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Business taxation in Ethiopia: Exploring administrative data to understand taxpayers' responses to tax thresholds

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Preface

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Executive summary

Increasing tax revenues is a priority in low-income countries, where governments collect much less revenue as a share of GDP than in middle- or high-income countries - about 15% on average. In the context of small personal income tax bases, taxes paid and remitted by businesses frequently represent a large proportion of total tax revenues and are therefore an important source of financing for development.

Yet policymakers often know relatively little about how businesses respond to their tax systems, and their understanding of business behaviour is hindered by weak administrative capacity, and high levels of evasion and informality in the economy.

Against this backdrop, this report has two main objectives:

- To map the discontinuities in the Ethiopian business taxation system by documenting relevant tax laws and the practice of tax administration. We are particularly interested in the policy and administrative thresholds that determine, for example, changes in the marginal rates of taxation for firms, and whether firms should register for VAT or report to the Large Taxpayers' Office (LTO). In a context where information about the tax system is not always readily available, compiling details about thresholds and the procedures around them represents a valuable contribution.

- To provide exploratory analysis of businesses' responses to the tax system in Ethiopia using administrative data from tax returns. We do this by investigating whether some taxpayers respond to discontinuities in the tax system by strategically positioning themselves on one side of a threshold in order to minimise tax liabilities, reduce compliance costs, or to access certain tax instruments that may benefit them in other dimensions. This phenomenon is known as 'bunching' in the academic literature. This analysis is the first using administrative data in Ethiopia and is largely exploratory and descriptive, representing a starting point for further research.

Key findings

- **There is no evidence that an excessively large number of businesses in Ethiopia report a profit equal to, or just below, the level at which marginal tax rates increase in the business income tax schedule. This is contrary to the evidence in middle- and high-income countries.** Although crossing these thresholds would imply higher marginal tax rates for sole proprietors, the rate increases in the graduated schedule are small relative to those analysed in other countries, which may help to explain this lack of response.

- **There is some weak evidence that a disproportionately large number of sole proprietors report a turnover just above the 500,000 Birr (25,528 USD in 2014) turnover threshold. Crossing this threshold has two key implications for businesses: they must submit more detailed financial records to the revenue authority, and they must register for VAT. It is not straightforward to explain this finding, and weaknesses in the available data, as well as the somewhat inconsistent behaviour of other types of taxpayers around this threshold complicate our interpretation of this result. Although it seems plausible that the**

VAT registration threshold could be driving this response, the evidence is not conclusive. In Ethiopia VAT-registered firms enjoy a number of benefits: First, they can compete for government procurement contracts. Second, they can trade with other VAT-registered firms, and access a larger number of customers. These benefits combined may outweigh the additional costs associated with complying with the VAT, submitting more information to the revenue authority, and the slightly higher effective tax rates that businesses pay. It is important to note, however, that firms registered for the simplified turnover tax (ToT) also demonstrate some slight bunching behaviour above this threshold, while corporations, which should face similar incentives in terms of accessing the VAT system, do not.

- **Businesses in Ethiopia do not appear to respond to administrative thresholds which segment them according to their size. This is in spite of potentially higher reporting and compliance costs and more intensive enforcement activities targeted at businesses with larger turnovers. The lack of response is likely linked to the fact that taxpayers are unaware of the change in location of these thresholds in advance and cannot manipulate their reported turnovers meaningfully as a result.** In theory, businesses might prefer to avoid being subject to the additional compliance costs and enforcement efforts associated with reporting at the Large Taxpayers' Office (LTO), for example. In practice, ambiguous local incentives and limited information about the location of the threshold mean that *a priori,* there should not be any bunching present.

This preliminary analysis of available administrative data, therefore, finds very limited evidence of responses by Ethiopian taxpayers to discontinuities in the tax system. The lack of response to the income tax kinks and the LTO administrative notch is not entirely surprising given the scale of policy changes and 'fuzziness' of the administrative thresholds. The slight bunching above the 500,000 Birr turnover threshold by sole proprietors is puzzling, although could potentially be rationalised by the access to public procurement bids. But overall, the complexity and fuzziness of the changes at this threshold make understanding the incentives faced by taxpayers and interpreting our empirical findings difficult.

The use of administrative tax data in the preparation of this report has highlighted the importance of generating and maintaining better digitised records for all taxpayers, tax offices, and across tax types. This would enable the revenue authority to develop a more in-depth understanding of its taxpayers, more effectively administer its tax system, and would support more nuanced policy-relevant research. For example, data limitations mean that in this analysis the turnover data used to explore taxpayers' responses to the VAT registration threshold derives from the income tax returns, as opposed to the VAT and ToT returns, because of the lack of data from the ToT declarations. Moreover, data entry into the Standard Integrated Government Tax Administration System (SIGTAS) is not uniform and in some areas of Ethiopia, information is only entered for certain taxpayers, with the criteria for entry largely unclear. This results in uneven coverage of taxpayers in the data outside of Addis Ababa, especially for unincorporated firms. As a result, the findings should be interpreted cautiously. It would be useful to further investigate taxpayers' responses around the 500,000 Birr turnover threshold using additional ToT returns data for the universe of firms in Ethiopia to ensure that the findings are robust.

1 Introduction

Taxation is the most important source of development financing in Ethiopia. Increasing the levels of domestic revenue mobilisation will be crucial if the government is to fund important public services and make the investments needed to tackle poverty and promote economic development. Ethiopia's current development plan (the Growth and Transformation Plan II, or GTP II) places a particular emphasis on the latter, which is to be achieved through industrialisation and investment. Currently, however, Ethiopia performs relatively poorly on this dimension, as its tax to GDP ratio was just 13% in 2015/16 – below the average for both Africa and other low-income countries more broadly.

In contrast to high-income countries where personal income tax is often the single largest source of revenue, taxes paid and remitted by businesses represent the most significant proportion of revenues in Ethiopia. The VAT is by far the greatest contributor; in the period 2015-16 about a third of total tax revenues came from VAT on domestic goods and services, while this share increased to over 46% when VAT on imports is included. The business profits or income tax represented the second largest source and was responsible for around 20% of total tax revenues.[1]

In this context, the Government of Ethiopia faces two apparently conflicting challenges: promoting a favourable business environment, while collecting sufficient amounts of revenue. While policymakers in all countries strive to balance sustainable tax collection with equity and efficiency objectives, governments in low-income countries face two additional challenges. First, administrative constraints limit their ability to enforce tax laws, especially when they require frequent monitoring and complex procedures. Second, they face higher levels of evasion and informality, compared with higher-income countries. These additional challenges may mean that policies that are effective in other contexts may not be as feasible or effective in low-income countries. Similarly, taxpayer responses to the tax system are likely to be affected both by a more challenging administrative environment and by greater opportunities for evasion.

The interactions between tax policy, tax administration, and taxpayers' responses determine the tax system's implications for equity and efficiency and the amount of tax revenue that governments can collect. It is therefore important and relevant to understand such responses and, where appropriate, factor them into policymaking.

Against this backdrop, this report has two main objectives:

- To map the discontinuities in the Ethiopian business taxation system by documenting relevant tax laws and the practice of tax administration. We are particularly interested in the policy and administrative thresholds that determine, for example, changes in the marginal rates of taxation for firms, and whether firms should register for VAT or report to the Large Taxpayers' Office (LTO). In a context where information about the tax system is not always readily available,

[1] Author's calculations based on data for the fiscal year 2015-16 provided by the Ministry of Finance and Economic Cooperation.

collecting details about thresholds and the procedures around them represents a valuable contribution.

- To explore whether there is evidence of taxpayer responsiveness to these thresholds, by looking at whether there is 'bunching' of taxpayers. This is the process of investigating whether taxpayers respond to discontinuities in the tax system by strategically positioning themselves on the side of the threshold in order to minimise tax liabilities or reduce tax compliance costs or to qualify to access certain tax instruments that may benefit them in other dimensions.

To the best of our knowledge, this is the first study that analyses bunching using taxpayer-level administrative data from Ethiopia, a low-income country. The only available evidence is from a study that provides suggestive evidence of bunching around the VAT registration threshold using survey data on manufacturing firms (Gebresilasse and Sow, 2016). In particular, they found evidence from the year 2003 consistent with the idea that manufacturing firms tried to avoid registering for the VAT system by under-reporting their turnover just after the introduction of the VAT system in Ethiopia, in 2002. Although this study is a reference point for our analysis, using large administrative datasets can be preferable to surveys, because the former benefit from a large number of observations and lower measurement error and these allow for better identification of the exact location of taxpayers on the tax schedule (Kleven, 2016; Saez, 2010).

In addition to contributing to the very limited literature on low-income countries, this report also aims to provide policy-relevant information about taxpayer responses, as well as some suggestions about how to improve taxpayer-level administrative data. The analysis is largely exploratory and descriptive, representing a starting point for further research.

The report is structured as follows. Section 2 provides a brief introduction to bunching analysis and a review of some key recent studies of taxpayers' responses to tax discontinuities in low- and middle-income countries using bunching methodology. Section 3 provides an overview of the Ethiopian tax system faced by businesses and the discontinuities in the system. Section 4 discusses the methodology and describes the data used. Section 5 presents the results. Section 6 offers some concluding remarks and avenues for future research.

2 Review of key studies on taxpayer bunching

2.1 An introduction to bunching analysis

In recent years, a growing number of studies have used taxpayer-level administrative data to understand how the tax system may be generating distortions to taxpayer behaviour and affecting revenue collection, through the implementation of bunching analysis. Kleven (2016) has provided a comprehensive review of the literature in this area.

Bunching analysis enables researchers to investigate how taxpayers respond to discontinuities in the tax system. These responses can occur:

- At cut-off points at which marginal rates of tax increase or decrease, for example around thresholds defining brackets in a graduated income tax schedule - often described as 'kinks'; or
- At cut-off points where average rates of tax increase or decrease, which can be due to different taxes being applied on different sides of the threshold - often described as 'notches'; or
- Where administrative, compliance or enforcement procedures change - such as thresholds above which additional information needs to be provided in tax returns – also known as 'notches'.

Bunching analysis allows researchers to identify unusually large numbers of firms positioned on one side of a threshold (the 'excess mass') and, relatedly, an unusually small number of firms positioned on the other side (the 'missing mass').

In simplified terms, conducting bunching analysis involves two steps:

- Step 1 involves investigating evidence of such excess and missing masses, which identifies taxpayer responses to a threshold. The existence of sharp bunching suggests that the relevant threshold is creating distortions in taxpayer behaviour.
- Step 2 involves exploiting this bunching to estimate structural parameters of interest; for example, the elasticity of reported income with respect to increases in the tax rate (when the threshold implies an increase in the marginal tax rate). Similarly, bunching analysis can be used to quantify taxpayer responses to increases in compliance costs or in the level enforcement they face, by estimating the extent to which they under-report income to avoid crossing a threshold.

Kleven (2016) distinguishes the analysis of kinks and notches as two conceptually different bunching designs, applicable in different settings and with distinct sets of empirical advantages and challenges.

2.2 The evolution of the bunching literature

Bunching design based on the analysis of kink points was first developed by Saez (2010) and was further advanced by Chetty et al (2011). Saez (2010) investigates evidence for bunching in the US at kinks created by the design of the Earned Income Tax Credit (EITC) system and the Federal Income Tax schedule. He finds strong evidence of bunching around the first kink point of the EITC and shows that this is true only in the case of self-employed income earners.[2] The elasticity estimates at the first kink point of the EITC range between 0.21 and 0.15 respectively for families with one and more than one children, confirming the bunching evidence observed from the histograms and density plots. For the federal income tax, he finds evidence of bunching only at the first kink point where tax liability starts, with no evidence of bunching at higher kink points.

The analysis of notches was developed by Kleven and Waseem (2013). The authors exploit a quasi-experimental variation created by tax notches in Pakistan's income tax system, where income is divided into brackets and average tax rates are constant within, but vary across, brackets. They find strong evidence for bunching below and missing densities above each notch. This response is found to be stronger for self-employed individuals than wage earners, although, perhaps somewhat surprisingly, the majority of self-employed individuals still do not respond.

In a further application of the analysis of notches, and using data from Spain, Almunia and Lopez-Rodriguez (2018) investigate firms' behavioural response to an administrative notch that determines whether they should report to the Large Taxpayers' Office (LTO), which has greater enforcement capacity. They show that although bunching firms under-report income by 6%- 9%, firms in sectors with relatively less traceable transactions do not seem to respond to the administrative notch.

The existing evidence in high-income countries generally confirms the presence of bunching below relevant tax policy and administrative thresholds and shows that taxpayer responses can be large and significant. This kind of responses occurs when similar firms are treated differently, around a threshold that is necessarily somewhat arbitrary. Although the firms slightly below and slightly above any threshold are very similar, they may face different tax rates, different reporting requirements or, in some cases, may be required to pay entirely different taxes. The literature then investigates how firms bunch above or below these discontinuities to avoid higher taxes, compliance costs, or enforcement activities.

In addition to highlighting distortions and taxpayer responses, bunching can potentially be used as one criterion for risk management and audit selection. Although in principle firms can respond to tax thresholds by reducing their real activity or income, most responses, especially when they are sharp, are thought to be the result of under-reporting (ie. evasion through under-reporting or avoidance) rather than real responses (Saez, 2010; Asatryan and Peichl, 2016; Boonzaaier et al., 2016; Almunia and Lopez-Rodriguez, 2018).

[2] The EITC is a transfer system where the subsidy amount depends on family earnings and number of qualifying children. It creates kinks in households' budget constraint as it first increases linearly with earnings (phase-in range) and reaches a maximum of 34% or 40% (for families with two or more children) and stabilises before starting to decline (phase-out range) at a rate of 16% or 21% (for families with two or more children).

Regardless of whether the response is real or related to reporting, the presence of bunching suggests that the tax system is generating distortions in the economy, which can have important implications for production efficiency, equity and revenues.

2.3 Evidence of bunching in low- and middle-income countries

Despite a growing number of studies using administrative tax return data for policy analysis and tax research in low-income countries (Eissa and Zeitlin, 2014; Ali et al., 2015; Mascagni and Mengistu, 2016; Mascagni et al., 2017), the majority of the existing studies on bunching - as well as those which might aid policymakers to better understand taxpayers' responses to the tax system more broadly – focus on high-income countries. The evidence on taxpayer responses to the tax system in low-income countries is still scant. A key reason for this remains the limited availability of administrative tax data to date.

A number of recent studies in middle-income countries are now beginning to shed more light on this issue in a wider variety of contexts, however. Table 2.1 below summarises some recent evidence from six countries, although the list is not exhaustive: Armenia (Asatryan and Peichl, 2016), Costa Rica (Bachas and Soto, 2018), Ecuador (Bohne and Nimczik, 2018), Pakistan (Best et al, 2015 and Kleven and Waseem, 2013), South Africa (Boonzaaier et al, 2016), and Uruguay (Bergolo et al, 2018).

