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Effective tax rates and firm size: the case of Ethiopia

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Abstract

Do some firms pay more corporate taxes than others? If so, which types of firms benefit from a reduced tax burden, and how do they achieve this reduction? Are differences in tax rates due to the design of the tax system, to strategic tax planning or to differential enforcement? These questions matter for tax design and are difficult to answer in an empirically founded and comprehensive manner. We use administrative tax data in many countries to systematically calculate firm-level effective tax rates (ETRs) and study how ETRs vary across the firm size distribution. This note shows the results for Ethiopia, where the corporate statutory tax rate is 30%. We find that the ETR averages 18% across all firms, increases over the firm-size distribution, and flattens at the top for the largest firms.

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1 Introduction

The effective tax rate (ETR) summarizes the tax burden faced by firms. Two effective tax rate concepts exist for corporate taxes: forward-looking ETRs, which measure the tax burden of a hypothetical investment project over its lifetime, and backward-looking ETRs, which are based on taxes paid on realized sales and profits. Our study focuses on backward looking ETRs built ex-post from micro tax return data. Depending on the exact ETR definition (more details below), it captures a combination of the effect of statutory tax provisions (e.g. statutory tax rates and tax base definitions), differences in enforcement (e.g. size-dependent enforcement Basri et al. 2019), and firms' responses to the tax system (e.g. tax planning via deductions and exemptions Siegfried 1974, Tørsløv et al. 2020). While the statutory corporate tax rate is often the same for all firms, the ETR can still vary substantially across firms due to these other elements.

Differences in ETRs across firms could matter for efficiency and for equity. From an efficiency perspective, differences in tax rates across firms lead to a misallocation of resources lowering productivity (Diamond and Mirrlees 1971, Bachas et al. 2019). From an equity perspective, smaller firms are often owned by poorer entrepreneurs than larger firms (La Porta and Shleifer, 2014), and employ poorer/more informal workers (Ulyssea, 2018). Further, there is evidence that taxes on firms pass through to employees' wages (Arulampalam et al. 2012, Suárez Serrato and Zidar 2016, Fuest et al. 2018). Thus, if smaller firms bear a disproportionate tax liability, then taxes could exacerbate inequality.

A handful of studies examine the relationship between ETRs and firm size, but these studies differ in their methodologies and results. The studies differ in the data they use—financial statements, administrative tax data or survey data—and the definition of the ETR.[2] Results are thus hard to compare, and unsurprisingly the literature has not produced consistent evidence on the ETR-firm-size relation.

We use firm-level administrative tax returns and a transparent methodology which can be applied across countries, to estimate the ETR and describe the ETR-firm-size relation. We also correlate the ETR with firm characteristics such as sector of activity, location, ownership status and firm age. Administrative tax records are an attractive data source to construct ETRs since they cover all formal firms in a country, and contain precise information on firms' tax liability.[3] In contrast, financial statements, which

[2]For example in Uganda, Gauthier and Reinikka (2006) argue that most of the tax burden is borne by mid-size firms, whereas large firms benefit from tax exemptions and smaller firms evade taxes. Other studies find that the ETR increases with firm size (Zimmerman 1983), decreases with firm size (Nicodème 2002, Richardson and Lanis 2007), is U-shaped ETR in firm size (Halleux and Valenduc 2007, Mascagni and Mengistu 2019), or that there is no systematic relation between ETRs and firm size (Lazăr 2016).

[3]Of course tax data are self-reported by firms and subject to evasion and underestimation. Depending on the type of misreporting, ETR estimates from tax data could be lower or upper bounds on the true ETR. If misreporting is firm-size or industry-specific, this type of measurement error could bias the analysis of the ETR-firm-size relationship.

have often been used in the past, only feature accounting measures of taxable profits, and hence represent an approximation of the true tax-relevant variables. Besides, in low and middle-income countries, financial statements are only available for very large, listed companies.

This note presents the methodology and results on the ETR and the ETR-firm-size relationship for Ethiopia. Anonymized firm-level corporate tax records for Ethiopia are provided by the Ethiopian Ministry of Revenues. The data contains all corporate tax records for the years 2011-2016. It includes the main variables used to construct ETRs, but it does not feature a breakdown of firms' costs into different cost elements. Information on firm characteristics such as sector and location is available for Ethiopia. We do not have information on ownership or firm age, but we use these data in other countries where it is available.

