The Elasticity of Corporate Taxable Income - Evidence from South Africa ♠

Colleen Lediga\textsuperscript{a}, Nadine Riedel\textsuperscript{a,b,∗}, Kristina Strohmaier\textsuperscript{c}

\textsuperscript{a}University of Bochum  \\
\textsuperscript{b}CESifo Munich  \\
\textsuperscript{c}University of Tübingen

Abstract

How strongly do firms reduce their reported taxable income when corporate tax rates increase? We add new evidence from an emerging economy to a so far developed-country-dominated literature.

Keywords: Corporate taxation, developing countries, bunching

1. Introduction

While a growing empirical literature assesses behavioral responses to corporate taxation in industrialized economies, limited access to corporate micro data has largely prevented analogous analyses for less developed countries. Our study helps filling this gap. We draw on the population of corporate tax returns in South Africa in 2009–2015 to determine the elasticity of corporate taxable income by exploiting non-linearities in the corporate tax schedule. The analysis yields large elasticities for firms with incomes around the first kink (∼70,000 South African Rand or €5,000 p.a.), while entities with incomes around the second and third kink (∼R365,000 and ∼R550,000 p.a.) respond only moderately to marginal tax increases.

Two further insights emerge. Firstly, we show that firms bunch at zero corporate taxable income. This supports \cite{Johannesen et al. (2016)} who report a

\∗Corresponding author: Nadine Riedel, Email: nadine.riedel@rub.de
similar pattern for multinational entities and interpret it as evidence for international income shifting. Our data suggests that zero is also a focal point for domestic tax avoidance and evasion - despite the fact that, for many firms, the South African tax provisions imply no, or even disincentives, for bunching behavior. This supports the notion of some taxpayers having imperfect information on the tax code (Hoopes et al., 2015).

Finally, we follow prior papers and assess how firms manage to bunch at kink points. As total assets, sales, costs and other accounting measures show no major discontinuities at our tax thresholds, bunching firms do not systematically differ from other entities near the kinks. This contrasts prior findings (see, e.g., Bachas and Soto [2016], which suggest that corporate tax responses are dominated by cost-overreporting.\footnote{After finalizing the first working paper version, we became aware of Boonzaaier et al. [2017] who equally estimate corporate income elasticities in South Africa. Compared to their study, our data offers the advantage that firms subject to SBC-taxation can be clearly identified, which allows for more precise estimates and may explain differences in result patterns. Contrary to others (including Boonzaaier et al. [2017]), we moreover assess bunching at zero corporate taxable income.}

2. Institutional Background, Data and Methodology

South Africa is an upper-middle-income economy with a tax-to-GDP ratio of 29% in 2015 (compared to a 34%-OECD-average)\footnote{Information on tax-to-GDP ratios was obtained from OECD revenue statistics.}. It levies a “standard” tax rate of 28% on corporate income and applies a progressive “Small Business Corporations” (SBCs) tax scheme, where income of eligible businesses is taxed at lower rates. Kinks in the SBC-schedule will in the following be used to identify the corporate taxable income elasticity. Figure 1 depicts the three kinks of the marginal tax rate schedule for 2015\footnote{See http://www.sars.gov.za for tax schedules in all years and eligibility criteria.}.

To quantify behavioral responses to taxation, we estimate the elasticity of taxable income (ETI), which captures all kinds of behavioral responses including real production shifts, tax avoidance and tax evasion. We employ the nonparametric approach of Saez (2010), which exploits clustering of firms around tax.
kinks. To estimate the excess mass of firms around the kink, we determine the counterfactual density by running a local polynomial regression on binned data, while excluding bins within the bunching window. The latter is determined by an endogenous data-driven procedure (Dekker et al. [2016]). To account for increasing tax thresholds over time when pooling the tax years, the data is rescaled relative to the threshold and a weighted average value is used. Finally, we only pool years with identical changes in marginal tax rates at a given kink.

3. Results

3.1. Bunching at Kinks in the Tax Schedule

Figure 2 shows the distribution of firms at the first kink in the SBC tax schedule. The data is subdivided in two time periods, 2009–2012 and 2013–2016, as the marginal tax jump differs between the intervals (being 0 to 10% in the former case and 0 to 7% in the latter).

For both time spans, we see clear bunching for firms under the SBC tax schedule (and no bunching for Non-SBCs). For the years 2010–2012 (2013–2016), we estimate a highly significant excess mass of taxpayers $\hat{b} = 6.62$ ($\hat{b} = 7.48$). Using a weighted average for the threshold value\footnote{We calculate this weighted average using the share of bunchers as weights.} this translates into an

![Figure 1: SBC Tax Schedule 2015](image-url)
ETI of $\hat{e} = 0.79$ ($\hat{e} = 1.33$).

