The Elasticity of Corporate Taxable Income Across Countries

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Abstract

Do firms respond similarly to corporate tax incentives across countries? We provide globally comparable estimates of the corporate elasticity of taxable income using administrative tax return data from sixteen countries and a unified empirical framework. Exploiting bunching at a common kink, zero taxable income, we estimate elasticities ranging from 0.08 to 1.9, with an average of 0.79. To explain this heterogeneity, we link elasticities to tax policy, firm characteristics, and country fundamentals. These differences imply that identical corporate tax reforms can generate sharply different revenue effects across countries, leading to substantial heterogeneity in the efficiency costs of corporate taxation.

JEL: C14, H25
Keywords: Corporate taxation, elasticity, bunching

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†We thank Kristoffer Berg, Michael Best, Michael Devereux, James Hines, Ben Lockwood, Nathan Hendren, Joel Slemrod, Kate Smith, and Juan Carlos Suarez Serrato. We further thank the participants of the CEPR Public Economics meeting, IIPF, JRC Fiscal Policy Modeling Workshop, Mannheim Taxation, EEA, EPCS Meeting, Czech Economic Society Conference, Slovak Economic Association Meeting, SIEP Conference, Spanish Economic Association Symposium, and seminar participants at Cornell University, CREST, the University of Wisconsin at Madison, SciencesPo, Stanford GSB STAX, Wharton, Northeastern University, Oxford University, Max Planck, IFN Stockholm, CUNEF, and the University of Warsaw.

1 Introduction

Corporate tax policy plays a central role in shaping firm behavior, yet evidence on how firms respond to tax changes is incomplete. A key parameter in this literature is the elasticity of corporate taxable income (ETI), which measures how reported income adjusts to tax incentives and informs both efficiency costs and revenue implications of tax reforms. As corporate tax reforms continue to feature prominently in policy debates, it is increasingly important to understand not only the magnitude of firms' responses, but how these responses vary across countries. This question is particularly salient in light of ongoing global corporate tax reform negotiations.[1] While extensive work has estimated ETIs in specific settings, we still lack a systematic, cross-country understanding of what drives these differences (e.g., Devereux et al., 2014; Lediga et al., 2019; Krapf and Staubli, 2020; Bachas and Soto, 2021; Coles et al., 2022). We ask why firms' responses to corporate tax incentives vary across countries, and which institutional, structural, and policy features account for this variation.

In this paper, we provide the first globally comparable estimates of the corporate ETI using a unified empirical framework applied to administrative tax return data from 16 countries across a wide range of regions and income levels. Our analysis harmonizes estimation methods across countries and applies a common framework to administrative tax-return data on millions of firms, ensuring that cross-country differences reflect behavior rather than methodology. We provide estimates for: Armenia, Austria, Canada, Chile, China, Costa Rica, Czechia, Ecuador, France, Greece, Montenegro, Norway, Portugal, Senegal, Slovakia, and South Africa. In most cases, our study provides the first estimate of the ETI for these countries. Notable exceptions include Costa Rica, Slovakia, and South Africa (Bukovina et al., 2025; Lediga et al., 2019; Bachas and Soto, 2021).

We document substantial heterogeneity in corporate ETIs across countries, ranging from near zero in some low-income, high-informality environments to well above one in wealthier economies. Across our sample, estimated elasticities range from 0.075 in Ecuador to 1.91 in Canada. Although this heterogeneity is meaningful, the overall range is narrower than that suggested by previous estimates. Across all countries, we estimate an average corporate ETI of 0.79. To interpret the magnitude of this elasticity, firms respond to a ten percent increase in net-of-tax rate by increasing taxable income by 9.2 percent.

We illustrate how a one percent change in the corporate rate can generate substantial cross-country heterogeneity in revenue responses using our elasticity estimates within a

[1] The Organization for Economic Cooperation and Development (OECD) has coordinated a major multinational effort—often referred to as the Global Tax Deal—to introduce, among other changes, a global minimum corporate tax rate of 15 percent. The OECD estimates that mismatches in international tax policy generate \$100–\$240 billion in lost revenue annually. `https://www.oecd.org/tax/beps/about/`

sufficient-statistic framework (Saez et al., 2012). For example, for two countries with the same statutory corporate tax rate, a percent increase in the corporate tax rate raises revenue by 0.74 percent in Norway but by only 0.56 percent in Greece, reflecting a more elastic corporate tax base in Greece (elasticity 1.19) than in Norway (elasticity 0.70). This heterogeneity reflects both differences in statutory rates and differences in behavioral responses of the corporate base.

We further evaluate the welfare implications of these revenue responses by computing marginal excess burdens and marginal values of public funds (MVPFs) for each country. On average, raising one additional dollar of corporate tax revenue entails an efficiency cost of \$0.32, with estimates as high as \$0.79 in Greece. These differences imply that countries with similar statutory tax rates can exhibit markedly different welfare costs per dollar of revenue raised, driven by heterogeneity in behavioral responses captured by the elasticity of taxable income. We show that the implied MVPFs for corporate taxation are comparable to, though generally lower than, those estimated for personal income taxation (Hendren and Sprung-Keyser, 2020), and that our corporate tax estimates align closely with benchmark calculations based on the elasticity estimated by Devereux et al. (2014) and Coles et al. (2022). These results highlight that marginal revenue responses alone provide an incomplete guide to policy evaluation, as similar revenue effects can be associated with sharply different efficiency costs depending on the responsiveness of the tax base.

Estimating the elasticity of corporate taxable income requires addressing a key feature of firm taxation that is largely absent in the individual income tax: the prevalence of loss-making firms.[2] Firms frequently report negative taxable income in some years and positive income in others. For example, over 40 percent of firms in the United Kingdom report non-positive corporate income in a given year (Bilicka, 2019). Because losses are not refundable, firms with negative taxable income face a zero statutory tax rate that increases discontinuously once income becomes positive, generating a piecewise-linear budget constraint with a kink at zero. This kink creates incentives for firms to bunch at zero taxable income.

To address this challenge, we develop a model with this piecewise-linear budget constraint in which firms differ in productivity and fixed costs to account for loss-making firms. This specifically accounts for loss-making firms, allowing us to estimate firm-level elasticities. Our approach focuses on firms near the kink—an economically important group that includes both profitable and loss-making firms and encompasses a substantial fraction of firms. Accordingly, our estimates identify the tax responsiveness of firms in this region of the income distribution,

[2] In contrast, most papers estimating elasticities of taxable income focus on individuals where negative income is negligible, and therefore, those methods explicitly exclude the possibility of negative income (e.g., Saez, 2010).

where taxable income is close to zero. While this model emphasizes real responses, our interpretation allows for reporting responses and use of tax features such as net operating losses.[3]

A key innovation of our approach is the use of a publicly available, standardized estimation package that can be easily used within secure administrative data environments. We deploy this package within each country's secure data environment, adhering to local data confidentiality constraints. We estimate nonparametric bounds and semi-parametric estimates by combining our model with recent advances in the literature (Bertanha et al., 2023, 2024), building on pioneering work by Saez (2010) and Kleven and Waseem (2013). The standardized package ensures that all elasticity estimates are generated using harmonized methods, rendering them directly comparable across countries.

We explore the variation across our elasticity estimates using machine learning methods and 95 observable characteristics, spanning firm-level characteristics, tax system design, and country fundamentals. We show that elasticities are systematically lower in countries with higher statutory tax rates and higher in wealthier economies. Using a random forest model and Shapley decompositions, we show that statutory corporate tax rates, manufacturing intensity, and foreign direct investment inflows explain the majority of cross-country variation. Our Shapley decomposition shows that tax characteristics explain roughly 50% of the variation, firm characteristics explain 29%, and country characteristics explain 21%. Our findings are robust to model extensions that include four and five predictors, with correlations of 0.89 to 0.93 between predicted and estimated elasticities. Using this framework, we generate out-of-sample predictions for 208 countries, producing a global elasticity map to inform both national and multilateral tax policy design.

Our contribution is threefold. First, we develop a flexible and scalable estimation method that enables consistent ETI measurement across countries. Second, we produce the largest cross-country dataset of corporate ETI estimates to date, creating a new empirical foundation for international tax research. Third, we demonstrate how machine learning methods can be used to decompose and extrapolate elasticity variation without administrative data access. To facilitate replication, extension, and policy use, we provide a publicly accessible website with the full set of elasticity estimates, their revenue and efficiency implications, and the standardized code needed to implement our approach within secure administrative data environments.[4]

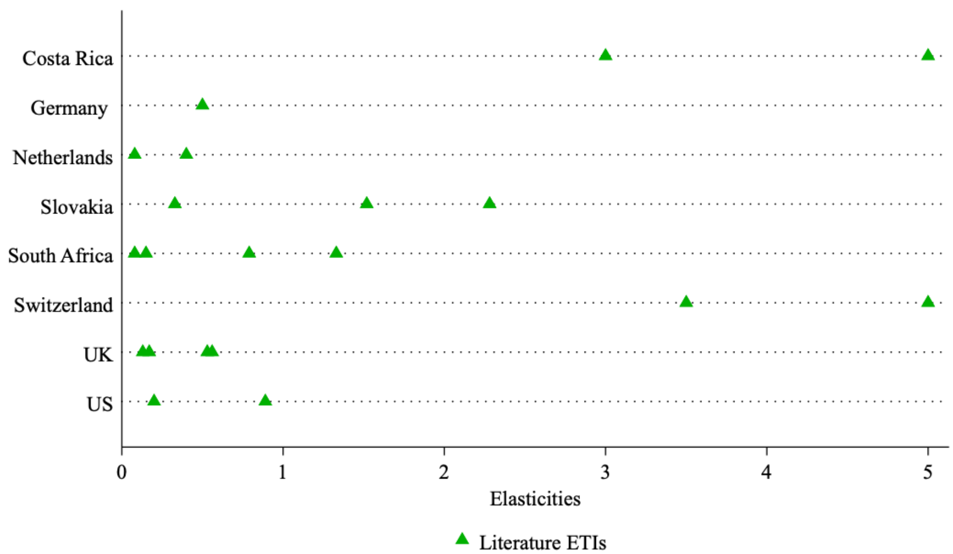
Our estimates contribute to a growing literature that views the elasticity of taxable

[3]In Appendix A, we provide an extension that considers reporting responses and in Appendix B, we provide an extension that considers loss carryforwards.

[4]See: `https://www.globaltaxresearchinitiative.org`.

income (ETI) as a central parameter for understanding both taxpayer behavior and the welfare implications of tax policy (Feldstein, 1995). Early research focused on individuals and produced widely varying estimates—ranging from –0.83 to 3—due in part to differences in data sources and empirical strategies (Feldstein, 1995; Goolsbee, 1999). Subsequent work adopted a range of methods, including instrumental variables (Auten and Carroll, 1999; Gruber and Saez, 2002), panel-based identification (Gelber, 2014; Kopczuk, 2005; Giertz, 2005; Weber, 2014), and bunching estimators that exploit kinks and notches in the tax code (Saez, 2010; Kleven and Waseem, 2013).

Figure 1: Dispersion in existing estimates



Notes: This figure graphs past elasticity estimates in the literature from different countries. We include estimates from Costa Rica (Bachas and Soto, 2021), Germany (Dwenger and Steiner, 2012), Netherlands (Massenz, 2024), South Africa (Lediga et al., 2019), Switzerland (Krapf and Staubli, 2020), Slovakia (Bukovina et al., 2025), and the US (Gruber and Saez, 2002; Coles et al., 2022), the UK (Devereux et al., 2014).

More recently, attention has turned to the corporate ETI. Estimates for the United States range from 0.2 using IV strategies (Gruber and Saez, 2002) to 0.89 using control group methods (Coles et al., 2022). Following Devereux et al. (2014), who estimated the corporate ETI in the United Kingdom at 0.5, most corporate ETI estimates have used bunching approaches. For example, corporate ETI estimates for other countries include Costa Rica (Bachas and Soto, 2021), Germany (Dwenger and Steiner, 2012), the Netherlands (Massenz, 2024), South Africa (Lediga et al., 2019), Switzerland (Krapf and Staubli, 2020), and Slovakia (Bukovina et al., 2025). These estimates span a striking range—from 0 to 5—even among relatively similar economies. Figure 1 illustrates this dispersion.

There are two broad explanations for this heterogeneity. First, differences in country fundamentals, tax system designs, and firm characteristics may generate genuine variation in elasticities across countries. This variation is important to understand for policy design. Second, as in the individual income literature, methodological differences across studies may themselves drive much of the observed dispersion. A key contribution of our paper is to minimize this second source of variation by applying a unified estimation framework to administrative data from a diverse set of countries, allowing us to isolate and study the drivers of corporate tax responsiveness.

Our findings have direct implications for the design and evaluation of international corporate tax policy. The substantial cross-country heterogeneity we document implies that harmonizing corporate tax rates, such as through global minimum tax initiatives, will generate uneven efficiency and revenue effects across countries. In economies where firms are highly responsive to tax incentives, higher statutory rates may entail sizable efficiency costs, while in countries with lower elasticities, similar reforms may raise revenue with comparatively limited behavioral responses. By providing globally comparable estimates of corporate taxable income elasticities and a framework for extrapolating them beyond countries with administrative data access, our results offer a quantitative foundation for assessing the consequences of coordinated tax reforms and for understanding how differences in economic structure and tax systems shape firms' responses in a globalized economy.

The paper is organized as follows. Section 2 develops the model of corporate behavior. Section 3 describes the datasets and countries for which we estimate elasticities, and outlines empirical methods used to estimate those elasticities. Section 4 summarizes our results, and Section 5 concludes.

2 Neoclassical Two-Period Model

In this section, we develop a two-period neoclassical model of corporate behavior. The model links bunching at a kink in the tax schedule to the elasticity of taxable income with respect to the net-of-tax rate. For ease of exposition, we present a parsimonious version, though the framework is robust to additional features.[5]

[5] For example, the neoclassical model in this section is consistent with the more in-depth framework in Patel et al. (2014), which incorporates debt and dividend taxation. In the appendix, we extend the model to incorporate reporting responses and loss carryforwards.

2.1 Model Fundamentals

Consider a firm i in country k, owned by a single shareholder, that begins period 1 with retained earnings $X_{i,k}$. Firms are heterogeneous in productivity, $A_{i,k}$, and fixed costs, $C_{i,k}$. In period 1, firm i chooses its period-2 capital, $K_{i,k}$. Firms choose capital in period 2 by deciding how much retained earnings to distribute as dividends ($D_{i,k} \geq 0$) or how much equity ($E_{i,k} \geq 0$) to issue, but not both. Capital therefore satisfies $K_{i,k} = X_{i,k} + E_{i,k} - D_{i,k}$.[6] In addition to equity, shareholders may hold government bonds with a tax-exempt rate of return, $r_k > 0$, which can vary by country k.

In period 2, capital generates income net-of-variable costs, such as depreciation costs, according to a strictly concave production function

$$I_{i,k}(K_{i,k}) = \frac{1+e_k}{e_k} A_{i,k}^{1/(1+e_k)} K_{i,k}^{\frac{e_k}{1+e_k}}. \tag{1}$$

Here, e_k determines the curvature of the production function and varies by country k. Finally, profit $F_{i,k}$ is income $I_{i,k}$ net of fixed costs $C_{i,k}$,

$$F_{i,k}(K_{i,k}) = I_i(K_{i,k}) - C_{i,k}. \tag{2}$$

In the presence of fixed costs, a profit-maximizing firm may report negative profits. We explicitly incorporate fixed costs to capture this feature of the data. In contrast to much of the existing literature, which abstracts from fixed costs, this framework can accommodate negative profits observed in the data.[7] This mechanism plays a central role in our cross-country comparisons in Section 4.

In our baseline model, taxable income is equal to profits $Y_{i,k}(K_{i,k}) = F_{i,k}(K_{i,k})$. In Appendix A, we expand the model to allow firm i to also choose how much to avoid or evade taxation $\rho_{i,k}$, such that $Y_{i,k}(K_{i,k}) = F_{i,k}(K_{i,k}) - \rho_{i,k}$. Our estimation is robust to this addition, and we relegate it to the appendix as the real and reporting responses are not the focus of

[6] For expositional simplicity, we restrict attention to equilibria in which firms do not simultaneously pay dividends and issue equity. In the general model in Patel et al. (2014), the restriction that a firm does not pay out a dividend and issue equity concurrently is derived as equilibrium behavior with a dividend tax. The restriction does not change the following analysis.

[7] Many tax systems allow firms to carry forward losses to future periods. These provisions have several implications. First, they provide firms that incurred losses in prior periods with a stock of credits that can be used to offset taxable income in the future. As a result, we expect tax systems with more generous loss carryforwards to exhibit higher elasticities. Second, loss carryforwards affect effective tax rates, particularly around the kink at zero taxable income. In Appendix B, we explicitly incorporate loss carryforwards into the model and show how our elasticity estimates change once they are included for a subset of countries. We discuss losses and effective tax rates further in Section 4.

this paper.[8]

At the end of period 2, all firms liquidate, returning their principal and profits to their shareholders.

With this model in mind, firm i chooses $K_{i,k}$ to maximize its value to its shareholder:

$$\max_{K_{i,k}} \quad V_{i,k} = X_{i,k} - K_{i,k} + \frac{(1 - t_{c,k})Y_{i,k}(K_{i,k}) + K_{i,k}}{1 + r_k}, \tag{3}$$

where $X_{i,k} - K_{i,k} = D_{i,k} - E_{i,k}$ are net distributions in period 1 valued by its shareholder.

The benefit of higher capital in period 2 is higher profit. Profit is taxed at the rate $t_{c,k}$ and discounted at the rate r_k.[9] The cost of higher capital in period 2 is reduced distributions in period 1 (fewer dividends or more equity issuances).

Consider the case where there is a kink in the marginal tax rate schedule such that $t_{c,k} = t_{0,k}$ for $Y_{i_k}(K_{i,k}) \leq \kappa$ and $t_{c,k} = t_{1,k}$ for $Y_{i,k}(K_{i,k}) > \kappa$, where $t_{0,k} < t_{1,k}$. Under this marginal rate schedule, the objective function faced by the firm is

$$\begin{aligned} \max_{K_{i,k}} \quad V_{i,k} =& X_{i,k} - \frac{1}{1 + r_k} r_k K_{i,k} \\ &+ \mathbb{I}(Y_{i,k}(K_{i,k}) \leq \kappa) \frac{(1 - t_{0,k})Y_{i,k}(K_{i,k})}{1 + r_k} \\ &+ \mathbb{I}(Y_{i,k}(K_{i,k}) > \kappa) \frac{(1 - t_{0,k})\kappa + (1 - t_{1,k})(Y_{i,k}(K_{i,k}) - \kappa)}{1 + r_k}, \end{aligned} \tag{4}$$

where $\mathbb{I}(Y_{i,k}(K_{i,k}) \leq \kappa)$ and $\mathbb{I}(Y_{i,k}(K_{i,k}) > \kappa)$ are indicator functions for taxable income being below or above the kink.

2.2 Model Solution

Firms choose their capital in period 2 to equalize the marginal benefit and marginal cost of additional capital. Under the Hall–Jorgenson formula (Hall and Jorgenson, 1967), firms choose capital so that the marginal product equals the opportunity cost of funds, $r/(1 - t_{c,k})$. The marginal product of capital decreases with capital because the income function is increasing and concave in capital. Firms subject to higher tax rates have higher opportunity-cost rates of return, and firms increase their marginal product of capital by decreasing their level of

[8] For more information on the real and reporting trade-off, see Coles et al. (2022).

[9] The equilibrium rate of return r_k is assumed to be exogenous, abstracting from all general equilibrium effects.

capital.

We extend this framework to a piecewise-linear tax schedule with a kink. To provide intuition, it is helpful to consider firm capital choices for three representative firms that differ based on the curvature of their production function, seen in Figure 2. An easy way to understand these firms' optimal choices with a kinked tax schedule, depicted in panel (c), is to first consider their choices with kink-free schedules with high and low opportunity-cost rates, respectively, in panels (a) and (b).

In panel (a) of Figure 2, Firms 1, 2, and 3 are subject to a kink-free tax schedule with a low opportunity-cost rate (low tax rate, t_0). In this case, the Hall-Jorgenson formula applies, and all firms set their marginal product of capital equal to the opportunity-cost rate of return $\partial Y_{i,k}(K_{i,k})/\partial K_{i,k} \equiv Y'_{i,k}(K_{i,k}) = r_k/(1-t_{0,k})$. Firm 3 sets its capital such that its taxable income is below the kink. Firms 1 and 2, by comparison, set their capital such that their taxable income is above the kink.

In Panel (b) of Figure 2, Firms 1, 2, and 3 are subject to a kink-free tax schedule with a high opportunity-cost rate (high tax rate, $t_{1,k}$). The optimal choices for Firms 1 and 3 change relative to panel (a) according to the Hall-Jorgenson formula applied to the higher opportunity-cost rate. However, their taxable income values remain above the kink for Firm 1 and below the kink for Firm 3, as in panel (a). As a result, with a kinked tax schedule, Firm 1 will be subject to the high opportunity-cost rate and will choose its taxable income as depicted in panel (b). Firm 3, on the other hand, under a kinked tax schedule, will be subject to the low opportunity-cost rate and will choose its taxable income as depicted in panel (a).

In contrast, Firm 2's taxable income values change from above the kink in panel (a) to below the kink in panel (b). As a result, when Firm 2 is faced with a kinked schedule, it sets its taxable income exactly at the kink point, depicted in panel c. At this point, its marginal product of capital is greater than the opportunity-cost rate of return with the lower tax rate and less than the opportunity-cost rate of return with the higher tax rate. We depict the optimal choices of the three firms with the kinked tax system in panel c of Figure 2.

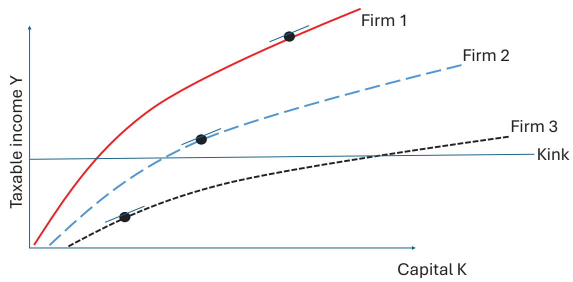
Formally, we derive the equilibrium capital and taxable income by taking the derivative of firm value with respect to capital in two regions where the derivative exists.

$$\frac{\partial V_{i,k}}{\partial K_{i,k}} = \begin{cases} \frac{1}{1+r_k}\left(-r_k + (1-t_{0,k})\frac{\partial Y_{i,k}(K_{i,k})}{\partial K_{i,k}}\right), & Y_{i,k}(K_{i,k}) < \kappa \\ \frac{1}{1+r_k}\left(-r_k + (1-t_{1,k})\frac{\partial Y_{i,k}(K_{i,k})}{\partial K_{i,k}}\right), & Y_{i,k}(K_{i,k}) > \kappa. \end{cases} \tag{5}$$

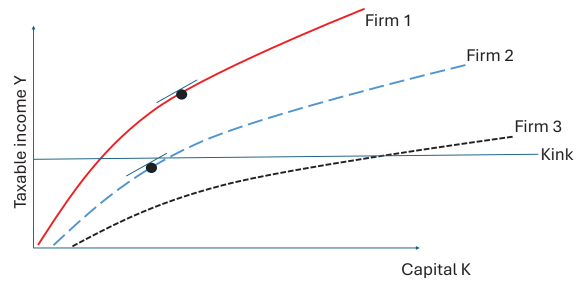
The solution for taxable income $Y_i(K_i)$ has a similar form to solutions derived in different contexts in this literature (Saez, 2010; Coles et al., 2022; Bertanha et al., 2023):

Figure 2: Firm optimization

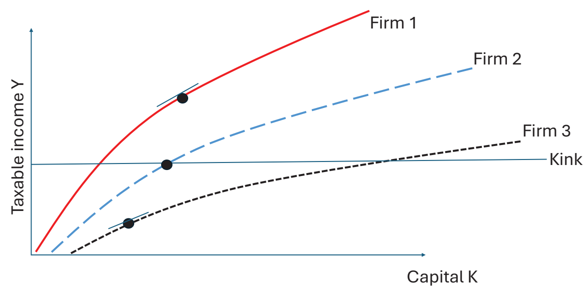
(a) Low opportunity-cost rate of return $r_k/(1-t_{0,k})$ kink-free schedule



(b) High opportunity-cost rate of return $r_k/(1-t_{1,k})$ kink-free schedule



(c) Kinked tax schedule with low and high opportunity-cost rates of return



Notes: This figure depicts the optimal choices of three firms in three different tax regimes in panels a, b, and c. Panel a depicts choices with a kink-free tax schedule with a low opportunity-cost rate of return. Panel b does the same with a high opportunity-cost rate of return. Finally, Panel c depicts the optimal capital and taxable income choices with the kinked tax schedule with low and high opportunity-cost rates of return.

$$Y_{i,k}(K_{i,k}) = \begin{cases} \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{0,k})^{e_k} A_{i,k} - C_{i,k}, & A_{i,k} \leq \underline{A}_{i,k} \\ \kappa, & \underline{A}_{i,k} < A_{i,k} < \overline{A}_{i,k} \\ \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{1,k})^{e_k} A_{i,k} - C_{i,k}, & A_{i,k} \geq \overline{A}_{i,k}. \end{cases} \tag{6}$$

The thresholds are found by setting the optimal taxable income equal to the kink κ with both tax rates:

$$\underline{A}_{i,k} = (\kappa + C_{i,k})/\theta_{0,k}, \qquad \text{and} \qquad \overline{A}_{i,k} = (\kappa + C_{i,k})/\theta_{1,k}, \tag{7}$$

where $\theta_{c,k} = \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{c,k})^{e_k}$, for $c = \{0, 1\}$.

2.3 Elasticities

The key parameter in our model is e_k, which determines the curvature of the profit function with $A_{i,k}$ and varies by country k. In addition, e_k determines how much firms adjust their capital in response to a change in tax rate and, therefore, characterizes the elasticity of income with respect to the net-of-tax rate. To see this, we write equilibrium income, net of depreciation costs, as

$$I^*_{i,k} = \begin{cases} \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{0,k})^{e_k} A_{i,k}, & A_{i,k} \leq \underline{A}_{i,k} \\ \kappa + C_{i,k}, & \underline{A}_{i,k} < A_{i,k} < \overline{A}_{i,k} \\ \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{1,k})^{e_k} A_{i,k}, & A_{i,k} \geq \overline{A}_{i,k}. \end{cases} \tag{8}$$

This representation of income is simply the profit function before taking into account fixed costs $C_{i,k}$.

The elasticity of income with respect to the net-of-tax rate is given by

$$\frac{\partial I^*_{i,k}}{\partial(1-t_{0,k})} \frac{(1-t_{0,k})}{I^*_{i,k}} = e_k \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{0,k})^{e_k-1} A_{i,k}(1-t_{0,k}) \frac{1}{I^*_{i,k}} = e_k \quad \text{if} \quad A_{i,k} \leq \underline{A}_{i,k} \tag{9}$$

$$\frac{\partial I^*_{i,k}}{\partial(1-t_{1,k})} \frac{(1-t_{1,k})}{I^*_{i,k}} = e_k \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{1,k})^{e_k-1} A_{i,k}(1-t_{1,k}) \frac{1}{I^*_{i,k}} = e_k \quad \text{if} \quad A_{i,k} \geq \overline{A}_{i,k} \tag{10}$$

The elasticity of *taxable income* with respect to the net-of-tax rate, $\varepsilon_{i,k}$ varies by firm and country and depends on the elasticity of income,

$$\begin{aligned} \varepsilon_{i,k} &= \frac{\partial Y_{i,k}(K_{i,k})}{\partial(1-t_{0,k})} \frac{(1-t_{0,k})}{Y_{i,k}(K_{i,k})} = \frac{\partial I^*_{i,k}}{\partial(1-t_{0,k})} \frac{(1-t_{0,k})}{Y_{i,k}(K_{i,k})} = e_k \frac{I^*_{i,k}}{Y_i(K_i)} \\ &= e_k \left(1 + \frac{C_{i,k}}{Y_{i,k}}\right) \end{aligned} \tag{11}$$

In our model, the elasticity of taxable income, ETI, is heterogeneous by firm and country and depends on the shape of the production function, captured by e_k, $A_{i,k}$, and $C_{i,k}$. For example, firms in countries with greater income elasticities will have greater taxable income elasticities, all else equal. We also show that firms with greater fixed costs are more elastic, potentially because they have lower marginal costs once their fixed infrastructure is in place. In a special case that we examine in this paper, i.e., at zero taxable income kink, the average elasticity across firms within a country may differ from the elasticity at different points in the distribution. This is because the elasticity varies by firm and our model explicitly allows for that. We further discuss the heterogeneity across firms within a country in Section 4.4, and for expositional ease, otherwise focus on a single elasticity by country.

Coles et al. (2022) shows that the elasticity of taxable income is a combination of the real and reporting responses. In the paper, we focus on the real response. In Appendix A, we show how this equation is updated when we allow for reporting responses.

Equation (6) maps the unobserved variables $A_{i,k}$ and $C_{i,k}$ to the observed variable $Y_{i,k}$. This mapping depends on the kink point κ, the value of production amenities to the left of the kink $\theta_{0,k} = \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{0,k})^e$ and on the right $\theta_1 = \frac{1+e_k}{e_k} r_k^{-e_k}(1-t_{1,k})_k^e$, and the income elasticity e_k. We can use this mapping to write the mixed continuous-discrete distribution of $Y_{i,k}(K_{i,k})$, which is observed by the researcher, as a function of the continuous distribution of $(A_{i,k}, C_{i,k})$, which is unobserved. The identification problem consists of using this mapping to back out e_k using the observed distribution of $Y_{i,k}$, which requires assumptions on the unobserved distribution of $(A_{i,k}, C_{i,k})$. We discuss solutions to this problem in the next section.

3 Datasets and Empirical Methods

In this section, we summarize the datasets and discuss the empirical methodology we use to estimate elasticities across countries. Each estimate was performed separately using administrative tax data, and reflects average firm sensitivity to tax rates within the context of the tax system in which they operate.

3.1 Datasets and Comparison of Countries

In this paper, we use corporate tax return datasets from the following 16 countries: Armenia, Austria, Canada, Chile, China, Costa Rica, Czechia, Ecuador, France, Greece, Montenegro, Norway, Portugal, Senegal, Slovakia, and South Africa. We provide detailed information on each dataset used in Appendix F, including how it was accessed, which time period was used to estimate the elasticities, and a brief description of the corporate tax system in each country.

The countries in our sample differ in their tax systems, firm characteristics, and economic fundamentals. A country's elasticity may depend on its statutory tax rate, though the direction and magnitude of this relationship are theoretically ambiguous and therefore ultimately an empirical question. In Table 1, we provide details of each country's tax system using information supplied by the national research teams. Countries in our sample have statutory rates ranging from 10% in Montenegro to 33% in France (column 2). In columns 3–7, we report rules governing loss carryforwards and carrybacks, loss consolidation, minimum taxes, and tax holidays. Some countries allow indefinite loss carryforwards (e.g., Chile and France), while others limit them to three years (Senegal). Most countries do not allow loss carrybacks, but three do (Canada, France, and Norway). Six countries allow loss consolidation across domestic affiliates within the same firm (France, Montenegro, Norway, Portugal, Senegal, and South Africa). Four countries also impose a minimum tax (Armenia, Canada, France, and Senegal), which can limit the use of deductions and tax holidays and may therefore affect reporting incentives. We anticipate that countries with more flexible tax provisions—such as those permitting more generous carryforwards or tax holidays—will exhibit higher elasticities.

