International Growth Centre

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The incidence and impact of Electronic Billing Machines for VAT in Rwanda

Donor aid represents roughly 40 percent of Rwanda's national budget. Expanding the tax base has been a crucial strategy in curbing its dependence on foreign aid. Value-added tax (VAT) is the largest tax-based contribution to government revenues in Rwanda and has been identified as a key priority for raising overall revenue.

In August 2013, the Rwandan government passed legislation requiring VAT-registered firms to provide customers with a certified Electronic Billing Machine (EBM) receipt for each sale. EBMs record and transmit all sales transaction data to the Rwanda Revenue Authority (RRA) in real time, enabling improved monitoring of firms' VAT obligations and, hence, compliance.

In an effort to assess the uptake and impact on tax revenues of the EBM initiative, IGC researchers Nada Eissa and Andrew Zeitlin, together with Saahil Karpe and Sally Murray, conducted a study of VAT-paying stores in Rwanda.

Although all VAT-registered firms in Rwanda were eventually required to use EBMs (except exempted firms), the programme was rolled out in phases, allowing for a rigorous impact evaluation to be conducted.

Data from VAT declarations, EBM adoption, and a small-scale 'mystery shopper' study were used to explore impacts on compliance and resulting government revenues. Adoption alone is not enough – longer-term efforts to improve compliance must strengthen incentives for actual usage of EBMs to have any meaningful impact on revenues.

> "Requesting an EBM receipt increased the chances of receiving one by 42 percentage points. This suggested that policies that motivate consumers to request VAT receipts could be a very effective way to raise compliance and revenues."

The study also provided insights into how VAT costs are shared between consumers and firms, and how the RRA can realise the full potential of EBMs for increasing tax compliance and raising revenues.

EBM adoption

The adoption of EBMs was rapid, reaching 77.8% of active VAT-paying firms by 2014Q3. However, adoption varied considerably by economic sector. Adoption was highest among hotel and restaurant sectors (89.2% and 87.8%, respectively), followed by transportation, wholesalers, and retail. Adoption was lowest among firms offering business services (at only 38.8%), where 'services' were defined as legal, financial, management, and consulting.

Larger firms were more likely to be early adopters of EBMs, but by 2014Q2, smaller firms had caught up entirely with no systematic correlation remaining between firm size and EBM adoption. What might explain the lag in early adoption by smaller firms is the requirement that firms cover the cost of the EBMs themselves. An EBM costs approximately 211,050 RWF (£192), which may pose a significant cost and liquidity challenge for small firms. An alternative explanation is that the RRA focused its earlier compliance and sensitisation activities on larger tax-payers due to greater expected uptake and revenue impacts.

The impact of EBM adoption on VAT revenue generation

EBM adoption increased firms' VAT payments by 5.4% on average, although impacts varied substantially by sector and firm size. The median firm in 2012Q1 had a quarterly VAT payment of 211,631 RWF (£195), and the impact of EBM adoption for such a firm was 11,428 RWF (£11) per quarter, or 45,712 RWF (£42) per year.

The largest impact on VAT generation was seen in the computing sector, followed by construction, hotels, and retail. Little impact was noted in telecommunications, restaurants, and manufacturing. This is most likely because pre-EBM VAT compliance in these sectors was relatively high to begin with.

Kigali construction

Image credit: Steve Andersen

Although the largest firms in the sample were less responsive to the adoption of EBMs, the revenue impacts of their adoption were larger. This is consistent with the view that larger firms had better VAT compliance pre-intervention and that targeting can improve compliance and revenue collection among larger firms.Both the smallest and largest deciles of firms showed an approximately 14% increase in VAT declarations as a result of EBM adoption. The impact on revenues for firms in the bottom-decile was just 1,135 RWF (£1) per quarter, but the impact for top-decile firms was a revenue increase of 1,983,568 RWF (£1,825). Given the high initial costs of the machines for firms, it would take years for some small firms' increased VAT payments to break even on the initial outlay for the machines. This brings into question the cost effectiveness of requiring EBM adoption for small firms.

Mystery shoppers

The researchers and the RRA hypothesised that the overall impacts of EBM adoption were fairly low (5.4% on average) due to inconsistent usage. Although issuance of an EBM receipt to customers is now mandatory, it is not always certain that customers will receive receipts if they are not explicitly requested, particularly for small purchases.

In order to estimate the extent of firms' non-utilisation of the EBMs they have installed, the researchers undertook a small-scale 'mystery shopper' survey, in which enumerators visited 129 EBM-active retail stores in Kigali and made small purchases of goods such as tea, coffee, soap, and staples, valued between 500 RWF and 2,000 RWF (£0.46 and £1.80). Each shop was visited 3 or 4 times; in half of the visits enumerators specifically asked for an EBM receipt.

Kigali market

Image credit: Katie Taylor

The mystery shopper survey helped confirm the RRA's hypothesis that despite being mandatory, receipts were not always being provided for small purchases; in fact, unless they were explicitly requested by customers, receipts were provided in only 21% of visits. However, it also revealed something important for compliance policy, namely that merely requesting an EBM receipt increased the chances of receiving one by 42 percentage points. This suggested that policies that motivate consumers to request VAT receipts could be a very effective way to raise compliance and revenues.

The survey also sought to understand how the costs of VAT compliance affected firms' profits and consumer prices. It found that the mystery shoppers paid more for goods when they demanded EBM receipts, but that VAT costs were only partially passed on to consumers. Price increases represented only ~50% of the total VAT on goods purchased. The researchers hypothesised that firms are wary of charging consumers higher prices due to competition from other (non-compliant or non-VAT-registered) firms, and hence shared the burden of VAT with their customers.

Policy implications

Future EBM adoption efforts should target sectors with lower compliance rates, and where absolute revenue impacts from adoption would be high; the construction sector in particular meets these criteria. Additionally, to increase compliance across the board, the RRA could work to raise firms' incentives to utilise installed EBMs by for example, strengthening purchasers' incentives to request EBM receipts ('consumer audits') and increasing firms' perceived risk of RRA audits.

Partly as a result of this study, 3 such interventions are now being trialled with support from the IGC. One focuses on consumer demand for receipts, and turns EBM receipts into lottery tickets from which consumers can win cash prizes. This was trialled earlier in Rwanda, but a cumbersome system of prize acknowledgement and delivery curbed its effectiveness. Now the lottery is undergoing an evidence-based redesign (with inputs from the IGC) to optimise its effectiveness.

The second intervention targets firms' perceived risk of being caught and penalised for not issuing EBM receipts: plain-clothes mystery shoppers will visit firms on behalf of the RRA and the RRA will issue fines if EBM receipts are not provided to consumers. The IGC will study whether audit strategy increase EBM compliance, and the overall cost-effectiveness of and optimal design for the intervention.

A third innovation is to improve the RRA's ICT systems, so that firms' monthly and quarterly VAT declarations are automatically checked against the data transmitted to the RRA by EBMs. This final change was suggested by an additional IGC study that found discrepancies between firms' sales as recorded by their EBMs and the sales they formally declared in their regular VAT declarations.

Findings of this study and its follow ups confirm the need to target enforcement activities in a way that does not negatively affect firm growth, consumer welfare, or allow non-compliers to out-compete compliant firms.