Table 2.1. Summary of some recent taxpayer behaviour analysis using *bunching* in middle-income countries

Country, authors, date of publication	Purpose of study and data used	Findings and possible implications
Armenia Asatryan & Peichl, 2016	**Purpose:** Analyses if and how small firms respond to **notches in the tax system created by three size-dependent regulations:** i) the notch created by the VAT registration threshold ii) the accounting notch where International Financial Reporting Standards (IFRS) become mandatory; iii) the administrative notch where the frequency of filing and paying taxes declines from monthly to quarterly. **Data:** The study used Population-wide corporate tax returns data on a panel of Armenian firms for the years 2007–2013.	**Findings:** No evidence of bunching below the VAT threshold. Strong evidence of bunching below the IFRS notch. Moderate bunching below the notch which reduces the frequency of filing and paying taxes from monthly to quarterly. Evidence from audited tax returns suggests that the responses are almost entirely driven by income under-reporting rather than real production responses. **Possible implications:** The relatively high level of the VAT registration threshold means that the benefit for larger firms of registering for VAT is, on average, likely to be higher than the compliance cost of registering. SMEs may be benefiting from rules which relax their compliance costs which may be positive for the sector but may also discourage growth. Responses are largely driven by under-reporting, however, meaning that revenue is potentially being lost to evasion. This could be mitigated by improved administration and targeted audit strategies.
Costa Rica Bachas & Soto 2018	**Purpose:** Analyses how small and medium firms respond to **notches in the corporate profit tax system:** average tax rates on profit (tax base) increase as a function of firms' revenues (tax rate determinant). In particular, the study estimates the elasticity of taxable profit and separates it into firms' cost and revenue elasticities in a context with weak enforcement. **Data:** The study uses the 2008–2014 universe of administrative corporate tax returns from the Ministry of Finance.	**Findings:** Evidence of significant bunching at the different revenue thresholds at which the corporate tax rate increases. Firms faced with a higher tax rate slightly reduce revenues but considerably increase costs, driven by evasion and not by production responses. This results in a large elasticity of taxable profit of 3–5. This is higher than same elasticities estimated in rich countries. **Possible implications:** A tax rate on profits above 17% (25%) is above the level which maximises tax revenue for the small (medium) firms considered in this study, given the current tax base. Furthermore, the government could also collect tax revenue by broadening the tax base (i.e., permitting fewer deductions): the study suggests that broadening the base while lowering the rate would increase government revenue by 80% without changing firms' pre-tax profits.
Ecuador Bohne & Nimczik, 2018	**Purpose:** Analyses the dynamic response of taxpayers to **discontinuities (kinks) in the graduated Personal Income Tax (PIT) schedule, and how these responses are affected by generous tax deductions policies**. In particular, they study how new formal employees learn how to use tax avoidance opportunities from working in different firms that may attract tax experts and knowledgeable managers. **Data:** The study uses the universe of firm-reported PIT returns of regular employees, merged with socio demographic data from the Civil Registry and firm-level data from the firm registry for the years 2006-2015.	**Findings:** Significant bunching among wage earners around the first kink in the PIT schedule - which is a very small, but very salient kink. The strong bunching observed is driven by reporting effects using deductions and not real labour supply effects. **Possible implications:** As taxpayers gain experience in the formal sector, they are more likely to avoid paying taxes by (over-)using generous deduction possibilities. The analysis suggests it is important to take into account firms and firm-level environments in driving the usage of tax avoidance opportunities by employees, when designing strategies to combat tax avoidance and setting up auditing targets.

Pakistan Kleven & Waseem, 2013	**Purpose: Analyses responses of individuals to large notches in the piecewise linear personal income tax schedule**. Each tax bracket is associated with a fixed average tax rate and there is a large increase in tax liability at bracket cut-off points. **Data:** The study uses the universe of personal income tax filers for the years 2006-2009.	**Findings:** Strong evidence for bunching and missing densities below and above each notch. Stronger response for self-employed individuals than wage earners, reflecting greater opportunities for evasion. Despite the strong bunching and missing mass evidence, the majority of self-employed individuals (50-80%) do not respond to the incentives created by notches. **Possible implications:** Large bunching responses are attenuated by optimisation frictions implying that without the frictions, responses would be larger. In spite of this, the underlying structural elasticity is modest. This evidence implies that notches can be inefficient because they induce large behavioural responses, even when structural elasticities are small.
Pakistan Best et al, 2015	**Purpose:** Analyses **responses of businesses to a kink in the tax schedule that is defined by a cut-off point in the level of firms' profit rates, above which both the marginal rate and the tax base change (the so-called minimum tax scheme)**. Above the cut-off point, firms pay a profit tax, below that point they pay a turnover tax. The incentives for real output and evasion responses change differentially at the kink, allowing the authors to provide a bound on the evasion response. **Data:** Administrative data from the Federal Board of Revenue, covering the universe of corporate income tax returns for the years 2006-2010.	**Findings**: Compelling evidence of a large and sharp bunching behaviour around the kink point introduced by the minimum tax scheme. This is consistent with firms changing mainly their evasion behaviour due to the tax incentives, rather than their real output. The empirical findings combined with economic theory and realistic assumptions about real output elasticities suggest that evasion decreases with the profit rate, justifying the existence of a minimum tax scheme: taxing each firm on either profits or turnover, depending on which tax liability is larger. **Possible implications:** Taxing firms on the basis of turnover rather than profits is a production inefficient policy commonly observed in low- and middle-income countries. The findings of the paper imply that in the presence of evasion the optimal tax base sacrifices some production efficiency in order to curtail evasion levels in settings with low state capacity. The authors estimate that turnover taxes reduce evasion by up to 60-70% of corporate income. Incorporating this in a calibrated optimal tax model, they find that switching from profit to turnover taxation increases revenue by 74% without reducing aggregate profits, despite the production inefficiency that it introduces.
South Africa Boonzaaier et al, 2016	**Purpose:** Analyses the casual effects of **discontinuities (kinks) in the graduated, progressive corporate income tax (CIT) schedule for small business corporations (SBCs)** on the behaviour of small and medium size firms. **Data:** The company tax register and population-wide CIT returns for the years 2010-2013.	**Findings:** Significant bunching of firms at the corporate income thresholds where the corporate tax rate increases, implying active responses to corporate income taxes. The implied elasticity estimates are also relatively large, 0.72 and 0.17 for the lower and upper kink points, respectively. Due to the potential existence of inattention and other frictions, these elasticities could be considered a lower bound. The analysis suggests the responses are due to reporting changes rather than a change in real output. **Possible implications:** Firms are responding to incentives in the tax system by changing the amounts reported, rather than their real outputs. In particular, evidence is consistent with taxpayers under-reporting sales to avoid paying higher taxes. This implies that the graduated CIT rate schedule may not be so effective in

		fostering the activity of SBCs, since firms just respond by changing their reported turnover. This suggests that lower marginal rates for smaller firms are unnecessary. In turn, this suggest that a size-based strategy like the CIT for SBCs is not so distortive in real terms.
Uruguay Bergolo et al, 2018	**Purpose**: Analyses individuals' behavioural responses to the **first kink point of the personal income tax schedule - i.e. the exemption threshold.** They focus on earned income by employees and the self-employed and on the first kink since it provides the biggest jump in the marginal tax rate and hence it is the most salient. **Data:** Administrative records from the Uruguayan tax agency for the period 2010-2014 that result in a unique dataset that combines self-reported tax records from taxpayers, third-party reported earnings and deductions by the employers (Employer Statements), and firm-level records at the individual level.	**Findings:** Significant bunching at the first kink of the PIT schedule. The authors estimate a moderated elasticity of taxable income in the first kink point (0.16) driven by a combination of gross labour income and deduction responses. The size of the elasticity is similar to that found in studies of PIT in advanced economies. Taxpayers use personal deductions more intensively close to the kink point (although deduction possibilities are limited) and under-report income unilaterally or through employer-employee collusion. **Possible implications:** Given that the estimated elasticity of taxable income to the first kink is quite modest, the authors suggest that frictions and optimisation costs may be important in Uruguay, consistent with the idea that taxpayers are still learning how the tax system exactly works. This implies that policymakers should proceed with caution on reforms aimed to expand tax deduction opportunities and improve the quality of third-party reporting mechanisms in order to limit tax evasion. Broadening the tax base and improving the administrative capacities of tax authorities might be the appropriate policy options.

A common application of the bunching approach relates to the analysis of the notch created by the VAT registration threshold. This is the amount of turnover above which firms are legally required to register for VAT. Asatryan and Peichl (2016) investigate firms' behavioural responses to this notch and their findings suggest a lack of strong evidence of bunching below the VAT threshold, which is in contrast to the strong evidence from high-income countries (see for example Onji (2009) for Japan, Liu and Lockwood (2015) for the UK; and Harju et al. (2016) for Finland). Still, in setting up a VAT system and determining the related threshold, governments should consider the possible incentives it provides for firms to remain small, either by restricting their growth or by under-reporting turnover through evasion, as this could hurt tax revenue and economic growth.

3 Overview of the Ethiopian business tax system and its discontinuities

Firms in Ethiopia pay and remit various taxes, including direct taxes on their business profits (business income tax), indirect taxes on sales (VAT/ToT and excise duties), taxes on imports (including custom duties), dividends, royalties and stamp duties, and a number of smaller fees and charges, such as property taxes if they are based in urban municipalities. They also remit taxes on employment income that they withhold from employees.

This section briefly describes the key features of the tax system for businesses in Ethiopia and outlines the different thresholds that generate discontinuities, and which may induce taxpayers to respond by changing their reporting or real behaviour, which we explore as part of this study. For a more comprehensive discussion of the Ethiopian tax system, see Mengistu et al (2015).[3] Because we use available data for the period 2010-2014, the system corresponds to the system valid in that period. However, we highlight any important changes that have happened after that for reference.

Before outlining the specific parameters of the tax system, it is important to note that Ethiopia is a federal country, and the 1995 Constitution of the Federal Democratic Republic of Ethiopia (FDRE), provides the Regional and Federal governments with different powers to levy and collect revenues. The tax administration which businesses file their returns and pay their taxes to depends on the businesses' legal form: corporations file and remit taxes to the Federal Government, to the Ethiopian Revenue and Customs Authority (ERCA) while unincorporated businesses file and remit their taxes to Regional Revenues Authorities (RRAs), with the relevant RRA determined according to the location of the firm's headquarters. During the period covered in this report, however, unincorporated businesses based in Addis Ababa also reported to ERCA.

3.1 The categorisation of taxpayers: Administrative notches

The Ethiopian tax system classifies businesses into three categories - A, B and C - according to whether the business is incorporated or not, and the size of the business as measured by its turnover. Incorporated taxpayers (corporations) are classified as Category A and face the same tax rate and administrative requirements regardless of their size. For unincorporated taxpayers, on the other hand, these categories determine the information that firms are required to submit when reporting to the revenue authority, and whether the firm must use a cash or an accruals basis for accounting. It is important to note that this categorisation could in principle affect compliance and administration costs but does not have any bearing on the tax rate. Reporting requirements are highest for Category A taxpayers – corporations and the largest unincorporated businesses - and decrease for smaller unincorporated businesses.

Table 3.1 summarises the reporting requirements for each category of taxpayer and the associated threshold.

[3] Available here: https://www.wider.unu.edu/sites/default/files/wp2015-115.pdf

Table 3.1. Categories of firms in Ethiopia, administrative notches valid in 2014

Category	Threshold for unincorporated businesses (Regulation 78/2002)	Reporting requirements
A (All corporations belong to this category)	Over 500,000 Birr (Over 25,528 USD)	Businesses are required to submit a balance sheet (a financial statement) and a profit and loss statement showing their gross profit and the manner in which it is computed, general and administrative expenses, depreciation, as well as provisions and reserves. Businesses must keep their accounts on accrual basis and must file their returns within four months of the end of the financial year.
B	100,000-500,000 Birr (5,106-25,528 USD)	Businesses are required to submit a profit and loss statement that summarises the revenues and expenses of the business over the reporting period, but no balance sheet (financial statement) information is required. They can keep simplified books of accounts using cash basis accounting and must file their returns within two months of the end of the financial year, reflecting the simplified requirements.
C	Below 100,000 Birr (Below 5,106 USD)	Businesses are not required to keep books of accounts, as firms pay their taxes based on an assessment made by ERCA. However, they can pay according to the information from their own books of accounts if the tax authority finds that acceptable and grants them permission to do so. Category C taxpayers must pay their tax liability within one month of the end of the financial year.

Note: Figures in USD are obtained by using the nominal exchange rate of 19.586 Birr/USD reported by the International Monetary Fund for 2014 – data available in this link: https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=ET.

In 2016, Federal Income Tax Proclamation 979/2016 doubled the threshold for Category A firms to 1 million Birr (51,057 USD) and correspondingly increased the threshold and band for Category B firms to 500,000 - 1 million Birr.

3.2 The business income tax: Kinks for unincorporated businesses

The tax base for business income tax outlined in Proclamation No. 286/2002 includes "income on commercial, professional, or vocational activity or any other activity

recognized as trade by the commercial code of Ethiopia and carried on by any person for profit".[4]

Table 3.2. Key information about the business income tax in Ethiopia – valid in 2014

Legislation relevant for this study	Proclamation 286/2002 Regulation 78/2002
Schedule and rate structure	Corporations: Flat rate: 30% Unincorporated businesses: Graduated schedule between 0 and 60,000 Birr (2,187 USD) of annual taxable income (see below)

The 2002 income tax schedule for unincorporated businesses is outlined in Table 3.3 below. The tax base is annual taxable income. As outlined in Table 3.1 above, however, Category C firms pay a presumptive tax based on an assessment by the revenue authority.

Table 3.3 The 2002 income tax schedule for unincorporated firms – valid in 2014

Bracket	Annual taxable income		Rate
	From	To	
0	0	1,800 Birr (66 USD)	Exempted
1	1,801 Birr (66 USD)	7,800 Birr (284 USD)	10%
2	7,801 Birr (284 USD)	16,800 Birr (612 USD)	15%
3	16,801 (612 USD)	23,200 (846 USD)	20%
4	28,201 (846 USD)	42,600 (1,553 USD)	25%
5	42,601 (1,553 USD)	60,000 (2,187 USD)	30%
6	Over 60,000 (2,187 USD)	-	35%

In 2016, Federal Income Tax Proclamation No. 979/2016 introduced new thresholds for each bracket, with businesses' annual taxable income up to 7,200 Birr exempted, and the top threshold rising from over 60,000 to over 130,800 Birr (4,769 USD). This change is not relevant for the analysis in this report, since the data used corresponds to the years 2011-2014.

3.3 The VAT and Turnover Tax (ToT): A policy notch

On 4th July 2002, Ethiopia issued Proclamation No. 285/2002 which legislated for the creation of a VAT on goods and services. Similarly, Proclamation No. 308/2002 governs the imposition and collection of a turnover tax (ToT), which applies to businesses not in the VAT system. On 1st January 2003, the Government of Ethiopia started implementing the VAT and the ToT systems, replacing the sales tax which had preceded them. The legislation, thresholds and rate structure which were relevant during the time period covered by this study are described in the table below.