2 Methodology

We define a firm's effective tax rate as the corporate income tax liability divided by economic profit. While the choice of the numerator is straightforward, the choice of the denominator is debated in the literature. Our objective is to measure firms' profitability without the influence of exemptions and non-standard deductions that lower firms' taxable profits via tax planning activities. The relevant concepts are represented in Figure 2 in the appendix. Using total sales/turnover as the denominator is the simplest option, but is problematic, as any comparison implicitly assumes that all firms have the same true profitability. Using the net tax base as the denominator would mechanically yield an ETR that equals the statutory tax rate, since all exemptions lowering a firm's tax base are already accounted for. There is thus a trade-off between choosing a concept that approaches a firm's true profitability, and taking into account tax expenditures.

Economic profit (i.e. net profit) is defined as total income minus all standard deductions: material, labor, operational costs, depreciation and financial costs. The measure is related to financial-statement-based measures of ETRs, which use Earnings Before Interest and Taxes (EBIT) or Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) as the denominator. But unlike these financial-statement-based measures, we allow depreciation, interest and financial expenses to be deducted when calculating net profit. Studies based on tax data often use gross profit, defined as turnover minus the cost of goods sold. The cost of goods sold includes only direct inputs and production costs, but does not include wages, management and overhead. In countries where the breakdown of costs into its components is available, we compare our ETR measure based on net profit to alternative measures. For Ethiopia, only cost of goods sold is available, so we can compare our ETR measure to a turnover-based and a gross profit measure (see Appendix Figure 3). We also look at the link between ETR and sector, and find no relationship (see Appendix Figure 4).

This ETR measure is transparent and comparable across countries. The construction of the mea-

sure does not depend on country-specific rules about exemptions and deductions. By using net profit as a denominator, we are confident that all economic costs have been deducted, but adjustments to taxable profit are yet to be made: re-integration of non deductible expenses, deductions of exempt incomes, applications of capital allowances and investment incentives exemptions, and finally carried over losses from previous periods. We can thus observe differences in effective taxation due to tax expenditures.

3 Empirical Evidence on the ETR-Firm-Size Relationship in Ethiopia

Ethiopia's statutory corporate tax rate remains at 30% over the span of the panel, from 2011 to 2016. There also exists a reduced mining income tax at 25% for large scale mining operations.[4] We find that the average effective tax rate is 17.5% in 2016, for the whole sample. The gap between the rates can be partially explained by loss-making firms within the distribution that face a negative or zero liability for the period, and hence an ETR of zero. For profitable firms only, the average reaches 28.1%. The remaining of the gap can be explained by the different tax exemptions.

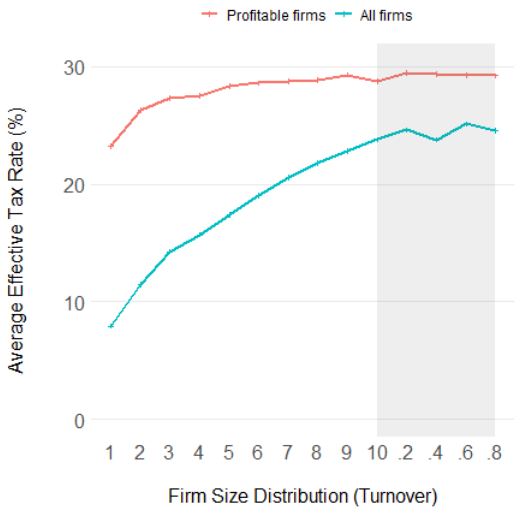
We find that the ETR increases with firm-size over most of the distribution (Figure 1). Figure 1a plots the average ETR by quantiles of firm turnover, and shows that firms in the first decile face an ETR that is 7 percentage points lower that firms in the top decile. These differences in ETRs are mostly driven by differences in statutory tax rates and by loss-making firms. When we restrict the sample to profitable firms (red lines)–around 70% of the sample–the slope flattens, suggesting that loss-making firms explain a large part of the relationship between ETR and firm-size. This is similar in other countries, where the ETR retains a slope–although steeper than in Ethiopia's case–in turnover for the sub-sample of profitable firms.

Given the contribution of the largest firms to total revenue collection, we are also interested in the ETR at the very top of the firm-size distribution. From Figure 1a, we already see that the ETR is flat at the top. Figure 1b confirms this pattern as it presents the distribution in percentiles, and further decomposes the top 1% in the top 0.1 and 0.01%. The ETR slope flattens from the 90th percentile and remains around 30% for the larger firms. This suggests that the corporate income tax is progressive and the largest firm face a relatively higher tax burden. In other countries, we observe a general decreasing trend at the top.