Table 1: Tax System Characteristics

Country	Tax rate	Loss carryforward	Loss carryback	Loss cons.	Min tax	Tax holiday
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Armenia	0.2	5	No	No	Yes	Yes
Austria	0.365	3	No	No	No	No
Canada	0.17	20	3	No	Yes	No
Chile	0.20	indefinitely	No	No	No	Yes
China	0.26	5	No	No	No	Yes
Costa Rica	0.30	5	No	No	No	Yes
Czechia	0.19	5	2	No	No	No
Ecuador	0.24	5	No	No	No	No
France	0.33	indefinitely	3	Yes	Yes	No
Greece	0.27	5	No	No	No	No
Montenegro	0.10	5	No	Yes	No	Yes
Norway	0.27	indefinitely	2	Yes	No	No
Portugal	0.21	5	No	Yes	No	No
Senegal	0.28	3	No	Yes	Yes	No
Slovakia	0.23	7	No	No	No	Yes
South Africa	0.32	indefinitely	No	Yes	No	Yes

Note: We present information on the statutory corporate tax rates, loss carryforwards and carrybacks, loss consolidation, minimum taxes, and tax holidays for the years when elasticities are estimated for each country. These characteristics were provided by each country's co-authors. All countries have VAT registration (over some threshold) and payment advances (monthly or quarterly).

Firm characteristics vary substantially across countries in our sample, with potentially important implications for differences in corporate ETIs. In Table 2, we provide details of firm distribution within each country using Orbis data reported in millions of US dollars (apart from number of employees).[10] In columns 2-4, we report measures of average firm size: assets, revenues, and number of employees, respectively. Czechia, Slovakia and Greece have firms with relatively small assets and revenues, and South Africa and Canada have relatively large average firms. In columns 5-7, we report the 10th, 90th, and 99th percentiles of asset distribution. We expect that firm size is related to firm elasticity but the overall effect may be ambiguous. For example, larger firms may be more tax sophisticated and adjust their employment and investment in response to higher taxes. Alternatively, smaller firms may have fewer fixed costs and be able to adjust production faster.

Beyond tax policy and firm composition, countries in our sample differ substantially in economic and institutional fundamentals that may shape firms' responsiveness to corporate taxation. In Table 3, we report a selection of these characteristics using data from the World Bank World Development Indicators to demonstrate the wide span of these characteristics across countries in our sample. We consider characteristics of the economy (column 2, log GDP per capita), the organization of economic activity (column 3, percent for formally registered firms), and the quality of government (column 4, governance quality index). Senegal has a relatively low share of formally registered firms, while Canada and France have a high share of formally registered firms. Canada and Chile have a higher governance quality index, while Ecuador and Costa Rica have lower indexes. We complement these by reporting the logarithm of total tax revenues (column 5), the Gini coefficient of income (column 6), which measures the distribution of resources in an economy, population (column 7), the value added of manufacturing (as a % of GDP) in column 8 and share of FDI inflows in GDP in column 9. In principle, each of these characteristics may influence how elastic firms are in each country and countries we have in our sample range from small (Costa Rica) to large (China) economies.

In Section 4.5, we use this cross-country variation in characteristics to provide evidence on how these characteristics influence firms' tax responsiveness.

3.2 Empirical Methods

This section discusses the identification of the elasticity parameter e_k using data with bunching at zero profits. Three features of corporate tax data motivate our focus on the zero-income kink. First, many firms report negative taxable income in a given year. Second, firms that are not near zero in one year have a substantial probability of reporting income close to

[10] Orbis provides balance sheet data for public and private firms across the world. The coverage of Orbis varies across countries, does not represent the full population of firms, and may be more limited to large firms in low-income countries in our sample. Nevertheless, it is the only dataset that allows international firm-level comparison.

Table 2: Firm Characteristics from Orbis.

Country	Assets	Revenue	Employees	p10 Assets	p90 Assets	p99 Assets
Armenia	22.04	9.48	171.78	5.59	39.09	193.77
Austria	92.76	36.69	20.90	0.04	7.94	221.40
Canada	3685.69	312.30	472.70	18.30	11691.37	48385.61
Chile	619.96	71.65	3382.19	0.71	946.44	9514.86
China	170.95	147.24	411.52	0.39	118.45	2874.26
Costa Rica	629.89	90.75	518.55	7.97	1417.95	9448.45
Czechia	2.67	2.41	25.66	0.01	2.26	33.04
Ecuador	375.44	64.80	678.67	12.12	1174.53	4885.06
France	16.90	4.55	25.86	0.04	3.16	58.99
Greece	5.15	3.68	22.06	0.17	8.97	56.75
Montenegro	22.86	8.94	150.87	0.18	53.06	210.98
Norway	12.41	2.77	9.24	0.01	3.78	73.08
Portugal	2703.32	95.62	462.14	40.52	3577.95	58170.78
Senegal	463.08	33.58	364.99	103.19	1157.79	1378.38
Slovakia	2.94	1.65	23.17	0.01	1.95	27.51
South Africa	4099.08	1113.13	1132.80	1.97	5849.82	69222.77

Note: Firm-level data comes from Orbis and represents averages for years 2004-2019. All amounts (apart from number of employees) are reported in millions of US Dollars. p10 is the 10th percentile of the distribution of assets, p90 is the 90th percentile and p99 is the 99th percentile.

Table 3: Country fundamentals.

Country	log GDP pc	% Formally Reg.	Governance	Total Taxes	Gini	Population	Manuf. VA	FDI inflows
Armenia	8.22	97.23	-0.27	3.44	32.14	2.98	10.03	3.62
Austria	10.79	99.20	1.54	3.95	30.47	8.51	16.70	-0.42
Canada	10.78	–	1.62	3.38	32.99	34.69	10.18	2.72
Chile	9.59	96.90	1.14	3.32	45.80	17.48	10.98	6.94
China	8.90	95.80	-0.51	4.21	38.83	1354.64	30.40	2.53
Costa Rica	9.26	87.90	0.59	4.06	48.49	4.66	12.56	5.53
Czechia	9.91	98.23	0.91	3.84	25.56	10.46	23.03	3.76
Ecuador	8.68	88.20	-0.67	3.53	45.53	15.51	13.75	0.80
France	10.61	99.20	1.19	4.21	32.09	63.24	10.24	1.36
Greece	9.98	98.10	0.43	3.88	34.76	10.95	8.54	1.02
Montenegro	8.89	97.03	0.05	3.26	37.81	0.62	4.13	12.15
Norway	11.38	–	1.74	3.69	27.36	5.02	6.64	0.81
Portugal	9.98	93.10	1.04	3.74	34.66	10.45	11.83	4.58
Senegal	7.21	83.35	-0.19	3.82	38.30	13.82	17.22	2.11
Slovakia	9.78	99.07	0.75	3.89	25.33	5.40	18.56	2.69
South Africa	8.80	93.40	0.27	3.45	63.00	53.06	12.03	1.15

Note: Country-level fundamentals data comes from World Bank World Development Indicators and is an average over years 2004-2019. We provide details of data sources and definitions for each variable in Table D1. In the last two columns, manufacturing value added and FDI inflows are calculated as a share of GDP.

zero in subsequent years. Third, all countries in our sample feature a kink at zero taxable income, and for many, this is the only kink in the tax schedule. To ensure comparability across countries, we therefore estimate elasticities at the zero-income kink.

Estimating corporate taxable income elasticities raises a fundamentally different identification problem than in the personal income tax setting, reflecting distinctive features of firm behavior and tax treatment. A central distinction is that many modern bunching approaches, originally developed for personal income tax estimates (Saez, 2010), rely on logarithmic transformations of income (Bertanha et al., 2023; Pollinger, 2024; Goff, 2022). The logarithmic transformation is well-defined in settings where taxable income is strictly positive, as in personal income tax settings. In corporate tax data, however, taxable income is frequently zero or negative, rendering such transformations invalid and necessitating an alternative identification strategy.

We start with the mapping between observables and unobservables in Equation (6). The parameter e_k is identified if we are able to solve for e_k as a function of the distribution of the data $Y_{i,k}$ while imposing minimal assumptions on the distribution of the unobserved productivity and fixed costs $(A_{i,k}, C_{i,k})$. To address this identification problem, we draw on the framework developed by Bertanha et al. (2023), who study the identification of labor supply elasticities using bunching methods. They study a related problem and seek to identify the elasticity of labor supply with respect to income taxes. Relative to our setting, their mapping between observables and unobservables is simpler along three dimensions (compare our Equation (6) to their Equation (3)).

First, their model features a single unobserved variable, whereas ours includes both productivity A_i and fixed costs C_i. Second, taxable income and the kink point are always positive in their setting, allowing for logarithmic transformations that are infeasible when income can be negative. Third, the threshold values governing regime changes are constant across individuals in their framework but firm-specific in ours (see Equation (6)). In light of these differences, we reformulate our problem into the framework studied by Bertanha et al. (2023), and we rely on their identification arguments to recover the elasticity parameter e_k.

Assumptions on fixed costs The first step reduces the problem from two unobserved variables to one. We use firm-level data to identify a functional form relating revenue and deductions, where deductions serve as a proxy for total costs (Coles et al., 2022). The firm's fixed cost equals the predicted deduction amount under the functional form when revenues are set to zero.

For an unknown vector of parameters $\beta \in \mathbb{R}^n$, assume there exist known functions $f(\cdot)$

and $g(\cdot;\beta)$ such that

$$f_k(\text{Deductions}_{i,k}) = g_k(\text{Revenues}_{i,k};\beta) + \varepsilon_{i,k}, \tag{12}$$

where $\varepsilon_{i,k}$ is an idiosyncratic shock independent of revenues, $f_k(\cdot)$ is invertible, and there is sufficient variation in revenues to identify β_k. Once we have β, we retrieve $\varepsilon_{i,k} = f_k(\text{Deductions}_{i,k}) - g_k(\text{Revenues}_{i,k};\beta_k)$ and the firm fixed costs is

$$C_{i,k} = f_k^{-1}\left(g_k(0;\beta_k) + \varepsilon_{i,k}\right). \tag{13}$$

The choice of deduction variables and functional form varies across countries depending on data availability. Table C4 in the Appendix provides the details. For example, one possible choice is $f_k(y_{i,k}) = \log(y_{i,k})$ and $g_k(x_{i,k};\beta_{i,k}) = \beta_0 + \beta_{1,k}x_{i,k}$, in which case $C_{i,k} = exp(\beta_{0,k} + \varepsilon_{i,k})$. In cases where panel data are available, $\beta_{0,k} + \varepsilon_{i,k}$ is replaced by a firm fixed effect. Estimation of $C_{i,k}$ follows naturally from readily available estimators for β_k in each context.

Operating leverage The second step in our identification argument is to create a new variable $W_{i,k}$ as a function of $Y_{i,k}$ and $C_{i,k}$, which is a measure of operating leverage. We define operating leverage W_i as profits $Y_{i,k}$ plus fixed cost $C_{i,k}$ divided by fixed cost $C_{i,k}$,

$$W_{i,k} = \frac{Y_{i,k} + C_{i,k}}{C_{i,k}}. \tag{14}$$

Recall that $Y_{i,k}$ equals revenue minus variable and fixed costs, so that $Y_{i,k} + C_{i,k}$ equals revenue minus variable costs. The ratio $W_{i,k}$ equals one at the break-even point, where revenue exactly covers costs. The ratio is greater than 1 when the firm is generating profits. The ratio is less than 1 but above zero when revenue covers the variable cost but not the fixed cost, so the firm is above their shutdown point. This ratio closely resembles standard measures of operating leverage (Ferri and Jones, 1979). The researcher is able to construct $W_{i,k}$ because $Y_{i,k}$ is directly observed and $C_{i,k}$ is constructed as explained above via Equation (13).

Operating leverage converts an accounting kink into a continuous measure of distance from the firm's shutdown margin. Using Equation (6) in Equation (14) and assuming the most common case of $\kappa = 0$, we find W_i to have three regimes:

$$W_{i,k} = \begin{cases} \theta_{0,k} A_{i,k}/C_{i,k}, & \text{if } A_{i,k}/C_{i,k} \leq 1/\theta_{0,k}, \\ 1, & 1/\theta_{0,k} < A_{i,k}/C_{i,k} < 1/\theta_{1,k}, \\ \theta_{1,k} A_{i,k}/C_{i,k}, & \text{if } 1/\theta_{1,k} \leq A_{i,k}/C_{i,k}. \end{cases} \tag{15}$$

For a continuous distribution of $A_{i,k}/C_{i,k}$, operating leverage $W_{i,k}$ has a mixed continuous-discrete distribution with a mass point at $W_{i,k} = 1$. Below the mass point, $W_{i,k}$ increases with the ratio $A_{i,k}/C_{i,k}$, with a slope of $\theta_{0,k} = \frac{1+e_k}{e_k} r_k^{-e_k} (1 - t_{0,k})^{e_k}$. Similarly, above the kink, W_i increases with the ratio $A_{i,k}/C_{i,k}$, with a slope of $\theta_{1,k} = \frac{1+e_k}{e_k} r_k^{-e_k} (1 - t_{1,k})^{e}_{k}$. The three regimes summarized above have important characteristics. First, the mapping presented in Equation (15) relates one unobserved variable $A_{i,k}/C_{i,k}$ to the observed variable $W_{i,k}$. Second, the variable $W_{i,k}$ is always positive, allowing for a logarithmic transformation.[11] Third, the threshold values on the variable $A_{i,k}/C_{i,k}$ that dictate the three regimes are constant across firms.

Next, we rewrite the mapping in Equation (15) using the logarithmic transformation. Define $w_{i,k} = \log(W_{i,k})$, $s_{c,k} = \log(1 - t_{c,k})$, $c = 0, 1$, $\mu_k = \log\left[\left(\frac{1+e_k}{e_k}\right) r^{-e_k}\right]$, $a_{i,k} = \log(A_{i,k}/C_{i,k})$. It follows that

$$w_{i,k} = \begin{cases} \mu_k + e_k s_{0,k} + a_{i,k}, & \text{if } a_{i,k} \leq -\mu_k - e_k s_{0,k}, \\ 0, & \text{if } -\mu_k - e_k s_{0,k} < a_{i,k} < -\mu_k - e_k s_{1,k}, \\ \mu_k + e_k s_{1,k} + a_{i,k}, & \text{if } -\mu_k - e_k s_{1,k} \leq a_{i,k}. \end{cases} \tag{16}$$

Define $n_{i,k}^* = \mu_k + a_{i,k}$. We finally arrive at

$$w_{i,k} = \begin{cases} n_{i,k}^* + e_k s_{0,k}, & \text{if } n_{i,k}^* \leq -e_k s_{0,k}, \\ 0, & \text{if } -e_k s_{0,k} < n_{i,k}^* < -e_k s_{1,k}, \\ n_{i,k}^* + e_k s_{1,k}, & \text{if } -e_k s_{1,k} \leq n_{i,k}^*, \end{cases} \tag{17}$$

which is the same mapping studied by Bertanha et al. (2023) with a kink value of 0 (i.e., see their Equation (4)).

Bunching methods The final step of our identification argument is to apply the identification strategies of Bertanha et al. (2023) to data on $w_{i,k}$. These strategies seek to identify

[11] Empirically, we do find negative values of $W_{i,k}$ when firms have very high losses and their fixed costs do not explain these losses. Our bunching identification strategy relies on the distribution of $W_{i,k}$ local to its mass point at 1 and thus negative values of $W_{i,k}$ do not harm the identification of e_k.

the elasticity parameter e_k under various assumptions on the distribution of the unobserved variable $n^*_{i,k}$. Identification is impossible when the distribution of $n^*_{i,k}$ is unrestricted within the class of continuous distributions (Blomquist et al. (2021), Bertanha et al. (2018)). Thus, bunching is only informative of e_k with assumptions stronger than continuity. In contrast, parametric assumptions on the distribution of $n^*_{i,k}$ yield identification of the elasticity, but are often deemed too strong. In the next paragraphs, we revisit two identification methods of Bertanha et al. (2023) that balance the two extremes.

The first method relies on the weakest type of assumption and yields partial identification of the elasticity parameter e_k. The assumption is that the probability density function of $n^*_{i,k}$ is Lipschitz continuous with slope bounded by a constant $M_k \in (0, \infty)$. Under this nonparametric class of distributions, Theorem 2 of Bertanha et al. (2023) gives analytical expressions for upper and lower bounds on e_k. The expressions depend on M_k and other quantities that can be estimated from the data. We refer to this first method as nonparametric bounds.

The nonparametric bounds provide insights into the heterogeneity across countries without relying on strong assumptions. These bounds nest the original estimators that either assume $M_k = 0$ or the so-called trapezoidal approximation (Saez, 2010; Chetty, 2009). Given a reasonable range of values for the slope restriction, M_k, we plot bounds as functions of M_k for each country. As we increase M_k, we loosen the shape restriction on the distribution of $n^*_{i,k}$ and can, therefore, examine the sensitivity of elasticity bounds to assumptions on the heterogeneity distribution.

The second method point-identifies the elasticity parameter e_k by relying on additional firm-level data $X_{i,k}$ and a semi-parametric distributional assumption on $n^*_{i,k}$. Bertanha et al. (2023) show how to identify e_k using a Tobit model with a censoring point in the interior of the distribution. The Tobit model typically assumes the normality of $n^*_{i,k}$ conditional on $X_{i,k}$. Lemma 1 by Bertanha et al. (2023) shows that such a normality condition is not necessary for the identification of the elasticity. In fact, a sufficient condition requires that the distribution of n^*_i equal an average of normal distributions, where the average is taken over the distribution of X_i. Tobit models are extremely easy to estimate, with statistical software that does so readily available. A simple way to assess the distributional assumptions of this second method is to compare the best-fit distributions produced by the model with the raw histogram of the data. Note that this second method relies on stronger assumptions than the first method above. In particular, in the absence of additional data $X_{i,k}$, this method simply assumes the normality of $n^*_{i,k}$.

We can further loosen the distributional assumptions by relying on a truncated Tobit model, where the dependent variable $w_{i,k}$ is symmetrically truncated at an interval centered at the mass point at zero. Intuitively, the distributional assumption that a mixture of normals approximates the distribution of $n^*_{i,k}$ only needs to hold over a smaller region rather than the full support. We can plot the estimated value of the elasticity as a function of decreasing truncation intervals to examine the sensitivity of estimates to the distributional assumptions.

We follow the advice of Bertanha et al. (2023) and use both methods to assess the robustness of elasticity values to different types of assumptions, from the weaker assumption of the nonparametric bounds to the stronger distributional assumption of the Tobit regressions. We further conduct sensitivity analyses by varying the strength of the assumption and examining how elasticity values change. In the first method, we vary the maximum slope value M_k around values that are consistent with slope magnitudes observed in the distribution of $w_{i,k}$. In the second method, we vary the truncation window around values for which the model best-fit distributions are similar to raw histograms of the data. Empirically, this results in choosing a subset of data that we use to estimate the baseline elasticities around the zero kink. Bunching is most informative on the elasticity parameter whenever elasticity values are robust to these sensitivity analyses across methods. Finally, estimators that follow the two identification strategies described in this section are implementable in Stata through the package named `bunching`. See Bertanha et al. (2022) for full details on the package.

3.3 Limitations

We conclude this section by discussing several limitations of our empirical approach and clarifying how our modeling framework shapes their interpretation.

First, the elasticity of taxable income is not a structural parameter in our framework. Elasticities vary across countries and firms, a feature we document empirically in Section 4.4. This perspective aligns with a growing literature that emphasizes that taxable income elasticities depend on the institutional features of the tax system, including enforcement, reporting opportunities, and the treatment of losses (Saez et al., 2012; Doerrenberg et al., 2015). We therefore interpret our estimates as policy-relevant reduced-form elasticities rather than universal structural parameters.

Second, the baseline model does not separately identify real and reporting responses. We interpret bunching at the kink primarily as arising from real adjustments driven by curvature in the profit function, through investment and production decisions. This is appropriate for revenue forecasting (Chetty, 2009). In practice, some portion of the observed response may reflect reporting behavior rather than changes in real activity. Disentangling these channels requires additional assumptions or auxiliary data that are not consistently available across countries. In Appendix A, we extend the model to allow for reporting responses and show

how, when combined with additional information, our estimates can be used to decompose real and reporting components.

Third, our focus on the zero-taxable-income kink raises issues related to net operating losses. We focus on this kink because it is present in all countries in our sample and because many firms cluster near zero taxable income, enhancing comparability and statistical power. At the same time, many tax systems allow firms to carry losses forward or backward, implying that firms may face positive effective marginal tax rates even when current taxable income is negative (Graham, 1996; Blouin et al., 2010). The generosity of these provisions shapes firms' incentives and therefore affects the elasticity of taxable income. In Appendix B, we incorporate loss carryforwards in a parsimonious extension of the model and show that more generous loss offset rules amplify bunching at the zero kink and increase the estimated elasticity of taxable income with respect to statutory tax rates. Using the available administrative data, we implement this adjustment for a subset of countries. This extension clarifies how cross-country differences in loss carryforward regimes generate heterogeneity in estimated elasticities, even when underlying production technologies are similar.

Finally, the framework abstracts from dynamic considerations that may influence behavior around zero taxable income. In richer dynamic settings, firms may bunch through intertemporal income shifting, adjustment costs in investment or employment, or strategic use of net operating losses (Le Maire and Schjerning, 2013; Miller et al., 2024). Such models would also allow short- and long-run elasticities to differ. The administrative data available across countries do not permit a unified dynamic analysis of these mechanisms. Instead, we examine their implications indirectly by comparing elasticities across countries with differing institutional features in Section 4.

4 Results

We begin by presenting our baseline results: semi-parametric point estimates of the ETI for all 16 countries in our sample. We then examine how truncation affects these estimates and report nonparametric bounds. Next, we study cross-country differences in ETIs using both descriptive comparisons and a machine-learning framework. We conclude by showing how our estimates can be used to predict elasticities for countries outside our sample.

4.1 Cross-country comparisons of the elasticity of taxable income

To facilitate cross-country comparisons, we report a single elasticity estimate, e_k, for each country, along with its standard error. When fixed costs are zero, this measure coincides with the elasticity of taxable income, ϵ_k. To estimate the elasticities, we use a point-identification that relies on the distributional assumptions on the error term. We assess these assumptions empirically and, based on the data, we choose as a baseline a truncated Tobit model that uses 60% of the distribution of firms around the zero kink. We summarize our preferred estimates in Figure 3 and in Table 4. Column (1) reports elasticity estimates, and column (2) standard errors. Table C3 in the Appendix reports the number of firms used in estimation and the sample period.

Our elasticity estimates range from 0.075 in Ecuador to 1.91 in Canada. A 10% increase in the net-of-tax rate corresponds to an increase in reported taxable income of between 0.75% and 19%. Seven countries have ETIs below 0.5, seven above 1, and the remaining two lie between 0.5 and 1. Just over half of our estimates are below the prevailing estimate for U.S. corporations, which predicts an 8.9% increase in taxable income following a 10% increase in the net-of-tax rate (Coles et al., 2022).

A central advantage of our setting is that elasticity estimates are directly comparable across countries. By holding the estimation method fixed, we ensure that differences across countries reflect variation in tax systems, rather than methodological choices. Existing estimates of the corporate ETI range from close to zero to as high as five. In our sample, the dispersion is substantially smaller: our largest estimates are less than half of the largest values reported in the literature. This reduction in dispersion has important implications for business tax policy. In particular, it suggests that corporate tax receipts may be less sensitive to statutory rate changes than earlier estimates imply.

Revenue and welfare implications We first illustrate how heterogeneity in elasticities can translate into differences in the revenue consequences of corporate taxation using a sufficient-statistic framework. A one percent increase in the statutory corporate tax rate generates markedly different revenue responses across countries because the mechanical effect of a higher rate interacts with country-specific behavioral adjustments of the tax base. Countries with lower statutory rates tend to exhibit larger mechanical revenue gains, while countries with more elastic tax bases experience greater behavioral erosion, resulting in smaller net revenue responses. For example, despite similar statutory rates, Greece and Norway display markedly different revenue elasticities due to differences in underlying taxable income responsiveness. Consistent with this mechanism, revenue elasticities range from 0.56 in Greece to 0.98 in Ecuador. These estimates are reported in Column (3) of Table 4. Appendix E provides the formal derivation following Saez (2001) and Hendren and Sprung-Keyser (2020); all estimates should be interpreted as partial equilibrium effects that abstract from general equilibrium adjustments and cross-country spillovers.

Table 4: Elasticity of Corporate Taxable Income and Welfare Implications: cross-country comparison

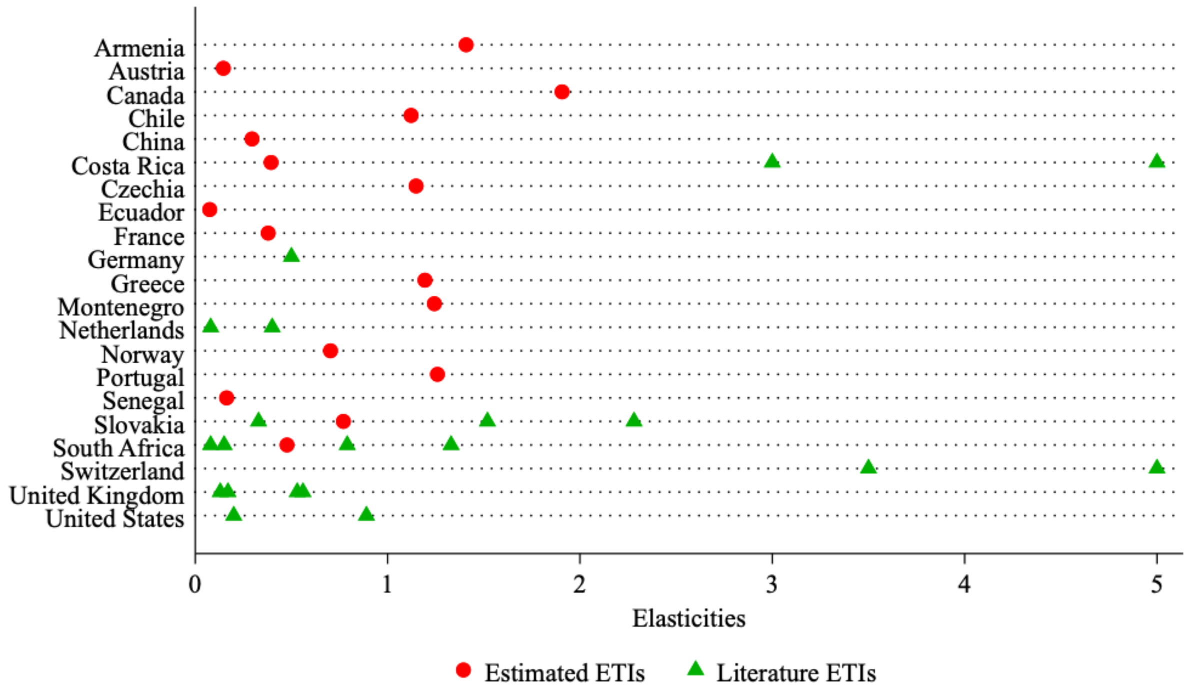
Country	Elasticity of income (1)	Std. error (2)	$\%\Delta R_k$ (%) (3)	MVPF (4)
Armenia	1.408	0.024	0.65	1.54
Austria	0.146	0.001	0.92	1.09
Canada	1.907	0.068	0.61	1.64
Chile	1.122	0.057	0.72	1.39
China	0.295	0.009	0.90	1.12
Costa Rica	0.394	0.001	0.83	1.20
Czechia	1.148	0.018	0.73	1.37
Ecuador	0.075	0.001	0.98	1.02
France	0.379	0.001	0.81	1.23
Greece	1.194	0.063	0.56	1.79
Montenegro	1.243	0.019	0.86	1.16
Norway	0.703	0.002	0.74	1.35
Portugal	1.259	0.008	0.67	1.50
Senegal	0.163	0.004	0.94	1.07
Slovakia	0.770	0.067	0.77	1.30
South Africa	0.477	–	0.78	1.29

Notes: Column (1) reports the estimated elasticity of taxable income with respect to the net-of-tax rate. Column (2) reports standard errors. Column (3) reports the implied revenue elasticity, defined as the percent change in corporate tax revenue associated with a one percent change in the net-of-tax rate. Column (4) reports the marginal value of public funds (MVPF) for a marginal corporate tax cut. Table C3 in the Appendix reports the number of firms used in estimation and the sample period.

We next evaluate the welfare implications of these revenue responses using the marginal value of public funds (MVPF). We calculate the MVPF for a marginal corporate tax cut (Hendren and Sprung-Keyser, 2020). The MVPF varies substantially across countries, reflecting differences in both statutory tax rates and the responsiveness of the corporate tax base. MVPFs range from values just above one in low-elasticity environments such as Ecuador and Senegal to nearly 1.8 in Greece. These estimates indicate that Greece would benefit more from a corporate tax cut than Ecuador, given differences in the efficiency cost of public funds. These estimates, reported in Column (4) of Table 4, imply that countries can face sharply different welfare costs of corporate taxation even when marginal revenue responses are similar.[12] This heterogeneity underscores the importance of country-specific elasticities for welfare analysis and policy design.

[12] We do not consider incidence or distributional effects, as the data required to do so are not available for most countries.

Figure 3: Estimated Elasticities



Notes: This figure plots the estimated and previous literature elasticities of corporate taxable income (ETIs). The estimated ETIs are in filled red circles and the previous literature ETIs in filled green triangles.

Appendix E reports additional welfare metrics, including marginal excess burden (MEB), revenue semi-elasticities, and deadweight loss. We also evaluate a counterfactual in which all countries are assigned a common statutory corporate tax rate of 15 percent, corresponding to the global minimum tax benchmark.[13] Holding statutory rates fixed at this common level isolates the role of cross-country differences in estimated elasticities for efficiency costs. Despite the uniform rate, implied MEBs vary widely across countries, with more elastic tax bases generating substantially larger welfare losses per dollar of revenue raised.[14] As a result, reforms that impose a common minimum tax rate are likely to entail heterogeneous efficiency costs across countries due to differences in behavioral responses to taxation.

External validity A natural question is whether elasticities estimated locally at the zero-taxable-income kink are informative about behavioral responses elsewhere in the corporate

[13]The global minimum tax imposes a 15 percent minimum rate and does not imply full convergence of statutory tax rates; this exercise is purely descriptive and intended to illustrate the implications of full rate harmonization.

[14]Coordinated tax changes may generate different revenue effects than isolated national reforms.

income distribution. A key reason to expect elasticities estimated at the zero–taxable-income kink to be informative is that many firms pass through zero taxable income as part of normal business fluctuations, rather than because they are persistently unprofitable. Firms experience frequent shocks to demand, input costs, and productivity, and taxable income reflects the interaction of these shocks with lumpy investment, depreciation allowances, and the timing of revenues and expenses. As a result, even otherwise profitable firms may report zero or slightly negative taxable income in a given year, particularly around business cycle fluctuations or periods of adjustment. This transitory movement around zero creates overlap between firms near the kink and firms elsewhere in the income distribution, making behavior at the kink informative about broader tax responsiveness.

