit-constrained.

C. Maybe credit-constrained

A firm falls within the maybe credit-constrained category when the following conditions are satisfied:

(i) Used external sources of finance for working capital and/or investments during the previous fiscal year and/or have a loan outstanding at the time of the survey;
(ii) Applied for a loan during the previous fiscal year.

The basic features of the firms that fall under this category are those that have had access to external finance with evidence of having bank finance.

D. Non-credit constrained

The last category is the non-credit-constrained. A firm falls within this category when the following conditions are satisfied:

(i) Did not apply for a loan during the previous fiscal year;
(ii) The reason for not applying for a loan was that the firm had enough capital to cover its needs.

Credit constrained is measured in an ordered structure; fully credit-constrained firms are assigned a value of 1, 2 for the partially credit-constrained, 3 for the maybe credit-constrained, and 4 for not credit-constrained. Table 2 shows the distribution of firms by their credit-constrained status. The evidence shows that, regardless of the credit-constrained status of firms, tax evasion is higher among firms that give bribes. For instance, among those that were not credit-constrained, about a third of the firms did not give bribes. For those that fall within the maybe credit-constrained category, about 36% give bribes and 38% for partial credit-constrained. Among those that were fully credit-constrained, about 29% gave bribes. The result indicates that the willingness to give bribes is non-linearly related to the level of credit constraints.

The low proportion of those who give bribes among fully constrained, relative to those either partially or maybe credit-constrained, partly explains the cost of giving a bribe. The incidence of tax evasion is highest among fully credit-constrained firms, followed by partially credit-constrained firms. The findings suggest that firms that are credit-constrained and give bribes are more likely to evade taxes than those that are less credit-constrained. Furthermore, Table 2 shows the t-test of the difference in tax evasion incidence between those who paid bribes and those who did not. The positive coefficient measures the extent to which those who paid bribes are more likely to engage in tax evasion than those who did not pay bribes. The difference is statistically significant at the 1% level. The results suggest that tax evasion prevails more among those who pay bribes and hold at all credit constraint levels.

Table 2: Credit constraints and tax evasion

	Bribe	Tax evasion dummy	T-test	No. of observations	Percentage (%)
Fully credit constraints	No	0.589	0.190***	1313	71.398
(FCC)	Yes	0.779		526	28.603
Partial credit constraints	No	0.595	0.165***	2775	61.571
(PCC)	Yes	0.760		1732	38.429
Maybe credit constraints	No	0.439	0.228***	1075	64.294
(MCC)	Yes	0.667		597	35.706
Not credit constraints	No	0.502	0.217***	2288	69.460
(NCC)	Yes	0.720		1006	30.540

Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denotes significant at 10%.

To further examine credit constraints' role in tax evasion, we classified the sampled countries into high credit constraints countries and low credit constraints countries based on the mean value of credit-constrained status. A country with a credit-constrained status value above the mean value is a low credit-constrained country. A country with a credit-constrained value lower than the obtained

mean value is a high credit-constrained country. Figure 4 revealed that bribery is positively associated with the incidence of tax evasion for both high and low credit-constrained countries. The chart shows striking evidence with the fitted line for low credit-constrained countries below the fitted line for high credit-constrained countries. Firms are less likely to underreport sales for tax purposes in countries with fewer credit-constrained firms for a given bribery behaviour. In other words, high credit-constrained firms are more likely to evade taxes when compared to less credit-constrained firms, whether or not they engage in bribery.

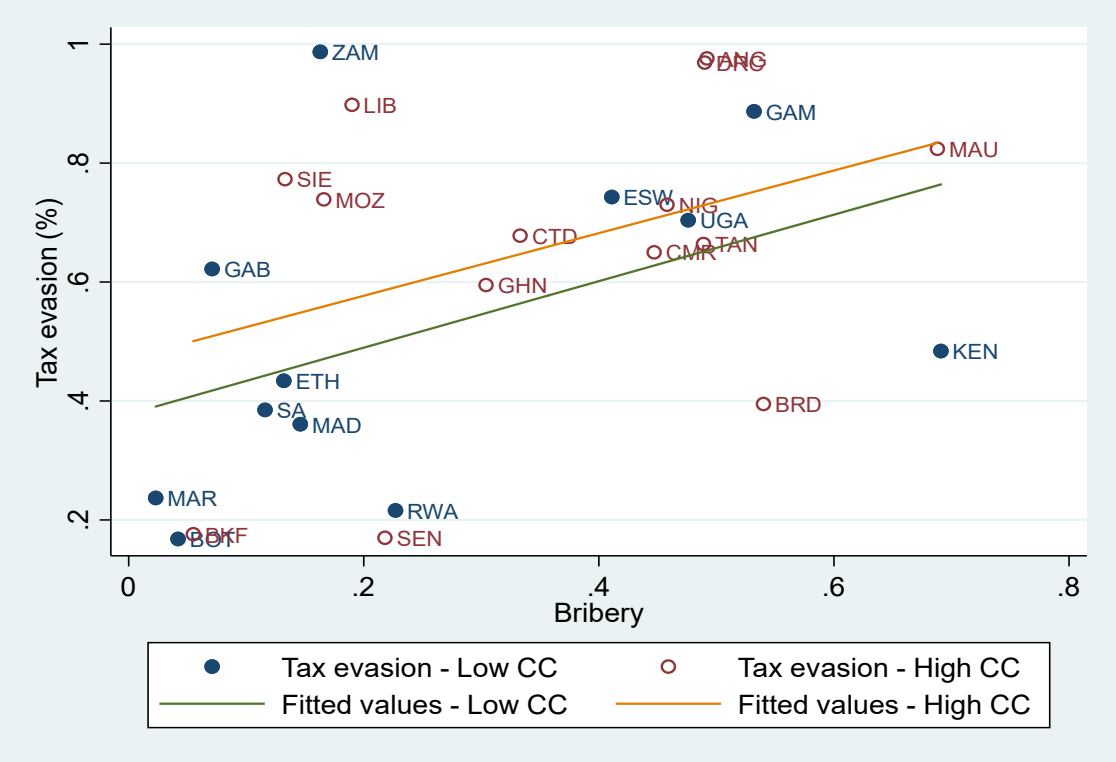


Figure 4: Credit constraints, bribery and tax evasion

Source: Author computation based on WEBS dataset

3.2.4 Control variables

In addition to giving bribes, several factors influence the firms' decision to evade taxes. Thus, to obtain an accurate estimate of the effect of corruption or a weak institution on tax evasion, firm-level and country-level factors were also controlled. The control variable at the firm level includes firm age, firm size, ownership structure, the firm's auditor status, and the share of the firm's exports in sales. Evidence from Beck et al. (2014), Ahamed (2016), and Alm et al. (2019) shows that these factors were important determinants of the decision of the manager to evade taxes. Age connotes the duration of operation of a firm. For a firm that has been operating for a long time and discovered that government officials are more likely to discover their unreported sales, there is a higher