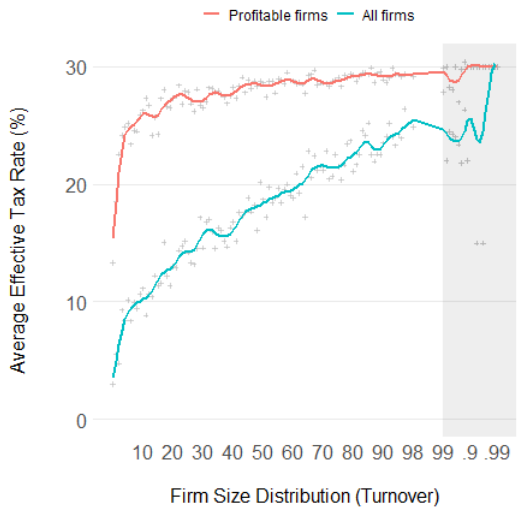
Alternative measures of the firm-size distribution yield a similar message. Figure 1c plots the ETR by equally-spaced intervals of log turnover and shows a very similar pattern. The ETR is increasing in log(turnover) and slightly decreasing when we reach the very top of the distribution. Finally, the results are consistent when the firm's ETR is built with total liability and total net profit across years (2011-2016).

[4] We cannot identify whether a firm operating in the mining industry is subjected to the lower rate for large scale operations, or the standard rate. We thus set the statutory rate to 25% for all firms within the industry, which can potentially underestimate the estimated gap between the statutory tax rate and the ETR.

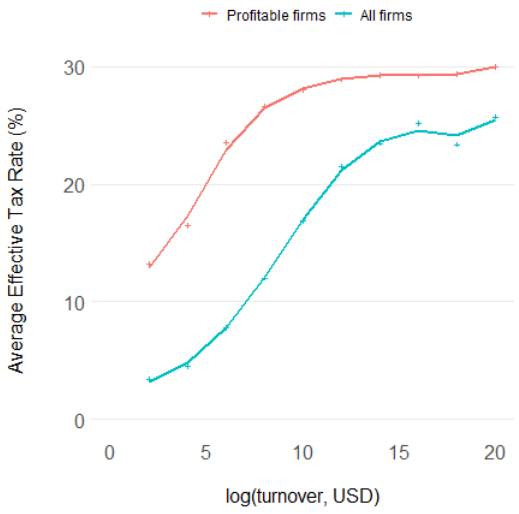
Figure 1: **Average Effective Tax Rate**



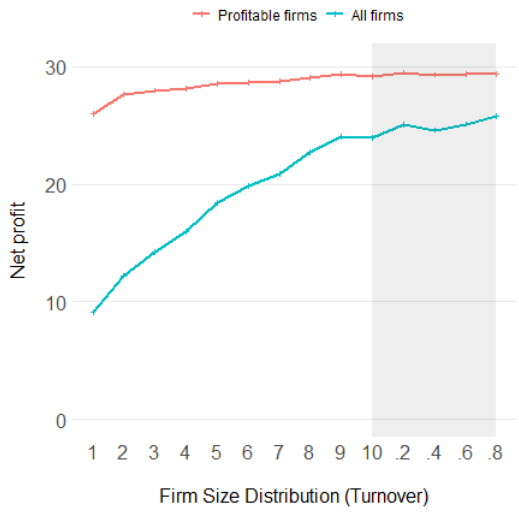
(a) By Deciles of Turnover



(b) By Percentiles of Turnover



(c) By Log Turnover



(d) By Deciles, Averages 2011-2016

Panel (a) and (b) show the average ETR (CIT liability/Net profit) by (a) deciles and (b) percentile of turnover for the last available cross-section (2016). Decile 10 in (a) is split in 5 or in quantiles 99.9 and 99.99 in (b), and represented in the grey area. Panel (c) shows the average ETR by equally-sized bins of log turnover (in USD) for 2016. Panel (d) shows the average ETR by deciles of turnover for the last year of the panel (2011-2016). In (b), the ETR is built at the firm level as the ratio of Total CIT liability over Total profit, where the totals are the sums across the years. The blue line includes all firms and negative ETRs are set to zero. The red line includes only profitable firms.

