Do tax administrative interventions targeted to small businesses improve tax compliance and revenue collection? Evidence from Ugandan tax administrative data

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Abstract:

Many developing countries have established a presumptive tax regime for small and medium-sized enterprises to improve tax compliance and simplify the tax regime. This study analyzes tax and administrative reforms which have been targeted to small businesses in Uganda using the population-wide tax administrative data. First, we utilize two different presumptive tax reforms to evaluate their impact on business activity of small enterprises. Second, we exploit two administrative interventions, the taxpayer’s registration campaign and the new electronic filing system for tax returns, to estimate their effects on number of taxpayers, and entry and exit of businesses using the difference-in-differences approach. We provide the first estimates of elasticity of taxable income for small businesses in low-income country context. Moreover, our analysis is the first study to detect the impact of tax administrative changes in the electronic filing system and taxpayer’s registration campaign.

Keywords: tax reform, tax administration, small businesses, tax compliance

JEL classification: H21, H25, H26, H32, O12

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1 Introduction

In developing countries weak administrative and enforcement capacity and large informal sector create challenges to revenue authorities. Therefore, in many countries, governments have established different tax regime for small and medium-size enterprises than for larger companies to improve overall tax compliance. Generally, tax regime is a presumptive tax where tax is based on enterprise’s turnover instead of profits and tax rates are lower. Usual motivation for implementing a presumptive tax is that taxpayers are not obliged to keep accounts from their sales and hence, tax liability is calculated from estimated turnover. Simplified tax regime and obligations make paying taxes easier and cheaper for taxpayer.

However, the different tax regimes for small enterprises are not alone enough to reduce informal sector. The tax administrative innovations and the adaption of new technologies can potentially help governments to improve tax compliance and reach a larger group of business owners. The other advantage of new technologies is that they could lower both the cost of paying taxes and the cost of enforcement. The technology innovations are not, nevertheless, only possible methods to increase tax compliance. The other more traditional methods, for instance, tax education campaigns or taxpayer register programs are widely used tools.

In this paper we focus on the 2014 and 2015 presumptive tax reforms. We analyze the effects of the reforms on business activity of small enterprises. The 2014 reform increased the presumptive tax rates in average by 2 percentage points and the lowest (zero tax) threshold from UGX 5 to 10 million. The 2015 reform, instead, reduced the presumptive tax rates in average by 1.5 percentage points and introduced a new upper threshold for the eligibility of presumptive tax regime. Further, the reform changed most of the thresholds in the middle of the schedule and divided the tax schedule of the lower turnover earners to be based on the location of business and the type of business.

The tax administrative interventions came into effect around the same time as the tax reforms. The first reform was ‘Taxpayer Register Expansion’ project (TREP) which started as a pilot program in July 2013 in Kampala city area. After since TREP has been expanded to other districts in Uganda, but it is not yet reached a country wide coverage. TREP is the taxpayer register and education campaign which is targeted, especially, to small business owners and the project’s objective is to encourage them to register as taxpayers. The second administrative reform, a new electronic filing (e-filing) system for presumptive tax returns was introduced in July 2015. The new e-filing system changed the tax declaration from Excel forms to a simpler online form. The taxpayer logs in on the Uganda Revenue Authority’s webpage and fill the form online. In the new e-filing system, taxpayer only needs to have an internet connection, unlike in previously, they require to have an Excel and knowledge how to use it.

In this study we utilize the comprehensive presumptive tax return, corporate income and presumptive payment data sets from Uganda Revenue Authority (URA) to analyze the impacts of the presumptive tax reforms and administrative interventions targeted to small businesses. We estimate the effects on both intensive (turnover and taxes) and extensive (number of taxpayers, entry and exit) margins. First, we exploit two different presumptive tax reforms to estimate the taxable income responses of small businesses. We follow the difference-in-differences (DD) approach from Waseem (2018) to provide elasticity estimates. Second, we analyze two tax administrative interventions and evaluate their impacts on number of taxpayers, and business entries and exits from the presumptive tax records using the DD
method. We assume that the elasticity of taxable income is not changing over time and thus, we control
the effects of tax reform in our analysis.