tendency for such a firm to report all sales for tax purposes than a newly established firm (Beck et al., 2014).

In addition, firms that have external auditors examine their financial statements are less likely to underreport their sales (Alm et al., 2019). Similarly, firms that engage in export are more likely to report accurate sales because of the likelihood of using external records to verify total sales (Beck et al., 2014). For non-exporting firms, such records are more difficult to verify by government officials. Hence, cross-examination of sales records across countries might discourage exporting firms from underreporting sales. Exporting firms might also underreport sales, but it might be at a lower level when compared with non-exporting firms.

Furthermore, businesses owned by sole proprietors are relatively small businesses and are less likely to be subjected to rigorous auditing processes like those of partnerships or limited liability companies (Tedds, 2010). As a result, in the absence of solid punishment for false declaration of sales, sole proprietorships are more likely to under-declare their sales and tax obligations. Foreign-owned businesses are usually operational in multiple countries, and, as a result, they tend to have a standardised mode of operation. Because sanctions in one country when caught for fraudulent business practices, including false tax declaration, might affect the global image of the organisation, the cost of false declaration is higher for such firms than for domestic firms. Hence, tax evasion is relatively lower among foreign-owned businesses, as found in Beck et al. (2014) and Ahamed (2016). A log of employment is used in the study to measure the size of an enterprise. Tax evasion is an illegal business practice with several consequences for the business. Firms with a relatively higher number of employees are more likely to have a brand image that they are protecting and would want to follow laid-down business procedures strictly. The cost of tax evasion is higher among big firms in terms of brand image. Hence, tax evasion is inversely related to employment, that is, the firm's size (Ahamed, 2016; Alm et al., 2019).

Table 3 provides preliminary evidence that the incidence of tax evasion is lower among exporting firms and firms that had their financial statement checked by an external auditor. Furthermore, tax incidence is lower among foreign-owned firms and higher among sole proprietors. This result suggests a correlation exists between ownership structure and tax evasion.

Table 3: Summary of categorical firm-level variables

		Tax evasion dummy	Tax evasion rate	Bribery ratio	Credit constraints	No. of observations	Percentage (%)
Check external auditor	No	0.675	0.327	0.366	2.327	6567	59.424
	Yes	0.525	0.279	0.294	2.925	4484	40.576
Export	No	0.63	0.313	0.346	2.522	10078	89.091
	Yes	0.443	0.223	0.307	2.944	1234	10.909
Foreign-owned	No	0.619	0.304	0.352	2.517	9830	86.899
	Yes	0.545	0.293	0.273	2.901	1482	13.101
Sole proprietorship	No	0.549	0.286	0.323	2.829	4865	43.007
	Yes	0.655	0.316	0.356	2.371	6447	56.993

Source: Author computation based on the WEBS dataset
Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denotes significant at 10%.

The control variable at the country level includes real GDP per capita and tax rate. The control variables used are consistent with recent studies (Ahamed, 2016; Alm et al., 2019; Beck et al., 2014; Oz-Yalaman, 2019). Real GDP per capita measures the level of development in an economy. Tax revenues serve as a source of finance for infrastructural development that supports economic development. As economic development increases, the incentive to evade taxes reduces. The tax rate is the share of profit tax on commercial profits. A high tax rate is likely to encourage tax evasion among firms (Beck et al., 2014).

The inclusion of both firm- and country-level control is likely to increase the accuracy of the study findings. In other words, the estimates from this study are less likely to suffer from variable omission problems since salient factors highlighted in the literature might influence the decision of the manager to underreport.

3.3 Sources of data

The variables mentioned above are from various sources. Firm-level data are from WBES, real GDP per capita, and tax rates are from World Bank Development Indicators. Institutional variables (the rule of law, control of corruption, government effectiveness and voice and accountability) are from World Governance Indicators. In Table 4, we presented the summary statistics of these variables. The results show that about 60% of sampled firms evade taxes and report about 70% of their sales for tax purposes, suggesting an extent of tax evasion of about 30%. A third of the firm gives bribes. These findings suggest that bribery is relatively common in African countries.

Furthermore, the results in Table 4 show that the mean value of credit constraints is 2.57, which indicates that a relatively large number of African countries are moderately financially constrained, since about 39.8% of the firms indicated that they were partially credit constrained. More than half of the firm's characteristics included in the study are sole proprietors, 13% are foreign-owned, and 11% engage in export. The average employment size is 49 people, and the average age is 15 years. The minimum value of 0 for employment indicates that a fraction of the sampled businesses do not have an employee besides the owner. It only occurs when it is a sole proprietorship business. Also, the minimum age of 0 means that a fraction of the sampled firms surveyed were established in the year they were surveyed.