With this in mind, we provide three complementary pieces of empirical evidence to support the external validity of our estimates. First, elasticities estimated at zero are broadly comparable to those obtained at higher kinks, with no systematic tendency for the zero-kink estimates to be larger, as seen in Figure 3. For Slovakia and South Africa, our estimates lie between existing estimates in the literature, while for Costa Rica, they are substantially smaller than previously reported outliers. This evidence suggests that the responsiveness we identify is not unique to the zero kink or to fixed-cost margins.

Second, Table C1 examines transition probabilities around zero taxable income. Roughly half of firms exhibit persistence at zero, consistent with repeated adjustment rather than one-time accounting realizations, while the remaining firms transition frequently into and out of zero across periods, indicating substantial overlap with the broader firm population.[15]

Third, Table C2 compares observable characteristics of firms at zero taxable income to those of firms slightly away from zero. Within each country, firms near zero are similar to firms in adjacent income bins in terms of revenues.

Taken together, these results indicate that elasticities estimated at zero taxable income provide informative and externally valid measures of corporate taxable income responsiveness.

4.2 Truncation results

Our preferred estimates rely on a truncated sample rather than the full dataset because the normality assumption is often too restrictive for the full distribution of firms. As illustrated in panel (d) of Figures F1–F16 in Appendix F, the normality assumption yields a poor fit across all countries when all observations are included. Estimates based on this fit are therefore more likely to be biased or inconsistent. By contrast, excluding the distribution's extremes typically improves the plausibility of the identifying assumptions. This improvement

[15] Persistence varies across countries, with Czechia and Senegal exhibiting relatively high persistence and Slovakia relatively low persistence.

is evident in panel (e) of Figures F1–F16, which report results using our baseline truncation (the central 60% of the data). We adopt this specification because it provides the best fit in the region of the distribution that drives identification.[16]

In Figure 4, we focus on three illustrative cases, Canada, Slovakia, and South Africa, to highlight differences in how the estimated ETI varies with the degree of truncation. These countries were selected because the shape of the elasticity curve with respect to sample inclusion exhibits distinct patterns. In Canada, the estimated elasticity rises steeply when using between 10 and 30 percent of the data, after which it stabilizes. In contrast, estimates for Slovakia decline gradually as more data are included, while those for South Africa remain relatively flat until a sharp increase occurs at the 90th and 100th percentiles. Across all three cases, the interior portion of the distribution yields the most stable estimates, suggesting that moderate truncation delivers more robust inference than relying on either tail of the data. We report the full set of nonparametric bounds for each country in panel (c) of Figures F1–F16 in Appendix F.

4.3 Nonparametric bounds

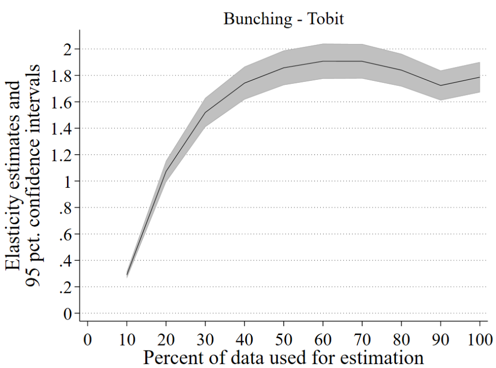
As an additional robustness check, we construct nonparametric bounds on the elasticity estimates. These bounds shed light on the identifying power of the slope restrictions imposed on the counterfactual distribution. Figure 5 presents results for three representative countries: Chile, China, and France. The horizontal axis denotes the maximum slope permitted for the counterfactual distribution. The dashed line plots the resulting upper bound on the elasticity, while the solid line shows the corresponding lower bound. For reference, the dashed red line indicates the estimate obtained under the trapezoidal assumption proposed by Saez (2010).

As the maximum slope increases, the bounds widen, reflecting the increasing flexibility of the counterfactual distribution. This divergence is particularly pronounced in Chile, where the bounds expand rapidly, suggesting greater sensitivity of the elasticity estimate to the identifying assumptions. In contrast, the bounds in China and France remain relatively tight, indicating more robust identification. We report the full set of nonparametric bounds for each country in panel (b) of Figures F1–F16 in Appendix F.

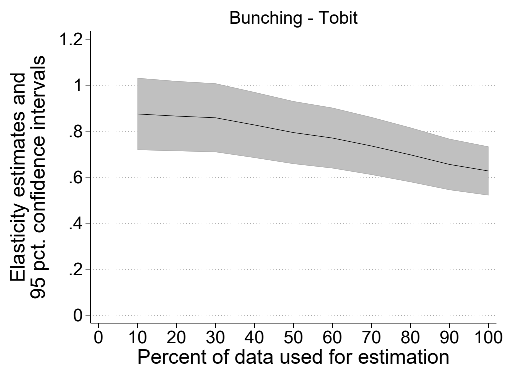
[16] Panel (a) of Figures F1–F16 displays the raw data for each country. In each case, we observe significant bunching at zero profits—the point at which the marginal corporate tax rate discontinuously increases. For example, the tax rate jumps from 0 percent to 25 percent in China, from 0 percent to 28 percent in Norway, and from 0 percent to 23 percent in Slovakia.

Figure 4: Elasticity of Corporate Taxable Income: cross-country comparison of elasticity estimates across the fraction of data used.

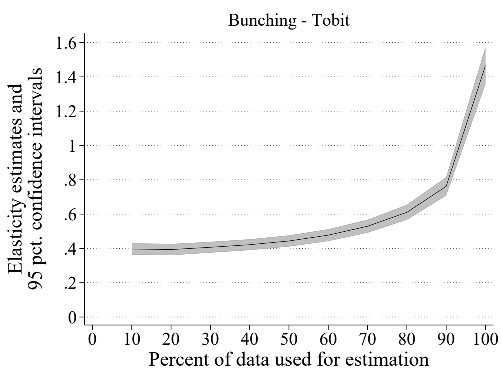
(a) Canada



(b) Slovakia



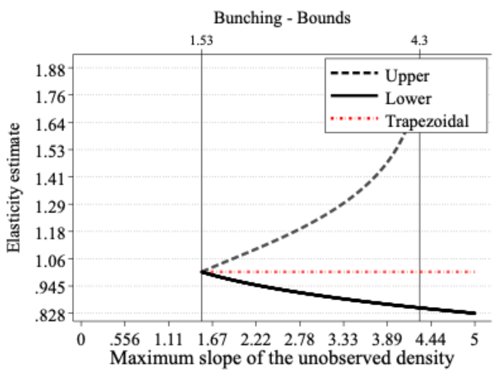
(c) South Africa



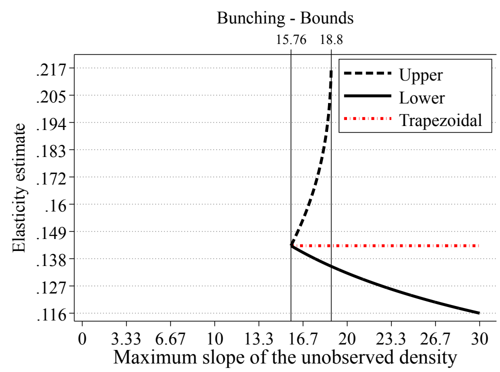
Notes: This figure plots the variation in the estimated elasticity of corporate taxable income based on the amount of data used in the estimation, truncation. We report the full set of nonparametric bounds for each country in panel (c) of Figures F1–F16 in Appendix F.

Figure 5: Elasticity of Corporate Taxable Income: cross-country comparison of bunching bounds.

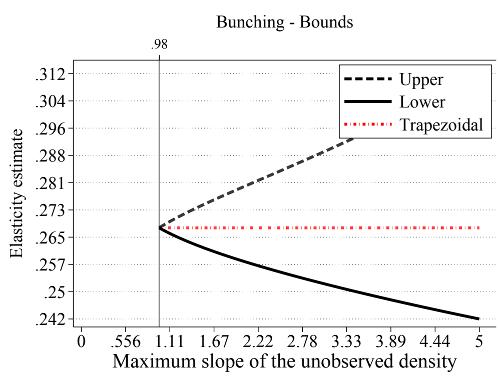
(a) Chile



(b) China



(c) France



Notes: This figure plots diagnostic tools for the traditional bunching estimate. Specifically, each figure plots the resulting upper and lower bounds on e using the nonparametric bounds method. The dashed red line indicates the estimate obtained under the trapezoidal assumption proposed by Saez (2010). We report the full set of nonparametric bounds for each country in panel (b) of Figures F1–F16 in Appendix F.

4.4 Distribution of ETIs

Average corporate ETI estimates conceal substantial heterogeneity in tax responsiveness across firms within countries. To uncover this heterogeneity, we use the estimated e_k values to recover the distribution of taxable-income elasticities across firms within each country. In the model, firm-level elasticities vary systematically with fixed costs and production amenities, implying that firms with different production and cost structures respond differently to changes in tax rates.

We characterize this heterogeneity in two steps. First, Table C5 reports the distribution of the fixed-cost-to-output ratio, $\frac{C_{i,k}}{Y_{i,k}}$, for a subsample of countries where these estimates were released. This distribution allows us to map from e_k to firm-level elasticities $\varepsilon_{i,k}$. Second, Figure 6 plots the implied elasticity distributions for three representative countries—Canada, Greece, and Slovakia—using the empirical distribution of $\frac{C_{i,k}}{Y_{i,k}}$.[17]

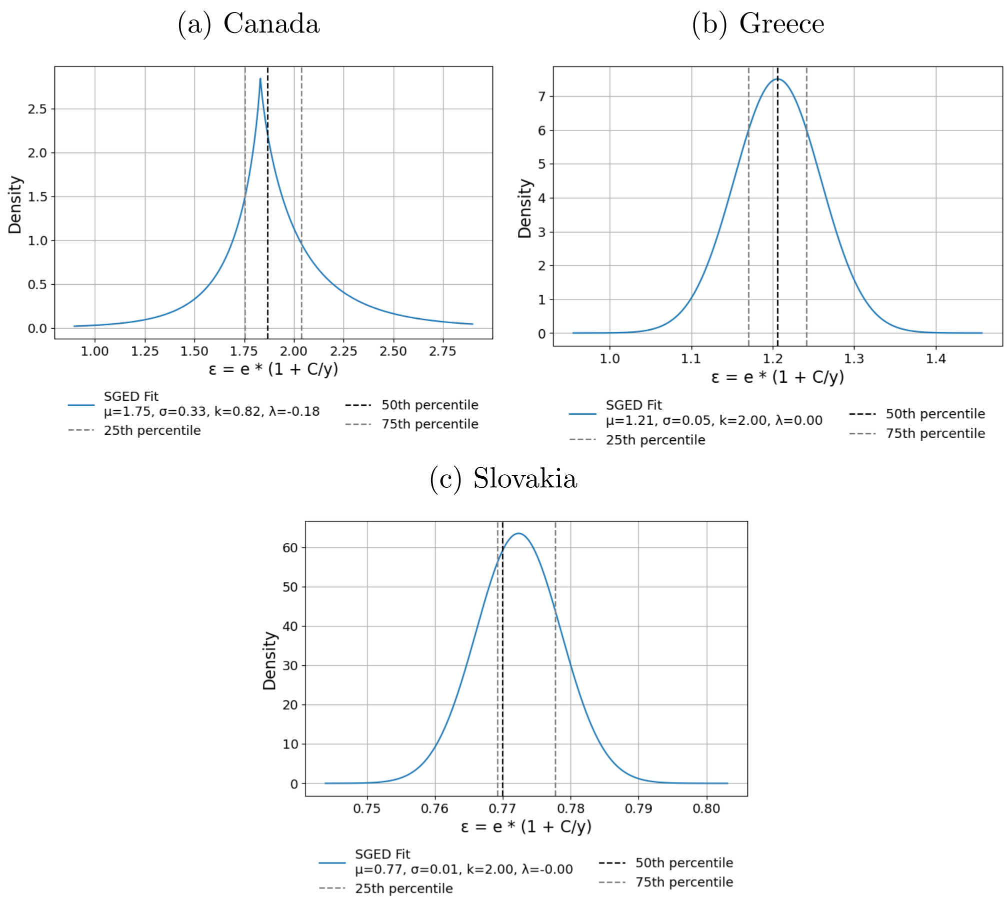
The estimated distributions exhibit substantial cross-country heterogeneity. Canada's distribution shows a pronounced mode, indicating a strong central tendency, whereas those in Greece and Slovakia are smoother and more dispersed. Distributional shape also varies across countries. Greece exhibits approximately symmetric distribution, while Canada and Slovakia display right-skewed distributions with longer upper tails of high-elasticity firms. The interquartile range also differs meaningfully. In particular, Slovakia's elasticity distribution is notably more compressed than those in Greece and Canada, suggesting lower within-country heterogeneity.

These differences in elasticity distributions reflect underlying variation in firms' fixed-cost-to-output ratios across countries. Canada's peaked distribution corresponds to a tightly concentrated $C_{i,k}/Y_{i,k}$ ratio around zero, while Greece's more dispersed distribution stems from a wider spread.

This heterogeneity has direct welfare implications. In countries with tightly concentrated elasticity distributions, such as Canada, marginal excess burdens of taxation are relatively uniform across firms. In contrast, countries with more dispersed distributions, such as Greece, exhibit substantial heterogeneity in the efficiency costs of taxation across the corporate sector, implying that targeted tax policies may yield larger welfare gains. More broadly, these results underscore why average elasticities obscure meaningful heterogeneity relevant for policy.

[17] Appendix C.3 describes the estimation of elasticity distributions in detail.

Figure 6: Distribution of Elasticities of Corporate Taxable Income.



Notes: This figure plots the distribution of elasticities for Canada, Greece, and Slovakia across fixed costs to output ratio. The estimation procedure is outlined in Appendix C.3.

4.5 Why are elasticities different across countries?

4.5.1 Correlates of cross-country elasticities

We begin by documenting simple correlations between our elasticity estimates and observable country characteristics to build intuition about cross-country variation in the corporate ETIs. Figure 7 plots elasticity estimates (hollow blue diamonds) against selected country-, tax-system-, and firm-level characteristic, together with fitted linear trends. In each panel, the elasticity is shown on the vertical axis and the country characteristic on the horizontal axis.

Elasticity estimates are positively correlated with log GDP per capita and the share of firms that are formally registered, and negatively correlated with the logarithm of total tax revenues. In our sample, elasticities therefore tend to be higher in larger, higher-income, and more formal economies, but not necessarily in countries with higher overall tax revenues.

Elasticities are negatively correlated with statutory corporate tax rates and average tariffs, and positively correlated with the presence of loss carryforwards. This pattern suggests that while higher statutory rates are associated with lower elasticities, more generous loss offset provisions are associated with higher taxable-income elasticities.[18]

Finally, elasticities are negatively correlated with the manufacturing sector's contribution to GDP, but show little correlation with measures of within-country firm size, such as average firm assets or the upper tail of the revenue distribution. Countries with a larger manufacturing base, therefore, tend to exhibit lower elasticities, while within-country firm size distributions do not appear to be strongly related to estimated elasticities.

Taken together, these correlations indicate that macroeconomic conditions and tax system design are systematically associated with cross-country differences in elasticities. However, because these characteristics are correlated with one another and may interact nonlinearly, simple pairwise correlations are insufficient to assess their relative importance.

4.5.2 Predicting elasticities using observable characteristics

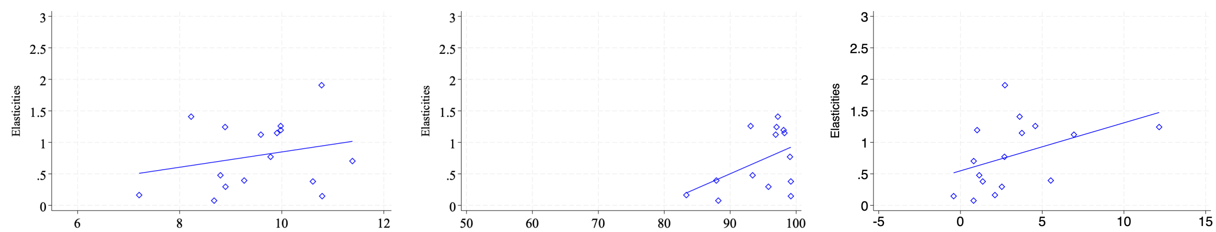
To move beyond descriptive correlations and assess the joint explanatory power of observables, we use a random forest prediction model to explain cross-country variation in ETIs. The model uses our estimated elasticities as outcomes and a set of 95 country-level observables drawn from three groups: tax system features, firm characteristics, and broader country

[18] Panel f of Figure 7 excludes countries with unlimited loss carryforwards: Chile, France, Norway, and South Africa.

Figure 7: Elasticity correlates across observables.

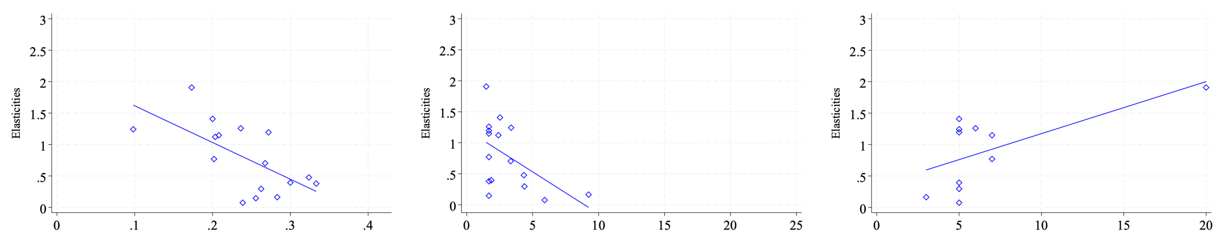
Country characteristics

(a) Log GDP per capita (b) % firms formally reg (c) FDI inflows, % GDP



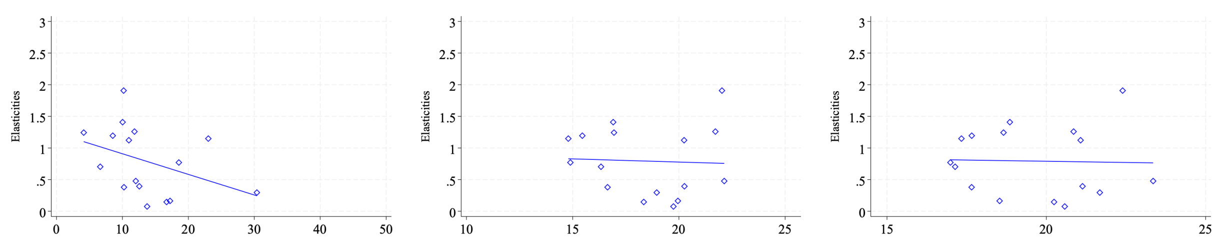
Tax system characteristics

(d) Statutory tax rates (e) Average tariffs (f) Loss carryforward



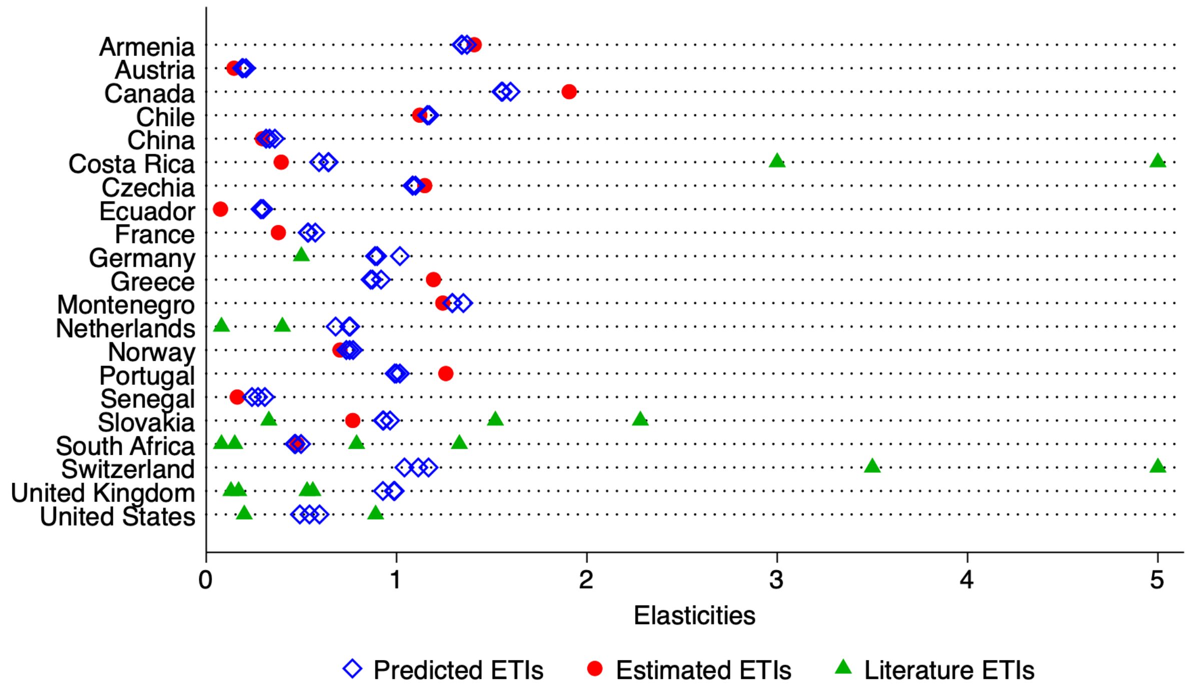
Firm characteristics

(g) Manufacturing VA, % GDP (h) Log of avg assets (i) Log 99th perc of revenue dist



Notes: This figure plots the correlations between our estimated elasticities and observable country level characteristics. The blue line represents the linear estimation of best fit. Each correlate is listed in the figure title. Note that in panel (f), we remove observations with unlimited loss carryforward, which are Chile, France, Norway and South Africa. We code them as 9999 in the dataset.

Figure 8: Predicted vs Estimated Elasticities.



Notes: This figure plots the predicted ETIs using the top three selected combinations of variables using a Random Forest. These specifications include models with 3, 4 and 5 features. The top 5 predictors, in order, the statutory corporate tax rate, manufacturing sector value added as a share of GDP, FDI inflows as a share of GDP, effective marginal tax rate (EMTR), and exports as a share of GDP. We include the list of all predictors in Appendix D. We plot the predicted ETIs in blue hollow diamonds, the estimated ETIs in filled red circles, and the previous literature ETIs in filled green triangles.

fundamentals. The full list of variables is provided in Appendix Table D1.[19]

We use the random forest model to select the three most predictive variables based on mean squared error and R^2 (Figure D2). The three strongest predictors are the statutory corporate tax rate, manufacturing value added as a share of GDP, and foreign direct investment inflows as a percentage of GDP. These variables correspond to tax system features, firm characteristics, and country characteristics, respectively. Importantly, we do not constrain the random forest model to select predictors from each category; rather, the random forest model independently chose predictors from each category as part of its optimization routine.

[19]Tax system variables are drawn from the Center for Business Taxation, firm characteristics from Orbis, and country characteristics from the World Bank, respectively. See: `https://oxfordtax.sbs.ox.ac.uk/cbt-tax-database`. These sources provide broad cross-country coverage and allow us to extend predictions beyond the countries with administrative data. Some countries have missing values for a subset of observables. To address the missing data, we use nearest-neighbor imputation following Troyanskaya et al. (2001).

We also consider extended specifications that include a fourth and fifth predictor—effective marginal tax rate (EMTR) and exports as a share of GDP.[20]

Figure 8 compares predicted elasticities (blue diamonds) from these models with estimates reported in the literature (green triangles) and our own empirical estimates (red circles). Predicted values align closely with observed elasticities, indicating that the model captures a meaningful share of cross-country variation. Figure 8 includes 21 countries. For three countries (Costa Rica, Slovakia, and South Africa), we observe all three types of estimates. For five (Germany, Netherlands, Switzerland, UK, and US), we observe literature estimates and predictions, but do not have administrative-data estimates. For the remaining countries (Armenia, Austria, Canada, Chile, China, Czechia, Ecuador, France, Greece, Montenegro, Norway, Portugal, and Senegal), we report our administrative-data estimates and model predictions. Overall, our model captures a substantial share of cross-country variation in ETIs, supporting its use as a tool for identifying and interpreting cross-country differences.

4.5.3 Decomposing the sources of cross-country variation

We next quantify the contribution of different factors to cross-country variation in predicted elasticities. To do so, we apply the Shapley Additive Explanations (SHAP) framework, which decomposes each country's predicted elasticity into marginal contributions from each predictor while accounting for nonlinearities and interactions. Each country's elasticity is anchored at a common baseline of 0.792, with deviations attributed to tax system characteristics, firm characteristics, and country fundamentals.

We present the full country-level decomposition in Table D2 and Figure D3 in the Appendix, which report level contributions of each factor relative to the common baseline. For ease of interpretation, Table 5 summarizes the same decomposition in percentage terms by factor. On average across countries, tax system characteristics account for roughly half of the variation in elasticities, firm characteristics account for roughly 29 percent, and country characteristics account for the remaining 21 percent.

These averages mask substantial heterogeneity across countries. For example, country characteristics contribute little to explaining elasticity deviations in Greece, China, and Slovakia, but account for more than half of the deviation in Portugal. Similarly, firm characteristics play a limited role in Portugal and Chile but explain over 60 percent of the deviation in Greece.

These results indicate that tax system design plays a central role in shaping cross-

[20] In Appendix D we also validate out-of-sample prediction performance of our 3,4, and 5 feature predictive models using leave-one-country-out cross validation. We list top 10 predictors with their Shapley values in Table D1.

Table 5: Percentage contribution of factors to deviations from average ETI

Country	Tax system	Country characteristics	Firm characteristics
Armenia	0.49	0.27	0.24
Austria	0.44	0.23	0.33
Canada	0.52	0.26	0.21
Chile	0.63	0.24	0.14
China	0.55	0.08	0.38
Costa Rica	0.51	0.27	0.22
Czechia	0.56	0.23	0.21
Ecuador	0.37	0.29	0.35
France	0.61	0.16	0.24
Greece	0.34	0.03	0.63
Montenegro	0.58	0.14	0.28
Norway	0.36	0.16	0.48
Portugal	0.36	0.53	0.11
Senegal	0.47	0.14	0.39
Slovakia	0.60	0.09	0.31
South Africa	0.68	0.16	0.16
Mean	0.50	0.21	0.29
Median	0.52	0.19	0.26

Notes: This table quantifies the role of different factors in explaining deviations from average ETI across countries. We use the top 3 factors that explain the differences in ETIs across countries: FDI inflows as a share of GDP, the statutory corporate tax rate, and manufacturing sector value added as a share of GDP. We call these country characteristics, tax system, and firm characteristics, respectively. We quantify the contribution of each factor in percent terms using absolute values and report level contributions in Table D2. Note that in principle all rows should add up to 100% but, due to rounding, they may not.

country differences in elasticities, while firm- and country-level characteristics also contribute meaningfully. Consistent with the descriptive patterns documented in Figure 7, the SHAP decomposition shows that statutory tax rates, sectoral composition, and measures of capital mobility account for a large share of cross-country variation in ETIs. Together, the correlation analysis and the decomposition results suggest that variation in ETIs reflects the interaction of statutory tax rates with enforcement regimes, sectoral composition, and the mobility of the corporate tax base.

4.6 Extending our estimates to other countries

Finally, we use the random forest model to generate predicted ETIs for 208 countries. A central contribution of the paper is the estimation of 16 country-specific elasticities using administrative tax data and a unified empirical framework. This substantially expands the eight existing estimates, which have relied on heterogeneous methods. Despite this expansion, direct elasticity estimates remain unavailable for most countries.

To address this limitation, we outline two complementary approaches. First, researchers with access to administrative tax records can implement our empirical framework using the publicly available code to produce country-specific elasticity estimates.[21] Second, in settings where administrative data are unavailable, researchers can rely on the predicted elasticities reported in Table A1. These predictions are based on observable country, firm, and tax system characteristics and exhibit strong predictive performance, as documented in Appendix D.

We report predictions from models that incorporate three, four, and five covariates. Predicted elasticities are highly correlated across specifications. The average predicted elasticity is 0.81 in the three-variable model and 0.76 and 0.77 in the four- and five-variable models. Importantly, these values closely match the mean elasticity estimated directly from administrative data, providing an external validation of the predictive framework. Taken together, these predictions provide a consistent basis for assessing how differences in tax systems and economic structure may shape the revenue and efficiency consequences of corporate tax policy across countries, including in settings where administrative data are unavailable.

5 Conclusion

This paper provides a better understanding of the corporate elasticity of taxable income worldwide. We generate the most comprehensive collection of comparable estimates across countries to date, including both developed and developing countries. The fact that all elasticities are estimated using the same methodology allows a meaningful comparison among them.

We find substantial heterogeneity in our ETI estimates across countries. These differences suggest there is scope for differences in tax regulation and enforcement to have a large effect on this elasticity. More specifically, we show that a large portion of the difference in elasticities is due to country-level fundamentals, tax systems, and firm characteristics that make it easier for firms to respond to changes in tax rates.

A second important result is that we find differences across countries to be substantially smaller than those reported in the literature. Our estimates range from 0.075 to 1.9, while

[21] If researchers chose to do that, we encourage them to contribute to the website `www.globaltaxresearchinitiative.org` that we created focused on documenting and reporting corporate ETIs across the world.

those in the literature range from 0 to 5. The substantially smaller range suggests that differences in methods across studies account for a large portion of the differences observed across countries. This finding highlights the need to use methods with reasonable, explicit identifying assumptions suited to the context and broadly applicable across countries for comparative purposes.

Our findings have four main implications for tax policy. First, similar statutory corporate tax changes can generate markedly different revenue and efficiency outcomes across countries due to differences in behavioral responses. Second, countries with highly responsive corporate tax bases face larger efficiency costs per dollar of revenue, suggesting scope for welfare-improving reforms and tax coordination. Third, the Shapley decomposition shows that this heterogeneity is systematically related to observable country characteristics, implying that effective corporate tax design requires tailoring policy to the underlying economic structure rather than adopting uniform reforms. Finally, our predicted elasticities enable evidence-based tax policy design in countries without the resources to estimate elasticities using administrative data.

The predicted estimates provide a sandbox for future research. For example, we may have thought that if capital moves freely across countries, the elasticity would be the same everywhere. The question arises, then, to what extent the variation across countries we observe indicates capital frictions, and the answer to this question may change how we interpret elasticity estimates. Further, is a low elasticity an indicator of a functional tax system or many frictions? Specifically, the high elasticity in Switzerland (both the one we predict and the one reported in the literature) might imply a porous tax system, but it could also reflect greater capital elasticity in Switzerland. In addition, important questions remain as to what constitutes a friction. For example, to what extent is uniqueness a friction, such as capital employed in Chile for copper mining? Similarly, to what extent do complementary infrastructure and human capital create frictions and lower elasticity? We hope the estimates in this paper provide a starting point for future research to investigate these and other important questions about capital and its responsiveness to tax policy.

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Table A1: Predicted ETIs across the world.