The previous literature provides estimates of impact evaluation from several types of tax administrative
interventions (e.g. see Kleven, Knudsen, Kreiner, Pedersen, & Saez (2011) evidence from audits and
Carrillo, Pomeranz, & Singhal (2017) from third-party information). However, the evidence from the
impacts of the change in the e-filing system or introduction of taxpayer register campaign is missing. Our
study contributes literature by providing first estimates of the effects of these tax administrative
interventions.

Moreover, we respond to the growing literature of the elasticity of taxable income (ETI) using tax
administrative data. While estimates of ETI for both firms and individuals are available from several
developed countries, there are only few studies from developing countries (see estimates for firms from
Pakistani administrative data by Kleven & Waseem (2013) and Best, Brockmeyer, Kleven, Spinnewijn,
& Waseem (2015); for small firms from South African tax registers data by Boonzaaier, Harju, Matikka,
& Pirttilä (2017)). However, both Pakistan and South Africa are middle-income economies and their
economic characteristics differ from low-income countries. This paper provides the first elasticity
estimates for small enterprises in low-income country context.

The rest of the paper is organized as follows. Section 1 continues with the overview of the related
literature. Section 2 describes the institutional background and the reforms. Section 3 presents the
chosen empirical strategy. Section 4 provides data description. Section 5 reports the main findings.
Section 6 concludes.

1.1 Related literature

Empirical framework for evaluating the tax administrative interventions is based on the theory of
optimal taxation, which includes also the theories about optimal tax rates, thresholds and tax
administration. In the recent paper, Keen & Slemrod (2017) provides the setting for analyzing the
optimal tax administration. They argue that the optimal tax administration is a balance between tax
enforcement and compliance costs and revenues collected from taxes. They show that in developing
countries with weak institutions it is not optimal to have perfect tax compliance and enforcement since
both tax evasion and/or avoidance, and paying taxes is costly for taxpayer and in the other hand, the
tax enforcement and administration are expensive for revenue authorities.

Yilmaz & Coolidge (2013) investigate the compliance costs of e-filing in three developing countries
(South Africa, Ukraine and Nepal). They analyze the compliance costs of small and medium size
businesses and show that compliance costs are depending of the e-filing system and the compulsory or
obligatory nature of the e-filing. They find a reduction in the compliance costs only in South Africa
since the e-filing was fully replacing the paper submissions. In other countries e-filing increased
compliance costs because it was not fully implemented, and submissions still were required in paper
format. They show that willingness to use e-filing differs by firm’s characteristics, for instance access to
internet, payment of different tax types and availability of electricity affect the usage of e-filing.
2 Institutions

2.1 Uganda

Uganda is a low-income country in Sub-Saharan Africa (GDP per capita is USD PPP 1,863.835 (World Bank, 2018)). Uganda is a member of the East African community (EAC). The total tax revenue was 13.29% of GDP in 2016 which is lower than, for example, in Kenya (15.88% of GDP) and Rwanda (14.9% of GDP) (ICTD/UNU-WIDER, 2018).

As in many developing countries, the informal sector is large in Uganda. The Uganda Bureau of Statistics (UBoS) estimated that around 87% of total employment is informal (Uganda Bureau of Statistics, 2016). The Uganda Revenue Authority with collaboration of other government institutions has implemented the administrative intervention, ‘Taxpayer Register Expansion project’ (TREP), to reduce the size of the informal sector. We explain TREP in more detailed in Section 2.3.3.

2.2 Domestic tax laws of Uganda

Domestic Tax Laws of Uganda consist of two tax acts: Income Tax Act and Value Added Tax Act (Uganda Revenue Authority, 2017). Income Tax Act includes taxation of individuals, partnership and partners, trust and beneficiaries, and companies and shareholders. It provides tax rates for small business taxpayers (refer to as presumptive), individuals, companies (refer to as corporate income), trustees and retirement funds, dividends, rents, and other special sources of incomes. Value Added Tax Act contains rules of value added taxes. The official fiscal year in Uganda is from 1st of July to 30th of June. Taxpayers can apply substituted fiscal year, for example, a calendar year if it is more convenient for company's accounting.