[4] See Clause (1) 6) of Proclamation No. 286/2002. Available: http://www.mor.gov.et/images/Documents/Proclamation/Income_tax/55.pdf

Table 3.4 Key features of the ToT and VAT system in Ethiopia valid in 2014

	Turnover Tax (ToT)	VAT
Legislation relevant to this study	Proclamation 308/2002	Proclamation 285/2002 Proclamation 609/2008
Registration threshold	Annual turnover below 500,000 Birr	Annual turnover above 500,000 Birr
Rate structure	2% On goods sold locally and services rendered locally by contractors, grain mills, tractors and combine harvesters 10% On other services	15% A range of exemptions and zero rates are also applicable on some goods and services. Some of these have been granted in the original legislation but most exemptions since then have been granted through directives issued by the Ministry of Finance and Economic Cooperation (MoFEC). See Table 8.1 in the Appendix. Imports are subject to VAT, but exports are zero-rated (the destination principle).

Note: The 2% rate of ToT also applies to services provided by contractors, grain mills, tractors and combine-harvesters. According to Proclamation 286/2002, "Contractor shall mean an individual who is engaged to perform services under an agreement by which the individual retains substantial authority to direct and control the manner in which the services are to be performed."

The VAT registration threshold of 500,000 Birr in 2002 was set in order to limit the coverage of VAT to relatively large firms, based on considerations related to administrative feasibility and compliance costs. From February 2018, this threshold was increased to 1 million Birr per year.

During our data period, only firms with annual turnovers in excess of 500,000 Birr had a legal duty to register for VAT, unless they operated in a VAT-exempted sector (see Table 8.1 in the Appendix). Businesses with annual turnovers of below 500,000 Birr could voluntarily register for VAT, under two conditions:

- They should be able to show that 75% of their transactions occur with other VAT-registered businesses; and
- They should show that they have the capacity to comply with the bookkeeping requirements of the VAT system.

In practice, voluntary registration has become particularly hard in recent years, as we discuss below.

As the table indicates, smaller firms in Ethiopia are exempt from paying VAT but are still required to contribute their share of indirect tax through the simpler ToT scheme.

3.4 The segmentation of taxpayers: The Large Taxpayers' Office (LTO) threshold, an administrative notch

A key feature of the Ethiopian tax administration system is taxpayer segmentation. Like revenue authorities in many other countries, ERCA segments taxpayers according to the size of their turnover for administrative purposes, to focus its enforcement efforts on the taxpayers which it believes will generate the highest tax revenue returns for government.

ERCA collects revenue from corporations and has a dedicated office for large corporations - the Large Taxpayers' Office (LTO), based in Addis Ababa. Smaller corporations file at a number of Medium and Small Taxpayers' Offices (MTOs and STOs). All unincorporated firms file their tax returns and remit their taxes at the offices of Regional Revenue Authorities around the country, and are not relevant for the LTO analysis.

While monitoring large taxpayers is a priority everywhere, it is particularly important in low-income countries where the majority of revenue comes from a few large firms: the largest 10% of Ethiopian corporations contribute around 90% of total business tax revenue (Mascagni and Mengistu, 2016), and this is similar in other low-income countries.[5] For this reason, much of the existing administrative capacity and enforcement efforts are concentrated at the LTO. The LTO's relatively greater capacity to monitor taxpayers closely should result in less opportunity for evasion.

The following two criteria determine whether corporations must report to the LTO in Ethiopia:

- Reported turnover: Corporations with reported turnovers above a moving threshold set by ERCA must report to the LTO, and/or;
- Industrial sector: Corporations operating in certain sectors, regardless of their size, must report to the LTO. This applies to taxpayers in the mining, petroleum, banking and insurance sectors, as well as the largest construction companies.[6]

ERCA has updated the turnover threshold which determines whether corporations should report to the LTO every two years since 2010, but not in a way that could have been anticipated by taxpayers. The process for setting the threshold explicitly involves two steps and takes into account administrative feasibility as a key criterion:

- The first step in the process is to establish the number of additional taxpayers that the LTO can handle, based on what is manageable given existing resources, and in order to ensure a quality service and a sufficient degree of oversight of taxpayers.
- In the second step, a committee of five ERCA officials decides the threshold by locating a level of turnover that gives the required number of taxpayers, based on data from the previous two years. In doing so, the committee also takes into

[5] See Mascagni et al, 2016.

[6] Construction companies (also called contractors) can be registered in one of ten grades depending on their capacity, where first grade contractors are the largest ones. It is first grade contractors that are required to report to the LTO. For the years prior to 2013, three-star hotels were also under the remit of the LTO.

account the fact that some taxpayers must file and pay their taxes at the LTO regardless of their annual turnover (for example if they belong to the sectors mentioned above).

The LTO thresholds for recent years are outlined in Table 3.5 below.

Table 3.5 Thresholds for LTO eligibility in Ethiopia

Period	Turnover
Since August 2011	15 million Birr (765,853 USD) - based on 2009/10 annual turnover
Since August 2013	27 million Birr (1,378,535 USD) - based on average annual turnover of 2010/11 and 2011/12
Since August 2015	35 million Birr (1,786,990 USD) - based on average annual turnover of 2012/13 and 2013/14

Source: This information has been compiled based on consultations with staff from ERCA and information provided in the Addis Fortune newspaper on 14th July 28, 2013 (Vol 14, No 691: https://addisfortune.net/articles/bar-for-large-taxpayer-bracket-rises-to-27-million-br/). The exchange rate used to convert figures to USD is 19.586 Birr/USD, corresponding to the average nominal rate in 2014.

3.5 Recent developments in Ethiopian tax policy and administration

As evident above, the Government of Ethiopia passed a number of key pieces of tax legislation in the early 2000s, and this was a major period of policy reform.

Until 2016, the laws governing tax policy remained largely constant, although there have been some ad-hoc changes, for example through the powers granted to the Ministry of Finance and Economic Cooperation (MoFEC) to exempt some goods and services from the VAT by Directive.

A lack of substantial reform or revision of the income tax, VAT or ToT thresholds resulted in the significant erosion of the real value of these thresholds over the past decade. With inflation as high as 30% in some years, thresholds would have had to increase almost five-fold in the decade following the 2002 reforms to maintain their real value. As a result of this lack of uprating, more firms were likely subject to the VAT than intended in 2002.

As outlined above, a recent reform of income taxation in 2016 (the Federal Income Tax Proclamation 979/2016), has changed this situation - increasing all thresholds in the tax schedule. The same law doubled the threshold for Category A firms to 1 million Birr (51,056 USD) and correspondingly increased the threshold and band for Category B firms to 500,000 - 1 million Birr. In December 2017, the VAT registration threshold was also increased to encompass firms with annual turnovers of 1 million Birr, in line with the Category A threshold.[7] These reforms were necessary in order to bring the tax system back into sync with the economic reality of the country.[8] Although these new thresholds are not part of our analysis, since they came into force after the most recent year in our

[7] See Circular Number T/K/Q 5/165 entitled 'Reforming the Compulsory VAT Registration Threshold'.

[8] Analysis of the pre- and post-July 2016 reform of income tax thresholds on poverty and inequality can be found in Hirvonen et al., 2018.

dataset (2014), the lack of revisions and the resulting bracket creep[9] may have influenced taxpayers' (lack of) response to the tax system, as we highlight in the sections below.

In addition, there have been a number of relevant administrative reforms. Among these, it is worth highlighting the merger of the Ministry of Revenues, the Ethiopian Customs Authority and The Federal Inland Revenue Authority to create ERCA, and the roll-out of electronic cash registers - both in 2008 (Proclamation 587/2008). More recently, the Addis Ababa and Federal ERCA offices were separated.

[9] Bracket creep is the erosion of the real value of the thresholds due to inflation.

4 Data and methods

4.1 Data sources

This study uses taxpayer-level administrative data from tax returns, obtained and extracted from the Standard Integrated Government Tax Administration System (SIGTAS). The main dataset used for our analysis comes from firms' income tax returns, where firms declare turnover, expenses and income in order to determine their income tax liability. The data includes information on legal form; taxpayer category (A, B or C); annual turnover; taxable income; the different types of taxes paid; and an anonymous taxpayer ID, which facilitates the matching of firms across different datasets and tax bases. The data from the tax returns is matched with data on the taxes actually paid for each of the different tax instruments.

Although we have data on turnover from VAT declarations in addition to the income tax returns, we were unable to obtain turnover information from the ToT declarations. We have used data on turnovers obtained from the income tax declarations, as opposed to the data from the indirect tax returns, in all of our analyses. This could be a limiting factor in our analysis of taxpayers' responses to the VAT threshold since there may be some important discrepancies between the turnover amounts declared in each type of tax return by the same taxpayer and this may be misrepresenting the responses of some taxpayers to the VAT threshold. This will be discussed further in Section 4.2.[10]

The project highlighted a number of key challenges with the data:

Challenge	Implication for analysis
Although data exist in principle for different regions in Ethiopia, consultations with officials from ERCA and one Regional Revenue Authority (the Oromia Revenue Authority, ORA) revealed some challenges around data coverage. Data entry into the SIGTAS system is not uniform and in some areas of Ethiopia, information is only entered for certain taxpayers, with the criteria for entry largely unclear. This results in uneven coverage of taxpayers in the data outside of Addis Ababa, especially for unincorporated firms.	• The geographical scope of the data used in this report is restricted to Addis Ababa and includes both incorporated and unincorporated firms. • Most of the country's economic activity takes place in Addis Ababa, with a large majority of the total tax revenue collected in the capital.[11] Although this restriction is not ideal, it still allows us to cover a good portion of business activity in the country.
Data on small taxpayers (category C) are largely incomplete and not	• We have limited our sample to Category A and B taxpayers, which include all medium and large enterprises, as well as all incorporated businesses.

[10] Mascagni et al (2018) document that 60% of taxpayers show (usually large) discrepancies in turnover figures reported in VAT and income tax returns for the years 2010 to 2014, and that often turnover reported in the VAT return was lower than the corresponding figure in the income tax return.

[11] For corporations over 95% of total income tax is collected from firms registered in one of Addis Ababa's tax centres (Mascagni and Mengistu, 2016).

representative of the relevant population.[12]	Moreover, our analysis only includes firms, both unincorporated and incorporated, but excludes government institutions and NGOs.
Data is available, in principle, for the years between 2006 and 2014. However, data prior to 2011 appears to be incomplete and unrepresentative of the number of firms, especially for unincorporated firms. We believe that this is related to the transition from the Integrated Revenue Management System (SIRM) to the introduction of SIGTAS in 2010.	• Our main analysis refers to the most recent year in the data – 2014 - while we use other years between 2011 and 2013 for robustness purposes. We do not use earlier data in the analysis.

The main sample used for the analysis in Section 5 corresponds to the year 2014, which is the latest year available in the dataset. However, we also repeat the analysis for pooled years from 2011 to 2014 and for other years individually. As discussed in Section 3 above, the only threshold that changed during this period is that which determines LTO registration. For this threshold, we carry out the analysis separately for the two-year periods before and after this change. The Appendix reports results using the pooled sample.

The sample excludes outliers (those observations with annual turnover exceeding the 99th percentile of the turnover distribution as reported in the income tax return), all nil-filers (those who declare zero turnover in the income tax return), and those taxpayers for whom turnover is missing. Furthermore, it focuses on sole proprietors and corporations.

4.2 Summary statistics

Table 8.2 to Table 8.4 in the Appendix report some summary statistics of the dataset for the taxpayer types used for our analysis: all corporations, and unincorporated firms (Category A and B) registered in Addis Ababa City. See Table 8.2 for the full dataset; Table 8.3 separates VAT and ToT taxpayers; and Table 8.4 separates incorporated and unincorporated firms. These tables include all taxpayers for 2014, the main year of analysis, including nil-filers (those who declare zero turnover), while those who declare missing and extreme values (above the 99th percentile) of annual turnover as declared in the income tax return are removed from the sample used to conduct the analysis in Section 5.

The descriptive statistics highlight the following patterns:

- Table 8.2 shows that 81% of firms in the data are sole proprietors, and 15% are corporations. The remaining 4% are partnerships, a mixed category that is

[12] These are presumptive taxpayers. Our data is likely to cover only those who were permitted by ERCA to declare their taxes based on books of accounts, rather than on the presumptive value of turnover.

excluded from the analysis presented in Section 5. Firms are equally split between the VAT (51%) and the ToT (49%) regimes.

- Table 8.3 shows that VAT taxpayers are – as expected - larger than ToT taxpayers, with an average turnover of around 4.8 million Birr (about 245,073 USD in 2014), compared to less than 400,000 Birr for ToT taxpayers (about 20,423 USD). Not surprisingly, given that they have a larger turnover and larger taxable income, VAT taxpayers pay, on average, a much larger amount of business income tax (around 97,910 Birr, or 4,999 USD) than ToT taxpayers (12,600 Birr, or about 643 USD). Their effective tax rates (profit tax paid scaled by gross profit) are similar at 12.9% for ToT taxpayers and 13.9% for VAT taxpayers. The average effective ToT rate (7.9%) is higher than the effective VAT rate (5.7%).

- Interestingly, Table 8.3 shows that there are some important discrepancies between the turnover declared in the business income tax return (and used in the analysis in the next Section) and the level declared in the VAT declarations. Although the mean levels appear quite similar, the maximum levels and standard deviations are remarkably different. It is possible that there is less room for manipulation of turnover in the case of VAT declarations since a significant proportion of the entries should have come from electronic sales registration machines (ESRMs). This suggests that the turnover variable used in the analysis for the VAT threshold could be under-reported.

- Table 8.3 also shows that some ToT taxpayers have a turnover well above 500,000 Birr, which is the threshold at which businesses have to register for, and comply with, VAT. In fact, there are thousands of ToT taxpayers with annual turnovers exceeding 500,000 Birr. This could be because VAT registration is not automatic, and taxpayers could have annual turnovers exceeding the threshold for some years without being required to register for VAT. This reflects possible weaknesses in the processing and use of the data provided by taxpayers, and administrative inertia on the part of the revenue authority.

- Table 8.4 shows that corporations are, on average, larger than unincorporated firms based on annual turnover and taxable income and pay a larger amount of tax in total across tax types. It is also interesting to observe that corporations who pay a flat profit tax rate of 30% pay, on average, a lower effective profit tax rate (10.9%) compared to unincorporated taxpayers that pay effective tax rate of 13.3%. Moreover, Table 8.4 shows that the majority of corporations (78%) are VAT registered, while unincorporated taxpayers are almost equally split between the VAT (47%) and ToT (53%) regimes.

4.3 Methods

Following standard practice in the literature, we start by investigating evidence of bunching in relation to the key thresholds for businesses in the Ethiopian policy and administrative system:

- The kinks at the thresholds in the income tax schedule.

- The notches at the 500,000 Birr threshold for Category A taxpayers (higher compliance requirements for larger unincorporated firms) and VAT registration (for both corporations and unincorporated firms).

- The notches at the LTO threshold for corporations. This administrative notch does not imply changes in tax types or the tax rate, but rather in enforcement pressure and, relatedly, evasion opportunities.

We conduct this analysis by using density plots to explore the distributions of taxable income or annual turnover[13] and histograms with frequency intervals to show taxpayers' distance from the relevant thresholds. As demonstrated in the next section, the descriptive analysis presented in this report does not reveal any meaningful evidence of bunching, although there is some weak evidence of an excess mass of sole proprietors above the 500,000-Birr turnover threshold that corresponds to both a policy notch (VAT registration) and an administration notch (category A taxpayers that face different compliance and administration costs).