Table 4: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Tax evasion dummy (incidence)	11312	0.61	0.488	0	1
Tax evasion rate (extent) - %	11312	30.295	33.355	0	99.5
Credit constraints status	11312	2.568	1.074	1	4
Fully credit constraints	11312	0.163	0.369	0	1
Partial credit constraints	11312	0.398	0.49	0	1
Maybe credit constraints	11312	0.148	0.355	0	1
Not credit constraints	11312	0.291	0.454	0	1

Bribery ratio	11312	0.341	0.474	0	1
Sole proprietorship	11312	0.57	0.495	0	1
Foreign-owned	11312	0.131	0.337	0	1
Export	11312	0.109	0.312	0	1
External auditor check FS	11051	0.406	0.491	0	1
Employment	11302	48.555	216.951	0	9600
Gift bribe for service (ratio)	11312	0.394	0.489	0	1
Age of firm	11263	14.835	13.152	0	190
GDP per capita ($PPP)	11312	4444.849	3811.25	632.997	15697.178
Tax rate[7]	11312	21.112	9.926	0	58.9
Voice and accountability	11312	-0.421	0.58	-1.33	0.854
Government effectiveness	11312	-0.634	0.565	-1.692	0.77
Rule of law	11312	-0.653	0.544	-1.608	0.918
Control of corruption	11312	-0.611	0.524	-1.391	1

Source: Author computation based on the WEBS dataset.

3.4. Model specification and Methodology

To understand the effect of bribery on the decision of managers to evade taxes, the following model specification is adopted.

$$TE_{ic} = \alpha + \beta B_{ic} + \gamma XF_{ic} + \delta XC_{c} + \varepsilon_{ic} \quad (1)$$

Where *TE* is the extent of tax evasion (tax evasion ratio) or incidence of tax evasion (tax evasion dummy) as provided by firm *i* in country *c*; *B* is the bribery status of the firm; *XF* is the vector of firm-level control variables; *XC* is the vector of country-level control variables; ε is the error term.

Instrumental Probit regression estimation technique was used to understand the effect of bribery on the incidence of tax evasion. The estimation technique was used due to the dichotomous nature of the independent variable. A value of 1 is assigned when a firm evades taxes and 0 otherwise, as explained in section 3.2.1. Since firms that give bribes to government officials are more likely to underreport their sales, there is a higher tendency that reverse causality holds. Hence, the need to adopt an instrumental Probit estimation technique, which helps address endogeneity issues. We used information on request for a gift or informal payment for the provision of a business permit, electronic connection, construction-related permit, or secure government contract to construct a dummy variable, Gift. A value of 1 if the firm received such a request from government officials and 0 if otherwise. The request for a gift was highly correlated with bribery and weakly correlated with tax evasion. A positive coefficient for bribery implies that the decision to underreport sales to the tax authority is associated with an act of giving a bribe. In other words, a bribe serves as a tool for establishing a relationship with the government officials, which, in turn, allows them to evade taxes.

The model was estimated using the Tobit model when the dependent variable is measured using the tax evasion ratio. The tax evasion ratio is the share of unreported sales for tax purposes of total

[7] Three African countries (Liberia, Mauritania, and Sierra Leone) had zero profit tax as share of commercial profits as reported in World Bank Development Indicators between 2006 and 2010. A robustness check would be conducted to see if removing these sets of countries significantly affects the study results.

sales. The nature of the tax evasion ratio, which is censored around 0, informed the appropriateness of this estimation approach. Beck et al. (2014) and Ahamed (2016) also used the Tobit approach in their studies. Similar to the incidence of tax evasion, the instrumental Tobit model was employed in the study to account for endogeneity. Gift, the instrument used in the probit model, was also used, as it is correlated with bribery, but with tax evasion. The Wald test was used to test for the validity of the instrument. Hence, the Instrumental Tobit estimation technique helped evaluate the effect of bribery on the extent of tax evasion. In both the instrumental Tobit and instrumental probit models, the Wald test was used to test the instrument's validity. The instrument is valid and appropriate when the Wald test is statistically significant. As shown in Tables 5 to 9, the Wald test is statistically significant, indicating that the use of Gift as instrumental was valid and appropriate. The variable "Gift" is correlated with bribery and uncorrelated with tax evasion.

It is expected that a positive relationship will exist; firms that give bribes have a working relationship with government officials, which in turn, provides them with the assurance that the government is less likely to punish them for their behaviours if detected. Firms that do not give bribes to government officials might also engage in tax evasion; this firm's extent of tax evasion will be minimal. The minimal disparity between actual and reported sales is expected in order not to make the government aware of their underreported sales. High differences could signal to the government the possibility of sales underreporting. Consequently, it increases the chances of a conscious effort by the government to investigate the firm's books and increases the probability of the underreporting being detected.

The study also examined the role of credit constraints on the effect of bribery on tax evasion. Based on the assumption that insufficient funding and the associated difficulty encountered when sourcing for external finance might push firms to underreport their sales. Underreporting sales becomes a strategy of increasing retained income used to finance the organisation in the next fiscal year. As a result, we modified equation (1) and specified it as follows:

$$TE_{ic} = \alpha + \beta B_{ic} + \theta CC_{ic} + \gamma XF_{ic} + \delta XC_c + \varepsilon_{ic} \quad (2)$$

The parameters are the same as those described earlier. CC is the measure of credit constraints. In the study, and as described in section 5.2.3, credit-constrained is measured in an ordered structure, 1 is assigned when the firm is fully credit constrained, 2 for partially credit constrained, 3 may be credit constrained and 4 for not credit constrained. Given the non-linear pattern observed in Figure 4, Eqn. (2) is modified to include the square of CC as shown in Eqn. (3)

$$TE_{ic} = \alpha + \beta B_{ic} + \theta CC_{ic} + \emptyset CC_{ic}^2 + \gamma XF_{ic} + \delta XC_c + \varepsilon_{ic} \quad (3)$$

From Eqn (3), the parameter for the credit-constrained, θ, is expected to be negative, whereas the square of credit constrained, $\emptyset$, should be positive to indicate non-linearity. The θ in Eqn (2) indicates how improvement in the financial performance of a firm shapes tax evasion behaviour, as well as the extent of tax evasion for those that evade taxes. Hence, the parameter is expected to be negative to support the notion that the credit constraints situation increases the incentive for the firm to evade taxes. This is in a bid to accumulate additional capital to support business operations.