The corporate income tax rate is 30% of the taxable income for other than mining companies and the tax rate has been same since 1997. The tax revenue from the corporate income tax was around UGX 732 billion in the fiscal year 2015/16 which is more than 6.5% of total tax revenue which was UGX 11 trillion in 2015/16.

Value Added Tax Act determines the value added tax rate which is 18%. Value added tax rate has been unchanged since 2006 but there have been changes in zero-rated items and the threshold value which determines the obligation of paying VAT. The zero tax threshold increased from UGX 50 million to UGX 150 million in 1st July 2015. The tax revenue collected from VAT was over UGX 1,772 billion in 2015/16 which is more than 15.5% of the total tax revenue. The number of registered taxpayers for value added tax have been stagnated to around 16,000 in recent years.

The focus of this paper is on the changes in the presumptive tax schedule. The presumptive tax schedule consists of several tax rates and income thresholds. The yearly revenue from the presumptive tax was around UGX 3.6 billion in the fiscal year 2016/17 which is about 0.03% of the total tax revenue which was UGX 12.7 trillion in 2016/17. The number of registered presumptive taxpayers is not separately report, but they are registered in corporate income taxpayers which number have increased from under 31,000 in 2011/12 to over 86,000 in 2017/18.

By current tax laws, businesses are eligible to pay the presumptive tax if their estimated turnover is over UGX 10 million but not exceeds UGX 150 million. Estimated turnover is the taxable income for
presumptive taxpayers since they are not eligible to any tax deductions or exemptions. However, taxpayers can choose between the presumptive and corporate income tax schedule even if their turnover is between the lower and upper threshold of presumptive tax schedule (Uganda Revenue Authority, 2015). If a taxpayer chooses to pay the corporate income tax, they need to keep accounts, but they also have right to apply tax deductions and exemptions. The progress of the presumptive tax schedule of recent years is presented in more detailed in Table 1. The applicable tax rate is either a lump-sum or percentage amount whichever is lower.

Table 1. Tax rates for small business taxpayers in 2002/03–17/18

<table>
<thead>
<tr>
<th>Tax year</th>
<th>Effective from</th>
<th>Turnover in millions</th>
<th>Tax rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015/16–17/18</td>
<td>01-07-15</td>
<td>0-10</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-50</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-75</td>
<td>937 500 or 1.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75-100</td>
<td>1 312 500 or 1.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100-125</td>
<td>1 687 500 or 1.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>125-150</td>
<td>2 062 500 or 1.5%</td>
</tr>
<tr>
<td>2014/15</td>
<td>01-07-14</td>
<td>0-10</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-20</td>
<td>450 000 or 3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-30</td>
<td>750 000 or 3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-40</td>
<td>1 050 000 or 3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40-50</td>
<td>1 350 000 or 3%</td>
</tr>
<tr>
<td>2002/03–13/14</td>
<td>01-07-02</td>
<td>0-5</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-20</td>
<td>100 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-30</td>
<td>250 000 or 1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-40</td>
<td>350 000 or 1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40-50</td>
<td>450 000 or 1%</td>
</tr>
</tbody>
</table>

Notes: *** Tax rates for turnover between 10-50 million shillings are lump-sum amounts which are presented in Table 2. Tax rates are depending on business sector and the location of business. The effective tax rates are either a lump-sum or percentage amount whichever is lower. The upper value of tax brackets is included in that tax bracket and when it is exceeded, the taxpayer is switched to the next tax bracket. The fiscal year is from 1st of July to 30th of June. All monetary values are in local currency (UGX).