If more evidence of bunching were present, it would be possible to use the estimated magnitude of bunching at different thresholds to estimate parameters of interest, such as the elasticity of reported income or turnover. This would require estimating a counterfactual distribution that one assumes would have been observed in the absence of a notch or kink in the tax schedule by fitting a flexible polynomial using the observed data, excluding observations around the threshold. Given a conceptual framework for how incentives change at a threshold, the estimated difference between the observed and counterfactual distributions can then be used to infer behavioural responses and structural parameters. Standard errors are typically estimated using a bootstrap procedure where the residuals from the polynomial equation used to estimate the counterfactual distribution are randomly drawn. For details on the application of the approach for the case of notches, see Kleven and Waseem (2013) who extended the method developed by Saez (2010) and Chetty et al. (2011) in the case of kinks. In our case, however, we do not proceed with this next step since the evidence of bunching is limited.

[13] We use a band width of 0.02 when annual turnover is in logs.

5 Results

This section presents the results from our descriptive bunching analysis, with reference to the tax policy and administrative thresholds outlined in Section 3 above.

5.1 Kinks in the business income tax schedule

In Ethiopia corporations face a flat rate of 30% regardless of their size, while unincorporated businesses, including sole proprietors, pay according to the rates in the income tax schedule outlined in Table 3.3 above. This graduated tax schedule has six kink points, corresponding to the upper threshold of each bracket. As discussed in the literature review, we might expect some bunching of sole proprietors below each of these thresholds in response to discontinuous increases in marginal tax rates in order to minimise tax payments. The biggest increase in the marginal rate is observed at the first kink, with a jump from 0% to 10% at an annual taxable income of 1,800 Birr. The remaining kinks imply an increase of 5 percentage points until the schedule reaches the maximum marginal rate of 35% for an annual taxable income over 60,000 Birr.

The lack of revision of key income tax thresholds, which made them largely outdated by 2014, suggests that income tax kinks are only relevant for a few businesses. All taxpayers in the sample (i.e. Category A and B taxpayers) should, by definition, have turnovers above 100,000[14] Birr and many of them have taxable incomes well above the top threshold of 60,000 Birr.[15] As shown in Table 8.4, unincorporated firms (sole proprietors) have an annual taxable income of 99,340 Birr on average, and the maximum turnover observed is over 17.5 million Birr per year. For the larger sole proprietors, whose average tax rate approaches the top marginal rate, kinks at low thresholds may be irrelevant. Nonetheless, there are still a significant number of sole proprietors with taxable incomes below the 60,000-Birr threshold for which the kinks are relevant and these taxpayers could display responses in their reported taxable incomes.

Figure 5.1 plots the distribution of annual taxable income and income tax kink points. Corporations can be considered a comparison group, since they pay income tax at a flat tax rate of 30% regardless of their size and are therefore not expected to respond to the kinks. Such a prediction is borne out in the data. But even for sole proprietors, we do not observe any clear bunching below income tax kink points, not even at the first kink point involving the largest change in the tax rate. There is perhaps a weak spike observed at 16,800 Birr.

Figure 5.2 investigates further signs of bunching around the 16,800-Birr threshold, where the marginal rate goes from 15% to 20%, a 33% increase in the marginal rate. There does not appear to be a spike at 14,800 Birr, but equally there is a spike after the threshold.

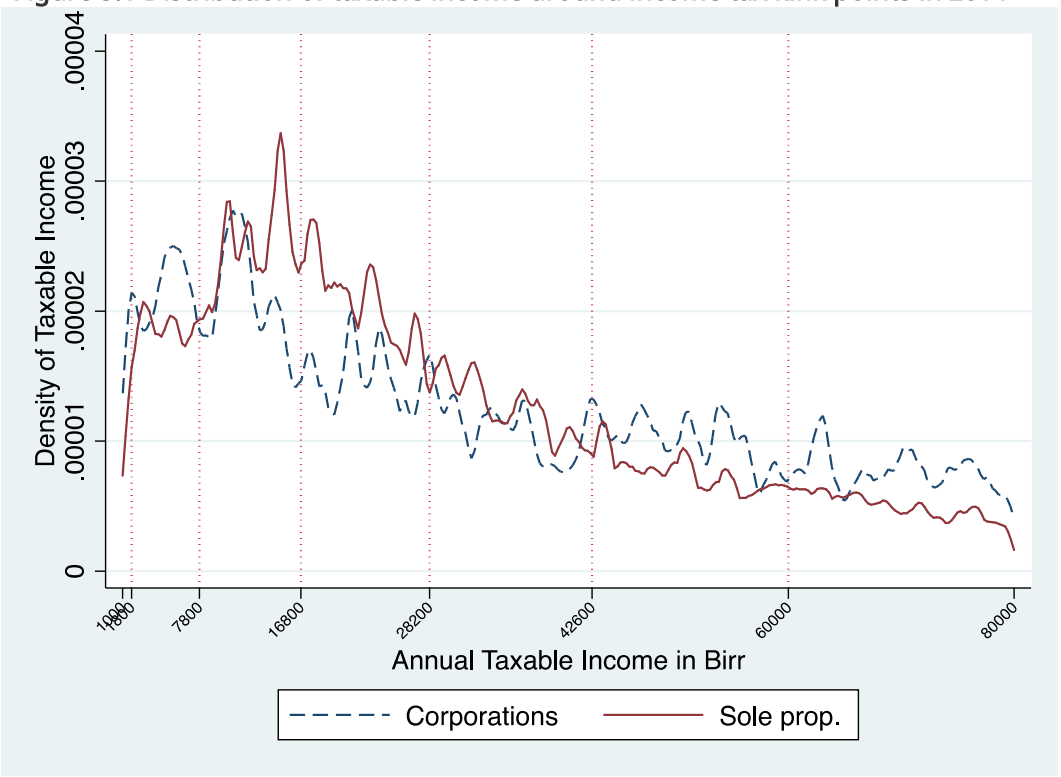
Figure 5.3 investigates bunching around the 60,000-Birr threshold – the highest threshold in the schedule. There is no evidence of bunching below this kink point, and there are a

[14] Some firms in our data can still report a turnover below 100,000 Birr for some years, because of fluctuations in annual turnover over time and because of some misclassification across categories.

[15] In 2014, 69.3% (70.9%) of all taxpayers (unincorporated taxpayers) have annual taxable income less than 60,000 Birr. The corresponding figure for corporations is 52.8%. These percentages are calculated excluding observations with zero annual turnover values.

number of spikes observed above and below for both sole proprietors and corporations. It is possible that this mild evidence of bunching at the 60,000-Birr kink point may reflect a tendency for firms to disproportionately report sales and liabilities as round numbers, which can be particularly salient (see, for example, Kleven and Waseem, 2013). All in all, there is little sign of behavioural responses to tax discontinuities.[16]

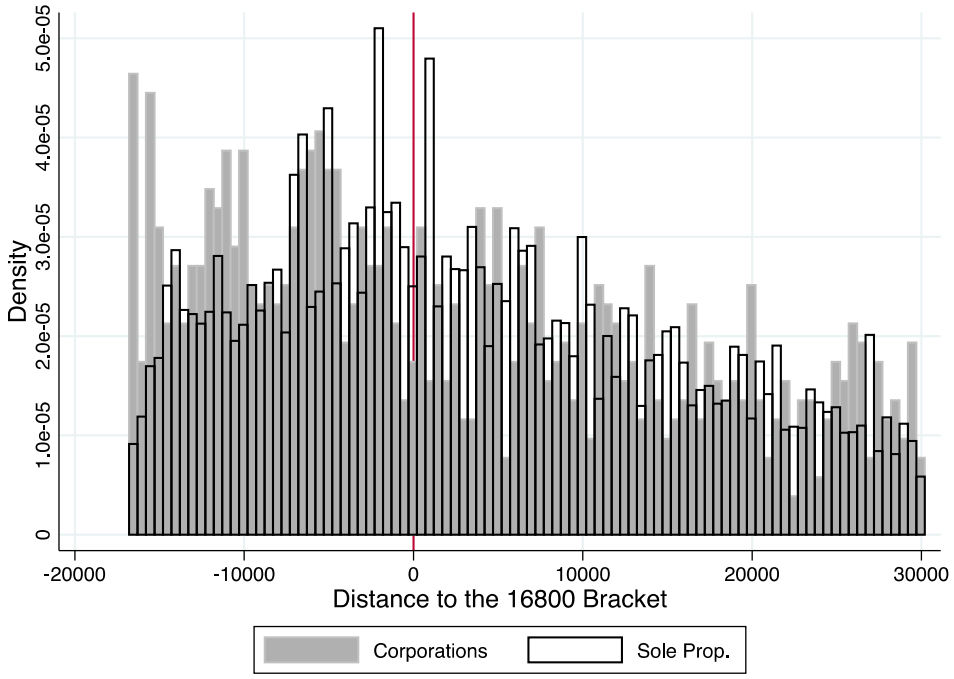
Figure 5.1 Distribution of taxable income around income tax kink points in 2014



Notes: The sample includes sole proprietors and corporations with a taxable income between 1,000 and 80,000 per year, among Category A and B taxpayers in Addis Ababa. A bandwidth of 400 is used in the kernel estimation.
Source: Own computation based on 2014 data from ERCA.

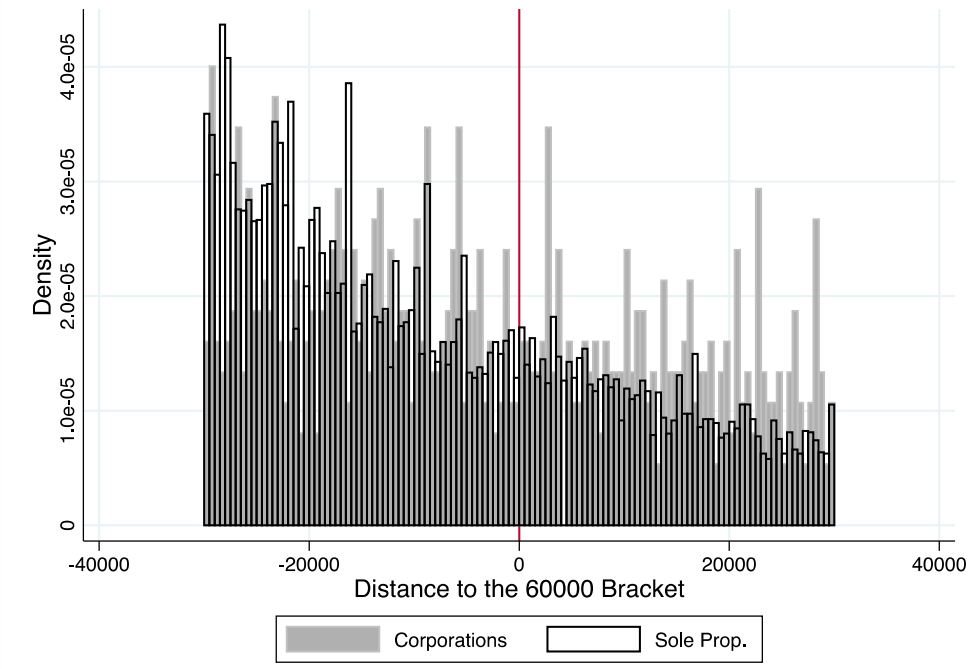
[16] This does not change when we use pooled data over the period 2011-2014. See Figure 8.1 and Figure 8.2 in the Appendix.

Figure 5.2 Bunching around the 16,800 Birr taxable income threshold in 2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa with an annual taxable income between $30{,}000 \pm 16{,}800$Birr. Bin=500 Birr.
Source: Own computation based on 2014 data from ERCA.

Figure 5.3 Bunching around the 60,000 Birr taxable income threshold in 2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa with an annual taxable income between $30{,}000 \pm 60{,}000$ Birr. Bin=500 Birr.
Source: Own computation based on 2014 data from ERCA.

5.1.1 Why is there no bunching below kinks in the income tax schedule?

The evidence presented for Ethiopian businesses within the graduated business income tax is in contrast with evidence from South Africa (Boonzaajer et al, 2016) and the UK (Devereux et al, 2014) that show that taxpayers have sizeable responses to changes in the tax rates observed in graduated business income tax schedules, mainly driven by reporting responses.

Taxpayers with an annual taxable income below 60,000 Birr per year may not bunch below kink points in the tax schedule in Ethiopia because true output and/or reporting elasticities with respect to changes in the tax rates may be too small, or because the kinks (the proportional changes in the marginal tax rates) are small and hence not very salient. We do not provide estimates of the elasticities in this paper since we do not observe sharp bunching in taxpayers' responses that would allow us to estimate them. The literature suggests that local taxable income elasticities can be small, consistent with no bunching at kink points, when, for example, firm owners do not react to changes in marginal CIT rates due to various behavioural frictions, such as inattention or unawareness (see Kleven, 2016). These frictions could be important for small businesses in Ethiopia since they may have relatively limited experience of the formal income tax system. In addition, the lack of revisions to tax thresholds coupled with substantial inflation meant that these thresholds were largely outdated by 2010 and may also have contributed to increasing behavioural frictions.

Kleven (2016) notes that bunching is normally observed when there are large kinks or notches that are stable over time. The large and significant bunching responses found in South Africa and the UK are associated with much larger kinks in the schedule[17] in comparison to Ethiopia which, after the first kink point in the schedule, has relatively small increases in the marginal rate at each threshold.

5.2 Notches at the 500,000 Birr turnover threshold: Category A firms and the VAT threshold

As outlined in Section 3 above, the threshold of 500,000 Birr of annual turnover defines both if businesses are classed as Category A taxpayers, and if they should register for VAT. The Category A administrative notch is only relevant for sole proprietors because all corporations are classed as Category A, while the VAT policy notch is relevant for both corporations and sole proprietors. These features generate discontinuous changes in compliance costs and tax liabilities for businesses. However, the system is complex and noisy, and may not provide clear incentives and observable taxpayer responses around thresholds in a way that can be interpreted and rationalised, limiting the scope to draw policy implications.

[17] See Boonzaaier et al (2016) and Devereux et al (2014). In the case of South Africa, Boonzaajer et al (2016) find an overall taxable income elasticity with respect to changes in the marginal tax rates of the CIT of 0.17 at the upper CIT kink (350,000 Rand or around 26,000 USD, which represents a change from 10% to 28% in the rate) and 0.7 at the lower kink (60,000 Rand, when the rate jumps from 0% to 10%). They also provide evidence consistent with the response being driven mainly by the under-reporting of sales.