4. Empirical findings

4.1 Bribery and incidence of tax evasion

The results in Table 5 show that bribery is positively associated with the incidence of tax evasion. The finding is consistent with the evidence in Alm et al. (2016) that focused on firms from thirty-two developing countries. The result means that tax authorities' unprofessional practices in receiving bribes are associated with tax evasion. Furthermore, the results show that by excluding firm-level and country-level factors, the impact of bribery on the incidence of tax evasion is overestimated by about 12%. Also, the results show that less credit-constrained firms are less likely to evade taxes. As shown in Column 1 of Table 5, the negative coefficient of credit constraints informed the remark. The finding is consistent with the evidence in Alm et al. (2019) that investigated the tax evasion behaviour of firms in twenty-seven transitioning countries. In other words, the results suggest that after controlling for bribery, firms are likely to underreport their sales to tax authorities when they are credit-constrained. The effect became insignificant when other firm-level characteristics, such as firm size (log of employment), duration of operation (log of the firm's age), external audit, ownership structure and exporting status. The finding suggests that including firm-level factors erodes the effect of credit constraint on the incidence of tax evasion.

Following the preliminary non-linearity observed in Table 2, as shown in Eqn (3), the square of credit constraints status was included in the regression equation. The results in Columns (2) and (5) of Table 5 show that the sign of credit constraints and the square of credit constraints were negative and positive, respectively, indicating non-linearity as initially observed. The effects are, however, insignificant. Furthermore, we examined the influence of the extent of credit constraints on the effect of bribery on the incidence of tax evasion. The coefficient of the interactive term of credit constraints and bribery is negative and significant. The results suggest that as firms' access to credit improves, the incidence of tax evasion reduces, whether or not the firm gives bribes. In other words, if two countries have the same level of bribery among firms, the country with firms that have more access to firms is less likely to evade taxes compared to firms in the other country with the same bribery behaviour. However, the positive coefficient of credit constraints does not support a prior expectation. It indicates that the incidence of tax evasion holds among firms that are not highly credit-constrained. Furthermore, in the situation where firms could engage in bribery, the effect turns negative. The effect holds whether or not we controlled for the firm and country-level factors.

In Columns 4 - 6 of Table 5, the results show that as the size of the firm increases, the tendency to underreport reduces. The size of the firm is measured using total employment. Furthermore, the findings show that firms that engage in exports are less likely to evade taxes. Macroeconomic factors such as the level of economic development and tax rate had an insignificant effect on the incidence of tax evasion. The finding is inconsistent with the evidence in Alm et al. (20119) and

Beck et al. (2014). These results indicate that differences in economic development in African countries had a minimal effect on firms' decisions to evade taxes.

Table 5: Bribery and incidence of tax evasion

Dependent variable: Tax evasion incidence	(1)	(2)	(3)	(4)	(5)	(6)
Bribery (=1 if yes)	0.948***	0.961***	3.567***	0.846***	0.849***	2.982***
	(0.219)	(0.221)	(0.787)	(0.187)	(0.190)	(0.816)
Credit constraints	-0.088**	-0.285	0.251**	-0.023	-0.061	0.242***
	(0.038)	(0.217)	(0.106)	(0.019)	(0.181)	(0.093)
Squared Credit constraints		0.037			0.007	
		(0.036)			(0.032)	
Interaction term (bribery and credit constraints)			-1.049***			-0.841***
			(0.265)			(0.275)
Firm-level controls						
Log of Employment				-0.058**	-0.058**	-0.051**
				(0.026)	(0.026)	(0.023)
Log of Age of Firm				0.023	0.024	0.021
				(0.029)	(0.029)	(0.031)
FS checked by external auditors				-0.182	-0.181	-0.167
				(0.112)	(0.112)	(0.111)
Sole proprietorship				0.078	0.077	0.101*
				(0.067)	(0.067)	(0.058)
Foreign-owned				0.078	0.077	0.054
				(0.125)	(0.123)	(0.127)
Export				-0.313***	-0.312***	-0.264***
				(0.073)	(0.073)	(0.075)
Macro-level controls						
Tax rate				-0.592	-0.595	-0.634
				(0.019)	(1.415)	(1.191)
Log of GDP per capita ($PPP)				-0.130	-0.130	-0.151
				(0.102)	(0.102)	(0.096)
Constant	0.185	0.397	-0.716**	1.418	1.457	0.852
	(0.166)	(0.260)	(0.351)	(1.031)	(1.058)	(1.099)
Observations	11312	11312	11312	10992	10992	10992
Wald test (instrument)	8.76***	8.91***	9.16***	6.76***	6.70***	7.25***

Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denotes significant at 10%. The reported standard errors are heteroscedastic-consistent. All estimates are marginal effects.

In Table 6, institutional quality was added as an additional macro factor. Four measures of institutional quality are used: government effectiveness, voice and accountability, control of corruption, and the rule of law. The results indicate that by incorporating institutional quality, the

magnitude of the effect of bribery on incidence tax evasion reduced to about 50% from about 83% as reported in column (1) of Table 6. In addition, in Column 2 Table 6, the coefficient of government effectiveness is negative and significant at 5%. The results imply that improvement in government effectiveness had a reducing effect on the incidence of tax evasion. This reducing effect of improved institutional quality also holds for the control of corruption and the rule of law. The coefficient of bribery had the most negligible effect with the inclusion of voice and accountability. The result indicates that improvement in voice and accountability had a minimal, reducing effect on the incidence of tax evasion. The coefficient of bribery declined marginally to 0.648 from 0.826 relative to 0.32 recorded for government effectiveness and 0.386 for control of corruption. The results in Table 6 indicate that in the presence of strong institutional qualities, bribery had a lesser effect on the incidence of tax evasion.