	Beginning of Table			
	Country	3 predictors	4 predictors	5 predictors
		(1)	(2)	(3)
1	Afghanistan	0.93	0.82	0.87
2	Albania	1.36	1.49	1.50
3	Algeria	0.25	0.29	0.27
4	American Samoa	0.44	0.41	0.38
5	Andorra	1.38	1.28	1.29
6	Angola	0.74	0.68	0.65
7	Antigua and Barbuda	0.94	0.83	0.86
8	Argentina	0.31	0.40	0.41
9	Armenia	1.37	1.34	1.34
10	Aruba	0.53	0.48	0.44
11	Australia	0.93	0.87	0.88
12	Austria	0.19	0.21	0.19
13	Azerbaijan	1.20	1.27	1.17
14	Bangladesh	0.29	0.33	0.32
15	Barbados	0.93	0.82	0.86
16	Belarus	1.17	1.05	1.02
17	Belgium	0.61	0.52	0.48
18	Belize	0.94	0.94	0.95
19	Benin	0.42	0.37	0.35
20	Bhutan	0.89	0.64	0.69
21	Bolivia	0.63	0.50	0.45
22	Bosnia and Herzegovina	1.21	1.00	1.06
23	Botswana	1.05	0.87	0.88
24	Brazil	0.71	0.79	0.82
25	Brunei Darussalam	0.93	0.79	0.81
26	Bulgaria	1.27	1.15	1.15
27	Burkina Faso	0.88	0.66	0.71
28	Burundi	0.85	0.74	0.80
29	Cabo Verde	0.96	0.87	0.89
30	Cambodia	1.06	1.10	1.11
31	Cameroon	0.29	0.40	0.42

	Continuation of Table A1			
	Country	3 predictors	4 predictors	5 predictors
32	Canada	1.60	1.55	1.56
33	Central African Republic	0.32	0.33	0.30
34	Chad	0.97	0.80	0.81
35	Chile	1.16	1.17	1.16
36	China	0.36	0.33	0.31
37	Colombia	0.61	0.52	0.53
38	Comoros	0.55	0.43	0.41
39	Congo	0.90	0.93	0.95
40	Congo, DRC	0.53	0.63	0.63
41	Cook Islands	1.10	1.06	1.07
42	Costa Rica	0.59	0.64	0.64
43	Croatia	1.20	1.07	1.06
44	Cuba	0.29	0.24	0.28
45	Curaçao	1.01	0.82	0.85
46	Cyprus	1.35	1.33	1.32
47	Czechia	1.08	1.10	1.08
48	Côte d'Ivoire	0.31	0.42	0.41
49	Denmark	0.35	0.28	0.28
50	Djibouti	0.93	0.83	0.81
51	Dominica	0.98	0.84	0.88
52	Dominican Republic	0.55	0.49	0.51
53	Ecuador	0.30	0.29	0.29
54	Egypt	0.27	0.40	0.47
55	El Salvador	0.29	0.38	0.38
56	Equatorial Guinea	0.55	0.64	0.64
57	Eritrea	0.56	0.56	0.50
58	Estonia	1.08	1.18	1.17
59	Eswatini	0.31	0.33	0.30
60	Ethiopia	1.00	0.96	0.97
61	Fiji	0.72	0.66	0.70
62	Finland	0.67	0.58	0.55
63	France	0.57	0.53	0.54
64	French Guiana	0.44	0.40	0.45
65	French Polynesia	0.44	0.40	0.45

Continuation of Table A1				
	Country	3 predictors	4 predictors	5 predictors
66	Gabon	0.53	0.63	0.61
67	Gambia	0.82	0.65	0.66
68	Georgia	1.36	1.36	1.37
69	Germany	1.02	0.89	0.90
70	Ghana	0.83	0.74	0.78
71	Gibraltar	1.10	1.06	1.07
72	Greece	0.92	0.86	0.87
73	Greenland	0.91	0.79	0.81
74	Grenada	0.93	0.82	0.83
75	Guadeloupe	0.44	0.40	0.45
76	Guam	0.44	0.40	0.45
77	Guatemala	0.27	0.46	0.48
78	Guernsey	1.34	1.27	1.28
79	Guinea	0.70	0.64	0.68
80	Guinea-Bissau	0.53	0.44	0.59
81	Guyana	0.90	0.80	0.83
82	Haiti	0.82	0.62	0.65
83	Honduras	0.51	0.49	0.53
84	Hong Kong	1.36	1.29	1.19
85	Hungary	0.99	1.00	1.01
86	Iceland	1.15	1.11	1.15
87	India	0.30	0.40	0.42
88	Indonesia	0.31	0.40	0.44
89	Iran	0.28	0.30	0.29
90	Iraq	1.25	1.06	1.07
91	Ireland	1.18	1.18	1.12
92	Isle of Man	1.38	1.29	1.28
93	Israel	0.59	0.52	0.47
94	Italy	0.28	0.46	0.43
95	Jamaica	0.96	0.82	0.85
96	Japan	0.24	0.39	0.36
97	Jersey	1.34	1.27	1.28
98	Jordan	1.07	1.02	1.07
99	Kazakhstan	1.09	1.10	1.07

	Continuation of Table A1			
	Country	3 predictors	4 predictors	5 predictors
100	Kenya	0.65	0.52	0.56
101	Kiribati	0.74	0.56	0.63
102	Korea, Republic of	0.68	0.81	0.78
103	Kuwait	0.73	0.77	0.71
104	Kyrgyzstan	1.17	1.09	1.09
105	Lao PDR	0.97	0.83	0.88
106	Latvia	1.51	1.27	1.27
107	Lebanon	1.38	1.27	1.29
108	Lesotho	0.42	0.32	0.36
109	Liberia	0.93	0.82	0.85
110	Libya	0.54	0.44	0.29
111	Liechtenstein	1.19	1.20	1.19
112	Lithuania	1.00	0.94	0.96
113	Luxembourg	1.21	1.22	1.12
114	Macao	1.37	1.29	1.20
115	Madagascar	1.18	1.08	1.11
116	Malawi	0.82	0.72	0.75
117	Malaysia	0.55	0.49	0.47
118	Mali	0.56	0.56	0.69
119	Malta	0.90	0.92	0.89
120	Marshall Islands	1.53	1.31	1.24
121	Martinique	0.44	0.40	0.45
122	Mauritania	0.99	0.87	0.91
123	Mauritius	1.26	1.16	1.15
124	Mexico	0.41	0.33	0.36
125	Micronesia	1.15	1.07	1.08
126	Moldova, Republic of	1.48	1.25	1.26
127	Monaco	0.44	0.40	0.45
128	Mongolia	0.97	0.90	0.94
129	Montenegro	1.35	1.29	1.29
130	Montserrat	0.54	0.50	0.55
131	Morocco	0.41	0.47	0.48
132	Mozambique	0.90	0.85	0.89
133	Myanmar	0.55	0.51	0.52

	Continuation of Table A1			
	Country	3 predictors	4 predictors	5 predictors
134	Namibia	0.70	0.62	0.73
135	Nauru	0.94	0.81	0.85
136	Nepal	0.73	0.59	0.56
137	Netherlands	0.75	0.76	0.68
138	Netherlands Antilles	0.54	0.50	0.55
139	New Caledonia	0.44	0.41	0.45
140	New Zealand	0.55	0.62	0.65
141	Nicaragua	0.55	0.50	0.52
142	Niger	0.90	0.80	0.83
143	Nigeria	0.86	0.61	0.66
144	Niue	0.54	0.50	0.55
145	North Macedonia	1.40	1.27	1.27
146	Norway	0.77	0.75	0.74
147	Oman	1.05	0.93	0.88
148	Pakistan	0.36	0.26	0.30
149	Palau	1.34	1.29	1.29
150	Panama	0.96	0.84	0.88
151	Papua New Guinea	0.75	0.58	0.59
152	Paraguay	1.00	0.90	0.87
153	Peru	0.55	0.64	0.65
154	Philippines	0.32	0.33	0.31
155	Poland	1.16	1.11	1.12
156	Portugal	1.02	0.99	1.00
157	Puerto Rico	0.32	0.38	0.37
158	Qatar	1.11	1.02	0.97
159	Romania	1.03	0.95	0.98
160	Russian Federation	0.96	1.02	0.95
161	Rwanda	0.94	0.80	0.83
162	Saint Kitts and Nevis	0.90	0.80	0.83
163	Saint Lucia	0.90	0.79	0.75
164	Saint Vincent and the Grenadines	0.90	0.80	0.83
165	Samoa	0.89	0.64	0.71
166	San Marino	1.19	1.12	1.04
167	Sao Tome and Principe	0.93	0.83	0.87

	Continuation of Table A1			
	Country	3 predictors	4 predictors	5 predictors
168	Saudi Arabia	1.04	0.92	0.88
169	Senegal	0.27	0.24	0.31
170	Serbia	1.17	1.07	1.08
171	Seychelles	0.90	0.90	0.94
172	Sierra Leone	0.93	0.93	0.92
173	Singapore	1.16	1.20	1.12
174	Slovakia	0.97	0.93	0.93
175	Slovenia	0.85	0.93	0.87
176	Solomon Islands	0.54	0.49	0.62
177	South Africa	0.47	0.46	0.50
178	South Sudan	0.97	0.92	0.97
179	Spain	0.57	0.61	0.65
180	Sri Lanka	0.27	0.30	0.34
181	Sudan	0.80	0.68	0.73
182	Suriname	0.32	0.25	0.31
183	Sweden	0.30	0.27	0.26
184	Switzerland	1.17	1.11	1.04
185	Syrian Arab Republic	0.55	0.57	0.65
186	Tajikistan	1.53	1.37	1.37
187	Tanzania	0.96	0.81	0.82
188	Thailand	0.29	0.47	0.44
189	Timor-Leste	1.27	1.14	1.08
190	Togo	0.93	0.81	0.82
191	Tonga	0.82	0.64	0.70
192	Trinidad and Tobago	0.22	0.29	0.29
193	Tunisia	0.25	0.24	0.28
194	Turkey	0.87	0.94	0.96
195	Turkmenistan	1.19	1.10	1.08
196	Uganda	0.94	0.82	0.82
197	Ukraine	1.23	1.11	1.11
198	United Kingdom	0.99	0.93	0.99
199	United States	0.49	0.54	0.60
200	Uruguay	0.60	0.56	0.61
201	Uzbekistan	1.03	0.97	0.92

Continuation of Table A1				
	Country	3 predictors	4 predictors	5 predictors
202	Venezuela	0.50	0.38	0.47
203	Viet Nam	0.63	0.65	0.60
204	Virgin Islands (British)	1.34	1.13	1.12
205	Virgin Islands (U.S.)	0.44	0.54	0.58
206	Yemen	0.79	0.71	0.79
207	Zambia	0.90	0.81	0.81
208	Zimbabwe	0.55	0.45	0.52
	Average	0.81	0.76	0.77
	Median	0.89	0.79	0.81
	Max	1.60	1.55	1.56
	Min	0.19	0.21	0.19
	Correlation (3 vs 4)	0.97		
	Correlation (4 vs 5)		0.99	
End of Table				

ONLINE APPENDIX—NOT FOR PUBLICATION, February 22, 2026

“The Elasticity of Taxable Income Across Countries”

A Real and reporting responses

In this appendix, we present a model with the addition of reporting responses. The key takeaway is that our equilibrium and methods for estimating the model primitive e_k are robust to this addition. We also show how to update the calculation of the elasticity of taxable income with reporting responses.

A.1 Model Fundamentals

Consider a firm, denoted Firm i, that is owned by a single shareholder and begins period 1 with retained earnings, $X_{i,k}$. Firms are heterogeneous in their productivity, captured by $A_{i,k}$, and their fixed costs, captured by $C_{i,k}$. In period 1, Firm i chooses its level of capital in period 2, $K_{i,k}$, and the amount of taxable income that will avoid taxes, $\rho_{i,k}$. Firms choose their level of capital in period 2 by determining the amount of retained earnings to distribute as a dividend payment ($D_{i,k} \geq 0$), and the amount of equity to issue ($E_{i,k} \geq 0$); $K_{i,k} = X_{i,k} + E_{i,k} - D_{i,k}$.[22] In addition to equity, shareholders may hold government bonds with a tax-exempt rate of return, $r > 0$. The cost of avoiding taxes, including the probability of audit and the penalty cost, is given by $c(\rho_{i,k})$, which is increasing and convex.

In period 2, capital generates income net-of-depreciation costs according to a strictly concave production function

$$I_{i,k}(K_{i,k}) = \frac{1+e}{e} A_{i,k}^{1/(1+e)} K_{i,k}^{\frac{e}{1+e}}. \tag{A.1}$$

Here, e determines the curvature of the production function. More importantly, e determines the elasticity of income with respect to the net-of-tax rate, which is an input to the elasticity of taxable income with respect to net-of-tax rate. Finally, profit is income net of fixed costs. Modeling fixed costs is important to match the data since a large proportion of firms report negative profits.

$$F_i(K_{i,k}) = I_i(K_{i,k}) - C_{i,k}. \tag{A.2}$$

Taxable income is defined as profit net of the amount of income that the firm decides to avoid or evade $\rho_{i,k}$,: $Y_{i,k}(K_{i,k}) = F_{i,k}(K_{i,k}) - \rho_{i,k}$.

At the end of period 2, all firms liquidate, returning their principal and profits to their shareholders.

[22] For ease of exposition, attention is restricted to equilibria where the firm does not payout a dividend and issue equity concurrently. In the general model in Patel et al. (2014) the restriction that a firm does not pay out a dividend and issue equity concurrently is derived as equilibrium behavior with a dividend tax. The restriction does not change the following analysis.

Firm i maximizes its value to its shareholder:

$$\max_{K_{i,k},\rho_{i,k}} \quad V = X_{i,k} - K_{i,k} + \frac{(1-t_c)Y_{i,k}(K_{i,k},\rho_{i,k}) + \rho_{i,k} + K_{i,k} - c(\rho_{i,k})}{1+r}, \tag{A.3}$$

where $X_{i,k} - K_{i,k} = D_{i,k} - E_{i,k}$ are net distributions in period 1 valued by its shareholder.

The benefit of higher capital in period 2 is a higher profit. Profit is taxed at the rate $t_{c,k}$ and discounted at the rate r.[23] The cost of higher capital in period 2 is lower distributions in period 1 (fewer dividends or more equity issuances).

Consider the case where there is a kink in the marginal tax rate schedule such that $t_{c,k} = t_{0,k}$ for $Y_{i,k}(K_{i,k},\rho_{i,k}) \leq \kappa$ and $t_{c,k} = t_{1,k}$ for $Y_{i,k}(K_{i,k},\rho_{i,k}) > \kappa$, where $t_{0,k} < t_{1,k}$. Under this marginal rate schedule, the objective function faced by the firm is

$$\begin{aligned}\max_{K_{i,k}} \quad V_{i,k} =& X_{i,k} - \frac{1}{1+r}(rK_{i,k} - c(\rho_{i,k})) \\ &+ \mathbb{I}(Y_{i,k}(K_{i,k},\rho_i) \leq \kappa)\frac{(1-t_{0,k})Y_i(K_{i,k},\rho_{i,k}) + \rho_{i,k}}{1+r} \\ &+ \mathbb{I}(Y_{i,k}(K_{i,k},\rho_{i,k}) > \kappa)\frac{(1-t_{0,k})\kappa + (1-t_{1,k})(Y_{i,k}(K_{i,k},\rho_{i,k}) - \kappa) + \rho_{i,k}}{1+r},\end{aligned} \tag{A.4}$$

where $\mathbb{I}(Y_{i,k}(K_{i,k},\rho_{i,k}) \leq \kappa)$ and $\mathbb{I}(Y_{i,k}(K_{i,k},\rho_{i,k}) > \kappa)$ are indicator functions for taxable income being below or above the kink.

A.2 Model Solution

Formally, we derive the equilibrium capital, tax avoidance, and taxable income by taking the derivative of firm value with respect to capital and avoidance in two regions where the derivative exists.

$$\frac{\partial V_{i,k}}{\partial K_{i,k}} = \begin{cases} \frac{1}{1+r}\left(-r + (1-t_{0,k})\frac{\partial Y_{i,k}(K_{i,k},\rho_{i,k})}{\partial K_{i,k}}\right), & Y_{i,k}(K_{i,k},\rho_{i,k}) < \kappa \\ \frac{1}{1+r}\left(-r + (1-t_{1,k})\frac{\partial Y_{i,k}(K_{i,k},\rho_{i,k})}{\partial K_{i,k}}\right), & Y_{i,k}(K_{i,k},\rho_{i,k}) > \kappa. \end{cases} \tag{A.5}$$

$$\frac{\partial V_{i,k}}{\partial \rho_{i,k}} = \begin{cases} \frac{1}{1+r}\left(-c'(\rho_{i,k}) + t_{0,k}\right), & Y_{i,k}(K_{i,k},\rho_{i,k}) < \kappa \\ \frac{1}{1+r}\left(-c'(\rho_{i,k}) + t_{1,k}\right), & Y_{i,k}(K_{i,k},\rho_{i,k}) > \kappa. \end{cases} \tag{A.6}$$

[23] The equilibrium rate of return r is assumed to be exogenous, abstracting from all general equilibrium effects.

The solution for taxable income $Y_{i,k}(K_{i,k})$ has a similar form to solutions derived in different contexts in this literature (Saez, 2010; Coles et al., 2022; Bertanha et al., 2023):

$$Y_{i,k}(K_{i,k}) = \begin{cases} \frac{1+e}{e} r^{-e}(1-t_{0,k})^e A_{i,k} - C_{i,k} - \rho_{i,k}, & A_{i,k} \leq \underline{A}_{i,k} \\ \kappa, & \underline{A}_{i,k} < A_{i,k} < \overline{A}_{i,k} \\ \frac{1+e}{e} r^{-e}(1-t_{1,k})^e A_{i,k} - C_{i,k} - \rho_{i,k}, & A_{i,k} \geq \overline{A}_{i,k}. \end{cases} \tag{A.7}$$

The thresholds are found by setting the optimal taxable income equal to the kink κ with both tax rates;

$$\underline{A}_{i,k} = (\kappa + C_{i,k} + \rho_{i,k})/\theta_{0,k}, \quad \text{and} \quad \overline{A}_{i,k} = (\kappa + C_{i,k} + \rho_{i,k})/\theta_{1,k}. \tag{A.8}$$

A.3 Elasticities

Here, we update the calculation of the elasticity of taxable income to account for both real and reporting responses. Critically, we note that the elasticity of income that we estimate remains a key piece to this calculation.

$$\begin{aligned} \varepsilon_{i,k} &= \frac{\partial Y_{i,k}(K_{i,k}, \rho_{i,k})}{\partial(1-t)} \frac{(1-t)}{Y_{i,k}(K_{i,k}, \rho_{i,k})} \\ &= \left(\frac{\partial F_{i,k}(K_{i,k})}{\partial(1-t)} - \frac{\partial \rho_{i,k}}{\partial(1-t)} \right) \frac{(1-t)}{Y_{i,k}(K_{i,k}, \rho_{i,k})} \qquad (A.9) \\ &= \frac{1}{Y_{i,k}(K_{i,k}, \rho_{i,k})} \left(e_{i,k} F(K_{i,k}) + e_{\rho,k} \rho_{i,k} \right) \end{aligned}$$

(A.10)

Note that to use the elasticity of taxable income for welfare analysis, it is also important to consider whether the reporting response (or to what extent the reporting response) is a resource cost or a transfer. For a more detailed discussion of the reporting response and its implications for welfare, see Coles et al. (2022).

B Loss Carryforwards and the Elasticity of Taxable Income

This appendix extends the baseline model to allow firms to carry forward losses. The extension is parsimonious and preserves the two-period structure of the model, while capturing cross-country differences in the generosity of loss carryforward rules. We show that more generous loss carryforward provisions increase the elasticity of taxable income with respect to the net-of-tax rate.

B.1 Loss Carryforward Technology

Recall that period-2 economic profits are given by

$$F_{i,k}(K_{i,k}) \equiv I_{i,k}(K_{i,k}) - C_{i,k}.$$

In the baseline model, taxable income equals profits, and losses generate no tax value. We now allow losses to be carried forward to future periods and used to offset future taxable income.

Because firms liquidate at the end of period 2, we represent the value of loss carryforwards as a terminal tax asset with a reduced-form present value. Specifically, a firm that realizes a loss in period 2 receives a payoff equal to a fraction of the statutory tax value of the loss:

$$\mathrm{NOL}_{i,k} = \lambda_k \, t_{c,k} \max\{-F_{i,k}(K_{i,k}), 0\}, \tag{B.1}$$

where $\lambda_k \in [0, 1]$ captures the generosity of the loss carryforward regime in country k. A higher λ_k corresponds to losses that can be carried forward for more years or are more likely to be used to offset future taxable income.

This formulation can be microfounded by assuming that losses may be carried forward for N_k periods and discounted at the rate r_k, with uncertainty about future taxable income or firm survival. For example, if a firm expects to realize sufficient future taxable income with probability s_k in each period, then

$$\lambda_k = \frac{s_k}{r_k + s_k} \left(1 - \left(\frac{1 - s_k}{1 + r_k} \right)^{N_k} \right),$$

which is increasing in the number of carryforward years N_k.

B.2 Firm Value with Loss Carryforwards

With loss carryforwards, the after-tax payoff from period-2 operations is

$$\Pi_{i,k}(K_{i,k}) = F_{i,k}(K_{i,k}) - t_{c,k} \max\{F_{i,k}(K_{i,k}), 0\} + \lambda_k t_{c,k} \max\{-F_{i,k}(K_{i,k}), 0\}.$$

The firm's problem becomes

$$\max_{K_{i,k}} \quad V_{i,k} = X_{i,k} - K_{i,k} + \frac{K_{i,k} + \Pi_{i,k}(K_{i,k})}{1 + r_k}. \tag{B.2}$$

The marginal retention rate on an additional unit of profit depends on whether the firm is in a profit or loss region:

$$\frac{\partial \Pi_{i,k}}{\partial F_{i,k}} = \begin{cases} 1 - t_{c,k}, & F_{i,k} > 0, \\ 1 - \lambda_k t_{c,k}, & F_{i,k} < 0. \end{cases} \tag{B.3}$$

B.3 Optimal Capital Choice

The first-order condition for capital choice is

$$-r_k + (1 - \tau_{i,k}(F_{i,k})) \frac{\partial F_{i,k}(K_{i,k})}{\partial K_{i,k}} = 0, \tag{B.4}$$

where the effective marginal tax rate is

$$\tau_{i,k}(F_{i,k}) = \begin{cases} t_{c,k}, & F_{i,k} > 0, \\ \lambda_k t_{c,k}, & F_{i,k} < 0. \end{cases}$$

Thus, in the loss region, firms behave as if they face a lower effective tax rate on marginal investment. As λ_k increases, losses become more valuable, and the effective net-of-tax rate becomes more sensitive to the statutory tax rate.

B.4 Income and Taxable Income Elasticities

In the loss region, equilibrium income net of fixed costs takes the form

$$I^*_{i,k} = \frac{1 + e_k}{e_k} r_k^{-e_k} (1 - \lambda_k t_{c,k})^{e_k} A_{i,k}. \tag{B.5}$$

Differentiating with respect to the statutory net-of-tax rate $(1 - t_{c,k})$ yields

$$\frac{\partial \log I^*_{i,k}}{\partial \log(1 - t_{c,k})} = e_k \frac{\lambda_k(1 - t_{c,k})}{1 - \lambda_k t_{c,k}}. \tag{B.6}$$

Taxable income is $Y_{i,k} = I^*_{i,k} - C_{i,k}$, so the elasticity of taxable income with respect to the net-of-tax rate is

$$\varepsilon_{i,k}(\lambda_k) = e_k \frac{\lambda_k(1 - t_{c,k})}{1 - \lambda_k t_{c,k}} \left(1 + \frac{C_{i,k}}{Y_{i,k}}\right). \tag{B.7}$$

B.5 Implications for the Elasticity of Taxable Income

Equation (B.7) implies that the elasticity of corporate taxable income is increasing in the generosity of loss carryforwards. Differentiating with respect to λ_k yields

$$\frac{\partial \varepsilon_{i,k}}{\partial \lambda_k} = e_k \left(1 + \frac{C_{i,k}}{Y_{i,k}}\right) \frac{1 - t_{c,k}}{(1 - \lambda_k t_{c,k})^2} > 0. \tag{B.8}$$

Thus, holding the curvature of the production function fixed, more generous loss carryforward rules increase the elasticity of taxable income with respect to the net-of-tax rate. Intuitively, when losses can be carried forward and used to offset future tax liabilities, investment decisions become more sensitive to statutory tax rates, amplifying both real responses and the observed bunching behavior around tax kinks.

Empirically, in Table B2 we show how we can adjust our elasticity estimates ex-post using information on the transition probabilities from Table C1. Specifically, if we assume that the probability with which a firm expects to realize sufficient taxable income, s_k, is the probability with which firms in each country will move away from reporting negative or zero taxable income, we can calculate s_k as the probability that a firm that reports losses reports positive income in period t+1. In Table C1 that is the sum of columns "bin 1" and "bin 2" for row "bin -1".

This extension highlights an important institutional channel through which cross-country differences in tax systems affect behavioral elasticities. Countries with longer or more certain loss carryforward provisions exhibit larger elasticities of taxable income, even when underlying production technologies are similar. This mechanism operates independently of reporting responses and complements existing explanations based on enforcement and avoidance technologies. While this extension shows that loss carryforwards are quantitatively important in some countries, we do not use these estimates as a baseline because we do not have information on the transitional probabilities from all countries in our sample.

Table B2: Elasticity of Corporate Taxable Income Adjusted for Loss Carryforwards.

Country	ETI at fixed costs = 0	s_k	r_k	N_k	λ	Tax rate	Adjusted ETI at fixed costs = 0	% of baseline ETI
Austria	0.146	0.3600	0.03	5	0.8376	0.3665	0.112	0.77
Armenia	1.408	0.1243	0.03	3	0.3105	0.20	0.373	0.26
Canada	1.907	0.2600	0.03	20	0.8953	0.17	1.672	0.88
Czechia	1.148	0.2097	0.03	5	0.6422	0.19	0.680	0.59
Ecuador	0.075	0.1800	0.03	5	0.5830	0.24	0.039	0.52
Greece	1.194	0.2336	0.03	5	0.6841	0.27	0.731	0.61
Norway	0.703	0.2728	0.03	9999	0.9009	0.27	0.611	0.87
Portugal	1.259	0.2653	0.03	5	0.7325	0.21	0.861	0.68
Senegal	0.163	0.1064	0.03	3	0.2707	0.28	0.034	0.21
Slovakia	0.770	0.2564	0.03	7	0.8037	0.23	0.585	0.76

Notes: This table computes elasticities adjusted for loss carryforwards. We take the statutory tax rates (tax rate) and the number of years a firm can carry losses forward (N_k) from Table 1, ETI from Table 4 and s_k is calculated using information from Table C1, where s_k is equal to the sum of bin 1 and bin 2 entries for row bin -1 for each country. Adjusted elasticity is computed using equation B.7 above, assuming that the fixed costs parameter $\frac{C_{i,k}}{Y_{i,k}}$ is equal to zero. We do not have information on s_k for Chile, China, Costa Rica, France, Montenegro and South Africa, which is why we cannot compute the adjusted elasticities for those countries. % of baseline ETI is the share of adjusted ETI in baseline ETI that shows the share of variation that remains in our baseline ETI that is not accounted for by loss carryforwards.

C Additional results

C.1 Additional descriptive statistics

C.1.1 Transition probabilities

Table C1: Transition probabilities across bins of income distribution.

Austria

	bin -1	bin 0	bin 1	bin 2
bin -1	31.52	35.90	27.13	5.45
bin 0	0.28	63.49	35.03	1.20
bin 1	0.13	15.54	75.87	8.46
bin 2	0.11	2.33	32.43	65.13

Armenia

	bin -1	bin 0	bin 1	bin 2
bin -1	84.82	6.19	1.40	7.60
bin 0	33.14	54.44	3.63	8.80
bin 1	40.59	16.99	22.63	19.78
bin 2	23.63	4.76	1.92	69.69

Canada

	bin -1	bin 0	bin 1	bin 2
bin -1	0.70	0.01	0.20	0.09
bin 0	0.21	0.53	0.17	0.09
bin 1	0.18	0.01	0.75	0.07
bin 2	0.13	0.01	0.11	0.75

Czechia

	bin -1	bin 0	bin 1	bin 2
bin -1	75.36	3.66	11.34	9.63
bin 0	7.99	86.35	4.72	0.93
bin 1	32.22	7.93	50.54	9.32
bin 2	24.57	1.02	9.33	65.08

Ecuador

	bin -1	bin 0	bin 1	bin 2
bin -1	0.76	0.06	0.09	0.09
bin 0	0.17	0.73	0.07	0.03
bin 1	0.38	0.17	0.36	0.09
bin 2	0.26	0.04	0.07	0.63

Greece

	bin -1	bin 0	bin 1	bin 2
bin -1	76.48	0.17	16.04	7.32
bin 0	14.51	55.78	22.58	7.13
bin 1	14.49	0.35	78.21	6.95
bin 2	13.90	0.16	8.93	77.01

Norway

	bin -1	bin 0	bin 1	bin 2
bin -1	69.03	3.69	16.97	10.31
bin 0	20.91	43.14	25.93	10.03
bin 1	15.25	20.39	56.84	7.52
bin 2	14.92	14.14	10.87	60.07

Portugal

	bin -1	bin 0	bin 1	bin 2
bin -1	72.73	0.74	14.26	12.27
bin 0	3.51	86.55	8.44	1.50
bin 1	28.56	4.67	55.28	11.49
bin 2	28.72	1.07	15.98	54.23

Senegal

	bin -1	bin 0	bin 1	bin 2
bin -1	76.27	13.02	3.27	7.44
bin 0	11.14	85.46	1.16	2.24
bin 1	27.65	25.48	31.99	14.88
bin 2	20.30	8.19	5.70	65.82

Slovakia

	bin -1	bin 0	bin 1	bin 2
bin -1	74.28	0.08	17.62	8.02
bin 0	42.67	12.89	27.11	17.33
bin 1	37.48	0.26	53.34	8.91
bin 2	20.85	0.11	11.23	67.80

Notes: This table shows the set of transition probabilities for firms that move between 4 bins of taxable profits, bin -1: negative profits, bin 0: zero taxable profits, bin 1: Q1-Q4 of the distribution of non-zero taxable profits and bin 2: Q5 of the distribution of non-zero taxable profits. Note that for countries which only have 1 year of data, we cannot produce the transition matrix. These are Chile and China. Further, we do not have this information for France, Montenegro and South Africa.

C.1.2 Comparison of firm revenues across taxable income distribution

Table C2: Summary of firm revenues at different points of taxable income distribution.