Before analysing whether there are any salient responses by taxpayers observable in the data, it is worth considering the various tax incentives for the different types of taxpayers, based on tax system described in Section 3:

- **Sole proprietors:** Economic reasoning would suggest that sole proprietors may want to avoid being both a Category A and a VAT taxpayer to minimise tax compliance costs by reporting an annual turnover just below the 500,000 Birr threshold. However, it is not clear that being VAT-registered entails higher costs than benefits for businesses *ex-ante* in Ethiopia. It is not clear *ex-ante* that tax liabilities are higher for VAT taxpayers relative to ToT taxpayers: In principle the tax rates should be equalising, but in practice it is ambiguous. Furthermore, being VAT-registered allows firms to trade with a larger number of customers[18] and, additionally and most importantly, in Ethiopia, it allows businesses to compete for government procurement contracts, which comprise an important market.[19] Businesses with an annual turnovers below 500,000 Birr can still voluntarily register for VAT if they can demonstrate that at least 75% of their sales are to other VAT-registered firms, but this can be a cumbersome and sometimes arbitrary process – these issues will be discussed in further detail below. This means that if the benefits of being in the VAT system outweigh the costs, firms may want to position themselves just above the 500,000 Birr threshold by manipulating their reported annual turnover if this is possible. Alternatively, the various costs and benefits may not be clear to taxpayers, resulting in no bunching at all.
- **Corporations:** For corporations the same issues apply apart from the fact that the variation in compliance costs due to differential categories of taxpayers (A, B, and C) is not relevant. Hence for corporations, any observed pattern in the data is likely to be associated with the VAT registration threshold. In terms of incentives, this means that relative to sole proprietors, corporations have a smaller incentive to bunch below the 500,000 Birr threshold.

Figure 5.4 plots the distribution of annual turnover separately for sole proprietors and corporations, focusing particularly on the area around the threshold. Figure 5.5 plots the same distribution in terms of distance to the 500,000 Birr threshold, again for both sole proprietors and corporations.

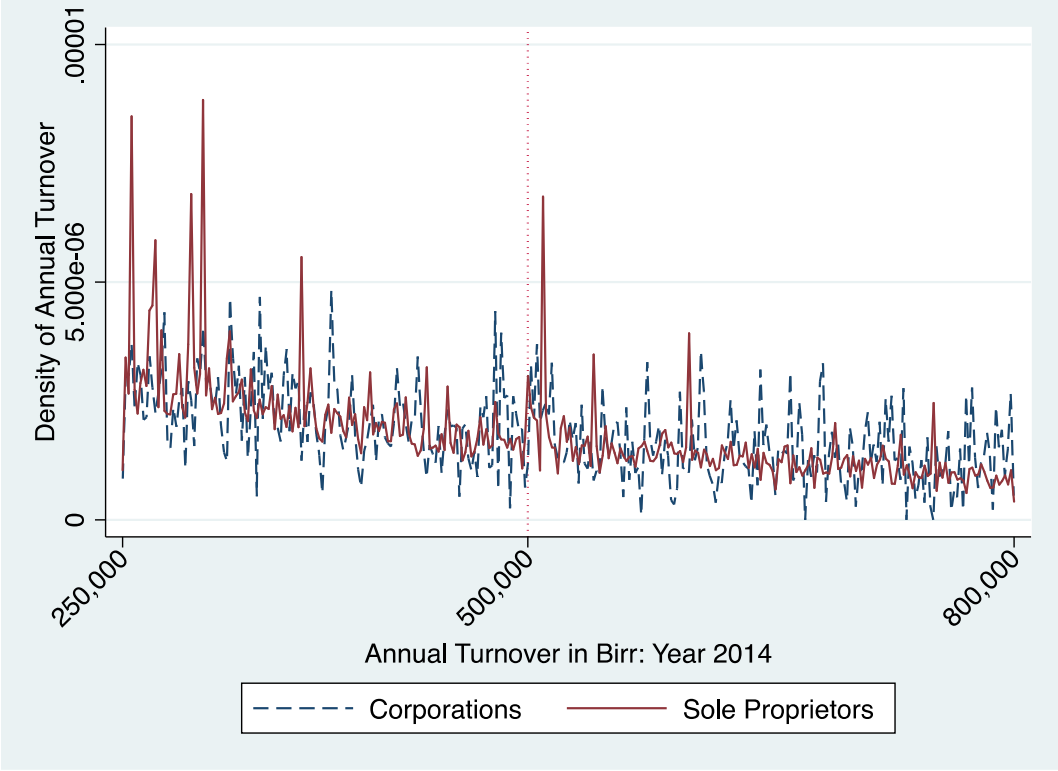
In both plots there is some evidence of bunching by sole proprietors *above* the threshold but no evidence of bunching around the threshold for corporations. Figure 5.5 shows a slight excess mass particularly concentrated in the interval between 510,000 and 512,000 Birr for sole proprietors. These figures remain very similar when we use pooled data over the period 2011-2014, as shown in Appendix (Figure 8.3 and Figure 8.4). The fact that the slight bunching observed is above the threshold may suggest that businesses are trying to access the VAT system, which is consistent with the idea that the benefits from being in the VAT system may be outweighing the costs. This is in contrast to the evidence on firm behaviour in other contexts that shows that firms tend to locate in excess below the VAT threshold to avoid entering the VAT system, as discussed in Section 2.3. At the same time, the fact that only sole proprietors bunch above is puzzling since the incentives to do this should be similar for both corporations and sole proprietors.

[18] See The World Bank (2015).

[19] See, for example, The World Bank (2016) for a review of public expenditure in Ethiopia over the last two decades and the important role of state-owned enterprises in the Ethiopian economy.

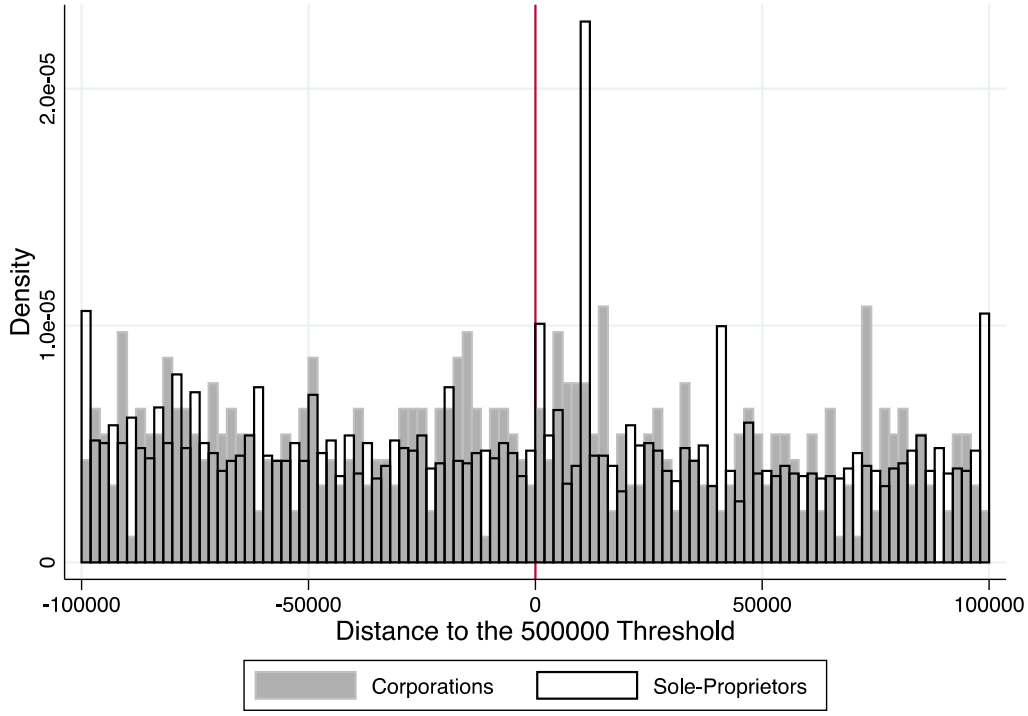
Given limitations in the data, and the policy and administration parameters, it is not possible to disentangle the potential effects of being a Category A taxpayer from the VAT registration threshold, since they share the same threshold. In addition, it is not possible to disentangle the different mechanisms at play within the VAT system (tax liabilities versus compliance costs). Nonetheless, the following sections explore the possible reasons for the lack of bunching below the threshold and the apparent (although slight) bunching by sole proprietors above it. We think that this discussion provides interesting insights which may help us to understand the tax system and its administration in Ethiopia. It cannot, however, provide conclusive evidence.

Figure 5.4 Bunching around the 500,000 Birr turnover threshold: Sole proprietors vs. corporations in 2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa. A bandwidth of 500 is used in the kernel estimation.
Source: Own computation based on 2014 data from ERCA.

Figure 5.5 Bunching around the 500,000 Birr turnover threshold: Sole proprietors vs. corporations in 2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa. Bin=2000 Birr.
Source: Own computation based on 2014 data from ERCA.

5.2.1 The Category A threshold may not be salient in practice for sole proprietors

This section focuses on sole proprietors that are classified in categories A and B.[20] Category A taxpayers must report additional information, using accrual instead of cash basis accounting, and do so more accurately, which requires greater financial and accounting capacity, and perhaps necessitates hiring a professional accountant. For this reason, one might expect sole proprietors to bunch below the 500,000 Birr threshold, to avoid higher reporting requirements and compliance costs. In addition, taxpayers may be averse to providing more information to the revenue authority as this could imply greater scope for the cross-checking of information and increased enforcement activities. However, as outlined above, Figure 5.4 and Figure 5.5 show no sign of excess mass below the threshold. This could be because the benefits of being above the threshold related to the VAT system are higher and/or in practice the costs of being Category A are not so large or salient to taxpayers.

First, the administration and enforcement of taxpayer categorisation rules appears to be weak. In principle, ERCA should assess and determine the correct category for each taxpayer based on their tax declaration. Each taxpayer should be re-assessed approximately every three years, in a coordinated effort by ERCA to verify all businesses. However, our consultations revealed that this re-classification is not conducted regularly and often firms are not re-assessed for several years - most likely due to limited administrative capacity. As a result, there seems to be a relatively large degree of misclassification in the data. Broadly speaking, it is more likely for a business's turnover to be over-estimated for the classification into categories than vice versa: our data shows that 42% of Category A firms report a turnover of less than 500,000 Birr, while only 5% of Category B firms report a turnover of greater than 500,000 Birr. Given the weak enforcement of taxpayer categorisation, how meaningful the de jure incentives at the 500,000 Birr threshold are is less clear. Additionally, the observed misclassifications could be consistent with issues regarding the quality of the administrative data that may hinder the quality of the analysis and the conclusions it is possible to reach.

Second, the additional burden of the reporting requirements faced by Category A firms compared to Category B firms may be relatively insignificant. From a reporting perspective, Category B firms do not have to submit a balance sheet but are still required to provide a profit and loss statement. Although this administrative notch should indeed imply higher compliance costs for firms, they may not be high enough to generate detectable taxpayer responses.

These two factors, taken together, mean that the Category A threshold may not be that relevant in practice (because many small firms are still classified as Category A, even if they report below the threshold), or significant (because the differences in reporting requirements may be small) to firms.

[20] Corporations should not respond to categorisation thresholds because they are automatically classified as category A as already mentioned. In addition, as mentioned in section 4.1, taxpayers in Category C are not included in our dataset and, therefore, in the analysis in this report.

5.2.2 The VAT system may yield net benefits for Ethiopian businesses, although quantitative evidence is inconclusive

What are the possible benefits of being in the VAT system, and the reasons that might explain why small firms around the threshold prefer to locate their turnover just above the VAT registration threshold?

From a compliance perspective, there are no benefits of the VAT system relative to the ToT system. Operating a VAT system is generally thought to be more complex than levying a simpler sales tax, both for the tax administration and for taxpayers themselves. The main reason for this lies in the input-output system of the VAT, whereby firms collect and remit tax on outputs and are allowed to claim refunds on the tax they pay on inputs. In the Ethiopian case, this higher compliance cost is further exacerbated by the frequency of reporting (monthly for VAT as compared to quarterly for ToT) and more demanding bookkeeping requirements. This is a clear disadvantage of being in the VAT system relative to the ToT system.

From a tax liability perspective, Table 8.3 in the Appendix shows that on average the effective tax rate paid by businesses registered in the ToT system is slightly higher than the average rate paid by businesses in the VAT system.[21] This could be one reason why firms may prefer to register for the VAT system. But this is an average across all firms. The same comparison looking at firms around the threshold (with turnover between 450,000 and 550,000 Birr) yields the opposite result: the ETR for VAT-registered firms is almost double that of ToT firms. This suggests that for firms at the margin, tax liabilities may not be a factor driving the observed behaviour.[22]

Importantly, being VAT-registered enables firms in Ethiopia to compete for government procurement contracts. Given that the government is the largest buyer in the Ethiopian economy, access to contracts may motivate businesses to register for VAT. According to a directive on public procurement issued by the Ministry of Finance and Economic Cooperation in May 2010, every public body has to ensure that businesses submitting bids for contracts with values in excess of 100,000 Birr (about 5,106 USD) have VAT registration certificates. This finding is somewhat corroborated by a World Bank study, showing that the opportunity to participate in government tenders is ranked as the most important advantage of registering for VAT (The World Bank, 2015). Consultations with ERCA officials revealed that the number of applications for voluntary VAT registration increased after the 2010 directive. Since it was clear that some of these applicants wanted to register exclusively to have the opportunity to participate in government bids, ERCA tightened its screening procedure for voluntary registration.

In addition, firms may have an incentive to register for VAT if they want to trade with other VAT-registered firms. This is because the input credit and refund system allow VAT-

[21] In both cases, the effective tax rate is calculated as the ratio between net tax payments (VAT or ToT) to annual turnover. In conducting this mean comparison test we have dropped observations with ETR below zero and above 50%, assuming that these represent errors/outlier observations in the data.

[22] Although VAT firms charge a 15% VAT on their sales, compared to 2% (or 10%) for ToT, they are also allowed to claim input credit and refunds for the VAT paid on inputs. The VAT and ToT rates are in theory supposed to be equalising on average, meaning that the tax burden across VAT and ToT regimes should be similar once VAT input credits and refund claims are taken into account. In practice, whether VAT or ToT is preferential in terms of tax liabilities for a given firm will depend on a number of factors, including whether they can manipulate the input they claim on VAT to reduce their VAT liabilities.

registered buyers to claim refunds for inputs when they trade with other VAT-registered firms. As highlighted by respondents in the World Bank survey mentioned above, being able to sell to a larger number of customers is one of the key advantages of registering for VAT (The World Bank, 2015).[23]

Voluntary registration for taxpayers with turnovers below the threshold and operating in non-mandatory sectors may not be feasible in practice, which may help to explain why they locate above the threshold. Some sectors are subject to mandatory VAT registration regardless of size.[24] For non-mandatory sectors, although there is a voluntary VAT registration process for firms with turnovers below 500,000 Birr, the opt-in procedure may not be feasible for some firms. The requirement that opt-in firms supply at least 75% of their sales to other VAT-registered businesses may make this impossible for some, for example. Moreover, opt-in firms need to adopt more stringent bookkeeping to convince ERCA that they have the capacity to administer the VAT. Even then, ERCA could still deny voluntary registration for a variety of reasons, which may not be clear to the taxpayer.[25] Therefore, taxpayers operating in non-mandatory sectors with a turnover around the threshold that perceive that the benefits from being in the VAT system are higher relative to the ToT system, may prefer to bunch slightly above the VAT threshold and become automatically eligible for VAT registration to circumvent these challenging requirements.