Table 6: Bribery, institutional quality, and incidence of tax evasion

	(1)	(2)	(3)	(4)	(5)
Bribery (=1 if yes)	0.826***	0.321***	0.648***	0.386***	0.385***
	(0.047)	(0.054)	(0.051)	(0.057)	(0.056)
Credit constraints	-0.022*	0.006	-0.016	0.0003	0.0005
	(0.012)	(0.013)	(0.012)	(0.013)	(0.013)
Control variables					
Log of Employment	-0.115***	-0.099***	-0.074***	-0.090***	-0.096***
	(0.015)	(0.013)	(0.013)	(0.013)	(0.013)
FS checked by external auditors	-0.182***	-0.074**	-0.139***	-0.101***	-0.103***
	(0.030)	(0.031)	(0.030)	(0.030)	(0.030)
Sole proprietorship	0.058**	-0.054*	0.016	-0.037	-0.037
	(0.029)	(0.030)	(0.029)	(0.030)	(0.030)
Export	-0.301***	-0.162***	-0.265***	-0.232***	-0.212***
	(0.042)	(0.043)	(0.043)	(0.043)	(0.043)
Log of GDP per capita ($PPP)	-0.115***	0.050***	-0.050***	-0.012	-0.003
	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)
Governance					
Government effectiveness		-0.684***			
		(0.028)			
Voice and accountability			-0.301***		
			(0.025)		
Control of corruption				-0.574***	
				(0.031)	
Rule of law					-0.573***
					(0.030)
Constant	1.248***	-0.283*	0.703***	0.279*	0194
	(0.135)	(0.153)	(0.143)	(0.146)	(0.147)
Observations	11041	11041	11041	11041	11041
Wald test (instrument)	58.85***	1.92	19.21***	0.03	0.00

Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denotes significant at 10%. The reported standard errors are heteroscedastic-consistent. All estimates are marginal effects.

4.2 Bribery and the extent of tax evasion

The results in Table 7 deepened our understanding of the effect of bribery on the extent of tax evasion. The results show that the extent of tax evasion is positively associated with bribery. The extent of tax evasion is about 18% more for firms that engage in bribery than for those that do not. In addition, the results indicated that credit constraints had an increasing effect on the magnitude of evaded taxes. This is consistent with the evidence in Beck et al. (2014) and Alm et al. (2019).

To extend the above studies, we examined both the size and interactive effects. Starting with the size effect, the results in Columns (2) and (5) of Table 7 show that the size effect matters. The effect of the square of credit constraints differs from the level of credit constraints, which is statistically significant. This evidence suggests that firms with a relatively moderate credit constraint had the lowest extent of tax evasion. In other words, the extent of evaded taxes is greater among highly credit-constrained firms and those that are not credit-constrained. The result indicates that whether or not a firm is credit constraints, they are likely to evade taxes in Africa. While credit-constrained firms evade taxes to augment working capital to ensure continued business operation, firms that are not credit-constrained might evade taxes because they are less likely to be caught, which increases their profit margin.

Furthermore, the study results in Columns (3) and (6) of Table 7 show that credit constraints increase bribery's impact on the magnitude of tax evasion, given the coefficient of bribery and the negative coefficient of the interactive term. First, the coefficient of bribery increased by about 45%. However, the interactive term is insignificant when we control both firm-level and macroeconomic factors. The finding indicates that as a firm's credit constraints worsen, the incentive to give bribes increases in a country with weak institutions. Consequently, the bribe lowers the probability of being punished when caught for not being faithful to sales reported for tax purposes. Thus, the evidence indicates that the worsened credit constraints situation of the firm makes the firm engage in bribery giving, which in turn leads to higher tax evasion.

We turned to the control variables. The results in Table 7 show that firm size is inversely related to the extent of tax evasion. Furthermore, non-exporting firms had a greater extent of tax evasion than exporting firms by about 10%, and the difference is statistically significant at 5%. In addition, the results in Table 7 show that the magnitude of tax evasion is higher among firms with unchecked financial statements by external auditors and foreign firms. Overall, the results in Table 7 revealed that after controlling for both firm- and country-level determinants of tax evasion, bribery still had a positive and significant effect on the tax evasion ratio. Hence, those who pay bribes to government officials underreport their sales for tax purposes more than those who do not.

Table 7: Bribery and extent of tax evasion

Dependent variable: Extent of Tax evasion	(1)	(2)	(3)	(4)	(5)	(6)
Bribery (=1 if yes)	0.213***	0.220***	0.581***	0.180***	0.183***	0.328**
	(0.020)	(0.020)	(0.150)	(0.020)	(0.020)	(0.143)
Credit constraints	-0.043***	-0.152***	-0.0004	-0.019***	-0.066**	-0.001
	(0.005)	(0.028)	(0.016)	(0.005)	(0.028)	(0.016)
Squared Credit constraints		0.021***			0.009*	
		(0.005)			(0.005)	
Interaction term (bribery and credit constraints)			-0.139***			-0.056
			(0.050)			(0.048)
Firm level controls						
Log of Employment				-0.047***	-0.047***	-0.047***
				(0.005)	(0.006)	(0.006)
Log of Age of Firm				-0.020***	-0.019***	-0.020***
				(0.007)	(0.007)	(0.007)
FS checked by external auditors				-0.025**	-0.024**	-0.025**
				(0.012)	(0.012)	(0.012)
Sole proprietorship				-0.006	-0.006	-0.003
				(0.012)	(0.012)	(0.012)
Foreign owned				0.051***	0.050***	0.050***
				(0.016)	(0.016)	(0.016)
Export				-0.108***	-0.107***	-0.107***
				(0.018)	(0.018)	(0.018)
Macro-level controls						
Tax rate				-0.052	-0.056	-0.058
				(0.049)	(0.050)	(0.051)
Log of GDP per capita ($PPP)				-0.071***	-0.071***	-0.073***
				(0.007)	(0.007)	(0.007)
Constant	0.206***	0.323***	0.091*	0.948***	0.996***	0.919***
	(0.015)	(0.033)	(0.050)	(0.059)	(0.066)	(0.067)
Observations	11312	11312	11312	10992	10992	10992
Wald test (instrument)	9.51***	11.02***	9.25***	1.60	1.91	1.57

Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denotes significant at 10%. The reported standard errors are heteroscedastic-consistent. All estimates are marginal effects.

