Two-Tier Tax Systems and Firms: Evidence from Brazil *

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1 Summary

Simplified tax regimes are prevalent in many countries (Bird *et al.* 2003). The details of such schemes vary somewhat across countries in terms of what "regular" taxes they replace, and what type of simplified taxation replaces those taxes. A common form of simplified schemes are tax regimes tailored to small and medium enterprises (SME) due to compliance costs, and administrative constraints that make it costly for tax authorities to observe the tax base for enforcement (Slemrod & Gillitzer 2013). As a result, modern systems of firm taxation – characterized by some combination of payroll, valued-added, and corporate income taxes whose statutory incidence falls on firms – often exist alongside special, simplified tax regimes that rely on presumptive tax bases (e.g. a single turnover tax). This paper uses novel administrative data on inter-firm trade linked to labor inputs from São Paulo, Brazil, to shed light on implications of such two-tier systems for firm growth, market competition and production decisions.

The precise way in which taxpayers are partitioned into different systems – turnover thresholds for value-added taxes (e.g, Keen & Mintz 2004) or payroll tax exemptions (e.g. Hsieh & Olken 2014) – also varies across countries (Kanbur & Keen 2014). In developing countries, particularly in Latin America and West Africa, firms below a turnover thresholds can often opt into a simplified regime where a single tax replaces a number of different taxes (Shome 2004). The case we focus on is a special tax regime in Brazil in which firms below a revenue threshold can choose between being part a simplified turnover tax system (SIMPLES) or be taxed in the "regular" tax system.[1] They key difference between the SIMPLES system and

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[1] Henceforth, we will refer to the non-simplified system as the "regular" system. However, given the usual shape of firm size distributions with a large mass of small firms, firms in the "regular" systems are actually less numerous than firms in the simplified system.

the regular system is that turnover becomes a surrogate tax base for both the value-added tax (VAT) and payroll taxes for firms that opt into SIMPLES.

Conceptually, the effects of such two-tier tax systems on firms matter in at least four ways. First, they could generate production inefficiencies through mis-allocation: a taxpayer may not choose the cheapest or best supplier as its choice may be affected by tax incentives. For instance, firms in the regular system can take VAT credit from suppliers in the regular system, but not from suppliers in the SIMPLES system. Thus, they may prefer to trade with firms that are also in the regular system. As a result, such a two-tier system may create partial segmentation of trade between firms in the regular tax regime and firms in the simplified regime (De Paula & Scheinkman, 2010). Second, a size-based tax system generates notches that affect the firm size distribution (Dharmapala *et al.* 2011) by reducing incentives for firms to grow. Such distortions in taxpayers' behavior to ensure eligibility for the simplified system may spill over to their trade partners (De Paula & Scheinkman, 2010). Third, the co-existence of taxpayers facing different tax burdens can also create an unleveled playing field for market competition. Finally, firms may change their input composition between intermediate inputs and labor inputs depending on whether inputs are deductible and whether payroll is taxed.

In this paper, we systematically analyze the effects of two-tier tax systems on firms using anonymized administrative data from the tax authority of the state of São Paulo. The data includes yearly trade flows between firms from electronic invoices. One of the key advantages of the Brazilian electronic invoice data over other newly available datasets on firm-to-firm transactions is that all firms must use electronic invoicing irrespective of the tax regime they choose.[2] As a result, the data allows us to map the trade network of regular firms and SIMPLES firms in our sample, including when firms switch tax regimes. Moreover, the data is linked to administrative records containing the total number of employees and payroll. We exploit this data using a rich set of research designs, including a reform that changed the location of the revenue-based VAT threshold within the period of analysis.

We begin by showing a number of stylized facts on the firm size distribution, the composition of firms' inputs across the distribution, and the tax regime of firms top suppliers. We find clear bunching at the eligibility threshold for the simplified tax system. Also, consistent with the tax incentives firms face, we find that firms in the simplified tax system use relatively more labor input and source relatively more of their intermediate input from other firms in the simplified tax system, which are not subject to the VAT. This leads to partial segmentation of the market between firms in the two systems.