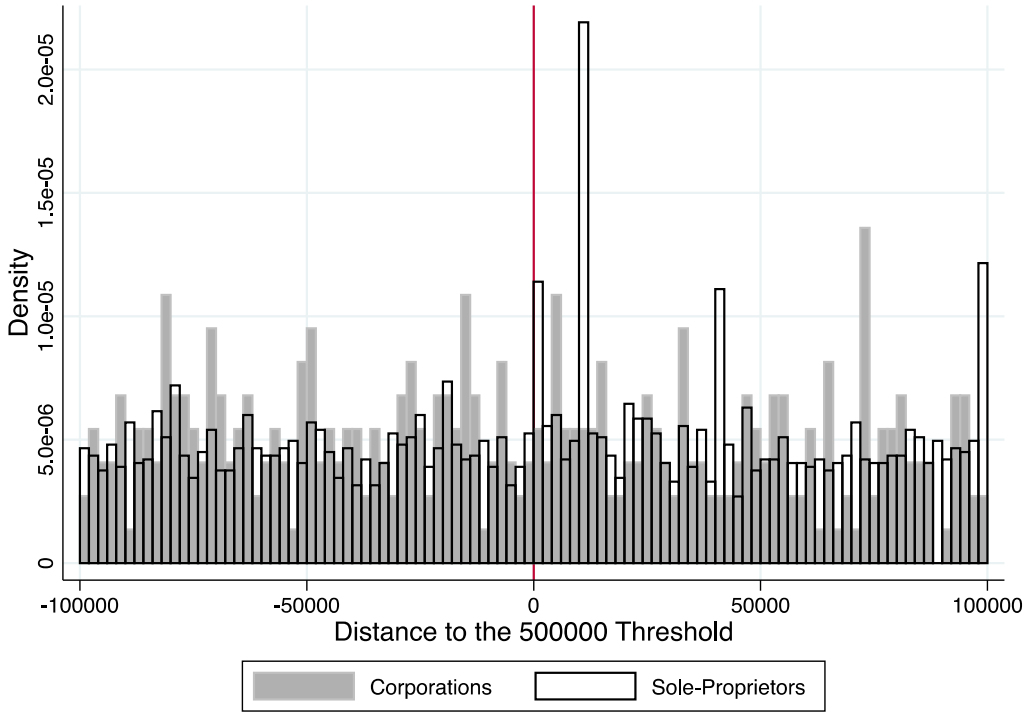
Having said this, looking at the distribution of taxpayers in terms of whether they are VAT registered or ToT-registered, Figure 5.6 and Figure 5.7 show that there is bunching above the threshold by both VAT and ToT taxpayers. Even if most taxpayers around the threshold are VAT-registered (see Table 8.5 in the Appendix), the fact that ToT taxpayers also show some slight bunching above the threshold weakens the argument that taxpayers locate above the threshold of 500,000 Birr to access the VAT. Furthermore, there is a long tail of ToT taxpayers with turnovers located above 500,000 Birr, which seems inconsistent with the law. This may suggest that there are weaknesses with the administration of, and compliance with, the system and/or data misclassification issues which restrict our ability to analyse the behaviour of taxpayers to this threshold meaningfully.

[23] We have tried to access data on trading partners to investigate this possibility further, but unfortunately, it does not appear to be available. We have also tried to conduct analysis by sectors according to whether VAT registration is mandatory or not. However, we do not have administrative data with sector categorisations that can be used for this purpose.

[24] According to Directive 25/2001, taxpayers in the following sectors should register for VAT regardless of their annual turnover: Contractors above grade 10 (largest contractors, Grade 1 to Grade 9); leather and leather product manufacturers; shoes factories; suppliers of computers and computer accessories; suppliers of electronic refrigerators, television sets or decks; importers; flour producers; plastic and plastic products manufacturers; and jewellers.

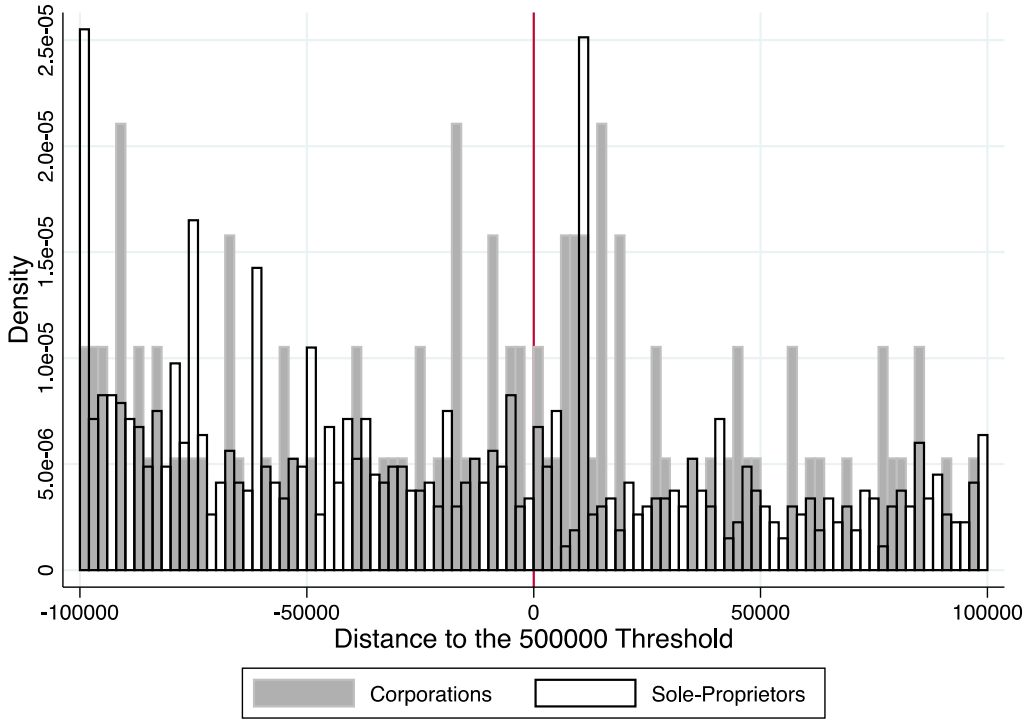
[25] For example, if "(a) the person has no fixed place of abode or business; or (b) the Authority has reasonable grounds to believe that the person will not keep proper records or will not submit regular and reliable tax returns" (VAT Proclamation 285 of 2002).

Figure 5.6 Bunching around the 500k birr threshold: VAT registered sole proprietors vs. corporations: Year 2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa that are VAT-registered. Bin=2000Birr.
Source: Own computation based on 2014 data from ERCA.

Figure 5.7 Bunching around the 500k birr threshold: ToT registered sole proprietors vs. corporations: Year 2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa that are VAT-registered. Bin=2000Birr.
Source: Own computation based on 2014 data from ERCA.

All in all, our exploration of the data shows no conclusive evidence of taxpayers' behaviour that can be rationalised in a straightforward manner given the incentives prevailing in the system. As previously discussed, bunching above the threshold is mainly driven by sole proprietors, a behaviour that is not mirrored by corporations. It is not clear why, since if this is driven by net VAT benefits, these should be the same for corporations. In addition, there is not only bunching for VAT-registered taxpayers but for ToT taxpayers too. Furthermore, bunching happens at a very specific point, at almost exactly 510,000 Birr, and nowhere else in neighbouring turnover intervals. We cannot rule out errors in the data, although the fact that the same behaviour is observed in other years and when pooling all years means that any anomaly is not specific to 2014. There may also be other reasons why there are a relatively large number of observations at 510,000 Birr, but these remain unknown even after extensive consultations with the relevant institutions. Finally, it is worth highlighting that although the 'bunching interval' includes more taxpayers than neighbouring ones, it still captures a small proportion of our sample (see Table 8.5 in the Appendix).

5.3 Notches at taxpayer segmentation thresholds: The LTO threshold

Similar to many other low- and middle-income countries, ERCA segments firms in Ethiopia according to the size of their turnover and requires them to report to different tax offices. As outlined above, the largest firms, as well as those in a number of key sectors, report to

the Large Taxpayers' Officer (LTO). Unincorporated firms are not required to report to the LTO, regardless of size.

Evidence from Spain (Almunia and Lopez-Rodriguez, 2018) suggests that taxpayers may opt to under-report their turnover and bunch below the LTO threshold, which is predetermined at 6 million Euros and is public knowledge. By doing this, taxpayers can avoid facing a potentially greater degree of scrutiny, and potentially reduce the probability of being audited. Indeed, one of the main purposes of establishing an LTO in Ethiopia was to support the development of an effective audit programme. As a result, taxpayers in the LTO face a higher probability of being audited, with approximately one auditor for every 21 taxpayers.[26]

Despite the potential additional enforcement capability at the LTO in Ethiopia, it is also plausible that firms may prefer to file their returns and remit their taxes at the LTO. The additional resources at the LTO may improve the quality of the service provided to taxpayers, reduce processing times, and facilitate improved accountability and dispute resolution mechanisms.

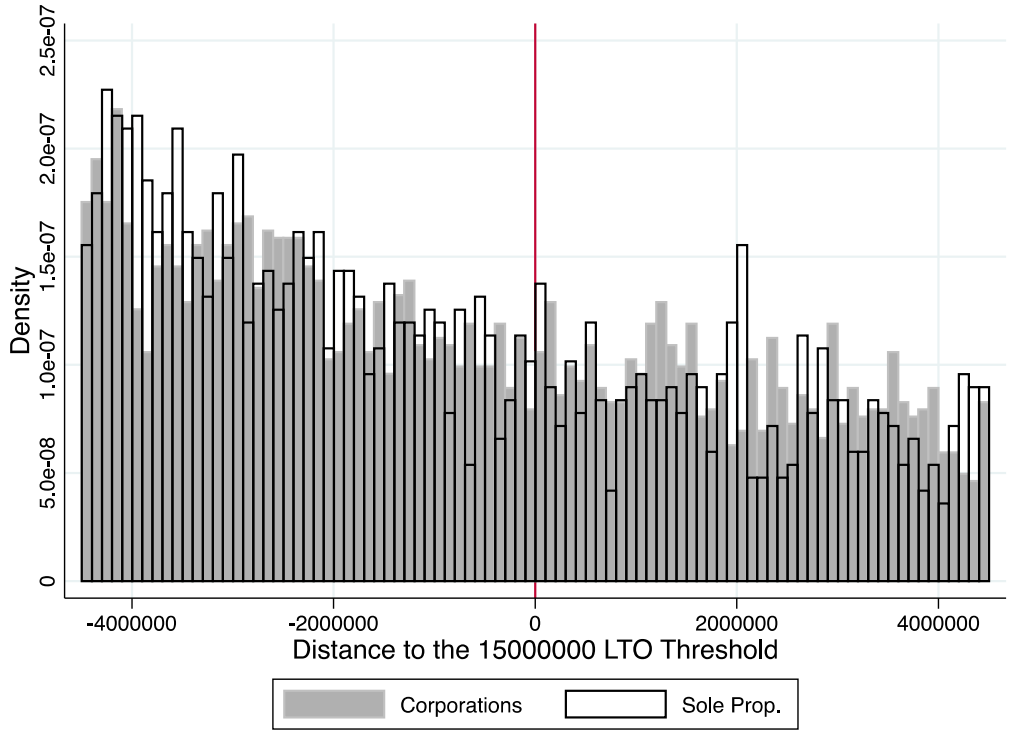
It is important to note at this stage, however, that firms in Ethiopia may not know where the LTO threshold is situated and cannot predict how it will change in the future. The ambiguous local incentives and informational uncertainty regarding the location of the threshold mean that *a priori,* there should not be any bunching present since taxpayers cannot manipulate their reported turnover meaningfully in this context. Once ERCA communicates the new threshold, it is already too late for firms to respond. Since the process of setting the threshold involves knowing the level of resources that ERCA intends to devote to the LTO and the number of taxpayers it considers manageable to work with given these resources, it is impossible for firms to effectively predict the threshold and plan accordingly.

We check for responses to this segmentation threshold in Ethiopia by plotting the distribution of distance to the LTO thresholds for years 2011-2012 and 2013-2014 (respectively 0 and 0). These plots are based on pooled data for years 2011 and 2012 (for bunching below the 15 million Birr threshold applied during 2011- 2012) and pooled data for 2013 and 2014 (for the 27 million Birr threshold used in 2013-2014). As expected, no bunching behaviour is evident in these figures, neither by corporations nor by sole proprietors, who do not report to the LTO, but are included mainly as a comparison group.[27]

[26] This figure is based on information provided as part of discussions with ERCA officials.

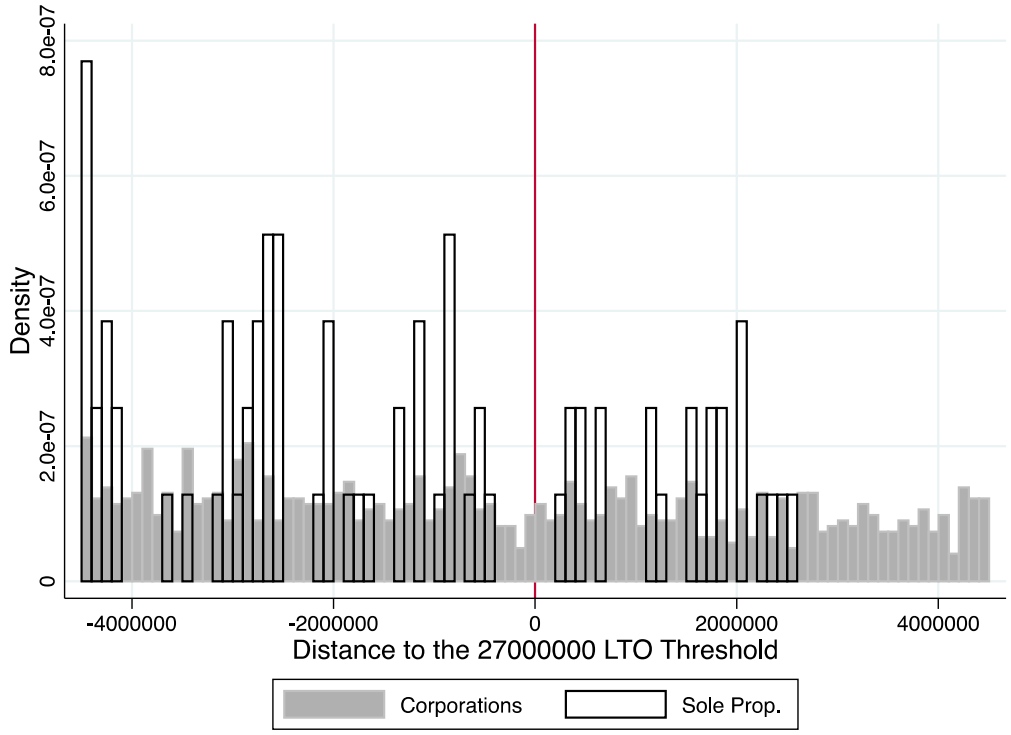
[27] Because only corporations file their returns at the LTO, the LTO threshold is irrelevant for unincorporated firms. 82% of the firms filing at the LTO are private limited companies; 8% are share companies; 8% are government organisations, and the remainder are businesses in other forms such as cooperatives, joint ventures, and partnerships. Consistent with the law, there are no sole proprietors in our data reporting at the LTO.