In Table 8, we added institutional quality to the model for the extent of tax evasion. The results are similar to the pattern reported in Tables 6 and 7. Specifically, the results show that the inclusion of institutional quality reduces the overall impact of bribery on the extent of tax evasion. The negative impact of bribery on the tax evasion ratio means that firms that pay bribes had higher rates of tax evasion of about 18%. If a non-bribe-giving firm evades tax (underreports sales) by 12%, bribe-giving firms will evade taxes by 30%. Thus, bribery of government officials can be interpreted as insurance to protect the firm from being investigated by government officials and avoid full sanction of the government when detected.

Furthermore, the results in Table 8 indicate that improvement in institutional quality has a direct and indirect effect on the magnitude of tax evasion. The negative coefficient for the four measures of institutional quality used in the study is the direct effect, and the sharp decline in the coefficient

for bribery is the indirect effect. Out of the four institutional quality measures, the results show that government effectiveness has the highest effect on tax evasion, followed by control of corruption, with the most negligible effect recorded for voice and accountability. Our finding reinforced the pattern in Figure 3.

The evidence in Table 8 suggests that tax evasion in African countries manifests poor institutional qualities, which happens both in the productivity and efficiency of the public sector and in the enforcement of the rule of law. Since voice and accountability had an insignificant effect on tax evasion, this suggests that an inclusive institutional framework might not translate to an accurate declaration of sales by firms. However, when the government is efficient with evidence of improvement in the business environment, firms are more likely to report higher sales for tax purposes. Also, undermining the rule of law contributes to high tax evasion in African countries. Therefore, high tax evasion among firms in African countries would reduce with an improvement in governance on the continent.

The negative coefficient for tax rate in Table 8 indicates that African countries with a high share of profit tax to commercial profits have a low level of tax evasion. This is inconsistent with the evidence in Beck et al. (2014). This evidence suggests that the tax rate mirrors the extent of tax evasion in African countries. Furthermore, results in Table 8 confirmed the inverse relationship between the level of economic development and the extent of tax evasion reported in Beck (2014). The finding suggests that in Africa, the problem of tax evasion is more prominent in low-income countries.

Table 8: Bribery, institutional quality, and extent of tax evasion

Dependent variable: Extent of Tax evasion	(1)	(2)	(3)	(4)	(5)
Bribery (=1 if yes)	0.180***	0.019	0.101***	0.038*	0.044**
	(0.020)	(0.021)	(0.020)	(0.022)	(0.021)
Credit constraints	-0.019***	-0.009*	-0.015***	-0.011**	-0.011**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Firm-level controls					
Log of Employment	-0.047***	-0.058***	-0.053***	-0.056***	-0.057***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Log of Age of Firm	-0.020***	-0.033***	-0.021***	-0.032***	-0.030***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
FS checked by external auditors	-0.025**	0.017	-0.001	0.008	0.008
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Sole proprietorship	-0.006	-0.045***	-0.026**	-0.036***	-0.036***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Foreign owned	0.051***	0.029*	0.029*	0.051***	0.046***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Export	-0.108***	-0.053***	-0.087***	-0.077***	-0.071***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Macro-level controls					
Tax rate	-0.052	-0.011	-0.142***	-0.140***	-0.190***
	(0.049)	(0.049)	(0.050)	(0.050)	(0.050)

Log of GDP per capita ($PPP)	-0.071*** (0.007)	-0.018** (0.007)	-0.049*** (0.007)	-0.041*** (0.007)	-0.040*** (0.007)
Governance					
Government effectiveness		-0.225*** (0.011)			
Voice and accountability			-0.137*** (0.060)		
Control of corruption				-0.197*** (0.013)	
Rule of law					-0.193*** (0.012)
Constant	0.948*** (0.059)	0.467*** (0.064)	0.772*** (0.060)	0.686*** (0.062)	0.682*** (0.062)
Observations	10992	10992	10992	10992	10992
Wald test (instrument)	1.6	30.39***	3.49*	18.23***	17.71***

Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denotes significant at 10%. The reported standard errors are heteroscedastic-consistent. All estimates are marginal effects.

4.3 Robustness

Table 9 shows the results of the impact of bribery on tax evasion (incidence and extent) across levels of credit-constrained. For brevity, the four levels of credit constraints were grouped into two: high and low credit constraints. The fully credit-constrained firms are high credit-constrained (HCC), whereas the remaining three categories – partial, moderate, and not credit-constrained- are low credit-constrained (LCC). In columns 1-4 of Table 9, the dependent variable is the incidence of tax evasion, and in columns 5-8 of Table 9, the dependent variable is the extent of tax evasion. The results in Columns 1, 3, 5, and 7 of Table 9 are for the high credit-constrained firms. The results in Columns 2, 4, 6, and 8 are for the low credit-constrained firms. The results in Table 9 show that those who engage in bribery are more likely to evade taxes for both high and low levels of credit-constrained firms. The results suggest that whether or not a firm is credit-constrained, a firm that gives bribes is more likely to be involved in tax evasion than one that does not.

Furthermore, Table 9 indicates that high credit-constrained firms are more likely to evade taxes than low credit-constrained firms. The coefficient informs this conclusion. The parameters of bribery for high credit-constrained are higher than for low credit-constrained, as shown in Columns 1 and 2. For the incidence of tax evasion, the coefficient of bribery for high credit-constrained firms is 0.841, whereas that of low credit-constrained firms is 0.639, with a gap of about 0.202. The obtained parameters indicate that high credit-constrained firms are likely to underreport their sales for tax purposes to retain finances for the subsequent financial year.

Furthermore, the results in Columns 3 and 4 of Table 9 show the conditional impact of institutional quality on the impact of bribery on the incidence of tax evasion. The results indicate that bribery had an indirect effect on the incidence of tax evasion through institutional qualities. Hence, countries with poor institutional qualities had a higher incidence of tax evasion.

For the extent of tax evasion, the impact of bribery is positive and significant at 10% for both levels of credit constraints. Similar to evidence obtained for the incidence of tax evasion, the magnitude

of the impact is higher for high credit-constrained firms. In other words, the results reveal that the magnitude of the coefficient for bribery is lower for low credit-constrained firms. Specifically, the coefficient for fully credit-constrained firms is 0.119, whereas it is 0.100 for low credit-constrained firms. The results imply that moderate improvement in credit-constrained helps in reducing the extent of tax evasion.