	(1) zero Y_i	(2) Q1	(3) Q2	(4) Q3	(5) Q4	(6) Q5
Austria revenues	153.433	164.421	183.591	214.057	253.526	301.250
Austria obs	159,630	76,035	76,031	76,032	76,033	76,032
Armenia revenues	58.16	215.90	51.36	101.30	197.30	1,248.00
Armenia obs	8,283	14,842	14,840	14,841	14,840	14,826
Canada revenues	54.76	106.00	9.07	14.63	23.69	275.00
Canada obs	945	7,500	7,500	7,500	7,500	7,500
Chile revenues	239.10	2,929.00	170.90	526.40	1,260.00	6,088.00
Chile obs	2,803	2,269	2,269	2,269	2,269	2,269
Costa Rica revenues	22.96	61.24	39.67	63.56	105.90	561.00
Costa Rica obs	552,210	221,463	221,462	221,463	221,462	221,462
Czechia revenues	3.30	11.58	2.05	3.81	9.38	70.35
Czechia obs	104,884	381,168	284,614	403,001	406,656	410,764
Ecuador revenues	0.01	0.59	0.06	0.21	0.56	4.04
Ecuador obs	99,938	55,171	55,170	55,170	55,170	55,170
Greece revenues	0.96	1.10	0.42	0.75	1.48	2.88
Greece obs	411	12,644	12,643	12,643	12,643	12,643
Montenegro revenues	0.06	0.15	0.03	0.07	0.16	0.70
Montenegro obs	22,251	30,192	30,196	30,197	30,183	30,191
Norway revenues	11.17	10.57	1.46	5.38	5.44	27.33
Norway obs	209,041	235,002	235,127	235,051	235,165	234,870
Portugal revenues	1.31	127.49	42.60	128.81	244.40	556.79
Portugal obs	108,865	258,284	258,282	258,283	258,281	258,282
Senegal revenues	67.899	1,210.000	120.900	139.600	523.100	4,396.000
Senegal obs	11,271	10,050	10,049	10,050	10,049	10,049
Slovakia revenues	0.72	0.78	0.14	0.24	0.50	2.88
Slovakia obs	132	16,282	16,281	16,281	16,281	16,281

Notes: This table presents the average of revenues for firms across 5 quantiles of taxable income distribution (columns 2-6) in millions of local currency and at zero taxable profits (column 1). We do not have this data for China, France, and South Africa.

C.2 Additional empirical model details

Table C3: Sample coverage by country

Country	Number of firms	Years used
Armenia	80,839	2007–2017
Austria	206,806	2009–2013
Canada	10,056	2012–2019
Chile	14,148	2018
China	269,225	2009
Costa Rica	542,880	2006–2020
Czechia	244,870	2018–2022
Ecuador	98,742	2014–2018
France	716,950	2010–2016
Greece	25,712	2002–2004
Montenegro	45,898	2011–2020
Norway	284,336	2006–2013
Portugal	449,185	2016–2019
Senegal	14,415	2010–2020
Slovakia	48,922	2013
South Africa	–	2010–2018

Notes: This table reports the number of firms and the years of data used for each country in the estimation of corporate taxable income elasticities. For South Africa, information on firm counts has not been disclosed.

C.2.1 Fixed costs estimation methods

Table C4: Summary of fixed costs estimation data and methods.

country	(1) Functional form assumption	(2) variable costs proxy	(3) panel/ cross-section
Austria	Cubic	inputs (VAT return)	panel with firm-fixed effects
Armenia	Cubic	Tax deductions	panel with firm fixed effects
Canada	log-log	Total expenses (Income Statement)	panel with firms fixed effects
Chile	quintic	wages	cross section
China	cubic	interest deductions	cross section
Costa Rica	cubic	Material, and Operational Costs	repeated cross section
Czechia	cubic	Material and energy costs	cross section
Ecuador	cubic	Labor and Material Costs	repeated cross section
France	cubic		repeated cross section
Greece	log-log	tax deductions	repeated cross section
Montenegro	quintic	labor input + material input + operating input	repeated cross section
Norway	quintic	operational costs and financial costs	panel, with firm fixed effects
Portugal	cubic	Costs of goods sold and material consumed + Supplies and external services + Employee expenses.	repeated cross section
Senegal	cubic		repeated cross section
Slovakia	log-log	depreciation of long-term tangible and intangible assets	cross section
South Africa	cubic	operational costs, financial costs, and other expenses	repeated cross section

Notes: This table presents the functional form assumptions, variable costs proxies and the type of data and fixed effects used for the fixed costs estimations across countries.

Table C5: Summary of fixed costs scaling parameter.

	25th pct	Median	75th pct
Austria	0.00	0.00	0.00
Armenia	-0.62	0.00	1.10
Canada	-0.08	-0.02	0.07
Chile	-0.34	0.03	1.05
Costa Rica	-0.04	1.34	6.94
Czechia	0.00	0.02	0.08
Ecuador	-5.99	-1.00	1.02
Greece	-0.02	0.01	0.04
Montenegro	-2.37	0.18	32.07
Norway	-1.66	-0.81	0.29
Portugal	-1.24	-0.89	-0.27
Senegal	-4.61	-0.45	1.76
Slovakia	-0.00	0.00	0.01

Notes: This table presents the distribution of fixed costs scalar,($\frac{C_i}{Y_i}$), across countries. C_i is the estimated firm-level fixed cost parameter, while Y_i is the taxable profits. Note that Y_i can be negative. We do not have this data for China, France, and South Africa.

C.3 Methodology for estimating the distribution of elasticities

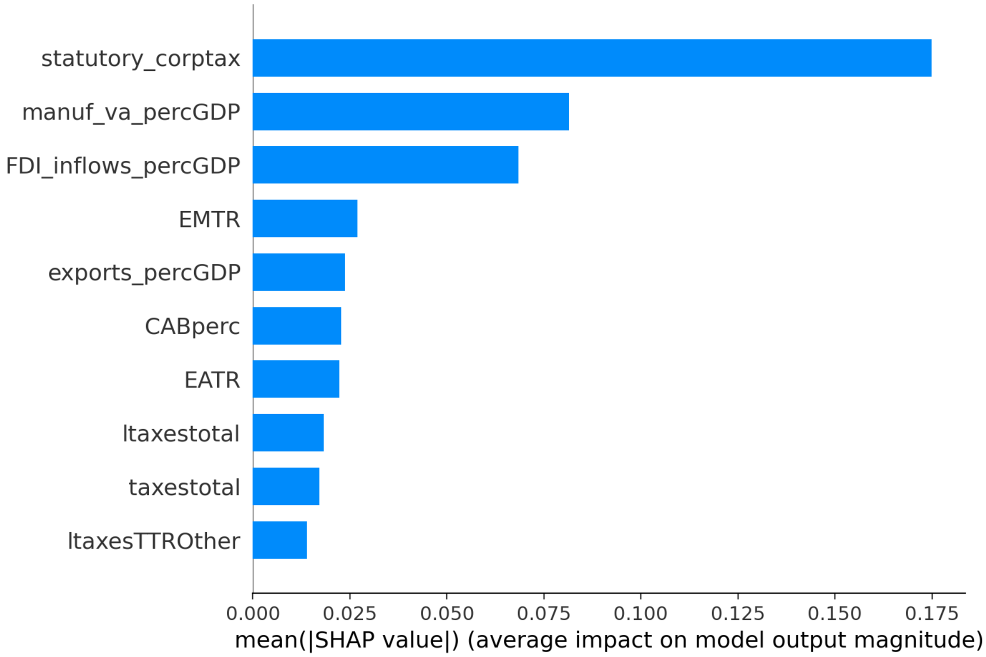
We estimate and graph the distribution of elasticities within a country in Figure 6. We employ a flexible parametric approach to recover the shape of the distribution of elasticities within a country. Specifically, we use the Skewed Generalized Error Distribution (SGED), which is defined by four parameters—mean, standard deviation, shape (k), and skewness (λ). The advantage of this distribution is that it allows for asymmetric, heavy-tailed distributions. To recover the distributional parameters, we match three quantiles—the 25th, 50th, and 75th percentiles. Identification proceeds by minimizing a non-linear least squares objective function. The optimization is constrained to ensure economically meaningful parameters (e.g., positive standard deviation, bounded skewness) and is implemented with a quasi-Newton method (L-BFGS-B) for computational efficiency.

D Predicting Elasticities

This appendix provides additional details and results for our random forest analysis to predict elasticities. Table D1 provides a list of the characteristics we use in our random forest analysis. We classify variables into three categories: tax system characteristics, country characteristics, and firm characteristics. The random forest procedure chooses the variables and the number of variables to include in our out-of-sample prediction. Note that we do not restrict the model to choose one characteristic from each category. Figure D2 graphs the mean squared error and R-squared of the model as the number of factors increases from 1 to 20. The lowest MSE and the highest R-squared occur with three factors. We list the top 10 factors with largest predictive power in Figure D1, of which the top 5 that we use are, in order, statutory corporate tax rates, manufacturing value added as a percentage of GDP, FDI inflows as percentage of GDP, Effective marginal tax rate (EMTR), and exports as percent of GDP. As baseline, we use the top three factors and we also provide estimates using a fourth and fifth factors. The estimates are similar across these three different models.

In Figure D3 we graph the contribution of the three top factors (statutory corporate tax rates, manufacturing value added as percent of GDP, and FDI inflows as percent of GDP) in explaining differences across elasticities based on the Shapley additive explanation (SHAP). For each country, the estimate starts with a base level of 0.792. Then, if a factor contributes positively to the difference from the base, it is shown above the base and in red. If, instead, a factor contributes negatively to the difference from the base, it is shown below the base and in blue. For example, the manufacturing value added adds to the elasticity for Canada while it adds negatively to Czechia. This comparison highlights that the same factor can cause estimates in some countries to be greater or less than the base estimate. Table D2 summarizes these waterfall graphs in a tabular format, while Table D3 and Table D4 show the percentage contributions of the four and five focal factors, respectively.

Figure D1: Top 10 random forest predictors.



Notes: This figure plots the top 10 predictors from random forest with highest Shapley values sorted in descending order. Each variable is defined in Table D1. The top 5 are: statutory tax rates, manufacturing value added as % of GDP, FDI inflows as % of GDP, Effective marginal tax rates (EMTRs), and exports as a % GDP.

Figure D2: Mean squared error and R-squared as number of factors increase

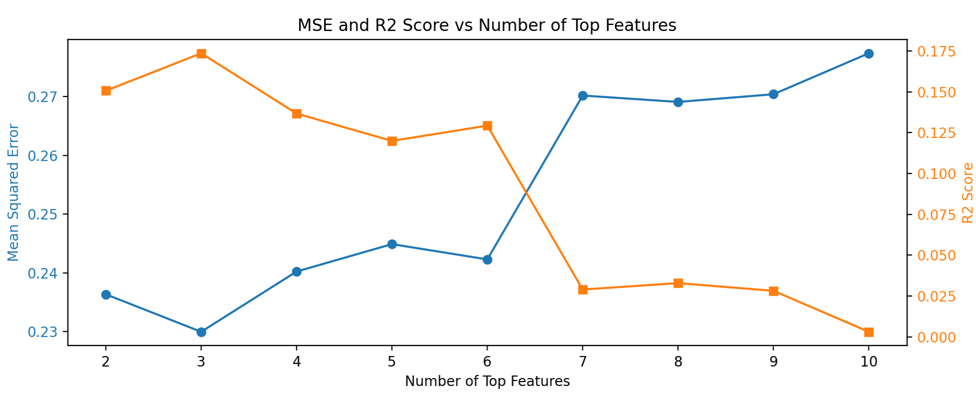
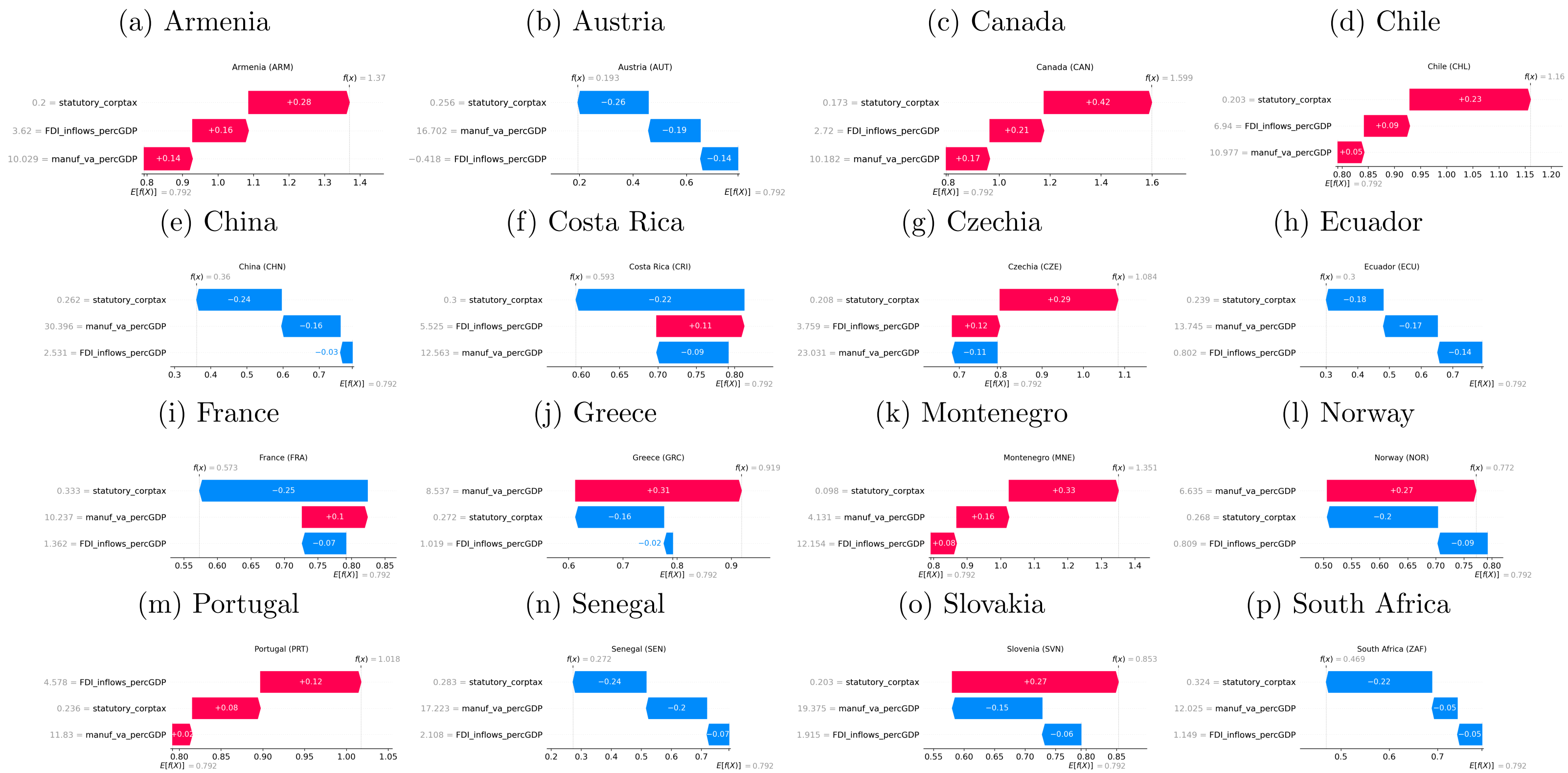


Table D1: List of all variables used in the random forest procedure.

variable name	variable description	source
Tax system characteristics		
statutory_corptax	statutory corporate tax rate	CBT tax database
loss_carry_forward	loss carryforward allowed years	CBT tax database
loss_carry_back	loss carryback allowed years	CBT tax database
national_loss_consolidation	dummy if loss consolidation allowed	CBT tax database
minimumtax	dummy if minimum ltax	CBT tax database
taxholiday	dummy if tax holiday	CBT tax database
SEZs	dummy if special economic zone	CBT tax database
EATR_oecd	effective average tax rate	OECD + CBT tax database
EMTR_oecd	effective marginal tax rate	OECD + CBT tax database
ltaxestotal	log total tax revenues	OECD + CBT tax database
taxesTTRprofit	total tax revenues	OECD + CBT tax database
ltaxesTTRprofit	log total tax revenues	OECD + CBT tax database
taxesTTRlabor	total tax revenues	OECD + CBT tax database
ltaxesTTRlabor	log total tax revenues	OECD + CBT tax database
taxesTTROther	total tax revenues	OECD + CBT tax database
ltaxesTTROther	log total tax revenues	OECD + CBT tax database
expenditure_percGDP	total tax revenues	OECD + CBT tax database
Country characteristics		
gdp_nom	nominal GDP (USD)	WDI
lgdp_pc	logarithm of GDP per capita (USD)	WDI
gdp_gr	GDP growth	WDI
gini	Inequality: Gini	WDI
govtexpperc	Government expenditrues as perc of GDP	WEO
govtrevperc	Government revenues as perc of GDP	WEO
FDI_bopUSD	Foreign direct investment, net (BoP, current US$)	WDI
FDI_inflows_percGDP	Foreign direct investment, net inflows (% of GDP)	WDI
FDI_outflows_percGDP	Foreign direct investment, net outflows (% of GDP)	WDI
CABperc	Current account balance as perc of GDP	WEO
exports_percGDP	Exports of goods and services (% of GDP)	WDI
improts_percGDP	Imports of goods and services (% of GDP)	WDI
manuf_exp	Manufactures exports (% of merchandise exports)	WDI
manuf_imp	Manufactures imports (% of merchandise imports)	WDI
natresourcerents_percGDP	Total natural resources rents (% of GDP)	WDI
tariffratemean	Tariff rate, applied, weighted mean, all products (%)	WDI
formal	Index built based on the quantiles of the distribution of the percent of firms that are formally registered	WB Informal Economy Database
epayments	percentage of payments received electronically	ISORA
taxadminexp_GDPshare	Tax administration expenditures (% of GDP)	ISORA
ltaxadminstaff	logarithm of Tax administrationstaff (total FTE)	ISORA
lPopulation	logarithm of population	WEO
governancequality	governance quality: average of voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption	WGI
exchrate	exchange rate USD	
Characteristics of firms within each country		
ageofirm	average age of firms	WDI
percfirmwith10percfown	Percent of firms with at least 10% of foreign ownership	WDI
manuf_va_percGDP	Manufacturing, value added (% of GDP)	WDI
pctfformallyregist	% of firms formally registered when they started operations	WB Informal Economy Database
lassets	logarithm of the average firm total assets	Orbis BvD
lp90assets	logarithm of the p90 of firm total assets	Orbis BvD
lp10assets	logarithm of the p10 of firm total assets	Orbis BvD
lp99assets	logarithm of the p99 of firm total assets	Orbis BvD
lrevenue	logarithm of average firm revenues	Orbis BvD
lp90revenue	logarithm of the p90 of firm revenues	Orbis BvD
lp10revenue	logarithm of the p10 of firm revenues	Orbis BvD
lp99revenue	logarithm of the p99 of firm revenues	Orbis BvD
lnbempl	logarithm of the average firm number of employees	Orbis BvD
lp90nbempl	logarithm of the p90 firm number of employees	Orbis BvD
lp10nbempl	logarithm of the p10 firm number of employees	Orbis BvD
lp99nbempl	logarithm of the p99 firm number of employees	Orbis BvD
lnbfirms	logarithm of the number of firms	Orbis BvD
llarge	logarithm of the number of above median size firms	Orbis BvD
lsmall	logarithm of the number of below median size firms	Orbis BvD
assetratio90_10	ratio of total assets of the p90 to p10 firm	Orbis BvD
share_small	share of below median firms in all firms	Orbis BvD

Figure D3: Contribution of factors to deviations from average ETI estimates



Notes: This figure quantifies the role of different factors in explaining differences in the corporate elasticity across countries. The factors that increase a country's elasticity are shown in red and factors that decrease a country's elasticity are shown in blue. In these graphs we show contributions using the top 3 factors model.

Table D2: Level contribution of factors to deviations from average ETI, 3 factors

Country	Base Value	Predicted ETI	Actual ETI	Tax system	Country	Firm
Armenia	0.792	1.370	1.408	0.284	0.158	0.136
Austria	0.792	0.193	0.146	-0.264	-0.140	-0.194
Canada	0.792	1.599	1.907	0.423	0.213	0.171
Chile	0.792	1.160	1.122	0.231	0.087	0.050
China	0.792	0.360	0.295	-0.235	-0.033	-0.163
Costa Rica	0.792	0.593	0.394	-0.220	0.114	-0.094
Czechia	0.792	1.084	1.148	0.286	0.116	-0.109
Ecuador	0.792	0.300	0.075	-0.180	-0.140	-0.171
France	0.792	0.573	0.379	-0.251	-0.065	0.098
Greece	0.792	0.919	1.194	-0.163	-0.016	0.306
Montenegro	0.792	1.351	1.243	0.326	0.077	0.156
Norway	0.792	0.772	0.703	-0.197	-0.088	0.265
Portugal	0.792	1.018	1.259	0.082	0.120	0.024
Senegal	0.792	0.272	0.163	-0.244	-0.074	-0.202
Slovakia	0.792	0.966	0.770	0.269	0.041	-0.136
South Africa	0.792	0.469	0.477	-0.219	-0.051	-0.053
Mean	0.792	0.812	0.793	-0.004	0.020	0.005

Notes: This table quantifies the role of different factors in explaining deviations from average ETI across countries in absolute terms. We use the top 3 factors that explain the differences in ETIs across countries: statutory corporate tax rate, manufacturing sector value added as a % of GDP, FDI inflows as a % of GDP. We call these tax system, firm characteristics, and country characteristics, respectively. We quantify the contribution of each factor in absolute values.

Table D3: Percentage contribution of factors to deviations from average ETI, 4 factors

Country	Tax system-corporate tax rate	Country	Firm	tax system-EMTR
Armenia	0.45	0.22	0.18	0.14
Austria	0.38	0.21	0.24	0.17
Canada	0.47	0.19	0.18	0.17
Chile	0.57	0.28	0.13	0.01
China	0.45	0.13	0.28	0.14
Costa Rica	0.47	0.24	0.18	0.11
Czechia	0.50	0.20	0.18	0.12
Ecuador	0.28	0.23	0.25	0.23
France	0.57	0.20	0.17	0.05
Greece	0.33	0.10	0.40	0.18
Montenegro	0.48	0.19	0.22	0.11
Norway	0.38	0.16	0.34	0.12
Portugal	0.34	0.50	0.07	0.09
Senegal	0.39	0.15	0.26	0.20
Slovakia	0.64	0.02	0.29	0.05
South Africa	0.64	0.19	0.16	0.01
Median	0.46	0.20	0.20	0.12
Mean	0.46	0.20	0.22	0.12

Notes: This table quantifies the role of different factors in explaining deviations from average ETI across countries. We use the top 4 factors that explain the differences in ETIs across countries: statutory corporate tax rate, manufacturing sector value added as a % of GDP, FDI inflows as % of GDP, and effective marginal tax rate (EMTR). We call these tax system-corporate tax rate, firm, country, tax system-EMTR characteristics respectively. We quantify the contribution of each factor in absolute values.

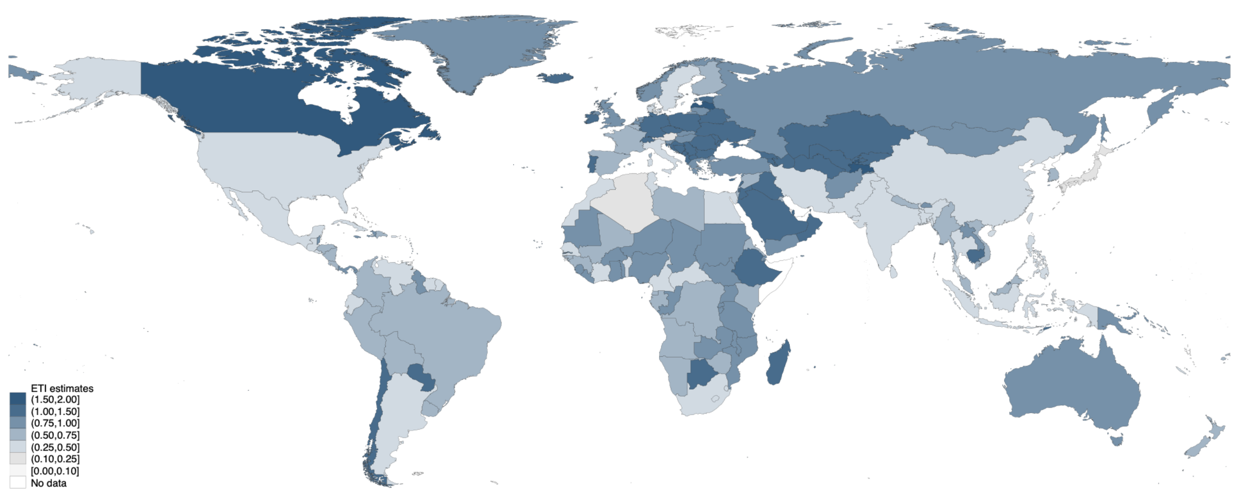
Table D4: Percentage contribution of factors to deviations from average ETI, 5 factors

Country	Tax system-statutory tax	Country	Firm	tax system-EMTR	country-CAB
Armenia	0.42	0.19	0.18	0.12	0.08
Austria	0.35	0.17	0.22	0.17	0.10
Canada	0.44	0.17	0.17	0.17	0.05
Chile	0.56	0.27	0.14	0.00	0.02
China	0.43	0.12	0.25	0.09	0.12
Costa Rica	0.47	0.21	0.18	0.11	0.04
Czechia	0.49	0.19	0.18	0.12	0.02
Ecuador	0.28	0.20	0.24	0.18	0.10
France	0.53	0.17	0.17	0.03	0.10
Greece	0.33	0.09	0.36	0.14	0.09
Montenegro	0.46	0.16	0.21	0.10	0.07
Norway	0.35	0.12	0.32	0.13	0.08
Portugal	0.28	0.42	0.06	0.10	0.14
Senegal	0.39	0.13	0.25	0.17	0.06
Slovakia	0.61	0.01	0.29	0.02	0.08
South Africa	0.62	0.16	0.15	0.01	0.06
Median	0.44	0.17	0.20	0.11	0.08
Mean	0.44	0.17	0.21	0.10	0.07

Notes: This table quantifies the role of different factors in explaining deviations from average ETI across countries. We use the top 5 factors that explain the differences in ETIs across countries: statutory corporate tax rate, manufacturing sector value added as a % of GDP, FDI inflows as % of GDP, effective marginal tax rate (EMTR), Current account balance as perc of GDP (CAB). We call these tax system-corporate tax rate, firm, country, tax system-EMTR, country-CAB characteristics respectively. We quantify the contribution of each factor in absolute values.

As we discuss in Section 4.5, we extend our prediction of elasticity estimates to 208 countries across the world—the near universe. Note that we do not make predictions for countries that have zero corporate tax rates, such as, Cayman Islands or Anguilla, nor those for which we do not have any corporate tax rates data available, such as, Holy See or small islands of Pitcairn or Reunion. We do make predictions for tax haven countries which have a non-zero statutory corporate tax rate for domestic companies, while having a zero statutory corporate tax rate for non-resident companies. Examples of those countries include St Kitts and Nevis or St Lucia. In Figure D4, we plot the predicted elasticities for 208 countries on a map, with dark blue indicating larger elasticities and light blue indicating smaller elasticities. We find substantial variation in the elasticities across and within each continent, with some countries within each continent having very high predicted elasticities while others have very low ones.

Figure D4: Cross-Country elasticity estimates



Notes: This figure maps the predicted elasticities using our three-factor random forest model. Estimates for each country using our three-, four-, and five-factor models are provided in Table A1.

D.1 Out-of-Sample Prediction Performance

As a more stringent validation check, we conduct leave-one-country-out cross-validation (Table D5). This exercise confirms that the 3-feature model maintains superior out-of-sample performance ($R^2 = 0.239$, RMSE = 0.460) and demonstrates that our results are not driven by any single influential observation. The exercise serves three purposes. First, it provides a direct test of external validity. Second, it evaluates the stability of the relationships identified by our feature importance ranking. Third, it provides a benchmark for the extent to which cross-country variation in ETI is predictable from observable macroeconomic and policy characteristics.

For each country $c \in \{1, \ldots, 16\}$, we exclude c from the sample and estimate a prediction model using the remaining 15 observations. We fit a Random Forest model using the top $k \in \{3, 4, 5\}$ features identified in the full-sample importance ranking from the main analysis. We then predict the ETI for the excluded country. Repeating this procedure for all countries yields a set of fully out-of-sample predictions.

Predictive performance is evaluated using root mean squared error (RMSE), mean absolute error (MAE), and the out-of-sample coefficient of determination (R^2). We do not re-run the feature selection procedure within each fold. With only 16 observations, doing so would not constitute a meaningful out-of-sample exercise and would instead confound feature instability with prediction error.

Table D5 reports leave-one-out cross-validation performance for models using the top three, four, and five features.

Table D5: Leave-One-Country-Out Cross-Validation Performance

Number of Features (k)	RMSE	R^2	MAE
3	0.460	0.239	0.380
4	0.482	0.165	0.375
5	0.486	0.151	0.383

Notes: RMSE denotes root mean squared error, MAE denotes mean absolute error, and R^2 is the out-of-sample coefficient of determination. All metrics are computed using leave-one-country-out cross-validation on the 16 countries with estimated ETI values.

The parsimonious three-feature specification performs best out-of-sample. Relative to the five-feature model, it reduces RMSE by approximately six percent and explains nearly 24 percent of out-of-sample variation in ETI, compared to 15–17 percent for more complex specifications. Mean absolute error is similar across models, with only minor differences. This pattern is consistent with the bias–variance tradeoff in small samples: as model complexity increases, predictive performance deteriorates rather than improves.

To place these magnitudes in context, the RMSE of 0.460 corresponds to roughly one quarter of the observed ETI range in our sample (0.075 to 1.907). The MAE of approximately 0.38 implies that typical prediction errors are economically meaningful. An R^2 of 0.239 indicates that the simple model predicts a substantial share of the variation, but that the majority of cross-country ETI variation remains unexplained.

The leave-one-out results yield three substantive conclusions. First, the superior performance of the simplest specification indicates that our feature ranking is not driven solely by overfitting. The top-ranked variables contain stable predictive signal that survives exclusion of any single country. Second, predictive power is concentrated in the top three features—statutory corporate tax rates, foreign direct investment inflows as a share of GDP, and manufacturing value added—suggesting that these variables capture the most robust correlates of cross-country ETI differences in our data. Third, the absence of sharp performance deterioration when individual countries are excluded indicates that no single observation disproportionately drives the main results.

The cross-validation exercise is purely predictive and does not provide causal identification. The variables that predict ETI may proxy for unobserved institutional features, reflect equilibrium policy choices, or be jointly determined with behavioral responses.

Several limitations should be emphasized. Each fold relies on only 15 observations, implying potentially high variance in fitted relationships. We impose no theoretical bounds on predictions, allowing for occasional implausible values. Finally, the out-of-sample R^2 indicates substantial unexplained heterogeneity, which may reflect measurement error, omitted institutional and political-economy factors, country-specific legal and administrative features, or genuine limits to predictability in policy design.

Despite these constraints, the leave-one-out results provide meaningful validation for the main analysis. The same variables emphasized by the SHAP decomposition perform best in out-of-sample prediction, and predictive accuracy declines as additional, lower-ranked features are introduced. At the same time, the limited explanatory power reinforces an important point: our objective is not to fully explain ETI variation, but to identify the most informative observables within severe data constraints.

Overall, the leave-one-country-out exercise indicates that a parsimonious model using a small set of core features achieves nontrivial out-of-sample predictive power, while leaving substantial heterogeneity unexplained. This pattern supports our emphasis on disciplined interpretation rather than comprehensive prediction and underscores the importance of country-specific institutions and policy details in shaping behavioral responses to taxation.

E Revenue and Welfare Implications

This appendix quantifies the revenue and welfare consequences of marginal changes in statutory corporate tax rates using our estimated country-specific elasticities. We proceed in three steps. First, we derive the revenue effects of a small change in the statutory rate. Second, we characterize the associated welfare implications using standard sufficient-statistic objects: the marginal excess burden (MEB), the marginal value of public funds (MVPF), and deadweight loss. Third, we apply this framework to a harmonized statutory rate of 15 percent, as implemented by the OECD/G20 Global Minimum Tax (GMT) in 2025, to assess how coordinated tax policy translates into heterogeneous efficiency costs across countries.