Figure 5.8 Bunching around the turnover level of 15 million Birr - LTO threshold: Pooled data for the years 2011-2012



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa. Bin=100,000Birr.
Source: Own computation based on 2011-2012 data from ERCA.

Figure 5.9 Bunching around the turnover level of 27 million Birr - LTO threshold: Pooled date for 2013-2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa. Bin=100,000Birr. Source: Own computation based on 2013-2014 data from ERCA.

6 Concluding remarks and opportunities for further research

In this report, we have mapped the discontinuities in the Ethiopian business tax system by documenting relevant tax laws and the practice of tax administration related to the taxation of business profits, the compliance with the VAT and the reporting to the LTO as of the year 2014. In a context where information on the tax system is not always readily available, compiling details about these thresholds and the procedures around them represents a valuable contribution.

Furthermore, we have provided exploratory analysis of businesses' responses to the tax system using administrative data from tax returns. This analysis is the first of its kind using administrative data in Ethiopia and is largely descriptive, representing a starting point for further research. This preliminary analysis finds very limited evidence of responses by Ethiopian taxpayers to discontinuities in the tax system. The lack of response to the income tax kinks and the LTO administrative notch are not entirely surprising given the scale of policy changes and 'fuzziness' of the administrative thresholds. The slight bunching above the 500,000 Birr turnover threshold by sole proprietors is puzzling, although could potentially be rationalised by the access to public procurement bids. But overall, the complexity and fuzziness of the changes at this threshold make understanding the incentives faced by taxpayers and interpreting our empirical findings difficult.

The increased availability of administrative data in Ethiopia is certainly a positive development. However, the use of administrative tax data in the preparation of this report has highlighted the importance of ensuring better digitised records for all taxpayers, tax offices and across tax types. This is a key priority for effective administration and enforcement of the tax system, but there is also much potential for further policy-relevant research based on administrative data in Africa. A growing number of studies are already being conducted on various topics, such as tax compliance and the application of technology in tax administration (Ali et al., 2015; Mascagni et al., 2017; Almunia et al., 2017).

Administrative data from tax returns in Ethiopia could be improved in a number of different ways in order to ensure better data coverage and increased accuracy.

First, digitised tax return records for the smallest taxpayers and taxpayers reporting to the sub-national level would be a welcome development. This report focuses on taxpayers based in Addis Ababa due to a lack of complete records for taxpayers registered elsewhere in the country which report to the Regional Revenues Authorities.

Second, improved sectoral information in the tax returns would allow the tax administration and researchers to fully map the industrial sectors in the administrative data with those in the law.

Third, ensuring that VAT and ToT tax returns are complete for the universe of taxpayers should also be a priority. In this analysis the turnover data used to explore taxpayers' responses to the VAT registration threshold derives from the income tax returns, as opposed to the VAT and ToT returns – due to lack of data on ToT declarations. It would be useful to further investigate taxpayers' responses around the 500,000-Birr turnover threshold using better quality administrative data to ensure this finding is robust.

Fourth, tax administration officials and researchers should be able to access and merge digital tax records for the same taxpayers across tax instruments to cross check key variables reported for tax liability calculations. This would be a valuable input for risk assessment and auditing processes.

Looking more specifically at further research stemming from this report, we would like to highlight two main directions in which this work may be extended in Ethiopia.

First, two recent policy changes increased the threshold for Category A and for VAT to 1 million Birr. The former was changed in July 2016 while the latter was implemented from January 2018. These recent changes were much anticipated and received significant media coverage, which makes them potentially very salient. One could exploit the difference in timing to disentangle responses to the threshold for Category A and to the threshold for VAT, which is hard to do with the data from previous years. The major advantage of this analysis compared with the one reported here is that we would be able to observe firms both before and after the new policy changes, whereas we do not have any data before 2002, when the thresholds analysed here were set.

Second, the fact that there is no bunching below the LTO threshold, although there might be incentives to do so is expected given that businesses are unaware of the threshold before it is announced. We intend to exploit this feature to evaluate the compliance effect of being in the LTO, comparing firms that have just qualified to similar ones that are just below the threshold or those that are subject the threshold regardless of their size – sole proprietors.

7 References

Ali, M., A. Shifa, A. Shimeles, and F. Woldeyes (2015). Information technology and fiscal capacity in a developing country: Evidence from Ethiopia. Working paper 31, International Centre for Taxation and Development.

Almunia, M., F. Gerard, J. Hjort, J. Knebelmann, D. Nakyambadde, C. Raisaro, and L. Tian (2017). An analysis of discrepancies in tax declarations submitted under value added tax in Uganda. Final report S-43312-UGA-1, International Growth Centre.

Almunia, M. and D. Lopez-Rodriguez (2018). Under the radar: The effects of monitoring firms on tax compliance. *American Economic Journal: Economic Policy 10(1),* 1–38.

Asatryan, Z. and A. Peichl (2016). Responses of firms to tax, administrative and accounting rules: Evidence from Armenia. ZEW Discussion Papers 16-065, Mannheim.

Bachas, P. and M. Soto (2018). Corporate Taxation under Weak Enforcement. *Mimeo.*

Bergolo, M., G. Burdín, M. De Rosa, M. Giaccobasso, and M. Leites (2018). Tax Bunching at the Kink in the Presence of Low Capacity of Enforcement: Evidence from Uruguay. *IZA Discussion Papers,* No. 12286.

Best, M., A. Brockmeyer, H. J. Kleven, J. Spinnewijn and M. Waseem (2015). Production versus Revenue Efficiency with Limited Tax Capacity: Theory and Evidence from Pakistan. *Journal of Political Economy.* Vol. 123, issue 6, 1311 – 1355.

Bohne, A. and J.S. Nimczik (2018). Information Frictions and Learning Dynamics: Evidence from Tax Avoidance in Ecuador. *IZA Institute of Labor Economics.* IZA Discussion Paper No. 11536.

Boonzaaier, W., J. Harju, T. Matikka, and J. Pirttilä (2016). How do small firms respond to tax schedule discontinuities? *UNU-WIDER* WIDER Working Paper 36/2016

Chetty, R., J. N. Friedman, T. Olsen, and L. Pistaferri (2011). Adjustment costs, firm responses, and micro vs. macro labor supply elasticities: Evidence from Danish tax records. *The Quarterly Journal of Economics 126*(2), 749–804.

Devereux, M. P., L. Liu, & S. Loretz (2014). The elasticity of corporate taxable income: New evidence from UK tax records. *American Economic Journal: Economic Policy*, 6(2), 19–53.

Eissa, N. and A. Zeitlin (2014). Using mobile technologies to increase VAT compliance in Rwanda. mimeo, McCourt School of Public Policy, Georgetown University.

Gebresilasse, M. and S. Sow (2016). Firm Response to VAT Policy: Evidence from Ethiopia. Working paper.

Harju, J., T. Matikka, and T. Rauhanen (2016, June). The effects of size-based regulation on small firms: evidence from VAT threshold. *Government Institute for Economic Research Finland (VATT) Working Papers 75*.

Hirvonen, K., G. Mascagni, and K. Roelen (2018). Linking taxation and social protection: Evidence on redistribution and poverty reduction in Ethiopia. *International Social Security Review 71*(1).

Kleven, H. J. (2016). Bunching. *Annual Review of Economics 8*(1), 435–464.

Kleven, H. J. and M. Waseem (2013). Using notches to uncover optimization frictions and structural elasticities: Theory and evidence from Pakistan. *The Quarterly Journal of Economics 128*(2), 669–723.

Liu, L. and B. Lockwood (2015). VAT notches. *Oxford University Centre for Business Taxation Working Paper Series* 1506.

Mascagni, G. and A. Mengistu (2016). The corporate tax burden in Ethiopia: Evidence from anonymised tax returns. *ICTD Working paper series 48*, International Centre for Taxation and Development.

Mascagni, G., N. Monkam, and C. Nell (2016). Unlocking the potential of administrative data in Africa: Tax compliance and progressivity in Rwanda. *ICTD Working Paper series 56*, International Centre for Taxation and Development.

Mascagni, G., C. Nell, and N. Monkam (2017). One size does not fit all: A field experiment on drivers of compliance and delivery methods in Rwanda. *ICTD Working Paper Series 58,* International Centre for Taxation and Development.

Mascagni, G., A. Mengistu and F.B. Woldeyes (2018). Can ICTs Increase Tax? Experimental Evidence from Ethiopia. *ICTD Working Paper Series 82*. July 2018.

Mengistu, A. T.; K.G. Molla and F.B. Woldeyes (2015). Tax–Benefit Microsimulation Feasibility Study in Ethiopia, *WIDER Working Paper 2015/115*, Helsinki: United Nations University World Institute for Development Economics Research (UNU-WIDER).

Onji, K. (2009). The response of firms to eligibility thresholds: Evidence from the Japanese value-added tax. *Journal of Public Economics 93*(5), 766 – 775.

Saez, E. (2010, August). Do taxpayers bunch at kink points? *American Economic Journal: Economic Policy 2*(3), 180–212.

The World Bank (2015). Tax compliance cost burden and tax perceptions survey in Ethiopia. Technical Report, Washington D.C.: The World Bank. Available: http://documents.worldbank.org/curated/en/761151467995397531/Tax-compliance-cost-burden-and-tax-perceptions-survey-in-Ethiopia.

The World Bank (2016). Ethiopia Public Expenditure Review. Report No: ACS14541. Washington D.C.: The World Bank. Available: https://openknowledge.worldbank.org/bitstream/handle/10986/24370/Ethiopia0public0expenditure0review.pdf?sequence=1&isAllowed=y

8 Appendix

8.1 VAT tax rates and exemptions

Ethiopia's tax system applies differential VAT rates in the form of either VAT exemptions or zero rates. When goods and services are subject to zero rates, this means that vendors do not charge VAT on the sale of these items *and* they can reclaim any VAT paid on their input purchases. In contrast, for a good or service to be exempt from VAT means that vendors do not charge VAT on the sale of these items, *but they cannot* reclaim any VAT paid on their input purchases. The majority of the existing exemptions and zero-rates were included in the original Proclamation that introduced VAT in 2002. These are outlined in Table 8.1 below.

Table 8.1 Key exemptions and zero-rates set in place under Article 7(2) and Article 8 of Proclamation No. 285/2002

Exempted items	Zero-rated items
Real estate services	International transportation (and goods/ services directly connected to the delivery of this service)
Financial services	Gold supplied to the National Bank of Ethiopia
Health / medical services	The supply/sale of a 'going concern' (i.e. transfer of business)
Educational / child-care services	All exports
Transportation services	
Utilities and kerosene	
Permits and license fees	
Goods and services for humanitarian aid	
Religious/cultural services	
Books and printed materials	

Note: The list above is not exhaustive.

Source: Proclamation No. 285/2002, 'Value Added Tax Proclamation'.

In recent years, while no additional zero-rates have been introduced, the number of VAT exemptions has notably increased – due to the fact that the Ministry of Finance and Economic Cooperation (MoFEC) has been given power to exempt goods and services by directive. In this context, it is also worth noting that by international standards, it is relatively unusual for ministries of finance to be granted such powers.
The major categories of goods and services that have been exempted from VAT as a result of MoFEC directives include:

- Key health/medical items: mosquito nets, condoms, water-treatment chemicals and eye-glasses;
- Basic foodstuffs: milk, bread, enjera, unprocessed grains, wheat flour, and oil seeds (but excluding most vegetables);
- Key agricultural inputs: fertiliser, pesticides, poultry feed and improved seeds and saplings;
- Imported cement.

In addition to the categories listed above, VAT exemptions have also been introduced for a number of very specific goods, services, or transaction types, such as: the supply of cotton for textile factories; the sale of finished leather from tanning factories to shoe factories; the sale of air travel by travel agencies; the marketing in pickle, wet-blue and crest products; and goods and services procured by the Ethiopian Electric and Power Company for power transmission projects.

8.2 Summary statistics

Table 8.2 Summary statistics for all business taxpayers

	All Taxpayers				
	No. of Obs.	Mean	Std	Min	Max
Annual Turnover	81,358	2597	15,026	0	411,148
Turnover (VAT Decl.)	81,337	3023	75,063	0	9,748,676
Net Income or Loss	81,357	-47	21,958	-5,001,019	248,829
Taxable Income	81,357	260	2,472	-182	248,829
Gross Profit or Loss	81,358	504	12,360	-2,113,707	377,313
VAT Paid	29,666	181	873	-1,389	40,821
ToT Paid	22,964	6	10	-35	226
Profit Tax Paid	77,434	57	590	0	66,172
Effective Tax Rate (%)	66,521	13.4	9	0	61
ETR: ToT/VAT (%)	48,259	6.7	8	0	50
Proportion (%) of taxpayers that are:					
Corporations	81,358	15	35	0	100
Sole proprietors	81,358	81	39	0	100
ToT-registered	81,358	49	50	0	100
VAT-registered	81,358	51	50	0	100
Category A	81,358	63	48	0	100
Category B	81,358	37	48	0	100

Notes: The sample includes incorporated and unincorporated (Category A and B) taxpayers in Addis Ababa. Annual Turnover, Turnover (VAT Decl), Taxable Income, Net Income or Loss, VAT Paid, ToT Paid, and Profit Tax Paid are in thousands. Profit Tax Paid corresponds to business income tax for unincorporated firms. ETR: ToT/VAT is calculated as the ratio between tax payments (VAT or ToT) to annual turnover. ETR is calculated as the ratio of profit tax payable to gross profit, conditional on a non-negative net income and a positive gross profit.
Source: Own computation based on 2014 data from ERCA.

Table 8.3 Summary statistics for all business taxpayers, by indirect tax type

	VAT Taxpayers				
	No. of Obs.	Mean	Std	Min	Max
Annual Turnover	41,410	4767	20,593	0	411,148
Turnover (VAT Decl.)	41,389	5605	105,116	0	9,748,676
Net Income or Loss	41,410	-124	30,764	-5,001,019	248,829
Taxable Income	41,410	460	3,359	0	248,829
Gross Profit or Loss	41,410	872	17,214	-2,113,707	377,313
VAT Paid	29,666	181	873	-1,389	40,821
Profit Tax Paid	39,994	98	785	0	66,172
Effective Tax Rate (%)	31,917	13.9	9.6	0.0	59.0
ETR: VAT (%)	27,228	5.7	7.1	0.0	50.0
Proportion (%) of taxpayers that are:					
Corporations	41,410	22.0	42.0	0.0	100.0
Sole proprietors	41,410	74.0	44.0	0.0	100.0
Category A	41,410	93.0	25.0	0.0	100.0
Category B	41,410	7.0	25.0	0.0	100.0
	ToT Taxpayers				
	No. of Obs.	Mean	Std	Min	Max
Annual Turnover	39,948	347	3,202	0	263,463
Net Income or Loss	39,947	32	949	-51,495	133,012
Taxable Income	39,947	52	818	-182	133,012
Gross Profit or Loss	39,948	123	1,918	-20,365	186,298
ToT Paid	22,964	6	10	-35	226
Profit Tax Paid	37,440	13	240	0	39,597
Effective Tax Rate (%)	34,604	12.9	7.4	0.0	60.6
ETR: ToT (%)	21,031	7.9	9.5	0.0	50.0
Proportion (%) of taxpayers that are:					
Corporations	39,948	7.0	25.0	0.0	100.0
Sole proprietors	39,948	88.0	32.0	0.0	100.0
Category A	39,948	31.0	46.0	0.0	100.0
Category B	39,948	69.0	46.0	0.0	100.0

Notes: The sample includes incorporated and unincorporated (Category A and B) taxpayers in Addis Ababa. Annual Turnover, Turnover (VAT Decl), Taxable Income, Net Income or Loss, VAT Paid, ToT Paid, and Profit Tax Paid are in thousands. Profit Tax Paid corresponds to business income tax for unincorporated firms. ETR: ToT/VAT is calculated as the ratio between tax payments (VAT or ToT) to annual turnover. ETR is calculated as the ratio of profit tax payable to gross profit, conditional on a non-negative net income and a positive gross profit.
Source: Own computation based on 2014 data from ERCA.