Source: Domestic Tax Laws of Uganda from years 2002-2017
Table 2. The tax rates (and lump-sum amounts) for small business taxpayers for different turnover brackets, locations and business sectors in 2015/16-17/18

<table>
<thead>
<tr>
<th>Location</th>
<th>Business sector</th>
<th>Turnover 10–20 million</th>
<th>Turnover 20–35 million</th>
<th>Turnover 35–50 million</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kampala city and Divisions of Kampala</strong></td>
<td>General trade</td>
<td>250 000</td>
<td>400 000</td>
<td>500 000</td>
</tr>
<tr>
<td></td>
<td>Carpentry/Metal workshops</td>
<td>250 000</td>
<td>400 000</td>
<td>500 000</td>
</tr>
<tr>
<td></td>
<td>Garages</td>
<td>300 000</td>
<td>450 000</td>
<td>550 000</td>
</tr>
<tr>
<td></td>
<td>Hair and beauty/salons</td>
<td>300 000</td>
<td>400 000</td>
<td>550 000</td>
</tr>
<tr>
<td></td>
<td>Restaurant or bars</td>
<td>300 000</td>
<td>450 000</td>
<td>550 000</td>
</tr>
<tr>
<td></td>
<td>Drug shops (=Pharmacies)</td>
<td>250 000</td>
<td>350 000</td>
<td>500 000</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>200 000</td>
<td>300 000</td>
<td>450 000</td>
</tr>
<tr>
<td><strong>Municipalities</strong></td>
<td>General trade</td>
<td>150 000</td>
<td>300 000</td>
<td>400 000</td>
</tr>
<tr>
<td></td>
<td>Carpentry/Metal workshops</td>
<td>150 000</td>
<td>300 000</td>
<td>400 000</td>
</tr>
<tr>
<td></td>
<td>Garages</td>
<td>200 000</td>
<td>350 000</td>
<td>450 000</td>
</tr>
<tr>
<td></td>
<td>Hair and beauty/salons</td>
<td>200 000</td>
<td>350 000</td>
<td>450 000</td>
</tr>
<tr>
<td></td>
<td>Restaurant or bars</td>
<td>200 000</td>
<td>350 000</td>
<td>450 000</td>
</tr>
<tr>
<td></td>
<td>Drug shops</td>
<td>150 000</td>
<td>300 000</td>
<td>400 000</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>150 000</td>
<td>350 000</td>
<td>400 000</td>
</tr>
<tr>
<td><strong>Towns and trading centers</strong></td>
<td>General trade</td>
<td>100 000</td>
<td>200 000</td>
<td>300 000</td>
</tr>
<tr>
<td></td>
<td>Carpentry/Metal workshops</td>
<td>100 000</td>
<td>200 000</td>
<td>300 000</td>
</tr>
<tr>
<td></td>
<td>Garages</td>
<td>100 000</td>
<td>250 000</td>
<td>350 000</td>
</tr>
<tr>
<td></td>
<td>Hair and beauty/salons</td>
<td>100 000</td>
<td>250 000</td>
<td>350 000</td>
</tr>
<tr>
<td></td>
<td>Restaurant or bars</td>
<td>100 000</td>
<td>250 000</td>
<td>350 000</td>
</tr>
<tr>
<td></td>
<td>Drug shops</td>
<td>100 000</td>
<td>200 000</td>
<td>300 000</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>100 000</td>
<td>250 000</td>
<td>300 000</td>
</tr>
</tbody>
</table>

Notes: The upper value of tax brackets is included in that tax bracket and when it is exceeded, the taxpayer is switched to the next tax bracket. All monetary values are in Uganda shillings.
Source: Domestic Tax Laws of Uganda from years 2015-2017

2.3 Tax and administrative reforms

The Ugandan government have implemented several tax and administrative reforms targeted to small businesses between 2009 and 2018. Figure 1 summarizes the reforms and their timelines. The first administrative reform was the implementation of e-tax to cover all tax offices country wide. The next administrative reforms were three phases of TREP starting from July 2013. In July 2015, the new e-filing system was introduced for presumptive taxpayers. The e-tax system and TREP are explained in more detailed in Sections 2.3.2 and 2.3.3.

The first presumptive tax reform which changed the tax rates was introduced in July 2014. The reform increased the tax rates and the zero tax threshold. The second tax reform was in force in the next year starting from July 2015. The reform was larger than the 2014 reform and many tax rates and thresholds changed, but the reform mainly decreased tax rates. The latest tax reform in 2016 were minor changes on the tax schedule. The more detailed description of the tax reforms is in Section 2.3.1.
Figure 1. Timeline of the different reforms targeted to small businesses and presumptive taxpayers from July 2009 to July 2018.