Next, we use variation arising from firms' tax regime switches in order to show that there is a causal link between tax regimes and trade networks. This rules out an explanation of pure selection, where for example firms characteristics such as sector of activity that could determine both registration and trade networks. We implement an event study exploiting firms switching into the SIMPLES regime and out of the SIMPLES regime to show how the VAT intensity of their inputs changes. This research design exploits the panel feature of our data, which allows us to control for fixed characteristics of firms through fixed effects. Our main finding is that firms start trading relatively more with firms in their new tax regime as soon as they switch regime.

In the second part of the paper, we exploit a reform that increased the SIMPLES threshold from R$2.4M

[2] Usually, such data is available through VAT declarations where firms itemize inputs and outputs (e.g. in India and Uganda). Therefore, only transactions for which a VAT-registered firm is either a buyer or a supplier can be observed, and transactions between non-VAT firms are not covered by the data. In addition, because firms declare their inputs and outputs, the declaration of the same transaction is subject to mistakes and misreporting by the two parties. In the case of Brazil, the electronic invoicing covers all business-to-business transactions and each invoice has a unique key such that the same transaction cannot be reported differently by suppliers and buyers. The data thus mitigates both concerns of data censoring and misreporting.

to R$3.6M. to study firm growth and market competition. First, we document how the firm size distribution shifts with the reform, including a clear movement of the location of bunching to the new threshold. Then, we provide evidence for the adverse effect of the coexistence of simplified and regular tax regimes, and the preferential tax treatment given to SMEs (the option to choose the simplified tax regime) on ineligible (larger) firms competing in the same market as eligible firms. We show that ineligible firms in sectors with more competition from SIMPLES firms before the reform grew relatively less after the reform compared to ineligible firms in sectors with less competition from SIMPLES firms.

Then we study the relationship between tax systems and production choices. To get at the causal effect from firms' tax regime to trade networks, we employ two research designs. First, we exploit the reform through a differences-in-differences strategy. Second, we study the impact of a supplier's change of tax regime on a firm's decision to purchase inputs from that supplier through an event analysis. For the second research design we restrict attention to firms that are a "small economy" to their supplier such that they do not influence the decision of their supplier to switch tax regimes. The results provide evidence that the respective tax regime of (potential) trade partners has a causal effect on their trade and thus on client's input choices. This leads to market segmentation between firms in regular and simplified tax regimes.

Our results show that firms respond to the tax incentives they face: once labor inputs become taxed and intermediate inputs are deductible, firms change their production decisions away from inputs with higher effective marginal cost. Furthermore, our overall results are consistent with production distortions: we find (partial) segmentation in the network between regular and SIMPLES firms, i.e. firms trade relatively more with firms in the same tax regime. The degree of segmentation, however, is mitigated by the fact that firms are heavily dependent on key suppliers. In fact, most firms trade across tax regimes, and most firms have a regular firm among their main trade partners. Moreover, these distortions should be weighted against other key motivations for exemptions such as compliance costs that could be quite large for small firms below the threshold.

This paper contributes to the literature by shedding new light on how tax systems interact with taxpayers sourcing decisions in the context of simplified taxation in a developing country. Although the literature has emphasized the potential relevance of network effects (Liu *et al.* 2018; Pomeranz 2015; De Paula & Scheinkman 2010), there is little empirical evidence of chain effects using micro-data on firm trade flows.[3] The chapter also contributes to a broader literature on misallocation (e.g. Hsieh & Klenow 2009), size-based regulation and taxation (e.g. Garicano *et al.* 2016, Monteiro & Assunção 2012, Boonzaaier *et al.* 2016, Best *et al.* 2015), and a growing literature documenting firm responses to VAT thresholds through avoidance (e.g. Onji 2009), evasion (e.g. Asatryan & Peichl 2016), and real desincentives to grow (e.g. Harju *et al.* 2015).

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[3]Concurrent to this chapter, there is some work in progress using data from India (Gadenne *et al.* 2018, Rios & Setharam 2018).

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