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Can ICTs increase tax? Experimental evidence from Ethiopia

Summary of Working Paper 82 by Giulia Mascagni, Andualem T. Mengistu, and Firew B. Woldeyes

African tax administrations have experienced rapid modernisation in the past two decades. The digitalisation of tax records and widespread adoption of ICTs have been key features of this process. However, there is still very little evidence on the effectiveness of ICTs and digitised data on tax collection and the functioning of tax administration more broadly. In principle, ICTs can have a great impact in making the tax administration more efficient and moving jobs away from mechanical tasks like data entering towards more sophisticated ones, like audits and data analysis. Similarly, digitised data can make enforcement cheaper and more efficient, for example by extending the use of third party information and by systematically cross-checking taxpayer information. Whether and to which extent these benefits can materialise in practice, in presence of severe capacity constraints within the tax administration, is an empirical question that we address in this paper.

Sales Registration Machines (SRMs) in Ethiopia

More specifically, we provide evidence of current data usage for tax enforcement and evaluate the impact of electronic sales registration machines (SRMs) in Ethiopia. SRMs record firms' transactions and transmit this information directly to the Ethiopian Revenue and Customs Authority (ERCA). By doing this, they were expected to increase compliance through better data on firms' sales. Their implementation was rolled out starting from 2008 and all firms were legally required to adopt eventually, with the exception of micro enterprises. SRMs increase only the availability and quality of data at ERCA's disposal, thus increasing enforcement capacity, but do not change anything else in the taxpaying process.

Administrative data and experimental methods

To evaluate the SRMs' effectiveness, we use administrative data from tax returns for all firms in Addis Ababa, from 2010 to 2014.[1] Using this type of data for research has only become possible very recently, thanks to the digitalisation of tax records across African tax authorities. Administrative data is particularly suitable for policy evaluation because it provides information on real taxpaying behaviour. In particular, field experiments or quasi-experiments allow for the real-life evaluation of policies as they are being implemented, thus providing rigorous evidence base for policymaking. In this paper, we use both quasi-experimental methods (difference-in-difference) and a letter experiment to evaluate the effects of SRMs in Ethiopia.

Widespread and large discrepancies in taxpayer records

We start by interrogating our data on the accuracy of taxpayer records. For those firms that file for both VAT and profit tax, we compute a firm-level measure of accuracy by calculating discrepancies between the amounts reported in the VAT and profit tax declarations. Although in principle there is no reason why taxpayers should report such discordant amounts, in practice we document large and widespread discrepancies in Ethiopian firms' tax records. Over 60% of firms report discordant amounts of total sales in the VAT and profit tax declarations. In most cases (67%), the former is smaller than the latter. This is consistent with the fact that the monetary gain from underreporting VAT turnover is greater than from under-reporting turnover for profit tax. When discrepancies occur, they are also large:

[1] We include all firms in Category A and B, but not those in Category C (i.e. micro firms) for which detailed administrative data are not sufficiently reliable.

about half of the largest turnover declared. Taxpayers would only declare such discordant information if they believe ERCA does not have these data or, at least, that it does not cross-check it for enforcement purposes. Indeed, if ERCA were to recover 15% tax (i.e. the VAT rate) on the amount of underreported turnover in the VAT declaration, compared to the profit tax declaration, it would obtain a potential revenue gain of 634 million birr (23 million USD). However, it must be noted that this is only a *potential* revenue gain, which is not guaranteed to be realised in practice, as taxpayer responses may well offset it partly or completely.

What is the impact of SRMs?

Using difference-in-difference analysis, we show that SRMs increase reported VAT sales by 87%. However, reported VAT inputs also increase, and more than proportionally than sales, by 150%. As a result, the increase in VAT revenue is proportionally lower than the increase in VAT-able sales – though still large: 70%. We find a similar effect on profit tax, where reported sales increase by 27%, total costs by 93% and tax by 18%. These results show that, although SRMs had a large and positive impact on tax revenue, this impact is lower than the full potential due to offsetting increases in firms' reported costs. In addition, we test whether SRMs also affected the accuracy of taxpayer records. Discrepancies in taxpayer records decrease by half as a result of SRM adoption, consistent with the fact that the machines may correct taxpayers' perceptions about the availability and usage of data at ERCA.

Is the impact of SRMs due to increases in compliance?

Having shown that SRMs were effective in substantially increasing tax, despite the offsetting response on costs, we investigate how this increase comes about. While an obvious candidate is increased compliance, firms may also experience an increase in their economic activity thanks to the machines. A recent survey revealed that firms found SRMs particularly useful to have more precise business records and to control their business better, including reducing the incidence of theft by employees. The letter experiment can help us disentangle these two possible mechanisms: real or compliance responses. ERCA sent personalised letters to a random group of taxpayers, which represent an increase in taxpayers' perceived probability of being detected cheating. If SRMs' positive effect on tax revenue stems from increased compliance, SRM users should react to the letter less than non-users, or not at all, since the former are already complying more, while the latter remain less compliant. The results from our letter experiments confirms this hypothesis, showing that the letter's effect is largely concentrated in the group of firms that did not yet adopt the SRM by the time of the experimental intervention. This experiment also provides an opportunity to indirectly test the effectiveness of SRMs – confirming the positive result from the difference-in-difference analysis.

Conclusions: what potential for ICTs and tax in low-income countries?

Our results show that, although ICTs are highly effective in increasing tax compliance and tax revenue in Ethiopia, they are still severely limited by low state capacity and by taxpayers' strategic responses. On the one hand, the extent and depth of discrepancies we document in Ethiopia reveals that low administrative capacity severely limits the potential of available data for enforcement purposes. On the other hand, taxpayers respond to increased enforcement on one margin (i.e. reported sales) by increasing other, less monitored, margins (i.e. reported costs), thus partly offsetting the SRM's positive effect and minimising any increase in tax.

Taken together, these results show that, while ICTs are highly effective, they are no silver bullet in contexts of limited state capacity. Realising their full potential requires substantial investments to boost the revenue administration's capacity to use available data and ICT systems. Tackling tax evasion effectively therefore requires a combination of technological innovation and measures to boost capacity and traditional enforcement.

Further reading

Mascagni,G; Mengistu, A.T; Woldeyes, F. B. (2018) '*Can ICTs Increase Tax? Experimental Evidence from Ethiopia*' ICTD Working Paper 82, Brighton, IDS: July.

Credits

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