Notes: TREP=Taxpayer Register Expansion project. Minor tax changes: increase tax rate of pharmacies from UGX 100,000 to 250,000 and excluded clinics.

2.3.1 The presumptive tax reforms in 2014, 2015 and 2016

The presumptive tax schedule has been amended in 2014, 2015 and 2016. The 2014 reform increased the tax rates from 1% to 3% and the lowest (zero tax) threshold from UGX 5 million to 10 million. Other thresholds of the tax brackets were unchanged. In 2015, the government introduced again a new tax schedule where the tax brackets and rates for small businesses, which turnover is less than UGX 50 million, are based on both the type of business and the location of business. This new schedule is presented more detailed in Table 2. However, the largest changes in the 2015 reform were the raise of the upper threshold from UGX 50 million to 150 million and the reduction of the tax rates to 1.5% in the new tax brackets. The 2016 reform was smaller than 2015. It increased only the lowest tax rate of drug shops (i.e. pharmacies) from UGX 100,000 to 250,000 and excluded clinics from the presumptive tax schedule.

URA informs taxpayers about the changes in the tax schedule after the government has announced a new tax law. Usually, this takes place when government is reading the national budget in the beginning of June. The policy is effective on 1st July when fiscal year starts. The information is provided in URA’s website and in a paper format in the beginning of the fiscal year.

Figure 2 illustrates the actual tax rates for presumptive taxpayers. The solid line is for 2015/16–2017/18, the dash line is for 2014/15, and the dot line is for 2002/03–13/14. In 2002/03–13/14, the tax rate was constant 1% for turnovers UGX 20–25, 30–35, and 40–45 million, and otherwise it was a fixed amount which can be seen from Table 1. The tax rates increased in 2014/15 to 3% when turnover was UGX 20–
25, 30–35, and 40–45 million. Otherwise, the amount of taxes were the fixed sums presented in Table 1. From 2015/16, the tax rates are constant 1.5% when turnover is between UGX 50–62.5, 75–87.5, 100–112.5, and 125–137.5 million. Otherwise the amount of taxes are fixed sums and therefore the actual tax rates are lower than 1.5% for taxpayers whose turnover is in those regions.

If taxpayer's turnover is above UGX 150 million, the taxpayer is paying either corporate income or individual income tax. The tax regime depends on whether the taxpayer is a company or an individual business owner. Moreover, these businesses must pay value added taxes from taxable sales if their turnover exceeds UGX 150 million.

Figure 2. Actual presumptive tax rates and thresholds for presumptive taxpayers in 2002/03–17/18

Notes: The dash-dot line in 2015/16–2017/18 indicates that turnover between UGX 10–50 million are taxed using a special schedule which is presented in Table 2. If taxpayer’s turnover is above the upper threshold, taxpayer is paying either individual or corporate income taxes and value added taxes from sales. The upper thresholds are shown in Table 1.

2.3.2 E-tax system and filing tax returns: the reform in 2015

Uganda Revenue Authority established the e-tax system in 2009. The e-tax system was implemented gradually to all tax offices in Uganda. It was first introduced as a pilot program in three tax offices in 2009 and by the end of 2012, the e-tax system was in place in every tax office in Uganda. The e-tax system is an online platform where taxpayers report their tax obligations. Every taxpayer must register to URA to get the Taxpayer Identification Number (TIN) which is used in the e-tax system. Taxpayers can amend their reported incomes afterwards in the e-tax system only if their annual income has increased. However, if they want to amend decreased annual incomes, they need to visit in their tax office.
Taxpayers are subject to file their tax returns using the e-tax system. In general, filing is done using downloadable Excel forms from URA website. Taxpayer fills the forms and submit them back to URA’s e-tax system. URA developed the e-tax system of the presumptive taxpayers, and in July 2015 they introduced a new e-filing system for presumptive tax returns. The new e-filing system is not requiring Excel forms, instead, taxpayer can directly file tax returns using an online form on the URA’s e-tax webpage. Before July 2015, the presumptive tax returns were filed using the Excel forms as other taxes still are. Thus, presumptive taxpayers are only ones who do not need to use Excel to file tax returns.

