

Merging to Dodge Taxes?

Unexpected Consequences of VAT adoption in India

Divya Singh ^{*†}

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Abstract

This paper investigates whether tax evasion creates incentives among firms to reorganize their production. Value Added Tax (VAT) is the world's most popular consumption tax and is considered revenue efficient since cross-reporting of firm-to-firm transactions leads to self enforcement. However, the ability to evade tax on firm to consumer transactions creates incentives for the last two firms in the production chain to integrate vertically. In this paper, I test this hypothesis by using a quasi-experiment in India where sales tax was replaced with VAT in a staggered manner between 2003 and 2008 and provided exogenous shock to tax evasion opportunities along the production chain. Difference-in-difference analysis reveals that post reform, treated firms sourced more 'upstream' products and had greater vertical mergers, indicating increased vertical integration under VAT. In addition, the effect is largest for firms which are closest to final demand indicating that tax-evasion is one of the channels. Overall, the results suggest that VAT is no longer production efficient in settings of low compliance.

*Divya Singh is an Economics Ph.D. Candidate at Columbia University in the City of New York (divya.singh@columbia.edu)

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Recent empirical work in public economics has investigated tax instruments in their ability to raise substantial tax revenues in developing countries when tax compliance and enforcement is less than adequate (Pomeranz (2015), Best et al. (2015)). Less studied is the effect of tax instruments on *real* decisions of the firms, which are crucial players in collection and remittance of taxes. An important question that emerges is: does a firm's position in the production chain respond to evasion incentives created by tax instruments? Or in the context of this paper, do firms vertically integrate to dodge taxes?

Under value added tax (VAT)- the world's most popular consumption tax, tax evasion opportunities vary significantly along the production chain. A VAT remitting firm pays tax on its net value added and is required to provide invoices of its purchases to claim input tax credit. This generates paper trail for firm to firm transactions and leads to self enforcement.¹ However, this self-enforcement mechanism unravels at the last (retail) stage where there is no cross-reporting by consumers.²

The absence of cross-reporting by consumers under VAT implies that in contrast to an unintegrated second last firm which sells to downstream firm only, an integrated retail firm sells to consumers and can evade taxes on its sales. This ability to evade tax at the last stage creates incentive for the second last firm in the production chain to integrate with the last firm (Kopczuk and Slemrod (2006)). If this hypothesis is correct and tax savings are big enough to make it worthwhile to integrate, one should expect greater vertical integration under VAT among firms closer to the last stage than father up the chain, especially in settings of imperfect enforcement.³

In this paper, I use differences-in-differences research design to empirically show that such differences in ability to evade tax along the production chain under VAT significantly increase vertical integration. I test this by using a unique quasi-experiment in India where retail sales tax (RST) was replaced with VAT in a staggered manner across states. Replacement of RST with VAT provides exogenous shock to tax evasion opportunities in the chain. This is because in RST, all firms except the last firm do not face any tax liability and therefore have no tax evasion incentive, whereas under VAT, all firms remit tax and the ability to evade tax lends strategic advantage to being the last firm in the chain.

The key hypotheses I test is- does replacement of sales tax with VAT lead to greater vertical

¹Consequently, VAT has been successful in reducing evasion and increasing tax revenues and greater number of countries have switched to VAT in recent past as illustrated in Figure ??.

²Naritomi (2013) shows that anti-tax evasion program that rewards consumers for submitting the receipts significantly increases revenues

³Another channel through which firms may dodge taxes is by selling directly to consumers instead of integrating with the downstream firm - unfortunately testing this is beyond the scope of this paper. We can think of results in our paper as lower bound to the actual effect.

integration among firms? And if so, are such effects largest for firms that are closest to the final stage and therefore, have most to gain from integration?

I test the effect of VAT adoption on vertical integration by measuring its effect on upstream measure of firms' inputs using plant-level data from India (Annual Survey of Industries 2001-2010). In particular, I draw from the trade literature ([Acemoglu et al. \(2010\)](#), [Antras et al. \(2012\)](#), [Antras and Chor \(2013\)](#), [Fally \(2011\)](#), [Alfaro et al. \(2016\)](#)), a measure of upstreamness of a product. A product that is used more as input in other products and/or in production of more upstream products is assigned higher value of upstreamness. I use position of outputs and inputs in the firms data to construct upstream index for each good in the sample. The idea is that a more vertically integrated firm sources inputs which are more upstream and vertical distance between its inputs and outputs is higher. Therefore, an increase in vertical integration should lead to increase in upstreamness of inputs. I also provide a more direct evidence of vertical integration by looking at direct vertical and horizontal mergers of firms during this period. I find that while number of log horizontal mergers remain unchanged during this period, vertical mergers sharply go up after VAT is adopted.