4 Appendix

Figure 2: **Concepts and Variables**

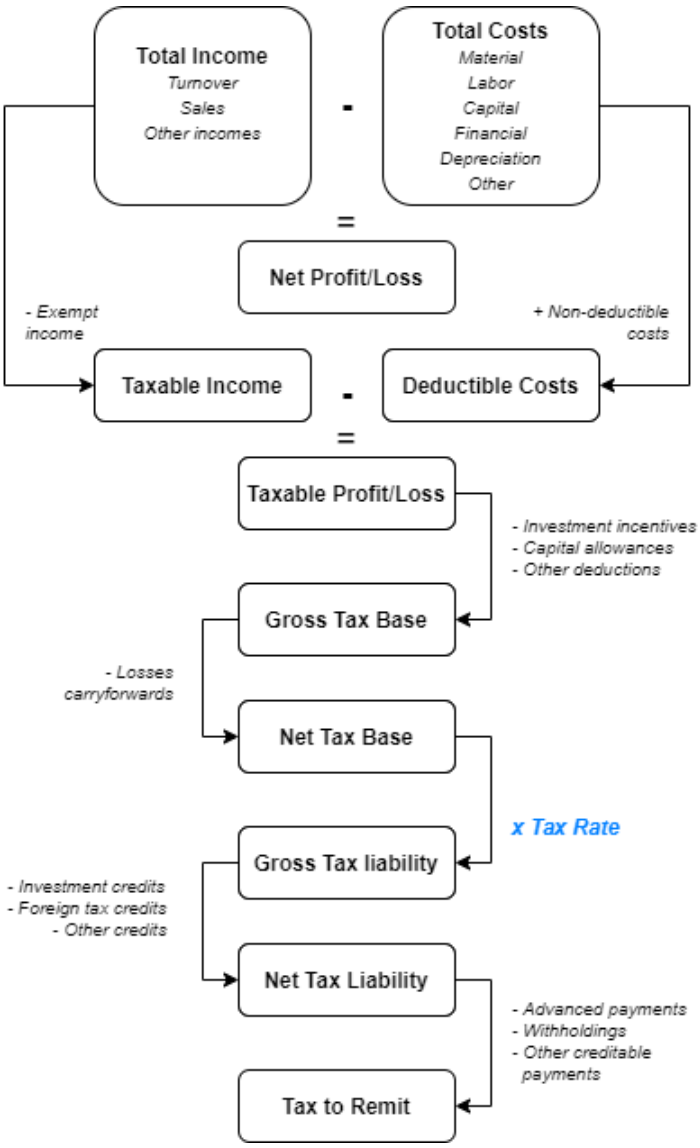
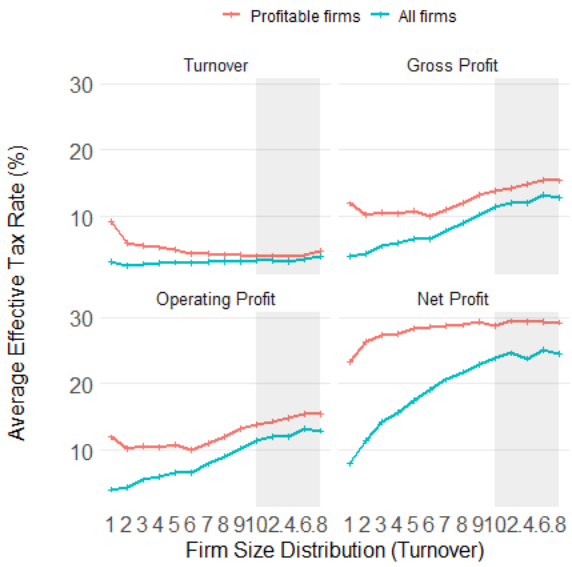
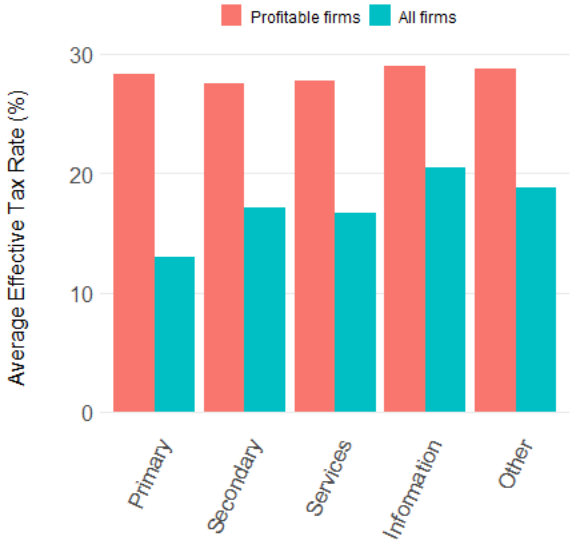


Figure 3: **Average Effective Tax Rate with Different Profit Metrics**



These graphs show the average for different ETR measures: CIT liability divided by Turnover, Gross Profit, Operating Profit and Net Profit, for each decile of turnover for the last year of the panel (2016). Everything else is as in Figure 1.

Figure 4: **Average Effective Tax Rate By Sectors**



These graphs show the average ETR (CIT liability/Net Profit), by large categories of sectors: Primary activities, Secondary activities, Services, Information activities, and Other activities; for the last year of the panel (2016). Everything else is as in Figure 1.

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