The new e-filing system calculates automatically payable taxes when taxpayer inserts their incomes in the form. Taxpayer can observe instantly the changes in their payable taxes when they are changing their incomes in the e-tax form. The online return form includes also the payment instructions and receipt which taxpayer print and submit to the bank.

2.3.3 Taxpayer Register Expansion project (TREP)

In developing countries, governments have a need to expand tax base and collect more revenues. However, the tax culture is not as advance as in developed countries. Generally, the informal sector is large in developing countries and it is not a one-dimensional problem that only consists of small business owners who are not paying taxes from their turnover. The informal sector in Uganda is also spread inside the formal sector and therefore it is not a separate part of the economy. In many cases, formal and informal sectors are overlapping, for example, companies can have both formal and informal employees at the same time.

The Ugandan government launched ‘Taxpayer Register Expansion project’ (TREP) in July 2013 to encourage citizens, especially small businesses, to register as taxpayers and receive the Taxpayer Identification Number (TIN). TREP is jointly organized by URA, Uganda Registration Services Bureau (URSB), Kampala Capital City Authority (KCCA) and Local Governments. The main objective of the TREP is to formalize businesses, educate them about taxes, reduce the compliance costs and harmonize different government agencies’ revenue and tax administration systems (Uganda Registration Services Bureau, 2017).

The first phase of the TREP (TREP I) started in July 2013 (fiscal year 2013/14) in Kampala based municipalities (see Table 3). The second phase, TREP II, followed in fiscal year 2014/15 in Wakiso district municipalities. The latest phase, TREP III, in July 2016 expanded the project to 31 municipalities outside Kampala and Wakiso districts. TREP III did not lead to coverage of whole country and still in 2018 there are municipalities that are not included to the project.

TREP has been mainly targeted to small businesses because the level of compliance of these businesses is substantially low and URA has have challenges to increase the tax revenue collection from them. The work methods in the beginning of TREP were mainly door-to-door visits. The methods have been developed to establishment of one-stop-centers for simplifying business registration, massive tax education and integration of institutional systems in later phases of TREP.
3 Empirical strategy

3.1 Difference-in-differences approach

This study exploits the difference-in-differences (DD) approach to estimate the elasticity of taxable income for small businesses utilizing the changes in the presumptive tax system. We follow the approach from Waseem (2018). Moreover, we set out a framework to separate the effects of tax rate changes from the impacts of the tax administrative interventions.

First, we estimate the elasticity of taxable income (ETI) using the 2014 presumptive tax reform when there were no tax administrative interventions. The treatment group is the presumptive taxpayers since their tax rates change from 1% to 3% and the lower threshold increased from UGX 5 to 10 million as shown in Figure 2. The control group is the corporate income taxpayers who have turnover between UGX 200 and 300 million since the 2014 reform did not affect them.

We use a simple first differences estimate to calculate the elasticity of taxable income:

\[ e = \frac{[E(\log y_{t_1}|\text{Treat} = 1) - E(\log y_{t_0}|\text{Treat} = 1)] - [E(\log y_{t_1}|\text{Treat} = 0) - E(\log y_{t_0}|\text{Treat} = 0)]}{d(1-\tau)/(1-\tau)} \]

where \( y \) is taxable income and it is a function of \( 1-\tau \) and \( s \), \( \text{Treat} \) is taking value 1 if presumptive taxpayers and zero otherwise, \( S \) is zero if there is no tax administrative interventions and one otherwise, \( t_0 \) is before reform years 2012/13 and 2013/14 and \( t_1 \) after reform year 2014/15, \( d(1-\tau) \) indicates the change in the average tax rate of treatment group and \( 1-\tau \) is the before reform average tax rate.
Second, we estimate the impacts of the tax administrative interventions. The taxable income, $y(1 - \tau, \alpha)$, is a function of the net-of-tax-rate $1 - \tau$ and the cost of filing a tax return $\alpha$. Therefore, the change in taxable income is a combination of two changes, the tax reform and the change in the cost of the online return filing system,

$$dy = y_1d(1 - \tau) + y_2d\alpha$$

Where $d$ defines the change, $y_1$ is income affected by the change in tax rate $(1 - \tau)$ and $y_2$ is income affected by the change in the cost of the online return filing system $\alpha$. The change in the online return filing system affect the cost of filing taxes and thus, it has an impact on taxable income.