E.1 Revenue, Excess Burden and Marginal Value of Public Funds

Let corporate tax revenue in country k be given by

$$R_k(t_k) = t_k\, B_k(t_k),$$

where t_k denotes the statutory corporate tax rate and $B_k(t_k)$ is the corporate tax base. Taking the total differential of revenue yields

$$dR_k = B_k, dt_k + t_k, dB_k. \tag{E.1}$$

The first term captures the mechanical effect of a rate change holding behavior fixed, while the second term reflects behavioral responses of the tax base. We summarize behavioral responses using the elasticity of the tax base with respect to the net-of-tax rate,

$$\varepsilon_k \equiv \frac{dB_k}{d(1-t_k)} \frac{1-t_k}{B_k}. \tag{E.2}$$

Rearranging and multiplying by t_k, gives

$$t_k dB_k = \varepsilon_k \frac{t_k}{1-t_k} B_k d(1-t_k) = -\varepsilon_k \frac{t_k}{1-t_k} B_k dt_k, \tag{E.3}$$

where $d(1-t_k) = -dt_k$. Substituting this expression into the revenue differential gives

$$dR_k = B_k dt_k + \left(-\varepsilon_k \frac{t_k}{1-t_k} B_k dt_k\right). \tag{E.4}$$

Equivalently,

$$dR_k = B_k dt_k \left(1 - \frac{t_k}{1-t_k}\varepsilon_k\right) = B_k dt_k \left(\frac{1 - t_k - \varepsilon_k t_k}{1-t_k}\right). \tag{E.5}$$

This expression highlights how revenue responses depend jointly on the statutory rate and the elasticity.

The negative of this ($-dR_k$) is sometimes referred to as the marginal net fiscal cost, and $t_k\varepsilon_k/(1-t_k)$ is the feedback rate, which measures the fraction of the mechanical revenue change that is offset by behavioral responses. Expressing the revenue effect in percentage terms yields

$$\frac{dR_k}{R_k} = \frac{1}{R_k}\frac{dR_k}{dt_k}dt_k \qquad = \left(\frac{1 - t_k - \varepsilon_k t_k}{1-t_k}\right)\frac{dt_k}{t_k}. \tag{E.6}$$

The marginal excess burden of taxation is given by the behavioral revenue loss. Normalizing by the net revenue raised yields the marginal excess burden per dollar of revenue,

$$\text{MEB}_k \equiv \frac{-t_k dB_k}{dR_k} \qquad = \frac{\varepsilon_k t_k}{1 - t_k - \varepsilon_k t_k}. \tag{E.7}$$

The MEB is a sufficient-statistic measure of efficiency costs: it is valid under heterogeneous firms and heterogeneous behavioral responses, and does not depend on the distribution of corporate income. It admits a simple interpretation as the efficiency cost required to raise one additional dollar of corporate tax revenue at the margin.

An alternative summary of welfare consequences is the marginal value of public funds (MVPF), following Hendren and Sprung-Keyser (2020). The MVPF of a marginal decrease in the corporate tax rate is

$$MVPF_k = \frac{1}{1 - \frac{t_k}{1-t_k}\varepsilon_k}. \tag{E.8}$$

The MVPF measures the social value generated by lowering the corporate tax rate per dollar of net revenue lost, accounting for behavioral responses of the tax base implied by the estimated elasticity.

Finally, we consider second-order efficiency costs by computing Harberger deadweight loss. Approximating deadweight loss as a triangle with base t_k and height dB_k we obtain

$$DWL_k = \frac{1}{2}dB_k dt_k = \frac{1}{2}B_k\frac{\varepsilon_k}{1-t_k}(dt_k)^2. \tag{E.9}$$

Deadweight loss is second-order in the tax change: while revenue effects scale linearly with dt_k, deadweight loss scales with $(dt_k)^2$. For comparability with our other efficiency measures, we report DWL_k/B_k, the deadweight loss as a share of the tax base, for a one-percentage-point increase in the statutory rate.

E.2 Empirical Implementation

Table E1 reports the implied revenue and welfare effects across countries. Columns (3) and (4) map cross-country heterogeneity in statutory tax rates and elasticities into elasticities and semi-elasticities of corporate tax revenue, respectively. The magnitude varies substantially. Countries with lower statutory rates exhibit larger mechanical revenue gains, while countries with more elastic tax bases experience greater revenue erosion due to behavioral responses. Consequently, similar revenue elasticities can arise from very different combinations of tax rates and elasticities, underscoring the importance of accounting for behavioral margins when evaluating corporate tax reforms.

Columns (5)-(7) report welfare implications. Column (5) presents MVPFs, with an average of 1.32 and values ranging from 1.02 (Ecuador) to 1.79 (Greece). For comparison, the implied MVPF for U.S. corporate taxation is 1.31, using an elasticity of 0.89 from Coles et al. (2022) and a 21 percent tax rate. In contrast, Hendren and Sprung-Keyser (2020) estimates an MVPF of 1.85 for U.S. personal income taxation based on the 1993 rate increase from 31 to 39.6 percent.

Column (6) reports the ratio of deadweight loss to mechanical revenue, which provides an alternative normalization of efficiency costs that abstracts from the scale of net revenue effects. Consistent with the MVPF, this ratio varies widely across countries and is systematically higher where corporate tax bases are more elastic. Column (7) reports the marginal excess burden evaluated at prevailing statutory rates. The estimates of MEB range between 0.02 in Ecuador to 0.79 in Greece. This puts our estimates between the existing calculations that range from 0.33 in Fullerton and Henderson (1989) to 0.64 in Tran and Wende (2021). Countries with higher elasticities or higher statutory rates exhibit larger efficiency costs per dollar of revenue raised, while countries with less elastic tax bases can raise additional revenue at relatively low marginal welfare cost.

E.3 Benchmarking Marginal Efficiency Costs under a Global Minimum Tax

To illustrate how heterogeneous elasticities translate into heterogeneous welfare costs, we conduct a simple harmonization exercise. We compare the marginal excess burden of the corporate tax evaluated at (i) each country's statutory rate t_k (during the years used for estimation) and (ii) a common harmonized statutory rate t^H, holding the estimated corporate ETI e_k fixed. Specifically, we evaluate marginal efficiency costs under a harmonized statutory tax rate of 15 percent, consistent with the GMT rate. This comparison isolates the efficiency implications of tax harmonization from baseline differences in national tax systems.

In column (6) of Table E1 we report the resulting calculations. Two patterns emerge. First, countries with relatively large ETIs exhibit substantially larger marginal welfare costs under harmonization (e.g., Armenia, Canada, Portugal), because the semi-elasticity $\frac{e_k}{1-t}$ is large and marginal revenue shrinks quickly as t rises. Second, for countries with low estimated elasticities (e.g., Ecuador, Austria, Senegal), moving to a harmonized rate has a limited impact on marginal welfare costs, since the behavioral response of the base is small. The difference between Columns (5) and (6) showcases how statutory tax rates mechanically drive differences in MEBs between countries and how much variation remains after these mechanical differences were accounted for. Column (6) shows that even under a uniform minimum tax, countries face substantially different efficiency costs per dollar of revenue raised, even before considering general equilibrium adjustments or cross-border profit reallocation. This highlights the role of cross-country heterogeneity in taxable-income responsiveness for evaluation the welfare consequences of coordinated corporate tax reforms.

In the context of the global minimum tax rate of 15, which establishes a lower bound on corporate taxation while leaving national tax bases and enforcement regimes unchanged our results show that, even under such harmonization, the marginal efficiency cost of corporate taxation varies widely across countries. This heterogeneity implies that coordinated minimum tax policies implicitly redistribute efficiency costs across countries, with more elastic tax bases bearing larger efficiency losses per dollar of revenue raised.

Table E1: Revenue and Welfare Implications of Corporate Taxation

	(1) ε_k	(2) t_k	(3) $\%\Delta R_k$ (%)	(4) $\%\Delta R_k$ (+1pp)	(5) MVPF	(6) DWL_k/B_k	(7) MEB	(8) MEB ($t_H = 0.15$)
Armenia	1.408	0.200	0.65	3.24	1.54	0.88	0.54	0.33
Austria	0.146	0.365	0.92	2.51	1.09	0.11	0.09	0.03
Canada	1.907	0.170	0.61	3.58	1.64	1.15	0.64	0.51
Chile	1.122	0.200	0.72	3.60	1.39	0.70	0.39	0.25
China	0.295	0.260	0.90	3.45	1.12	0.20	0.12	0.05
Costa Rica	0.394	0.300	0.83	2.77	1.20	0.28	0.20	0.07
Czechia	1.148	0.190	0.73	3.85	1.37	0.71	0.37	0.25
Ecuador	0.075	0.240	0.98	4.07	1.02	0.05	0.02	0.01
France	0.379	0.330	0.81	2.46	1.23	0.28	0.23	0.07
Greece	1.194	0.270	0.56	2.07	1.79	0.82	0.79	0.27
Montenegro	1.243	0.100	0.86	8.62	1.16	0.69	0.16	0.28
Norway	0.703	0.270	0.74	2.74	1.35	0.48	0.35	0.14
Portugal	1.259	0.210	0.67	3.17	1.50	0.80	0.50	0.29
Senegal	0.163	0.280	0.94	3.35	1.07	0.11	0.07	0.03
Slovakia	0.770	0.230	0.77	3.35	1.30	0.50	0.30	0.16
South Africa	0.477	0.320	0.78	2.42	1.29	0.35	0.29	0.09

Notes: Column (1) reports the estimated elasticity of taxable income with respect to the net-of-tax rate, ε_k. Column (2) reports the statutory corporate tax rate during the estimation period. Column (3) reports the implied revenue elasticity. Column (4) reports the semi-elasticity of corporate tax revenue with respect to a one percentage point increase in the statutory tax rate, expressed as the percent change in revenue. Column (5) reports the marginal value of public funds (MVPF). Column (6) reports the deadweight loss relative to mechanical revenue, DWL_k/B_k. Column (7) reports the marginal excess burden (MEB) evaluated at the country-specific statutory tax rate t_k. Column (8) reports the MEB evaluated at the global minimum tax rate $t_H = 0.15$. Our calculations following equations E.6, E.7, E.8, and E.9.

F Detailed Data Description

In this Appendix, we present detailed data description and information on elasticity estimates for each country. In all graphs and figures we report the elasticity of taxable income evaluated for a firm with zero fixed costs, which is the elasticity of W with respect to the net-of-tax rate. All in-line references to the elasticity of taxable income reflect e_W. As shown in equation (14), the elasticity of Y with respect to the net-of-tax rate is related to the elasticity of W with respect to the net-of-tax rate using a scale factor, $(1 + \frac{F}{Y})$. We provide additional information about the magnitude of this scale factor for each country in Appendix B to allow the reader to convert e_W to e_Y.

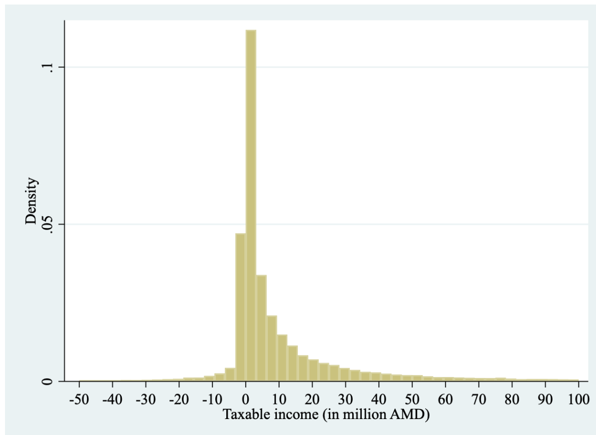
F.1 Armenia

Tax Data The estimates are based on administrative data provided by the State Revenue Committee of the Republic of Armenia. We use the universe of corporate income tax returns of firms filing taxes over the period 2007-2017. The data contains balance sheets, economic sector, tax regime, tax deductions and credits, depreciation, taxable income, and corporate income taxes paid. This data is also used in Asatryan and Joulfaian (2022).

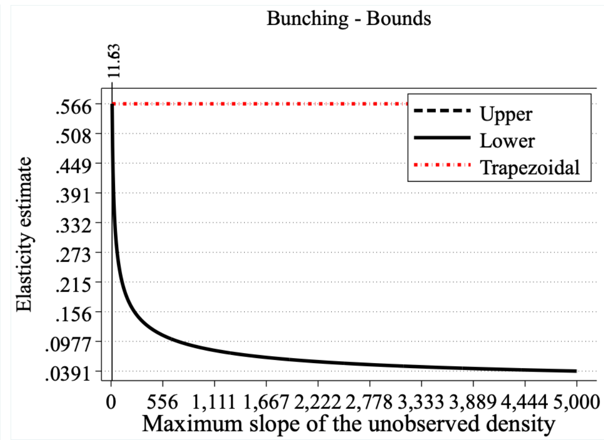
Corporate Tax Context During the observation period 2007-2017, Armenian corporate firms were subject to a flat tax rate of 20% on their corporate profits. Firms report gross income which primarily consists of turnover or net receipts. This is reduced by cost of goods sold, employee compensation, interest expenses, and depreciation allowances among others costs. Consolidated returns are not permitted, each company must file a separate return. Tax losses may be carried forward and set off against tax profits for the following five years. The carry back of tax losses is not permitted. Companies are required to pay quarterly advance payments. The tax year is the calendar year.

Figure F1: Corporate Elasticity of Taxable Income: Armenia, 2007-2018

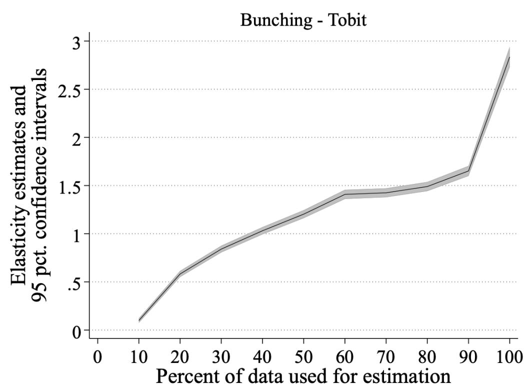
(a) Raw Data



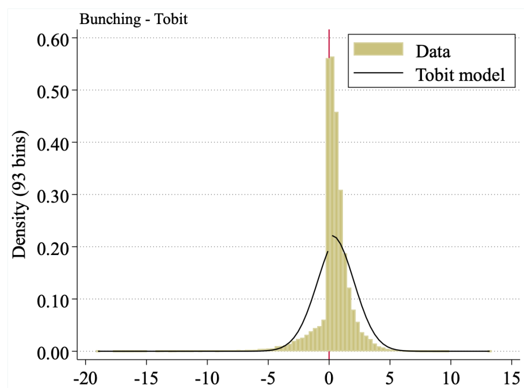
(b) Bunching Bounds



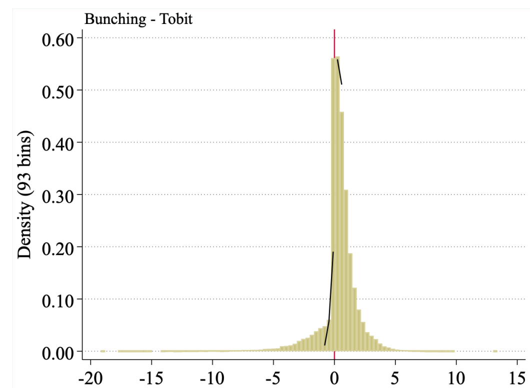
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Armenia. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.2 Austria

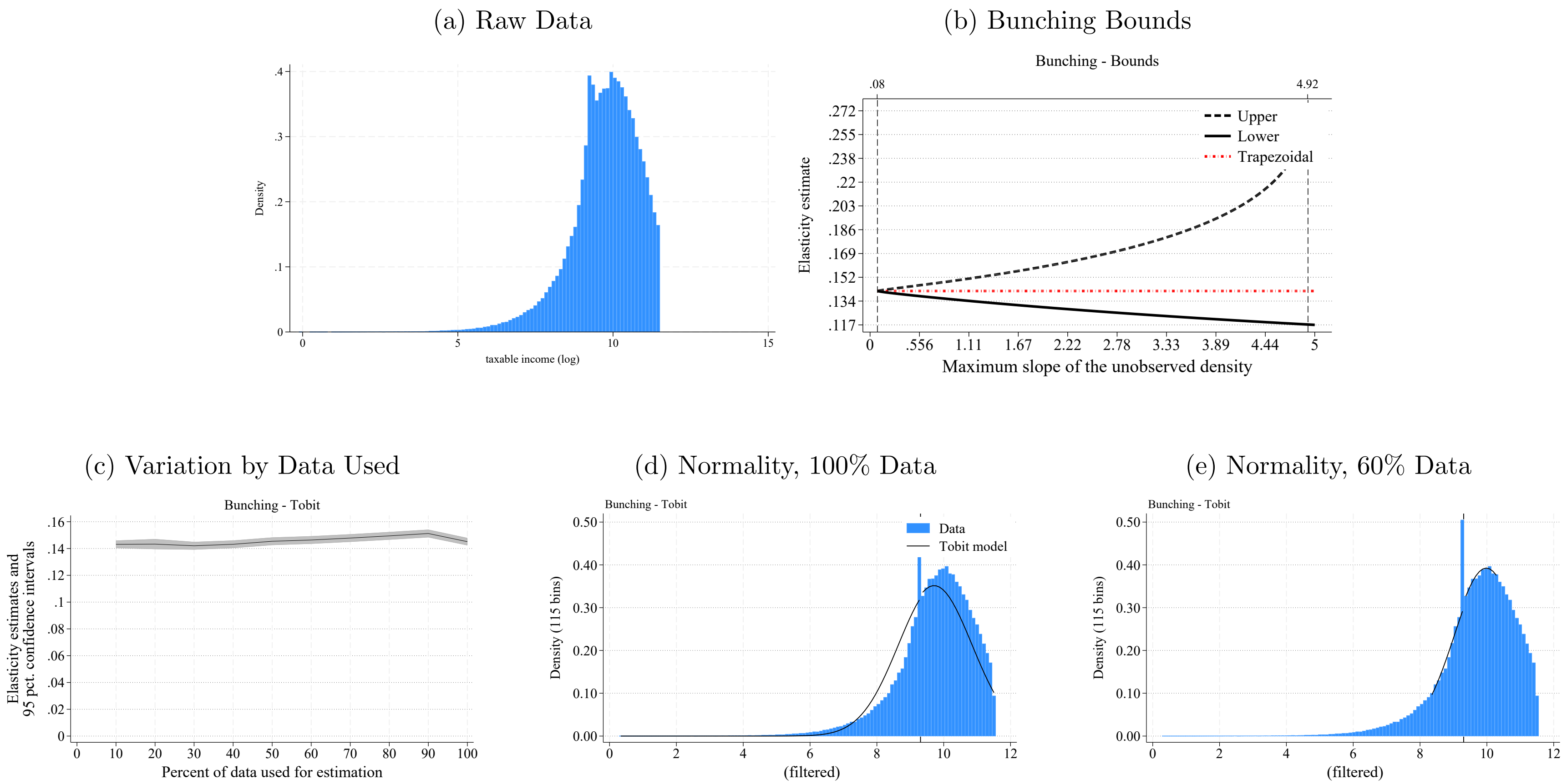
Tax Data We use administrative data from income tax returns submitted to the Austrian fiscal authorities prior to verification and audit. Specifically, we combine personal income tax records of business owners—which contain detailed firm-level tax information, including all allowable deductions—with monthly value-added tax (VAT) returns that report sales and input costs.

We restrict the sample to business owners with no other sources of income, ensuring that taxable income reflects business income only. The data cover the period from 2009 to 2013 and form an unbalanced panel. Due to data protection regulations, the sample is restricted to firms with taxable income of up to EUR 100,000 and deductible losses of up to EUR 100,000.

Corporate Tax Context In Austria, business income is subject to income taxation. During the sample period (2009–2013), incorporated firms—such as limited liability companies—were subject to a flat corporate income tax rate of 25 percent. Distributed profits were additionally subject to a dividend withholding tax of 25 percent, resulting in an effective tax rate of 43.75 percent at the firm-owner level.

Non-incorporated firms, such as the sole proprietorships analyzed in this study, are taxed under a progressive income tax schedule. Taxable income up to EUR 11,000 is exempt from taxation. Income above this threshold is taxed at a marginal rate of 36.5 percent, which increases to 43.2 percent for income exceeding EUR 25,000 and to 50 percent for income above EUR 60,000. These upper tax brackets create a strong incentive to incorporate.

Figure F2: Corporate Elasticity of Taxable Income: Austria, 2009-2013.



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Austria. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.3 Canada

Tax data The estimations are based on administrative data from the Canada Revenue Agency accessed through Statistics Canada's Microdata Access Division. The data consists of the T2 Corporation Income Tax Return and all its accompanying schedules (forms T2 SCH1 to T2 SCH200). These data contain hundreds of variables such as total revenue, expenses, assets and liabilities, as well as accounting profit, net income (or loss) for tax purposes, some tax deductions such as tax depreciation and losses carried forward, scientific research and experimental development expenditures, charitable donations, etc.

Our sample contains only public corporations (a corporation resident in Canada with a class of shares listed on a Canadian stock exchange) and corporations controlled by a public corporation, for the years 2012 to 2019. We exclude corporations with total expenses below $100,000 CAD or total assets below $500,000 CAD as well as those with dividend income representing more than 50% of their total revenue. We further restrict the sample by excluding corporations in the Finance and insurance sector (NAICS 52) as they face different tax rules. Our variable of interest is taxable income before the carryforward of previous years' losses (that is net income (or loss) for income tax purposes minus charitable donations and gifts minus deductible dividends).

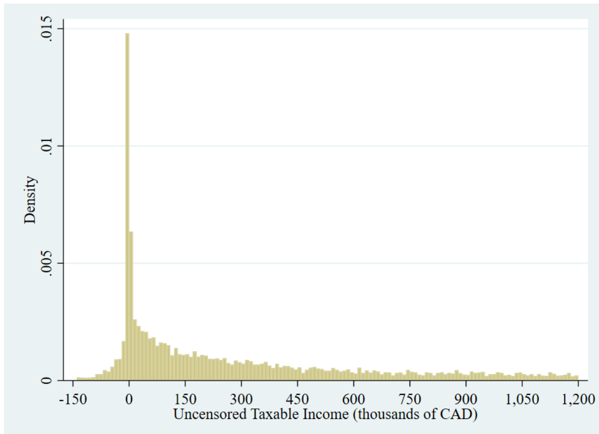
Corporate Tax Context Corporations are liable for federal and provincial corporate income tax on their worldwide income (foreign tax credits are available to offset business income tax paid in other countries). The general corporate tax rate at the federal level is 15% since 2012, and ranges at the provincial level from 8% to 16% for a total tax burden of 26.5% on average in our sample. Expenditures in scientific research and experimental development (SRED) are eligible for a 15% non-refundable tax credit.

Canadian-controlled private corporations (CCPC) with total assets below $10 million and passive investment income below $50,000 are facing the small business tax rate on their first $500,000 of active business income, which is 9% at the federal level and between 0% and 3.2% at the provincial level, for a total tax burden of 11.8% on average. Active business income in excess of $500,000 is taxed at the general rate of 15%. The SRED credit rate is 35% on the first $3 million of eligible expenditures for small CCPCs and is refundable. As our sample is limited to public corporations and their subsidiaries, CCPCs are excluded from the analysis.

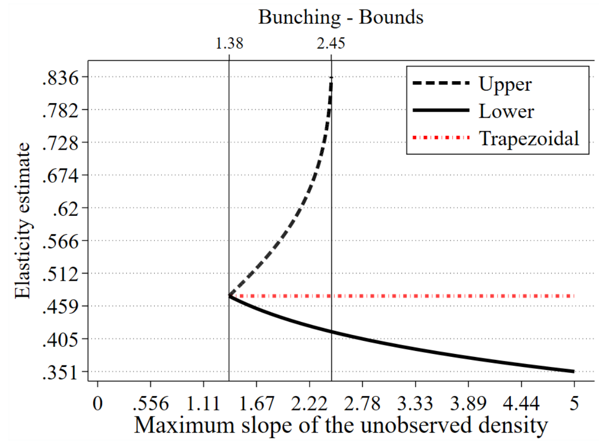
The main differences between book income and taxable income are that only half of capital gains are included in taxable income (taxed at realization, not on an accrual basis), generally more generous tax depreciation rules, some expenses are not deductible for tax purposes (for example only half of meals and entertainment expenses are allowed), and dividends received are generally excluded from taxable income (to avoid double taxation). Non-capital losses can be carried-back to the three previous tax years or carried-forward for 20 years (after which they expire). Unused non-refundable SRED credits can also be carried-back to the three previous tax years or carried-forward for 20 years. Capital losses (50% inclusion rate applying to capital gains also applies to capital losses) can only be applied against capital gains. They can be carried-back to the three previous tax years or carried-forward indefinitely.

Figure F3: Corporate Elasticity of Taxable Income: Canada, 2012-2019.

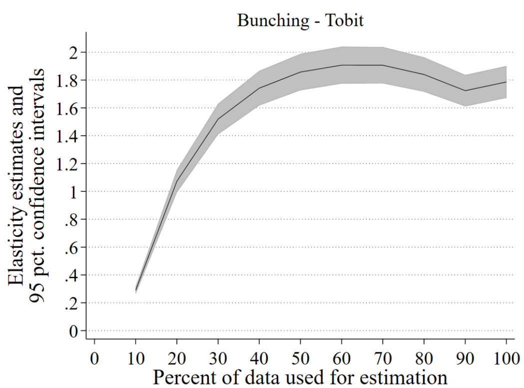
(a) Raw Data



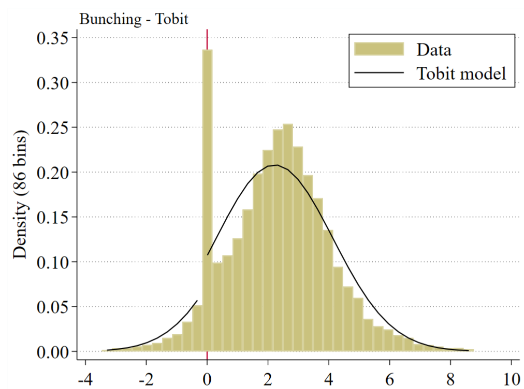
(b) Bunching Bounds



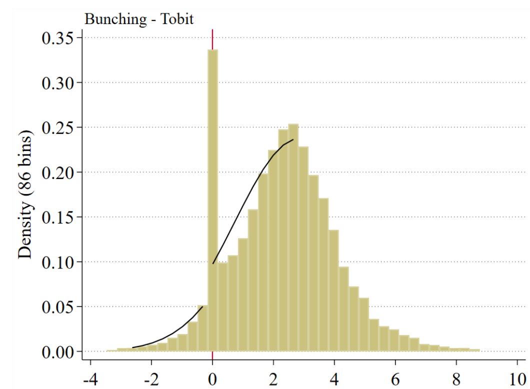
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Canada. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.4 Chile

Tax Data The estimations are based on administrative data provided by the Chilean IRS. We use the universe of income tax returns of firms filing taxes in 2018. The data consists of the full income tax form (F22) for each firm, which contain economic sector, tax regime, sales, VAT debits and credits, wages, operating expenses, financial expenses, tax credits (for fixed assets purchases, Research and Development expenses, training expenses, donations, property taxes paid), depreciation, amortization, taxable income, corporate income tax base, and corporate income taxes paid.

Corporate Tax Context There are two general tax regimes for corporate taxes in Chile, both with a flat rate:

1. Partial-Integration: under this regime the corporate tax rate is 27%, the tax base for personal income taxes is distributed profits and 65% of corporate taxes paid are credited against personal income taxes

2. Full Integration: under this regime the corporate tax rate is 25%, the tax base for personal income is accrued profits, and corporate taxes paid are fully credited against personal income taxes

All firms must choose one tax regime and cannot switch to the other one for 5 years

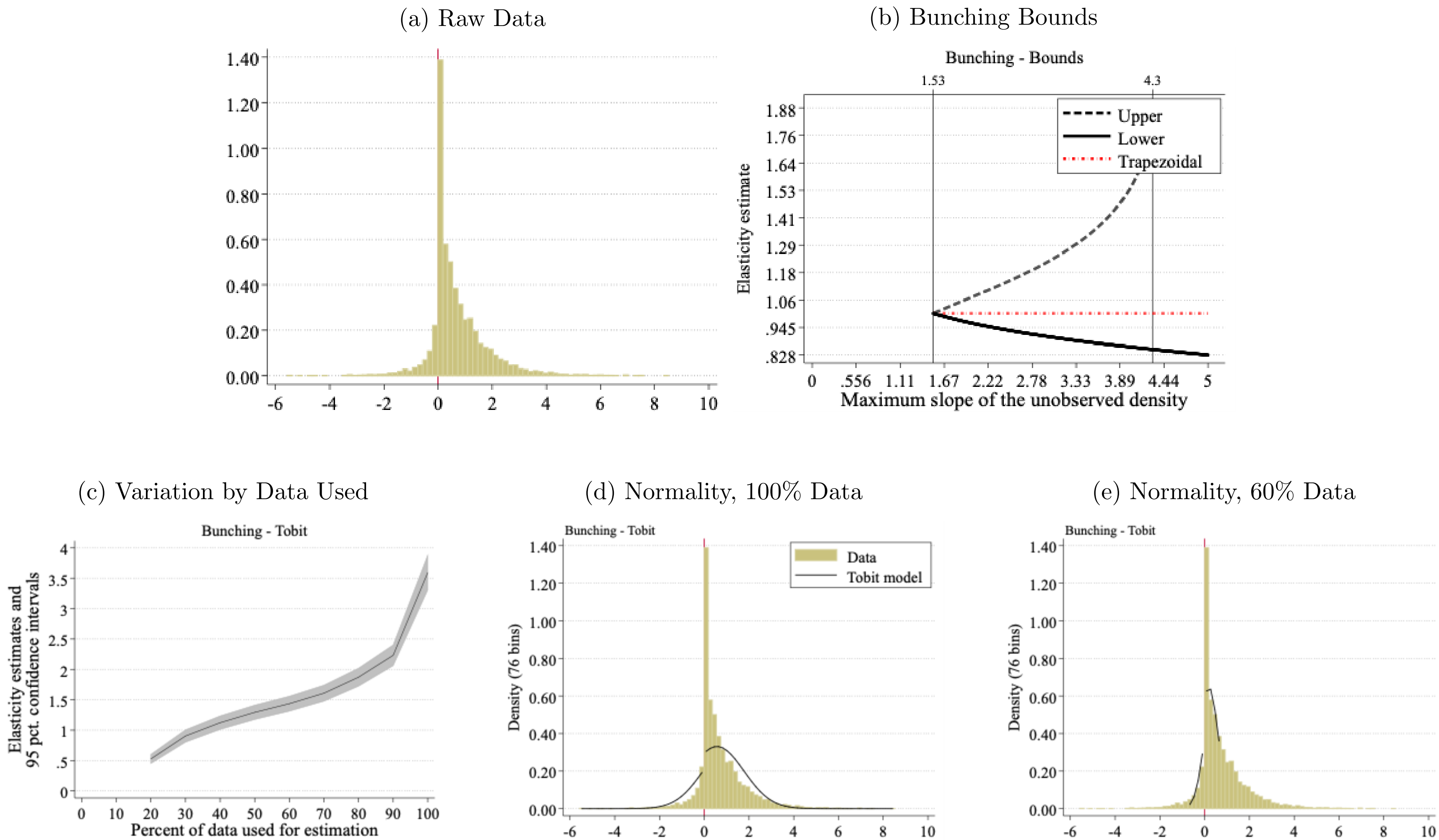
In addition, there is a unique tax regime for small businesses. Under this regime they pay no corporate taxes, only personal income taxes on distributed profits. There is a cap on annual sales of around USD 4 million to be considered small business for tax purposes.