Table 1 reports the results for the other two thresholds. Firms respond at both income levels. Compared to the lowest threshold, the bunching at the second and third threshold translates into significantly smaller elasticity estimates though (ranging between 0.08 and 0.15).

While existing papers report large tax elasticities in less developed country contexts (see, e.g., Waseem 2018), we find mixed evidence for the corporate income tax in South Africa. Specifically, our results point to moderate tax elasticities—similar in size to developed country estimates—for larger SBCs at the upper two kinks; the elasticities at the lower end of the income distribution are, in turn, sizable and well exceed their developed country counterparts, compare e.g. evidence for the UK in Devereux et al. (2014). This pattern may

---

Devereux et al. (2014) report an ETI for the UK of 0.14–0.18 (0.54–0.57) for companies with profits around the £300k kink (£10k kink).
root in differences in institutional and economic tax evasion constraints faced by entities of different size.  

Table 1: Results Bunching Analyses

<table>
<thead>
<tr>
<th>Bunching window</th>
<th>binwidth</th>
<th>excess mass</th>
<th>se</th>
<th>elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second threshold</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010–2012</td>
<td>[-10,362 ; 6,705]</td>
<td>1219</td>
<td>6.6147</td>
<td>0.5023</td>
</tr>
<tr>
<td>2013</td>
<td>[-6,090 ; 2,610]</td>
<td>1740</td>
<td>4.3389</td>
<td>0.3732</td>
</tr>
<tr>
<td>2014–2016</td>
<td>[-10,230 ; 930]</td>
<td>1860</td>
<td>3.8754</td>
<td>0.2484</td>
</tr>
<tr>
<td>Third threshold</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014–2016</td>
<td>[-3,792 ; 1,264]</td>
<td>2528</td>
<td>2.9359</td>
<td>0.3142</td>
</tr>
</tbody>
</table>

3.2. Bunching at Zero

On top, one of the most salient features of our corporate taxable income distribution is that firms strongly bunch at a taxable income of zero, cf. Figure 3 for active SBCs and Non-SBCs in 2009–2015. Strikingly, this aspect has been largely ignored in the existing literature - except for a recent paper by Johannesen et al. (2016), who show that multinational firms bunch at zero income and interpret the pattern as evidence for international tax avoidance.

As SBCs are by definition domestic entities, the results in Johannesen et al. (2016) are found to carry over to national entities in our analysis, despite the fact that the South African tax schedule provides no or even disincentives for SBCs to bunch at zero. One possible explanation for the pattern is that taxpayers have incomplete information on the business tax schedule (see, e.g., Hoopes et al. 2015) and zero is a focal point for domestic evasion/avoidance strategies based on these false perceptions.

---

6 We tested for differences in response rates along observed dimensions other than size, namely industry affiliation and host region and found no evidence of systematic variation.

7 =firms with positive sales and deductions

8 Above zero, income is exempted from taxation; below zero, indefinite loss-carryforward provisions in the South African tax schedule provide an implicit tax subsidy (see, e.g., Domar and Musgrave 1944), making the budget set convex or linear. For Non-SBCs, the budget set is linear around zero if they expect positive future income.

9 A quantitative interpretation (yielding an ETI) is not straightforward at zero, given that
3.3. Anatomy of Response

Finally, we follow previous papers and plot the median of total assets, sales and total costs of sales against taxable income around the kinks to determine how firms bunch (cf. Figure 4). We cannot detect any clear anomalies except for a small jump in costs for the second threshold. These findings contrast recent evidence (see, e.g., Bachas and Soto, 2016), which suggests that firms’ tax responses are dominated by tax evasion through cost-overreporting. Our results are, in turn, consistent with evasion by a proportional underreporting of sales, deductions and assets (with evading firms “mimicking” taxpayers at the threshold) and with real responses - hence underpinning that response margins may differ across countries and institutional contexts.

4. Conclusion

Three conclusions follow: First, the pattern of identified tax elasticities suggests that progressive business taxation may be optimal from an efficiency perspective. Second, if zero serves as a focal point for (domestic) tax evasion/avoidance strategies, variation in “zero-bunching” across time and across firm-subgroups may be used to identify correlates of evasion/avoidance behavior. Third, our there are no (clear) jumps in the marginal tax rates and relative income responses cannot be calculated. The estimated excess mass for SBCs (Non-SBCs) is 11.8 (29.7).
Figure 4: Anatomy of Response

(a) Total Assets (log)

(b) Sales (log)

(c) Total Costs (log)

Notes: The panels show the medians of total assets, sales and costs around the first and second threshold for SBCs (filled, blue dots) and Non-SBCs (non-filled, grey dots).
analysis stresses that tax response margins may depend on institutional contexts and that findings for one country may not carry over to others.

References