In analysis, we separate the tax rate and the online return filing changes assuming that the elasticity of taxable income is not changing over time. We utilize the 2015 reform when the new e-filing system was introduced and the presumptive tax rate and brackets changes. Furthermore, we consider the progressive implementation of TREP and we control it in our analysis. We use the ETI estimate from the 2014 reform in our estimation of the change in tax administrative interventions.

The effect of the reforms for the taxable income can be written by,

$$\frac{dy}{dR} = \frac{\partial y}{\partial(1 - \tau)} \frac{d(1 - \tau)}{dR} + \frac{\partial y}{\partial \alpha} \frac{d\alpha}{dR}$$

where $dR$ is the effect of the tax administrative reform. Since we are interested in the effect of the change in the online return filing system, we rewrite the equation as,

$$\frac{\partial y}{\partial \alpha} \frac{d\alpha}{dR} = \frac{dy}{dR} - \frac{\partial y}{\partial(1 - \tau)} \frac{d(1 - \tau)}{dR}$$

and finally, we use the elasticity of taxable income $e = \frac{\partial y}{\partial(1 - \tau)} \frac{(1-\tau)}{y}$ in the equation,

$$\frac{\partial y}{\partial \alpha} \frac{d\alpha}{dR} = \frac{dy}{dR} - e \frac{d(1 - \tau)}{dR} \frac{y}{(1 - \tau)}$$

In the estimation, we use the ETI estimate $e$ from the first reform.

For the difference-in-differences approach, we have the presumptive taxpayers whose turnover is under UGX 50 million as a treatment group and the corporate income taxpayers whose turnover are between UGX 200 and 300 million as a control group. We estimate the following DD equation:

$$Y_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 After_{it} + \beta_3 (Tre at_i x After_{it}) + \beta_4 X_{it} + \epsilon_{it}$$

Where $Y_{it}$ is an outcome variable (either log turnover or dummy for entry/exit), $Tre at_i$ is taking value one if individual is in a treatment group, $After_{it}$ is taking value one if observation is after 1 July 2015, $Tre at_i x After_{it}$ is taking value one if individual is treated and observation is after 1 July 2015, $X_{it}$ is time-varying control variables for controlling, for example, TREP. Variable of interest is $\beta_3$, the interaction term of treated and after.
4 Data

We use the tax administrative data from URA’s e-tax system. Data includes information of tax returns from 2009 to 2018 and from tax payments from 2015 to 2018. All fields in the e-tax forms are not mandatory, thus we have more missing values for some variables than others if the field of that variable is voluntary to fill. We extracted the variables of interest from four different e-tax forms. We use two separate presumptive tax return (forms used before and after July 2015), non-individual (corporate) tax return, and non-individual TIN register forms. The payment data is from payment registration data set. Data sets are appended and merged together to create the final harmonized data set for the analysis.

In Table 4 and 5, we show the summary statistics of the variables of interest for presumptive taxpayers in 2011–2018. The presumptive taxpayers are in average small businesses which turnover is under UGX 20 million and tax payable is under UGX 300,000. The tables point out that there are some outliers in data sets since, for example, the maximum tax payable in 2011/12 is UGX 500,000,000 which is over the possible presumptive tax amount. We exclude the outliers from the analysis. The number of observations is substantially increasing over the years and in 2016/17 it is over 25,000. The trend of the number of taxpayers is visualized in Figure 3.