Corporate taxes are paid in an annual tax return filled in April (Form 22, which is the source of the data used), but monthly provisional payments have to be made based on an average of previous years' tax payments. Only loss carryforwards are allowed; no loss carrybacks

There exist two types of investment incentives. The first one, applies to: all firms under full accounting and sales up to USD4 million, which can deduct from the corporate income tax base up to USD200,000. The second one, benefits taxpayers who declare CIT on effective income determined according to full accounting records that acquire, finish build or take in leasing fixed assets, and that register a maximum of average annual sales. The benefit consists of a tax credit, whose magnitude depends on the size of the firm. Firms with average annual sales less than or equal to UF 25,000 (around USD 840,000) receive a tax credit of 6% of the value of the fixed assets, acquired new, finished build during the fiscal year or taken under leasing. Firms with average annual sales of more than UF 25,000 but less than or equal to UF 100,000 (around USD 3,365,000), receive a tax credit of either 6% x [(100,000 -

annual income) /75,000] or 4%, whichever is larger. Finally, firms with average annual sales of more than UF 100,000 receive a tax credit of 4%.

Figure F4: Corporate Elasticity of Taxable Income: Chile, 2018



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Chile. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.5 China

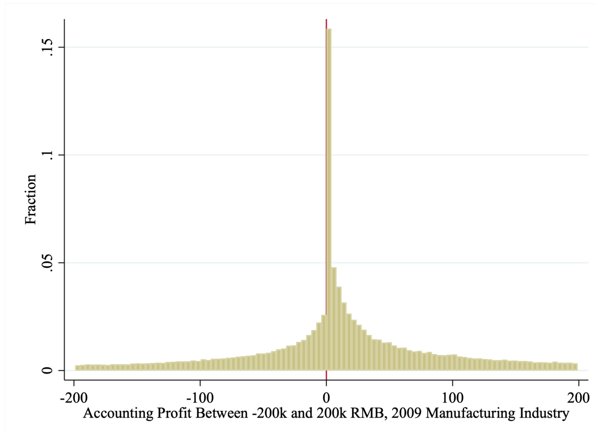
Tax Data Our estimates are based on businesses in the manufacturing industry in China in 2009. Data is drawn from the 2009 China Tax Survey, conducted by the State Taxation Administration (STA) in China — the counterpart to the IRS in the United States. These data provide firm-level information on the components of tax payment in addition to limited financial information for 269,225 firms. Specifically, we observe accounting profit, net profit after tax adjustment, taxable profit, tax adjustments, operating revenue, operating costs, depreciation expenses, total wage and bonus expenses, interest payments, intangible assets purchased, fixed assets held at year-end, R&D expenditures, and loss carryforwards from prior tax years.

Corporate Tax Context In 2009 corporations were subject to 17 different taxes within the Chinese business tax system. Most important among these are the Value-Added Tax (VAT), the Corporate Income Tax, the Business Tax, the VAT and Excise Tax on imports, and the domestic Excise tax. In total, these five taxes account for 80% of total corporate tax revenue. VAT and excise taxes are consumption taxes that are levied on goods. Specifically, the VAT taxes the value-added at each stage of goods production and sales, and the baseline VAT rate is 17%. 2009 saw a VAT reform in which firms were allowed to deduct the VAT paid on investment in fixed assets. Excise taxes are levied on a selective list of goods, and business taxes apply to the provision of services, intangible assets, and real estate.

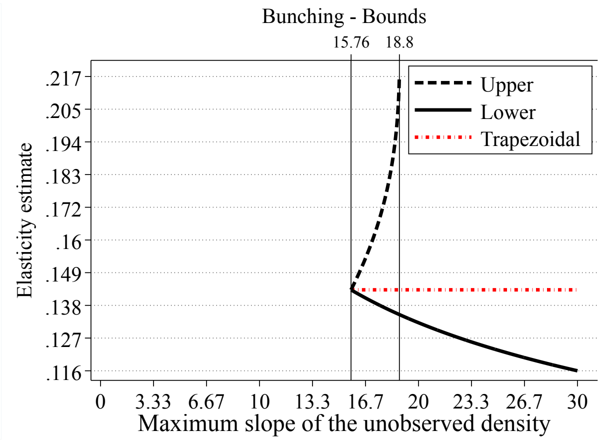
Here, we study how firms respond to the corporate income tax. Prior to 2008, domestic enterprises paid a higher corporate income tax rate than foreign-invested enterprises (33% compared with either 15% or 24%). In 2008, China consolidated corporate income tax rates to a flat 25%, regardless of foreign vs domestic distinctions. Those businesses that faced a preferential rate prior to 2008 were granted a phased-in increase in the corporate income tax rate from 18% – 25% over 5 years. After 2012, all businesses faced the flat 25% rate. Generally, firms are permitted to carry losses from prior tax years forward up to five years to offset current-year positive taxable income.

Figure F5: Corporate Elasticity of Taxable Income: China, 2009

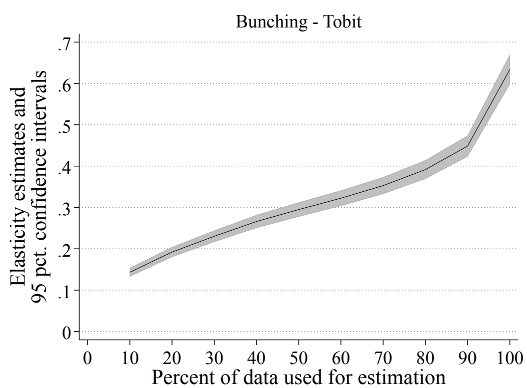
(a) Raw Data



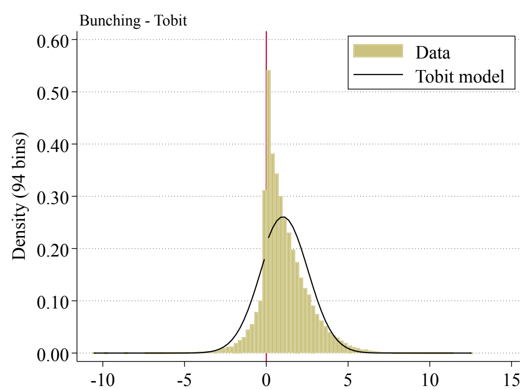
(b) Bunching Bounds



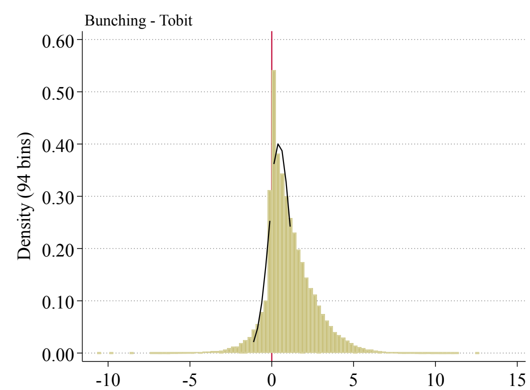
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Chinese manufacturing firms in 2009. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

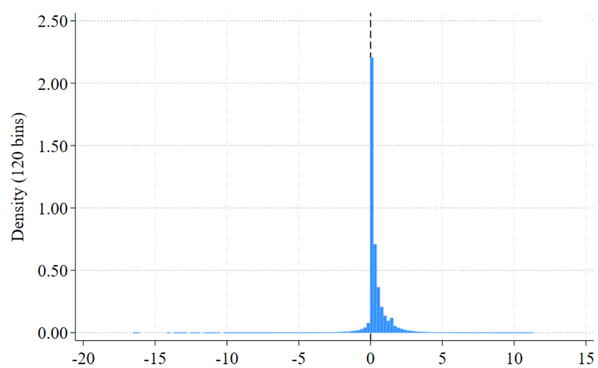
F.6 Costa Rica

Tax Data The sample includes firms identified as legal entities. We rely on an entity type indicator to classify firms as either legal or natural persons. Cases with missing values in this indicator are dropped to avoid accidentally including natural persons.

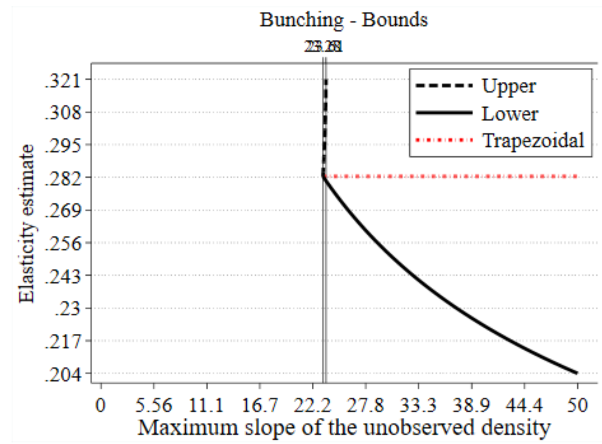
Tax Context The highest statutory corporate tax rate was 30 percent during the years covered by our data (2006–2019). The tax system includes two other tax brackets for smaller firms with rates at 10 and 20 percent. Tax rates apply to profits, but tax brackets are based on firms' revenue, with thresholds adjusted for inflation annually.

Figure F6: Corporate Elasticity of Taxable Income: Costa Rica, 2006-2020

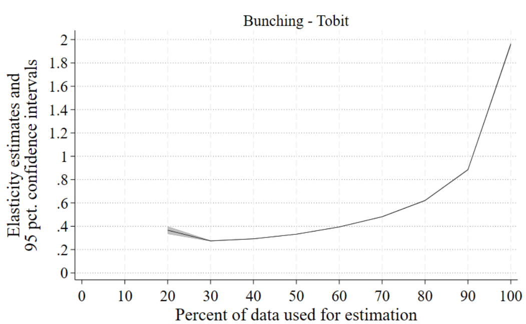
(a) Raw Data



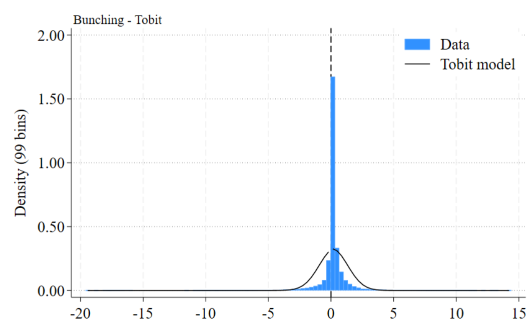
(b) Bunching Bounds



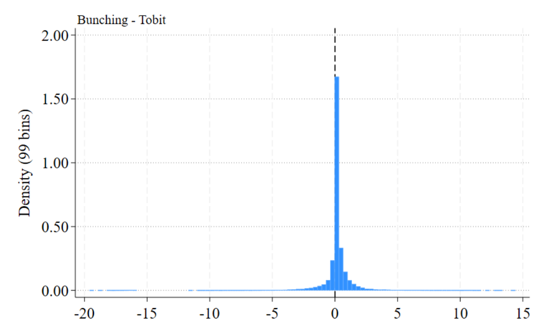
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Costa Rica. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the Tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the Tobit model using 60% of the data, and reflects our preferred specification.

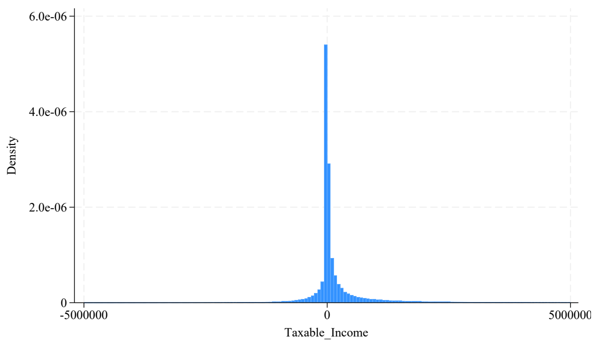
F.7 Czechia

Tax Data We use administrative tax data from the Czechia provided by the General Financial Directorate. The dataset covers all corporate income tax returns filed by legal entities for the tax year 2021. The tax data are linked with accounting information from firms' balance sheets and profit and loss statements, enabling a comprehensive analysis of firm-level financial characteristics. The final sample includes over 300,000 firms and comprises hundreds of variables, including the tax base, revenues, depreciation, and various categories of costs. For the purposes of our analysis, we focus on three key variables: the tax base, turnover, and material and energy inputs. We exclude firms with negative reported material and energy costs and those with turnover below CZK 250 (approximately EUR 10), in order to restrict the sample to firms with a minimum threshold of genuine economic activity. Firms operating in the financial and insurance sectors are excluded due to their distinct tax treatment.

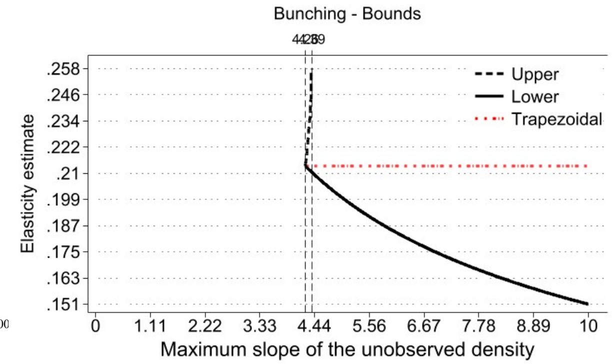
Tax Context In 2021, the standard statutory corporate income tax rate in Czechia was 19%, applicable to most firms, including branches of foreign companies. Investment funds were taxed at a reduced rate of 5%, and pension funds were fully exempt (0%). Resident firms are taxed on their worldwide income, while non-resident firms are taxed only on their Czechia-source income. The value-added tax (VAT) rate is 21% for most goods and services, with a reduced rate of 12% applied to items such as food and pharmaceuticals. Firms may carry forward tax losses for up to five years; since 2020, losses may also be carried back for up to two years. Consolidation of tax losses across affiliated firms is not permitted—each entity is taxed on a standalone basis.

Figure F7: Corporate Elasticity of Taxable Income: Czechia, 2021

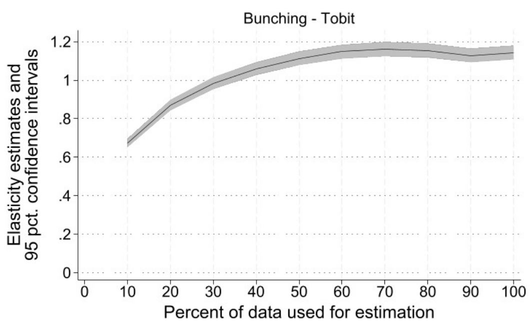
(a) Raw Data



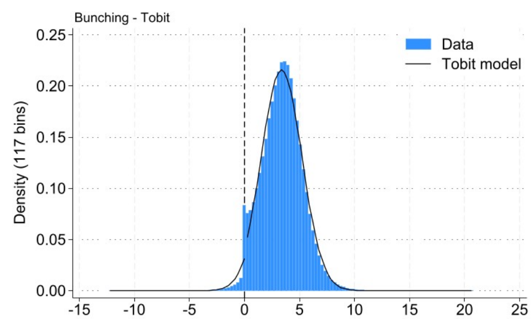
(b) Bunching Bounds



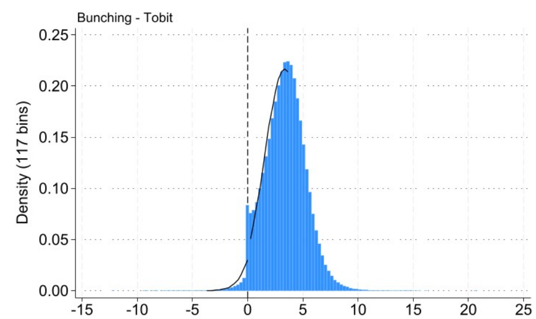
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Czechia. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the Tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the Tobit model using 60% of the data, and reflects our preferred specification.

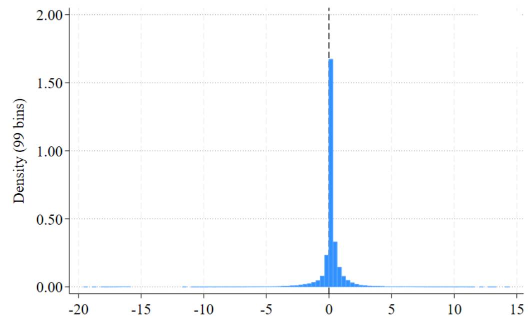
F.8 Ecuador

Tax Data The data consist of firms' balance sheets provided by the "Superintendencia de Compañías, Valores y Seguros". This information is unrestricted and available under this link .

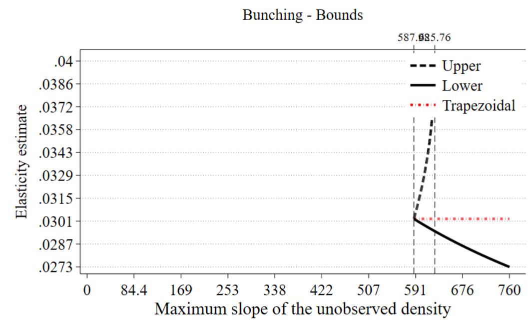
Tax Context The STR was 22 percent from 2013 to 2017 and increased to 25 percent in 2018. Micro-firms with revenue below 1,000,000 LCU in 2018 remained subject to the 22 percent rate, along with firms in the mining and extractive industries. Depending on the shareholder structure and disclosure compliance, the STR can also be 28 percent.

Figure F8: Corporate Elasticity of Taxable Income: Ecuador

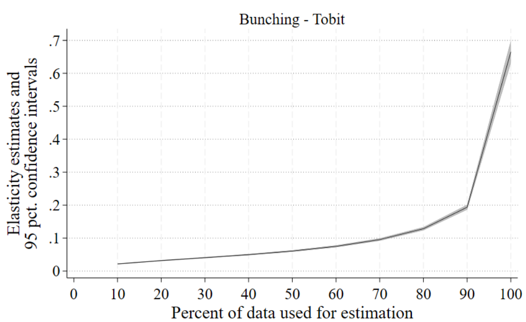
(a) Raw Data



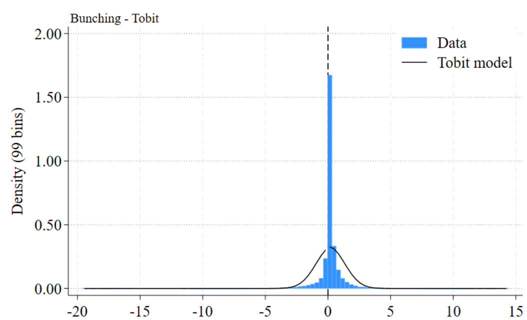
(b) Bunching Bounds



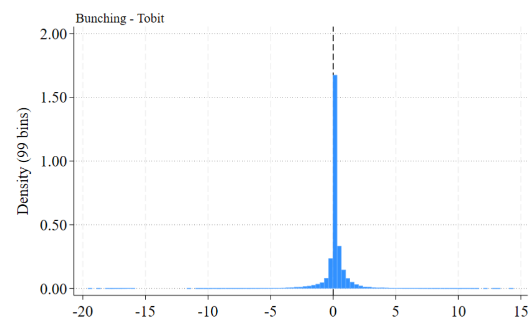
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Ecuador. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the Tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the Tobit model using 60% of the data, and reflects our preferred specification.

F.9 France

Tax Data The estimations are based on administrative data provided by the Direction Générale des Finances Publiques (DGFiP), the French equivalent of the IRS. These data are remotely accessible to researchers via the Centre d'Accès Sécurisé aux Données (CASD). We use the universe of corporate income tax returns of firms filing taxes over the period 2010-2016, a period over which exhaustive data are available and there were at the same time no significant reforms of the corporate tax regime. The data consist of the full income tax form (2033 and 2050) for each firm, which contain detailed balance sheets and profits and loss accounts, economic sector, tax regime, tax deductions and credits, depreciation, taxable income, and corporate income taxes paid. Business groups as defined per the French tax code must file, in addition to the former, information on the group-level taxable income.

Tax Context Broadly speaking, there are three distinct business income tax regimes in France :

1. Pass-through regime (BIC-IR): this is the equivalent of the American partnership and S-corp regimes; there is no tax paid at the level of the corporate entity, and all accrued profits are taxed at the shareholder level, following the (progressive) personal income tax schedule (up to 60% if one includes all forms of personal income tax) if the shareholder is an individual and the corporate tax schedule if the shareholder is a corporation subject to the default corporate tax system.

2. Default corporate tax regime (BIC-IS): this is the equivalent of the American C-corp regime; accrued profits are taxed at the level of each unconsolidated corporation at a marginal rate of 34.3% (before 2017) for the part above 38k euros, and 15% for the part below. Dividends are then taxed only if they are distributed to individuals (under the progressive schedule, after a deduction of 40%) or minority corporate owners (under the corporate tax schedule, without deduction).

3. Business group tax regime (IS Groupe fiscal): this regime follows similar rules as the default corporate tax regime for the most part, except that tax losses recognized by some members of the business group contemporaneously offset taxable income recognized in other parts of the business group, leading to the definition of a group-level taxable income against which the default corporate tax schedule is applied.

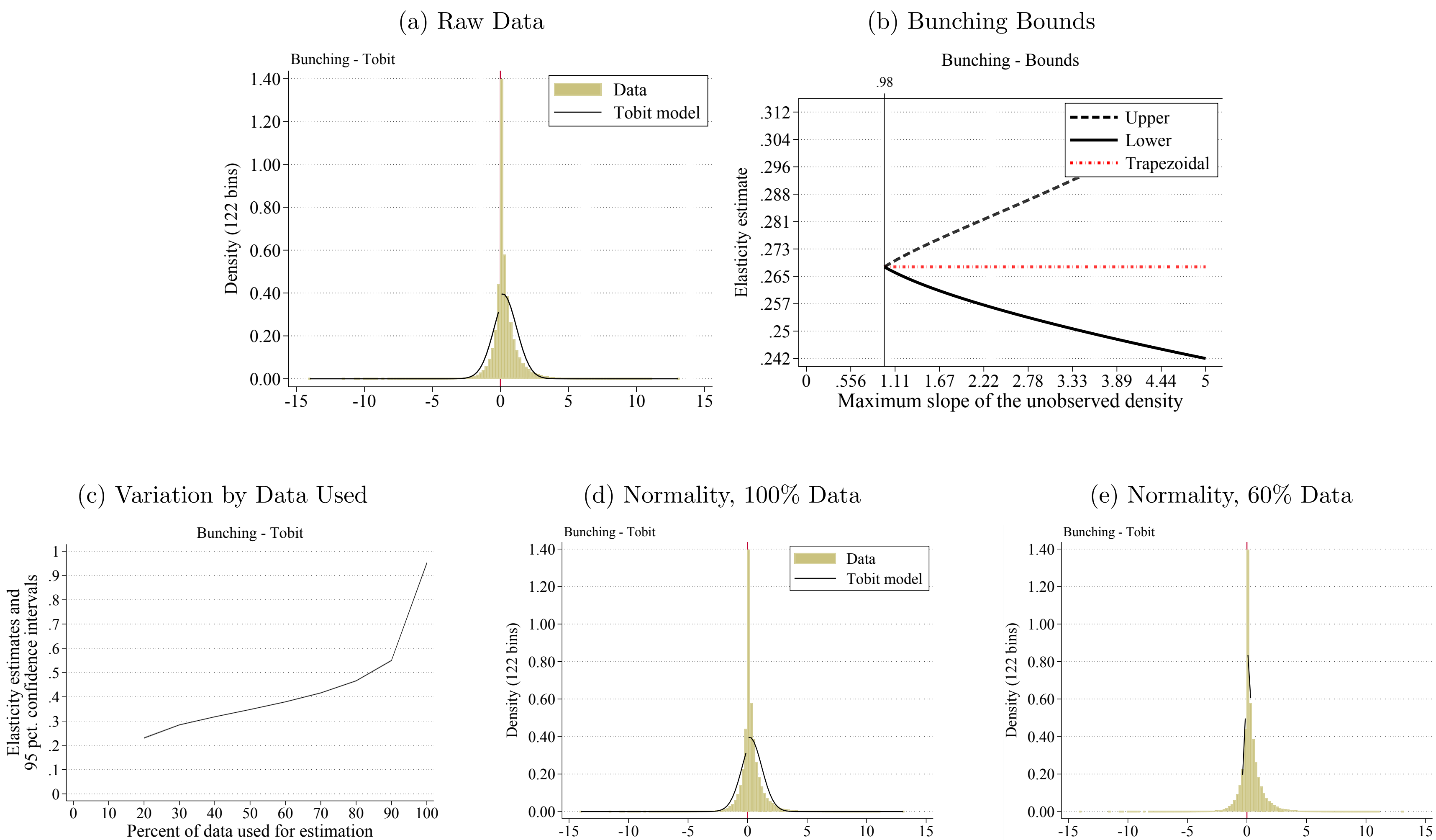
The pass-through regime is the default regime for partnerships and can be chosen by some limited liability corporations. Because the tax schedule is specific to each shareholder under this tax regime, we do not include these firms in our analysis.

The business group regime can be chosen by limited liability corporations who share ownership links greater than 95% between each other. Under this regime, the schedule is really only applied to the group-level taxable income. Unfortunately, it is not possible to thinly decompose group-level taxable income into group-level turnover and group-level costs. This is why in our baseline, we leave all business group members out of the analysis. However, we provide in the Appendix an analysis including these business group members.

This means the bulk of the analysis on French data is run only on firms choosing the default corporate tax regime. Under this regime, corporate taxes are paid in an annual tax return filled in May (forms 2033, which are the sources of the data used in the estimation), but quarterly provisional payments have to be made based on the previous year' tax payments. Losses can be carried forward without any limitation of time, but past losses cannot offset more than 50% of the taxable income before carryforwards; loss carrybacks are allowed only up to a small amount in absolute terms.

There are substantial tax deductions targeted at specific industries and locations, but no widely-applied investment deductions. R&D subsidies are corporate tax credits and hence do not affect bunching incentives.

Figure F9: Corporate Elasticity of Taxable Income: France, 2010–2016



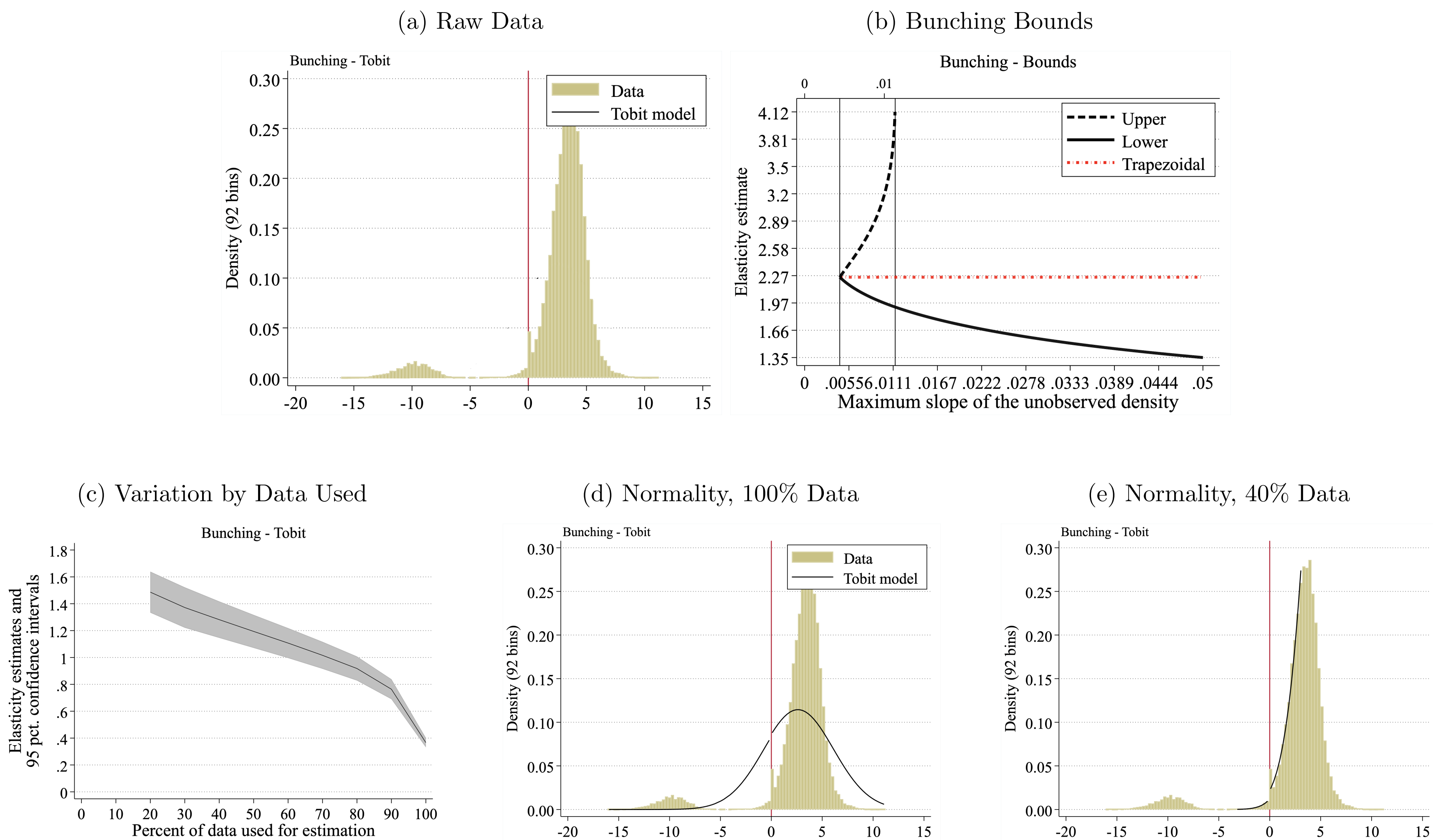
Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from French firms using data from 2010–2016. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.10 Greece

Tax Data The Greek sample consists of the population of firms established as corporations (mainly Societe Anonyme, Limited Liabilities Companies, Private Capital Companies) for the period 2002-2004. The dataset has been compiled by using two different sources: tax returns available through the Tax Administration of the Ministry of Finance and financial variables from ICAP, the leading provider in Greece. There are more than 50 variables available from the tax form and more than 100 from ICAP records. Financial information from ICAP is limited to larger corporations based on revenue, asset, and employee size thresholds.

Tax Context The corporate tax system in Greece is extremely complicated, characterized by overregulation and low tax collectability. Resident corporations are taxed on their worldwide income. Until 2003, LLCs were taxed differently compared to SAs: half of their profits were taxed in the name of the company and the rest in the name of the partners (natural persons-owners). Beginning in 2003 all corporations, no matter their specific legal type, are taxed in the same way, i.e., all their profits are taxed in the name of the firm. The statutory corporate tax rate demonstrates noticeable volatility over time: the rate has been changed 9 times in the last 20 years. Advanced tax must be also prepaid up to a certain percentage (which is unstable ranging from 55% to 100% during our study period) of the tax obligation in the current year. Businesses are permitted to carry tax losses forward up to five years to reduce taxable profit.