Tables 5 and 8 were re-estimated based on two data modifications. First, to minimise the effect of a large sample emanating from a single country, Nigeria, which accounts for about a third of the sampled firms, was excluded. Second, I dropped three countries - Liberia, Mauritania, and Sierra Leone because the tax rate was zero. The tax rate ideally ought to be positive and non-zero. The results in column 2 of Table 10 indicate that, excluding Nigeria, the coefficient of credit constraints status became statistically significant at 10%. The results suggest that improvement in credit constraints had a moderate effect in inducing firms to engage in tax evasion. For the extent of tax evasion, the exclusion of Nigeria increased the coefficient by about 0.06 points, and the impact remained significant. The result means that the inclusion of Nigeria does significantly alter the narrative about the effect of credit constraints status on the extent of tax evasion.

Columns 5 and 10 of Table 10 show the impact of institutional quality in moderating the negative impact of the tax rate on both incidence and extent of tax evasion. The results showed that institutional qualities played a role in influencing the impact of the tax rate on the extent of tax evasion. As a result, an improvement in institutional qualities decreases the extent of tax evasion for a given level of the tax rate. In other words, at a higher tax rate, a decrease in tax evasion is driven by an improvement in institutional quality. Overall, the robustness tests confirmed the earlier obtained results.

Table 9: Effect of bribery on tax evasion for high and low credit-constrained firms

	(1) HCC TaxEvaD	(2) LCC TaxEvaD	(3) HCC TaxEvaD	(4) LCC TaxEvaD	(5) HCC TaxEvaR	(6) LCC TaxEvaR	(7) HCC TaxEvaR	(8) LCC TaxEvaR
Bribery (=1 if yes)	0.841***	0.639***	1.251***	0.905***	0.119*	0.100***	0.043	0.110***
	(0.166)	(0.055)	(0.391)	(0.102)	(0.066)	(0.022)	(0.167)	(0.041)
Firm-level controls								
Log of Employment	-0.067*	-0.076***	-0.062	-0.074***	-0.065***	-0.053***	-0.066***	-0.053***
	(0.039)	(0.015)	(0.040)	(0.015)	(0.015)	(0.006)	(0.016)	(0.006)
Log of Age of Firm	-0.014	0.023	-0.009	0.023	-0.037**	-0.018**	-0.038**	-0.018**
	(0.046)	(0.012)	(0.046)	(0.020)	(0.017)	(0.008)	(0.018)	(0.008)
Financial statement checked by external auditors	-0.094	-0.145***	-0.096	-0.142***	0.014	-0.007	0.014	-0.007
	(0.082)	(0.033)	(0.080)	(0.033)	(0.033)	(0.013)	(0.033)	(0.013)
Sole proprietorship	-0.045	0.048	-0.072	0.045	-0.086***	0.021	-0.081***	-0.013
	(0.079)	(0.033)	(0.078)	(0.033)	(0.030)	(0.017)	(0.030)	(0.013)
Foreign owned	0.170	-0.001	0.153	-0.001	0.058	0.021	0.061	0.021
	(0.117)	(0.042)	(0.114)	(0.042)	(0.046)	(0.017)	(0.045)	(0.017)
Export	-0.581***	-0.230***	-0.632***	-0.242***	-0.235***	-0.071***	-0.224***	-0.072***
	(0.146)	(0.045)	(0.148)	(0.045)	(0.059)	(0.019)	(0.044)	(0.019)
Macro-level controls								
Tax rate	0.310	-1.240***	0.408	-1.243***	0.181*	-0.285***	0.167	-0.286***
	(0.274)	(0.148)	(0.266)	(0.148)	(0.107)	(0.058)	(0.104)	(0.058)
Log of GDP per capita ($PPP)	-0.132***	0.062***	-0.143***	-0.025	-0.052***	-0.051***	-0.050***	-0.050***
	(0.043)	(0.019)	(0.043)	(0.020)	(0.017)	(0.007)	(0.017)	(0.008)
Institutional quality								
Voice and accountability	-0.347***	-0.321***	-0.503***	-0.451***	-0.169***	-0.131***	-0.141***	-0.137***
	(0.066)	(0.028)	(0.098)	(0.034)	(0.026)	(0.011)	(0.044)	(0.014)
Bribery x Voice and accountability			0.624	0.524***			-0.113	0.017
			(0.389)	(0.111)			(0.160)	(0.043)
Constant	1.196***	0.941***	1.171***	0.594***	0.791***	0.766***	0.791***	0.758***
	(0.392)	(0.170)	(0.393)	(0.191)	(0.152)	(0.067)	(0.152)	(0.074)
Observations	1777	9215	1777	9215	1777	9215	1777	9215
Wald test	4.90**	14.65***	4.63**	15.21***	0.511	2.58	0.44	2.42

Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denote significant at 10%. The reported standard errors are heteroskedastic consistent.