Table 8.4 Summary statistics for all business taxpayers, by legal form

	Incorporated Taxpayers				
	No. of Obs.	Mean	Std	Min	Max
Annual Turnover	11,893	11,707	37,473	0	411,148
Net Income or Loss	11,892	108	31,194	-2,122,076	248,829
Taxable Income	11,892	1,217	6,324	0	248,829
Gross Profit or Loss	11,893	2,556	30,666	-2,113,707	377,313
VAT Paid	6,217	5,901	1,805	-702	40,821
ToT Paid	593	12	20	0	226
Profit Tax Paid	11,654	257	1,486	0	66,172
Effective Tax Rate (%)	6,069	10.9	8.6	0.0	44.6
ETR: ToT/VAT (%)	5,651	6.4	6.8	0.0	49.3
Proportion (%) of taxpayers that are:					
ToT-registered	11,893	22.0%	41.0	0.0	100.0
VAT-registered	11,893	78.0%	41.0	0.0	100.0
	Unincorporated Taxpayers				
	No. of Obs.	Mean	Std	Min	Max
Annual Turnover	65,966	1082	2,780	0	26,940
Net Income or Loss	65,966	-79	20,476	-5,001,019	17,501
Taxable Income	65,966	99	365	-182	17,501
Gross Profit or Loss	65,966	158	4,242	-855,367	25,410
VAT Paid	22,798	74	211	-1,389	13,167
ToT Paid	21,219	6	10	0.00	214
Profit Tax Paid	62,444	22	102	0.00	5,776
Effective Tax Rate (%)	57,814	13.3	8.1	0	60.6
ETR: ToT/VAT (%)	41,067	6.6	8.4	0	50.0
Proportion (%) of taxpayers that are:					
ToT-registered	65,966	53.0	50.0	0.0	100.0
VAT-registered	65,966	47.0	50.0	0.0	100.0
Category A	65,966	55.0	50.0	0.0	100.0
Category B	65,966	45.0	50.0	0.0	100.0

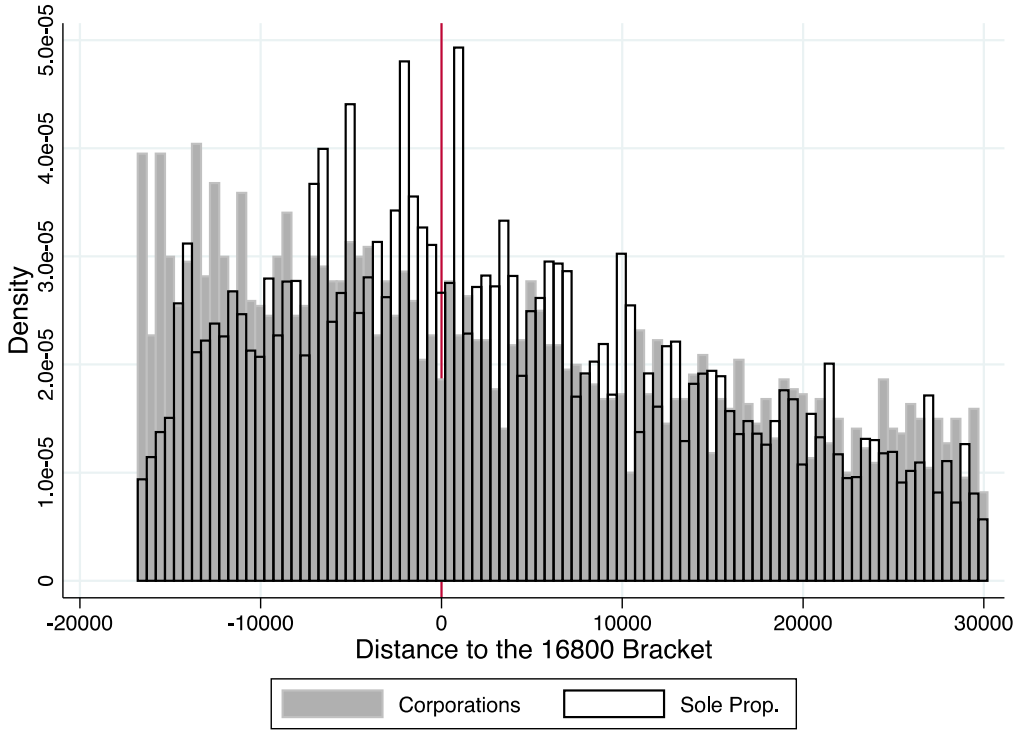
Notes: The sample includes incorporated and unincorporated (Category A and B) taxpayers in Addis Ababa. Annual Turnover, Taxable Income, Net Income or Loss, VAT Paid, ToT Paid, and Profit Tax Paid are in thousands. Profit Tax Paid corresponds to business income tax for unincorporated firms. ETR: ToT/VAT is calculated as the ratio between tax payments (VAT or ToT) to annual turnover. ETR is calculated as the ratio of profit tax payable to gross profit, conditional on a non-negative net income and a positive gross profit.
Source: Own computation based on 2014 data from ERCA.

Table 8.5 Proportions of VAT/ToT and Category A/B Taxpayers around 510,000: Year 2014

	Share (%)	Number of taxpayers
Share of VAT Taxpayers Below 510k [506000-508000)	0.90	31
Share of Category A Taxpayers Below 510k [506000-508000)	0.97	31
Share of VAT Taxpayers Below 510k [508000-510000)	0.87	38
Share of Category A Taxpayers Below 510k [508000-510000)	0.86	38
Share of VAT Taxpayers in the 510k Bin [510000-512000)	0.69	213
Share of Category A Taxpayers in the 510k Bin [510000-512000)	0.86	213
Share of VAT Taxpayers Above 510k [512000-514000)	0.83	42
Share of Category A Taxpayers Above 510k [512000-514000)	0.88	42
Share of VAT Taxpayers Above 510k [514000-516000)	0.81	42
Share of Category A Taxpayers Above 510k [514000-516000)	0.88	42

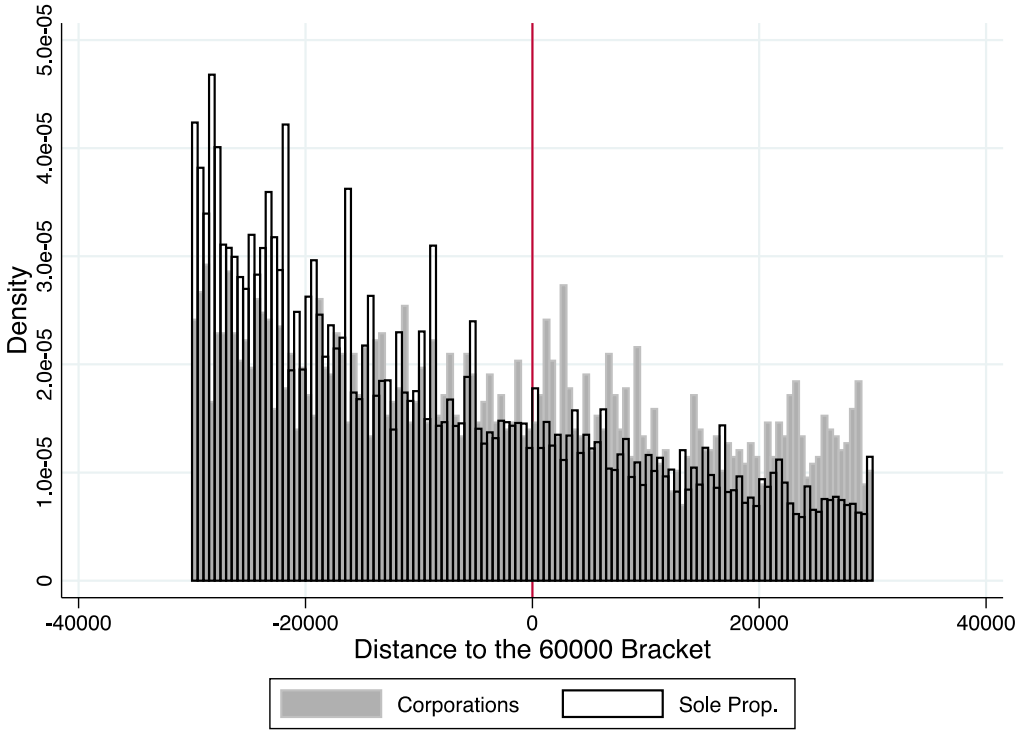
Source: Own computation based on 2014 data from ERCA.

Figure 8.1 Bunching around the taxable income 16,800 Birr threshold, period 2011-2014



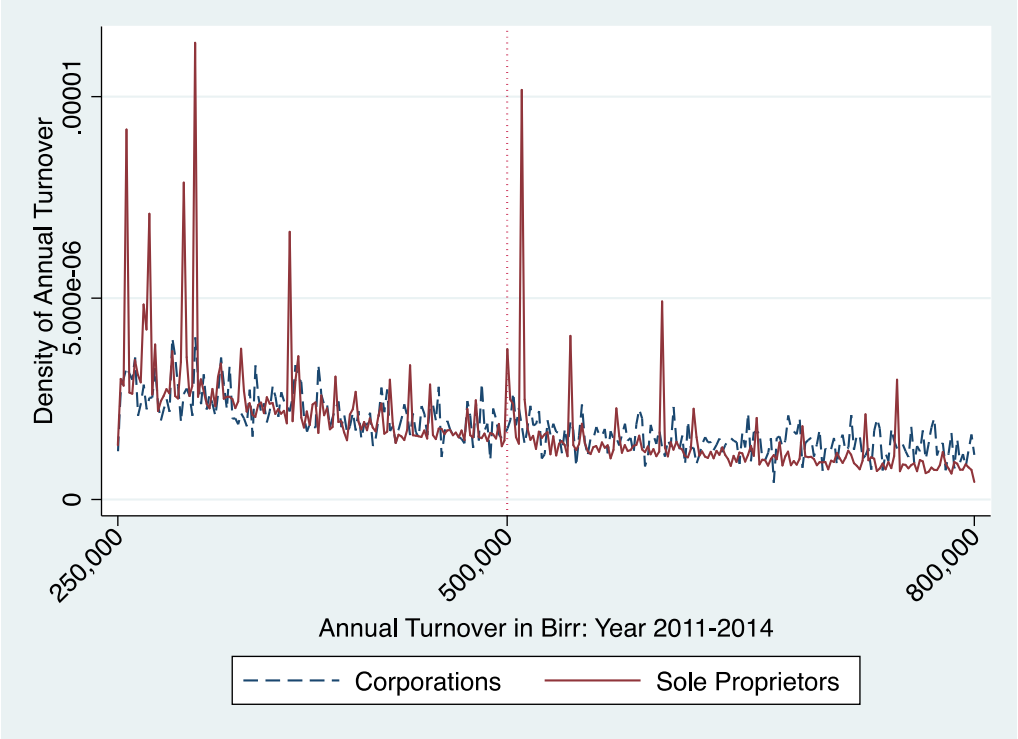
Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa . Bin=500 Birr.
Source: Own computation based on 2011-2014 data from ERCA.

Figure 8.2 Bunching around the taxable income 60,000 Birr threshold, period 2011-2014



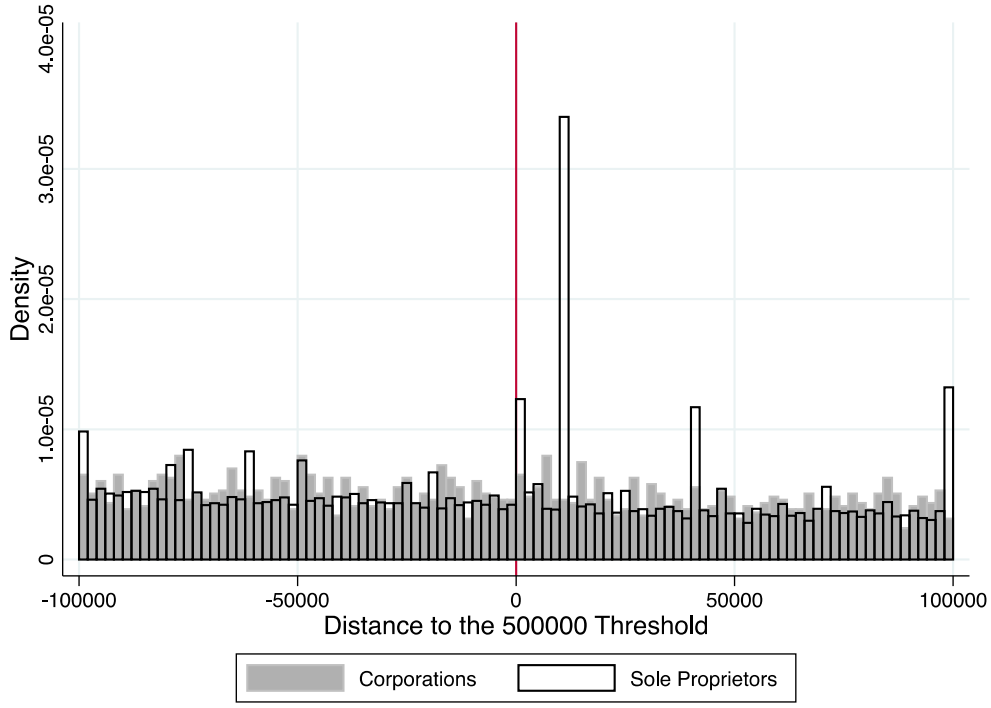
Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa . Bin=500 Birr.
Source: Own computation based on 2011-2014 data from ERCA.

Figure 8.3 Bunching around the 500k birr threshold: sole proprietors vs. corporations, period 2011-2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa. A bandwidth of 0.02 is used in the kernel estimation.
Source: Own computation based on 2011-2014 data from ERCA.

Figure 8.4 Bunching around the 500k birr threshold: sole proprietors vs. corporations, period 2011-2014



Notes: The sample includes sole proprietors and corporations among Category A and B taxpayers in Addis Ababa. A Bin=2000Birr is used.
Source: Own computation based on 2011-2014 data from ERCA.