Figure F10: Corporate Elasticity of Taxable Income: Greece, 2002–2004

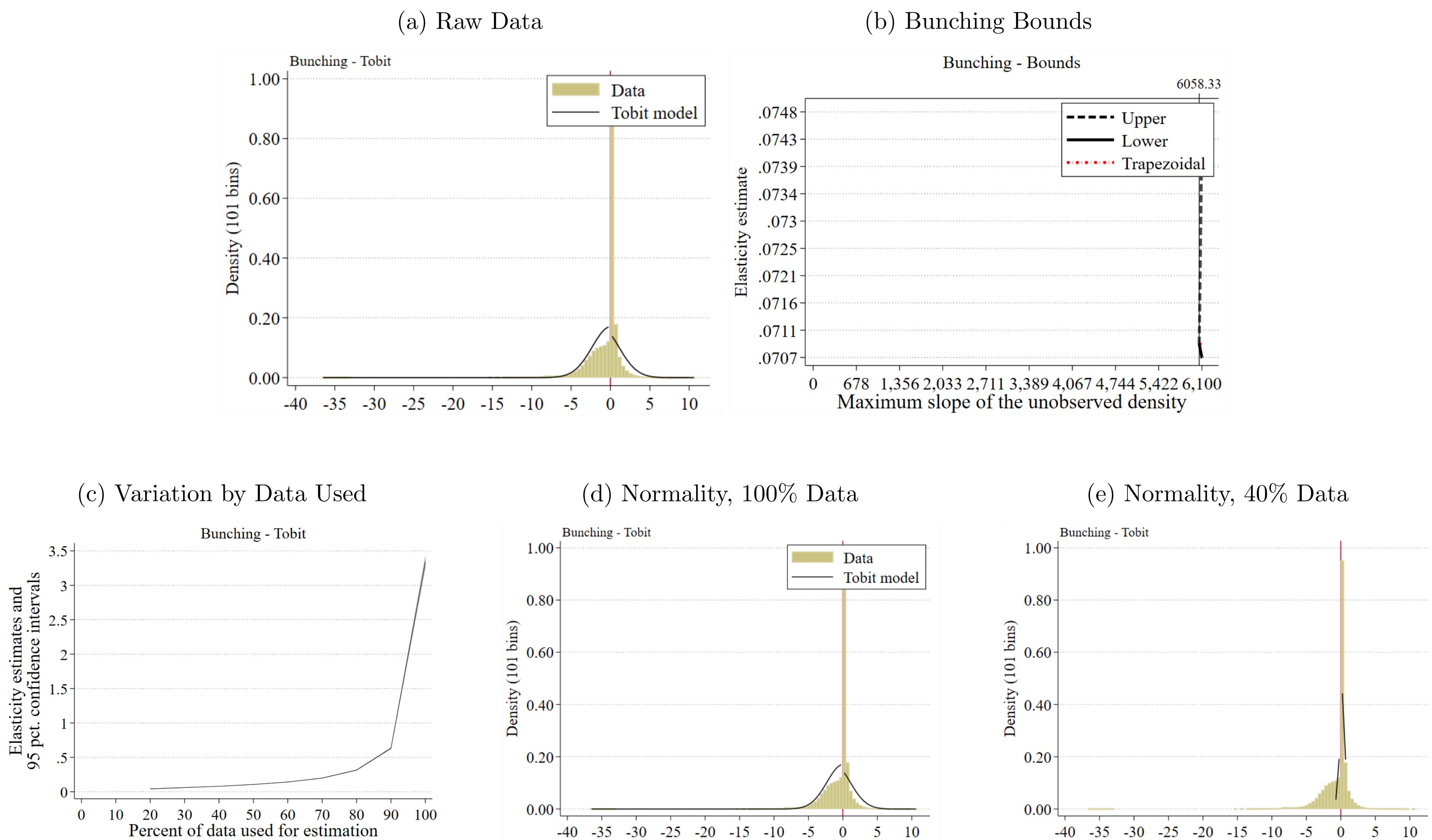


Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from large Greek firms using data from 2002–2004. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.11 Montenegro

Montenegro levied a flat corporate income tax at 9% during the period covered by the data. Starting in 2022, the CIT schedule became progressive with marginal rates of 12% and 15% for profits about 100,000 and above 1.5 mio Euro respectively. The data are financial accounting records for all firms filing these, provided by the Ministry of Finance.

Figure F11: Corporate Elasticity of Taxable Income: Montenegro, 2011–2020



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Montenegro firms using data from 2002–2004. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.12 Norway

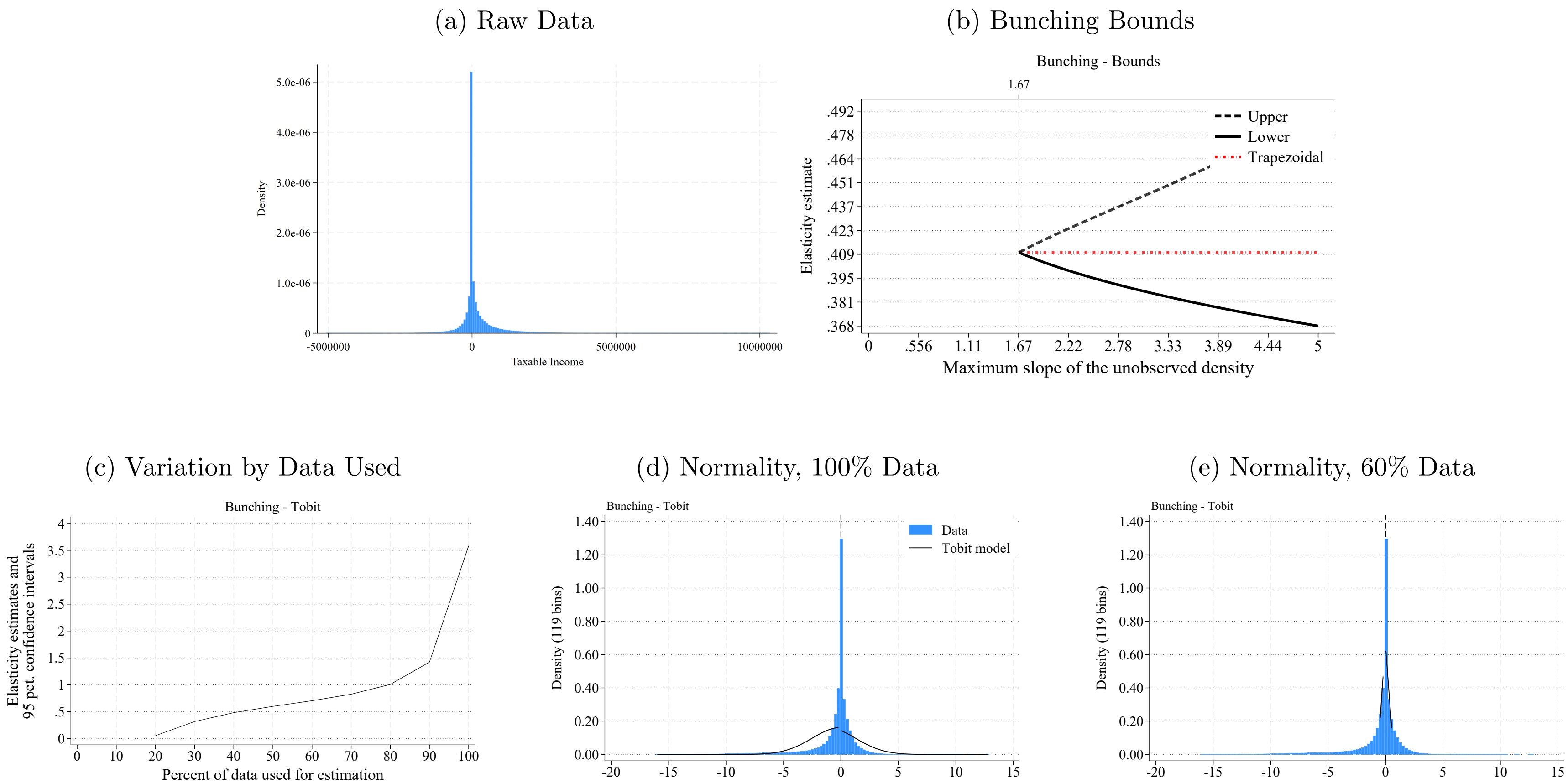
Tax Data We construct our estimation sample from the universe of Norwegian private and public limited liability firms (AS, *Aksjeselskap* and ASA, *Allmennaksjeselskap*). We draw data from the Norwegian Tax Authority covering the tax years 2006-2013. Information is reported on two mandatory tax forms that must be submitted simultaneously: the actual tax return (form RF-1028) and the income statement (RF-1167). Taxable profit is reported on the tax return and defined as the pre-tax earnings less special deductions. Special deductions include losses from previous years, losses from resource extraction on the Norwegian continental shelf, and group contributions paid to other firms in the corporate group.

Revenue and ordinary deductions are taken from the income statement and computed as the sum of financial and operating income or costs, respectively. For the two-step procedure, we use additional information from the Accounting Register of Norway, which collects mandatory balance sheet and profit statement information from all private and public limited liability firms. In addition, we collect information on total intangible fixed assets, depreciation, and write-down of fixed assets and long-term liabilities to financial institutions.

Corporate Tax Context During the observation period 2006-2013, Norwegian companies were subject to a flat tax rate of 28% on their corporate profit. This tax base includes the operating and financial profits generated either in Norway or on the Norwegian continental shelf. Income and deductions are assigned to tax years following the realization principle. The tax year is identical to the accounting year and coincides with the calendar year for most firms.

Businesses are permitted to carry tax losses forward to future periods indefinitely to reduce taxable profit. Dividends received by corporate shareholders are exempt from taxation. This also applies to income received from foreign subsidiaries. There is no municipal or local corporate income tax. Finally, businesses face a special tax of 56% on income from offshore production and pipeline transportation of petroleum.

Figure F12: Corporate Elasticity of Taxable Income: Norway, 2006–2013



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Norwegian firms using data from 2006–2013. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.13 Portugal

Tax Data The data comes from the Central Balance Sheet Harmonized Panel (CBHP), harmonized and provided by Banco de Portugal through BPLIM. We use the universe of non-financial corporations reporting through the mandatory Informação Empresarial Simplificada survey between 2016 and 2019. The CBHP includes sector of activity, location, and a wealth of variables from balance sheets, profit and loss statements, employment records, trade information, and corporate actions. We exclude public entities and firms in the islands of Azores and Madeira.

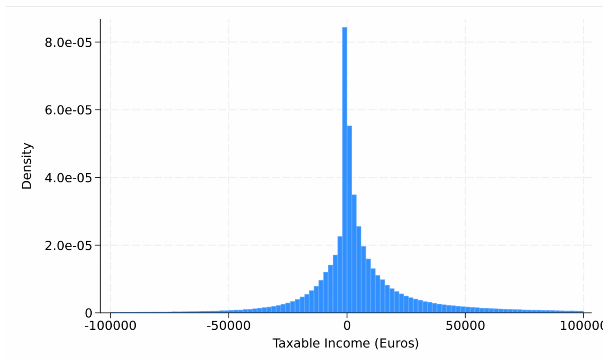
For the purposes of our analysis, we focus on three key variables: earnings before tax, turnover, and a proxy for fixed costs estimated using a cubic functional form based on variable costs (costs of goods sold and material consumed, supplies and external services, and employee expenses). We only keep firms with earnings before tax that are not extremely far from the kink point (between -100,000 and 100,000). The final sample includes 1,400,277 firm-year observations.

Corporate Tax Context Between 2016 and 2019, Portuguese corporations were subject to a general corporate income tax (IRC) rate of 21% on taxable profits. In addition to this base rate, companies could face municipal surtaxes (derrama municipal) of up to 1.5%, depending on the municipality, and a progressive state surtax (derrama estadual) based on profit thresholds: 3% for profits over 1.5 million, 5% for profits over 7.5 million, and 7-9% for profits exceeding 35 million. Despite the relatively high tax rates, Portugal offered various incentives, including exemptions for certain public and social entities and deductions for R&D and investment in strategic sectors.

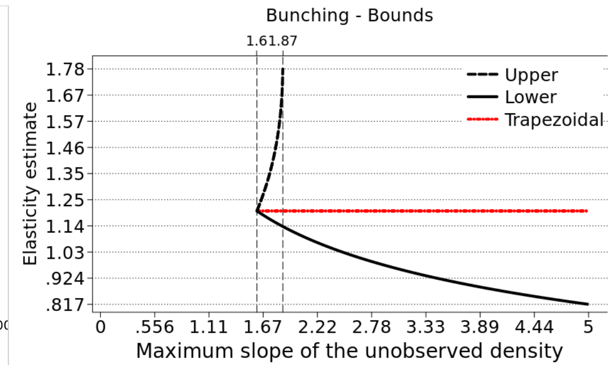
Small and medium-sized enterprises (SMEs) benefited from a reduced IRC rate of 17% on the first 25,000 of taxable income. Additionally, SMEs with annual turnover below 200,000 and a total balance sheet not exceeding 500,000 could opt for a simplified taxation regime. Under this regime, taxable income was calculated using fixed percentages of gross invoicing, depending on the type of activity: 15% for sales, 35% for tourism-related services, and 75% for liberal professions. This method eliminated the need for detailed expense tracking and professional accounting services, making it particularly attractive for micro-enterprises.

Figure F13: Corporate Elasticity of Taxable Income: Portugal, 2016-2019

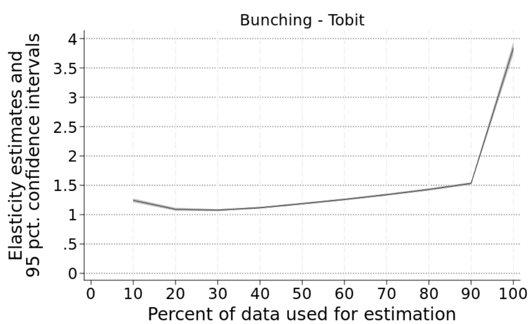
(a) Raw Data



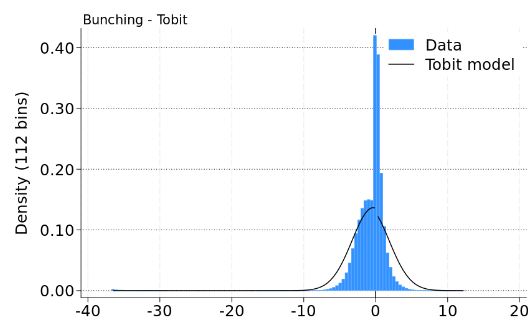
(b) Bunching Bounds



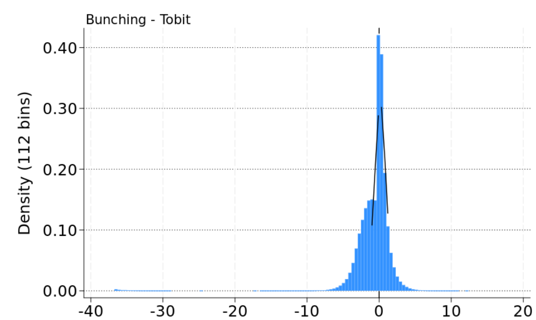
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



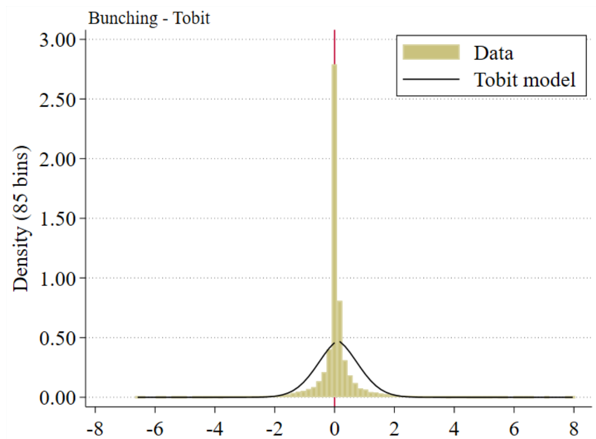
Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Portugese firms using data from 2016-2019. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.14 Senegal

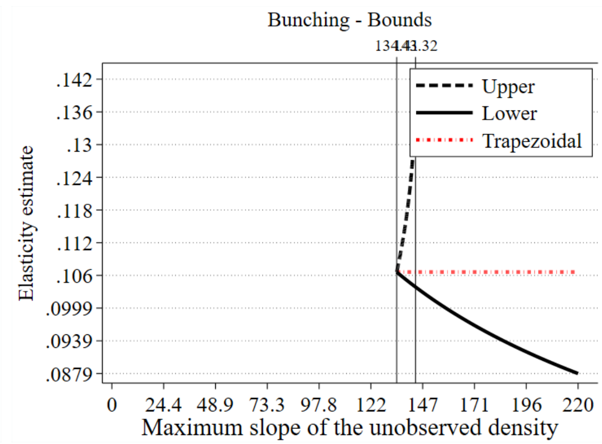
Senegal's corporate income tax is levied at a standard rate of 30%, with a minimum tax on turnover of 0.5% of turnover, up to a maximum of XOF 5 million (approximately USD 8,800). There is a simplified tax regime for individual entrepreneurs with a revenue below 50 million XOF (80,000-90,000 USD) with sector-specific tax rates, but these firms are not included in the study. The data are corporate income tax records for the universe of filers, provided by the tax administration.

Figure F14: Corporate Elasticity of Taxable Income: Senegal, 2010-2020

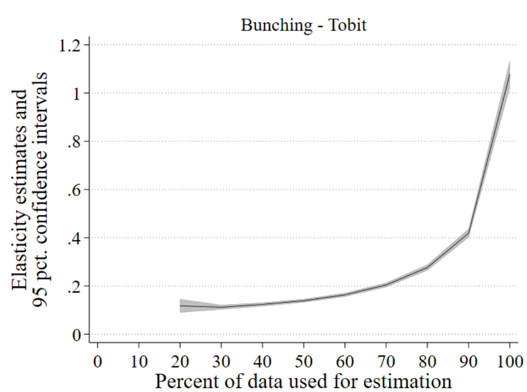
(a) Raw Data



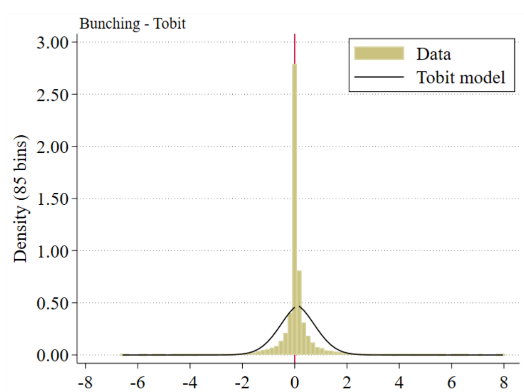
(b) Bunching Bounds



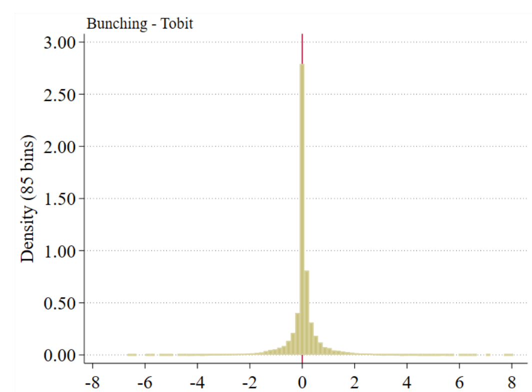
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Senegalese firms using data from 2016-2019. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

F.15 Slovakia

Tax Data We construct our estimation sample based on administrative tax data capturing the population of corporate tax returns in 2013. These data are confidential and owned by the Financial Directorate of the Slovak Republic (FDSR).[24] The data includes tax variables which correspond to individual items recorded on tax return forms. We utilize especially the information about corporate taxable income (or loss) before companies carry forward losses from previous fiscal years (row 400).

We merge the tax return data with additional information from corporate balance sheets and profit and loss statements. The information is publicly available from the Slovak Register of Financial Statements, into which companies are required to submit financial data when they file tax returns to the tax office.

Using these data we limit our analysis to companies with positive (non-zero) sales. In addition, we collect information about the depreciation expense for long-term tangible and intangible assets and information about the net value of non-current intangible assets.

Corporate Tax Context In 2013, governmental tax revenue in Slovakia amounted to 31% of GDP, 11% of which was derived from the corporate income tax. Prior to 2013, incorporated companies were subject to a flat corporate tax rate of 19% on all profits.[25] In 2013, the corporate tax rate increased to 23%. Businesses are permitted to carry tax losses forward to future periods for up to seven years to reduce taxable profit. Loss carrybacks are not permitted.

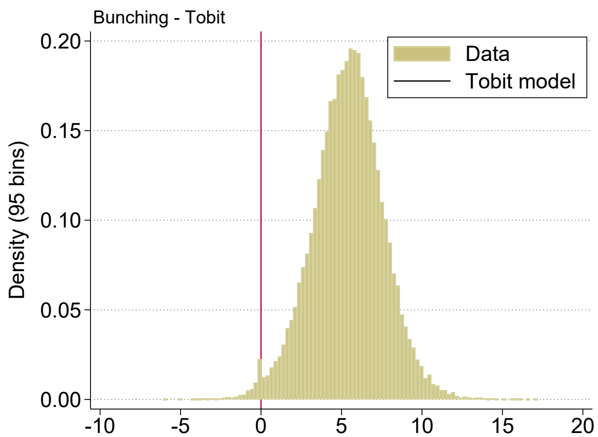
In addition, companies must register for the VAT once their revenue in the previous 12 months exceeds a fixed threshold specified by the tax law. Furthermore, companies are required to pay quarterly (or monthly) tax advances to the tax office if their tax liability exceeds specific thresholds, also given by the tax law. In 2013, the revenue threshold for mandatory VAT registration was 49,790 euro. The tax liability threshold for quarterly tax advances was 1659.7 euro, while the tax liability threshold for monthly tax advances was 16,597 euro.

[24] FDSR provides the data to other state organs of the Slovak Republic following article 11 of the Slovak Tax Code Act no. 563/2009 on tax secrecy. For details, see: https://www.zakonypreludi.sk/zz/2009-563

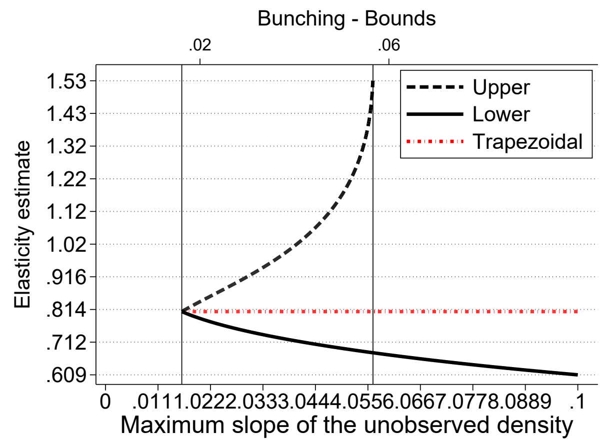
[25] In contrast, the profits of unincorporated legal entities, such as sole proprietorships and partnerships, were taxed according to the personal income tax schedule, once profits were attributed to individual partners. Unincorporated companies yet generate only around 4% of tax revenue collected from legal entities.

Figure F15: Corporate Elasticity of Taxable Income: Slovakia, 2013

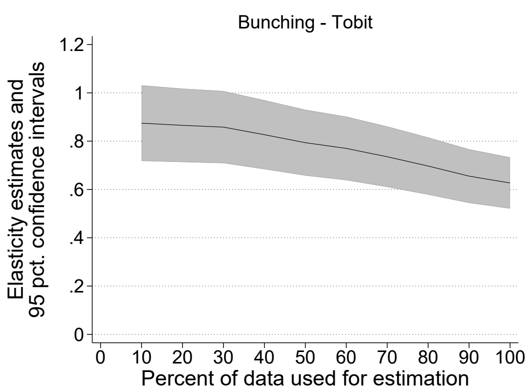
(a) Raw Data



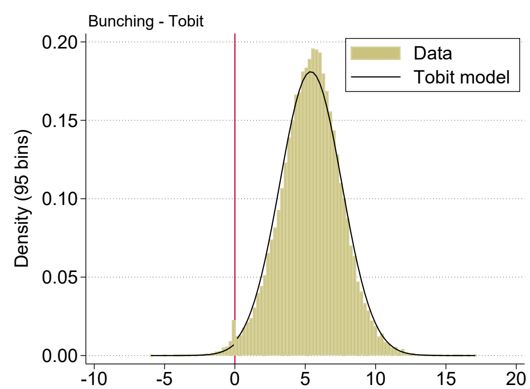
(b) Bunching Bounds



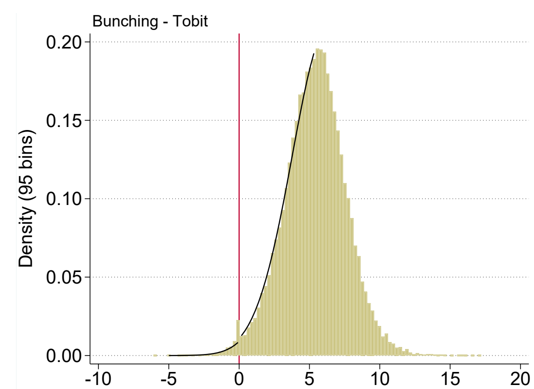
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from Slovakian firms using data from 2013. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.

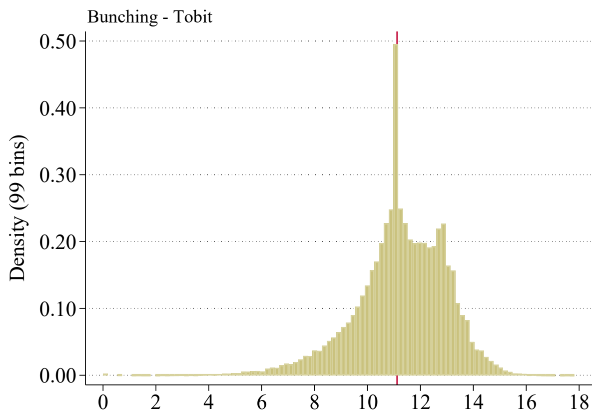
F.16 South Africa

Tax Data We use administrative corporate tax data from the South African Revenue Service (SARS) which was made available in a joint project with National Treasury (NT) (see Pieterse et al. (2018) for full description of the NT-SARS database). It is an unbalanced panel dataset that includes all kinds of firm's balance sheet items like total assets, sales, cost of sales as well as deduction items like, for example, directors' remuneration, donations, travel expenses. The data also includes exact taxable income from the income statement. In total, the bunching analysis uses 2 million firm-year observations for approximately 200,000 firms.

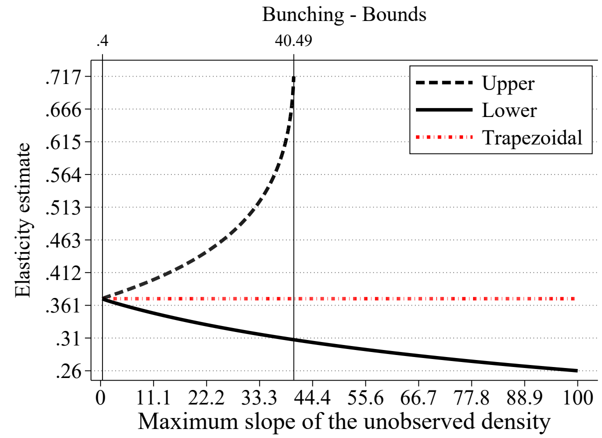
Corporate Tax Context Corporate income taxes are levied by the national government of South Africa under the Income Tax Act 58 of 1962. The tax system is residence-based, and the headline company tax rate is 28%. All tax returns submitted by a tax-registered firm must be completed electronically or at a SARS branch within 12 months of its financial year end (usually at the end of February). Small and Medium Businesses (SBCs) in South Africa benefit from a progressive tax schedule, starting with a tax rate of 0%. To qualify as a SBC, a company must i) not have elected to be classified as a Micro Business for the year of tax assessment and ii) meet specific criteria. These include, among others, gross income not exceeding R20 million (R14 million prior to the 2013 tax year) and limited shareholding. Depending on the tax year considered, there are two to three tax kinks where the marginal tax rate jumps. For the tax year 2015, for example, the marginal tax rate jumps to 7% at the income threshold 70,000 Rand and then increases to 21% and 28% at threshold values of 365,000 and 550,000 Rand. The tax rate of 28% is then applied to all SBCs with taxable income larger than 550,000 Rand. Over time, the thresholds as well as the tax rates have changed over time.

Figure F16: Corporate Elasticity of Taxable Income: South Africa, 2014

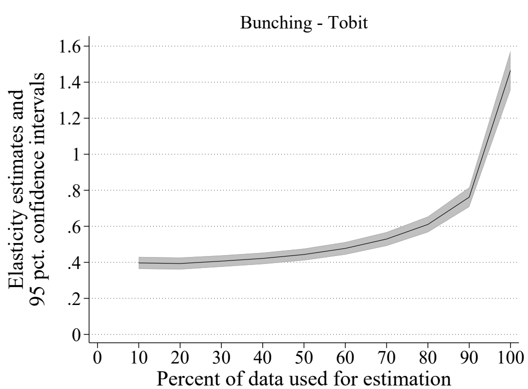
(a) Raw Data



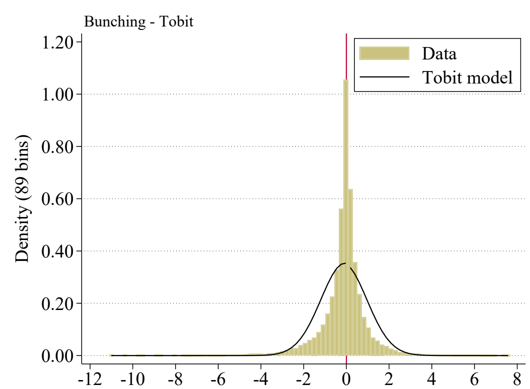
(b) Bunching Bounds



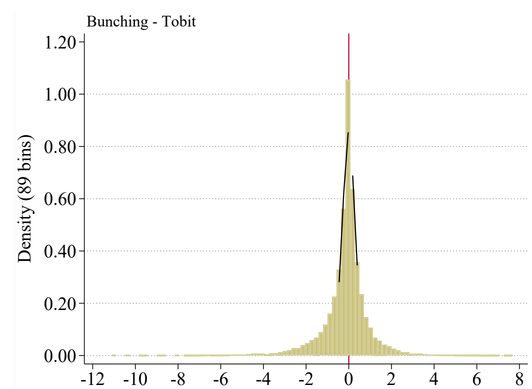
(c) Variation by Data Used



(d) Normality, 100% Data



(e) Normality, 60% Data



Notes: This figure plots diagnostic graphs related to the estimation of the corporate elasticity of taxable income using administrative data from South African firms using data from 2014. Panel (a) plots the raw distribution of accounting profit and highlights bunching behavior. Panel (b) plots diagnostic tools for the traditional bunching estimate. Panel (c) plots variation in the estimated elasticity of taxable income based on the amount of data used in the estimation. Panel (d) plots the fit of the normal distribution in the tobit model for 100% of the data. Panel (e) plots the fit of the normal distribution in the tobit model using 60% of the data, and reflects our preferred specification.