Table 10: Effect of Credit constrained, and bribery on tax evasion

	(1) TaxEvaD	(2) TaxEvaD	(3) TaxEvaD	(4) TaxEvaD	(5) TaxEvaD	(6) TaxEvaR	(7) TaxEvaR	(8) TaxEvaR	(9) TaxEvaR	(10) TaxEvaR
Bribery (=1 if yes)	0.663***	0.780***	0.616***	0.690***	0.720***	0.101***	0.257***	0.100***	0.268***	0.276***
	(0.221)	(0.208)	(0.200)	(0.189)	(0.182)	(0.020)	(0.027)	(0.021)	(0.029)	(0.029)
Credit constraints	-0.016	-0.035*	-0.016	-0.036*	-0.038*	-0.015***	-0.021***	-0.016***	-0.023***	-0.023***
	(0.221)	(0.020)	(0.024)	(0.021)	(0.020)	(0.005)	(0.006)	(0.005)	(0.007)	(0.007)
Firm-level controls										
Log of Employment	-0.073***	-0.082*	-0.076***	-0.088***	-0.088**	-0.053***	-0.057***	-0.054***	-0.058***	-0.058***
	(0.026)	(0.032)	(0.027)	(0.033)	(0.035)	(0.005)	(0.007)	(0.006)	(0.008)	(0.008)
Log of Age of Firm	0.020	0.024	0.011	0.010	-0.0005	-0.021***	-0.011	-0.022***	-0.012	-0.015
	(0.032)	(0.030)	(0.030)	(0.024)	(0.027)	(0.007)	(0.009)	(0.007)	(0.010)	(0.010)
Financial statement checked by external auditors	-0.132	-0.107	-0.106	-0.069	-0.061	-0.001	-0.012	0.003	-0.006	-0.004
	(0.107)	(0.141)	(0.111)	(0.143)	(0.142)	(0.012)	(0.015)	(0.012)	(0.017)	(0.016)
Sole proprietorship	0.031	0.048	0.003	0.008	-0.012	-0.026**	0.013	-0.034***	0.002	-0.003
	(0.078)	(0.100)	(0.082)	(0.104)	(0.108)	(0.012)	(0.015)	(0.012)	(0.017)	(0.017)
Foreign owned	0.026	0.104	0.013	0.096	0.096	0.029*	0.041**	0.032*	0.045**	0.045**
	(0.118)	(0.098)	(0.123)	(0.106)	(0.105)	(0.016)	(0.019)	(0.017)	(0.020)	(0.020)
Export	-0.269***	-0.257***	-0.261***	-0.245***	-0.242***	-0.087***	-0.109***	-0.092***	-0.155***	-0.113***
	(0.078)	(0.084)	(0.082)	(0.089)	(0.087)	(0.018)	(0.012)	(0.018)	(0.022)	(0.022)
Macro-level controls										
Tax rate	-0.805	-0.848	-0.257	-0.269	-1.482	-0.143***	-0.197***	-0.144**	-0.245***	-0.639***
	(1.388)	(1.421)	(1.962)	(2.012)	(2.800)	(0.050)	(0.056)	(0.060)	(0.070)	(0.109)
Log of GDP per capita ($PPP)	-0.067	-0.101	-0.020	-0.064	-0.072	-0.049***	-0.028***	-0.053***	-0.033***	-0.035
	(0.107)	(0.111)	(0.130)	(0.129)	(0.143)	(0.007)	(0.009)	(0.006)	(0.010)	(0.010)
Institutional quality										
Voice and accountability	-0.316**	-0.240*	-0.345**	-0.261*	0.146	-0.137***	-0.152***	-0.136***	-0.155***	-0.039
	(0.141)	(0.146)	(0.143)	(0.149)	(0.427)	(0.010)	(0.012)	(0.010)	(0.013)	(0.028)
Tax rate **x** Voice and accountability					-1.799					-0.504***
					(1.995)					(0.106)
Constant	0.930	1.201	0.450	0.825	1.159	0.772***	0.540***	0.813***	0.600***	0.694***
	(1.069)	(1.084)	(1.430)	(1.383)	(1.550)	(0.060)	(0.079)	(0.068)	(0.089)	(0.091)
Observations	10992	7846	10474	7328	7328	10992	7846	10474	7328	7328
Wald test	1.72	3.35*	1.14	1.76	1.96	3.49*	6.13**	4.65**	4.18**	4.61**
Exclude Nigeria	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Exclude countries with Zero tax rate	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes

Notes: *** denotes significant at 1%, ** denotes significant at 5%, * denote significant at 10%. The reported standard errors are heteroskedastic consistent.

5. Conclusion and policy implications

This study deepens our understanding of tax evasion by firms in African countries. I analysed data from more than 10,300 firms to understand the effect of bribery on the incidence and extent of tax evasion in African countries. About 60% of the sampled firms engage in tax evasion by underreporting their sales for tax purposes. The study findings show that the incidence of tax evasion is higher among firms that give bribes, and the difference in the extent of tax evasion was about 18%. The results indicate that countries with a high incidence of bribery had a high level of tax evasion. Hence, eliminating bribery in African countries is instrumental in reducing tax evasion to the barest level. Bribery would be reduced or minimised when government officials are sanctioned immediately for receiving bribes.

Furthermore, the study shows that as the credit constraints situation of firms worsens, the likelihood of evading tax increases. Also, the study established that high credit-constrained firms are more likely to evade taxes than those that are less constrained. The results imply that highly credit-constrained firms evade taxes to expand internal capital for the next fiscal year. In contrast, less credit-constrained individuals might engage in tax evasion to increase shareholders' return in the form of higher profit through the assistance of corrupt officials aiding and abetting them. Since the incidence is high among highly credit-constrained firms, developing the financial sector to meet the financial needs of firms would discourage firms from engaging in tax evasion. Hence, there is a need to prioritise policies that would expand the size of the financial sector in African countries. Policies focused on bank expansion should be supported with policies that will increase their outreach to ensure that the financial sector development increases lending to existing credit-constrained firms.

In addition, the study findings reveal that firm size is inversely related to both incidence and extent of tax evasion. Exporting firms had a lower incidence and extent of tax evasion. The study findings also reveal that institutional qualities such as voice and accountability, government effectiveness, control of corruption and the rule of law had a negative and significant effect on both incidence and extent of tax evasion. Therefore, the findings of the study imply that tax evasion is self-inflicted by African governments. Every effort targeted at weakening institutions invariably reduces realisable government revenues through tax evasion. Hence, to reduce tax evasion and increase government revenues, there is a need for substantial effort to enforce the rule of law. Also, African governments should become more proactive to make the public sector more efficient in providing public services. Initiatives that would discourage corruption and encourage honesty among public servants are essential and executed with all seriousness and apolitically.

The study had limitations. First, the data employed is a bit dated. The gap in the knowledge on tax evasion at the firm level and the limited data necessitate the use of the data. Recent studies, including Alm et al. (2019), also employed similar dated data to understand tax evasion in transition economies. There is a need for investment in data collection at the firm level to understand tax evasion more deeply. Despite this drawback, the evidence in this study indicates the importance of effective and strong institutions in discouraging tax evasion in African countries.

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Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

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