The key identifying assumption is that time trends in vertical integration in states that adopted VAT earlier do not differ significantly from states that adopted later in the absence of VAT adoption. Even though it was agreed in 2002 that all states would introduce VAT with effect from April 2003, multiple states adopted VAT with varied lags. I argue that this state-specific delay in implementation across states was largely due to political and administrative reasons. These include forthcoming state elections and disagreement between ruling federal and state governments with regards to VAT implementation. I provide further evidence by showing absence of pre-trends in the outcome variable. Furthermore, to increase precision of my estimates, I use within state variation in intensity of treatment - which arises from the fact that firms which produced VAT-exempt goods prior to VAT adoption are likely to be less intensely treated than firms which produced VAT applicable goods.

Results indicate that adoption of VAT led to greater vertical integration among firms with some heterogeneity across firm size. Adoption of VAT significantly increased upstreamness of firms' inputs. While immediate effect is small, it grows over time. Moreover, effect is largest for firms in second quartile of size distribution. These firms are not too large to gain little from evasion and not too small to have high costs of integration. Additionally, adoption of VAT increased vertical mergers while there is no effect on horizontal mergers. All the results are robust under varying specifications.

I then explore if tax evasion is one of the channels that causes firms to integrate more under VAT. A testable empirical implication of this channel is that one should expect most of the effect

of VAT adoption to come from retail firms. I plot the treatment effect as a function of distance to final demand. Firms which are at 0 distance to final demand exhibit largest increase in upstream measure of their inputs-consistent with tax evasion hypothesis.

However, there are other channels as well that may lead to vertical integration in the middle of the chain. Firms which belong to second to tenth ventile also experience small but significant effect of the tax reform. One possible mechanism is that for small credit constrained firms, when monthly/quarterly tax payment is to be made before the realization of revenues, VAT imposes tax burden and incentives to integrate in the middle of the chain. This tax burden is real when refunds are slow or non-existent. Another mechanism relates to compliance costs. Filing costs may increase or decrease under VAT depending on the size of firm and its position in the value chain. If filing costs go up, bigger firms under VAT benefit from economies of scale.

The empirical results however, do not lend support to liquidity constraints hypothesis or compliance costs hypothesis. In particular, the magnitude of effect of VAT on vertical integration does not depend on magnitude of financial constraints faced by the firm as measured by its industry level cash flow sensitivity estimate (Almeida et al., 2004). This is at odds with prediction of liquidity constraint hypothesis which states that effect should be larger for firms which have larger liquidity constraints. Finally, in contrast to prediction of compliance costs hypothesis- that magnitude effect should be larger for smaller firms when compliance costs are fixed costs, the estimated effect is independent of firm size as measured by number of employees.

This finding has important implications for tax policy design especially in developing countries because it shows that in response to higher taxes, firms may adjust their production decisions. This implies that lower revenues in low compliance settings is a combination of tax evasion and production responses of the firms. A tax policy that ignores firms' real production decisions will therefore, raise lower revenues.

The empirical results in this paper have implications to optimal tax theory. A canonical result in the theory is that any optimal tax must maintain production efficiency [Diamond and Mirrlees \(1971\)](#). Under perfect enforcement, VAT maintains production efficiency. However as this paper argues, VAT is no longer production efficient when enforcement is weak. Because firms integrate to evade taxes under VAT, this represents real responses of firms to VAT. A revenue maximizing tax rate under VAT that disregards firms' incentives to integrate raises lower revenues than the one which takes them into account. Therefore, a privately optimal firm is larger than a socially optimal firm. Thus it may be optimal to deviate from production efficiency when tax evasion response is taken into account as has been previously argued by some authors ([Emran and Stiglitz \(2005\)](#), [Kopczuk and Slemrod \(2006\)](#), [Gordon and Li \(2009\)](#)).

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