Table 4. Summary statistics before system reform years 2011/12–14/15

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>359</td>
<td>359</td>
<td>725</td>
<td>2,153</td>
</tr>
<tr>
<td>Tax payable</td>
<td>725</td>
<td>725</td>
<td>2,153</td>
<td>2,598</td>
</tr>
<tr>
<td>Mean</td>
<td>12,080,273</td>
<td>1,496,215</td>
<td>13,141,885</td>
<td>15,894,003</td>
</tr>
<tr>
<td>Sd</td>
<td>14,123,521</td>
<td>26,383,855</td>
<td>14,182,905</td>
<td>13,651,331</td>
</tr>
<tr>
<td>Min</td>
<td>-22,350,768</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Max</td>
<td>50,000,000</td>
<td>50,000,000</td>
<td>50,000,000</td>
<td>50,000,000</td>
</tr>
</tbody>
</table>

Notes: All monetary values in Ugandan shillings.
Source: Authors own calculations using tax administrative data.

Table 5. Summary statistics after system reform years 2015/16–17/18

<table>
<thead>
<tr>
<th></th>
<th>2015/2016</th>
<th>2016/2017</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>6,134</td>
<td>6,134</td>
<td>25,589</td>
</tr>
<tr>
<td>Tax payable</td>
<td>25,589</td>
<td>25,589</td>
<td>31,372</td>
</tr>
<tr>
<td>Mean</td>
<td>7,392,460</td>
<td>223,050</td>
<td>17,036,293</td>
</tr>
<tr>
<td>Sd</td>
<td>14,528,365</td>
<td>200,427</td>
<td>12,872,362</td>
</tr>
<tr>
<td>Min</td>
<td>0</td>
<td>9,720</td>
<td>0</td>
</tr>
<tr>
<td>Max</td>
<td>147,500,000</td>
<td>4,000,000</td>
<td>150,000,000</td>
</tr>
</tbody>
</table>

Notes: All monetary values in Ugandan shillings.
Source: Authors own calculations using tax administrative data.
Figures 4–6 visualize the distribution of presumptive taxpayers by their turnover size in 2010–2018. We exclude the taxpayers, who have turnover above upper thresholds of the presumptive tax schedule (over UGX 50 million before 2015 and over UGX 150 million after 2015), from the figures. Figure 4 shows the distribution of presumptive taxpayers in the fiscal years 2010/11–2014/15. Most of the presumptive taxpayers have turnover under UGX 10 million. Nevertheless, there are spikes in 2013/14 around UGX 20 and 30 million and in 2014/15 around UGX 10 million. Potential explanation to the spike of UGX 10 million in 2014/15 is the change of the lower threshold from UGX 5 to 10 million.

We present the distribution of presumptive taxpayers in 2015/16–2017/18 in Figure 5 and 6. Figure 5 shows all presumptive taxpayers who are eligible to the presumptive tax. Most of the observations have turnover under UGX 50 million, the old upper threshold of presumptive tax. In Figure 6, we concentrate on the taxpayers whose turnover is under UGX 60 million to investigate closer the distribution. Figure 6 highlights the spikes around UGX 10 and 20 million which both are the thresholds. As noted, Figures 4–6 present that many observations are concentrated near the round number values and hence near the threshold values. This can imply that there is substantial round number bias in data set.

The summary statistics of corporate income taxpayers and payment data are in progress but will be part of this section later.

The other data sets used in our analysis are the implementation schedule of tax offices and TREP. We have information about the location at returning in our data sets which we can use to detect the affected taxpayers.
Figure 4. Distribution of taxpayers before system reform in 2010/11–2014/15

Notes: All monetary values in Ugandan shillings.
Source: Authors own calculations using tax administrative data.

Figure 5. Distribution of taxpayers after system reform in 2015/16–2017/18

Notes: All monetary values in Ugandan shillings.
Source: Authors own calculations using tax administrative data.
5 Results

5.1 Taxable income (turnover) (intensive margin)
Results still in progress

5.2 Tax revenue (intensive margin)
Results still in progress

5.3 Entry and exit (extensive margin)
Results still in progress

5.3.1 TREP
Results still in progress

5.3.2 E-filing system
Results still in progress
6 Conclusion

References


