Policy Brief

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Do taxes affect firm-to-firm trade?

Evidence from India

In brief:

- Intra-national trade costs are large in developing countries; gains from better integration of supply chains within these countries are potentially substantial. This study considers how the Value Added Tax (VAT) affects intra-national firm-to-firm trade in the state of West Bengal, India.
- Using rich data on the universe of the 180,000 firms paying taxes in the state and the transactions between them, the authors first show that there is substantial segmentation of supply chains along tax lines: firms that pay VAT trade substantially more with other VAT-paying firms than firms that do not pay VAT.
- To understand the causes and consequences of this segmentation the authors build a model of firms' sourcing and tax decisions within supply chains, and use the data to test the model's predictions.
- The findings suggest that two mechanisms lead to supply chain segmentation:
    - First, firms that do not pay VAT are 12% less likely than VAT-paying firms to buy from VAT-paying suppliers.
    - Second, there are strategic complementarities in firms' tax choices: firms are more likely to choose to pay VAT if they trade more with VAT-paying clients and suppliers.

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Policy motivation

Value Added Tax (VAT) is one of the main sources of government revenues in developing countries (Keen, 2016). It is thought to have several advantages compared to other forms of taxation. First, it is often described as more 'production efficient' than for example turnover taxes, because it distorts production decisions less. Second, it is better suited to contexts with low tax compliance because of its built-in `third party reporting' incentives. A transaction between two firms has to be reported by both the buyer and the seller, as the two firms have opposite incentives to misreport so we can expect the transaction to be reported truthfully, giving the government precious information on firms' activity. Perhaps as a consequence the VAT is today used by more than 160 countries throughout the world.
In developing countries, however, VAT-paying firms typically operate in the same markets as a large number of non-VAT paying firms, whether firms in the informal sector or firms paying taxes under a non-VAT regime. This means the VAT will affect the economy differently than in the textbook case of an economy in which all firms pay taxes in the same way.

In particular, it will affect firms' decisions of which suppliers to use, and hence the overall efficiency of supply chains. This is because under a VAT system no taxes are levied on transactions between two VAT-paying firms but VAT is levied on transactions between a VAT-paying supplier and a non-VAT-paying client. Intuitively, this means that non-VAT-paying firms are going to buy less from suppliers that pay the VAT than they would otherwise, even if these suppliers are the best producers of the inputs they need. If large, this effect will make non-VAT paying firms less efficient and decrease the market share of VAT-paying suppliers. This will in turn lower overall growth in the economy and the VAT revenues collected by the government.

This potential effect of VAT on supply chains also has implications for market integration within developing countries. There is substantial evidence that market integration is limited in those countries by high firm-to-firm trade costs. In an economy in which VAT and non-VAT paying co-exist and may wish to trade with each other, the VAT increases the cost of some firm-to-firm transaction, further lowering market integration. The VAT thus limits the extent to which firms can grow by reaching new clients, as well as their ability to reap productivity gains from specialisation.

Finally, this research also has important implications for the way the VAT is administered. If the VAT distorts firm-to-firm trade as suggested above, firms will take into account the behaviour of other firms in their supply chain when deciding whether or not to pay VAT. Intuitively, a firm is more likely to choose to pay VAT the more its clients and its suppliers are also paying VAT. This implies that policy interventions that induce some firms to start paying VAT, such as tax enforcement policies, will have spillover effects on other firms in their supply chains, inducing some of them to also start paying VAT. Such 'multiplier effects' of tax interventions are valuable for tax authorities, as they increase the returns to enforcement policies.

We know very little about the mechanisms described above. Do firms really take the VAT into account when choosing how much to source from different suppliers, or whether to themselves pay VAT? Are these effects large enough to substantially affect supply chains? Are spillover effects of enforcement policies throughout supply chains likely to be large enough to warrant being taken into account by tax authorities? The research summarised below provides answers to these questions in the context of West Bengal in India.

Overview of the research

Our study asks how the tax system affects intra-national trade within developing countries. In most of the developing world high transport and regulatory costs act as a barrier to firm-to-firm trade, and the economic gains from better integration of supply chains within countries are potentially large. Our study investigates to what extent the VAT system contribute to these high trade costs, and what this implies for tax policy. Intuitively, VAT can affect trade because under a VAT system transactions between two VAT-paying firms are not taxed, but a tax is levied on a transaction between firms that do not pay VAT and firms that do. In a context in which many firms do not pay VAT, this has the potential to severely limit firm-to-firm trade by segmenting supply chains.

We use novel administrative tax data on the 180,000 firms paying taxes in West Bengal, India, for the period 2010-2016 to overcome two key observational constraints. First, administrative tax data typically does document firms that do not pay VAT; we observe both VAT-paying and non-VAT-paying firms because firms below a size threshold can opt for a non-VAT ‘simplified’ tax scheme. Second, domestic trade flows are hard to characterise because firm-to-firm trade is rarely observed. We have information on trade between 4.8 million annual client-supplier pairs, because VAT-paying firms report transactions with other tax-registered firms. This allows us to map supplier networks by matching clients’ and suppliers’ tax identifiers.

Our first contribution is to document the segmentation of supplier networks by tax scheme. The correlation between firms’ decision to pay VAT and how much they buy from, or sell to, VAT-paying firms is large and robust to controlling for firm size and detailed location and industry characteristics. We find that VAT-paying firms on average sell 14 percentage points more to VAT clients, and buy 8 percentage points more from VAT suppliers, all else equal, than non-VAT-paying firms.

Our second contribution lies in a model that clarifies the mechanisms leading to the supply chain segmentation we observe. Our main result is that under a VAT system there is partial segmentation of supply chains by tax scheme in equilibrium for two reasons: the VAT’s incentive structure leads to supply-chain distortions; and all else equal a VAT-paying firm buys a higher share of its inputs from VAT-paying suppliers than a non-VAT-paying one does. Endogenising firms’ tax choices introduces a second mechanism of strategic complementarities in tax decisions: firms are more likely to choose to pay VAT the more they trade with VAT-paying suppliers and clients.

Finally, our third contribution is to provide empirical evidence on the mechanisms outlined by our model. We first estimate the causal effect of taxes on firm-to-firm trade by leveraging our transaction level data and variations in trade over time within supplier-client pairs, allowing for unobserved supplier productivity shocks. We find that firms buy 12% more on average from VAT-paying suppliers when they themselves choose to pay VAT.

To identify strategic complementarities in firms’ choice of tax scheme we use within-firm changes over time in the share of sales (inputs) that firms can sell to VAT-paying clients (purchase from VAT-paying suppliers) generated by the entry and exit of their VAT-paying trading partners. We find evidence of strategic complementarities in firms’ VAT decisions: our estimates imply that forcing all of a firm’s trading partners to pay the VAT would increase that firm’s propensity to pay the VAT by 8-10 percentage points compared to a situation where none of its trading partners pay VAT. Simulation exercises using our estimates show that the two mechanisms explain a non-trivial share of the supply chain segmentation by tax scheme we observe.

Policy recommendations

- **There is a cost to using the VAT: it distorts firm's sourcing decisions.**
  Our results show that the VAT affects firms' decisions of whether to trade with other firms, and which other firms to trade with. This means tax policy reforms can boost firm-to-firm trade, allowing local firms to reap gains from trade and creating conditions for stronger economic growth.

- **India's recent GST reform likely lowered the cost of using VAT.**
  In particular, our results speak to the consequences of India's major reform of its VAT system in 2017, known as the General Sales Tax (GST) reform. Prior to the GST reform, India's VAT system was organised at the state level and effectively taxed transactions that occurred across state borders even if both firms involved in the transaction paid VAT. The GST reform removed this tax-induced trade distortion, which is very similar to the one we study. Our results imply that removing it will have increased trade between VAT-paying firms across state borders and contributed to making supply chains more integrated across regions in India.

- **Tax enforcement policies will have spillover effects in supply chains.**
  Our findings also imply that tax compliance policies that induce some firms to pay VAT will have substantial spillovers effects on firms in their supply chains, as some of these firms' clients and suppliers will also start paying VAT. The tax revenue returns to these policies may well be higher than previously thought, and higher than what can be estimated by looking only at the firms directly targeted by the policy.

- **Targeting enforcement policies to firms that are central in supply chains could increase their returns.**
  The spillover effects of these policies will be larger the more the firms targeted by the policies have central position in supplier networks: inducing a firm to pay VAT is more likely to lead to many other firms paying VAT if this firm has many supplier and clients. Targeting enforcement policies to some firms or sectors that trade a lot with other domestic firms could yield high tax revenue returns.