Final report

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An Analysis of Discrepancies in Tax Declarations Submitted Under Value-Added Tax in Uganda.*

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Abstract

Many low-income countries (LICs) have implemented Value-added tax (VAT) systems during the last decades on the recommendation of economists, who predict that VATs should (i) not distort production, (ii) help create paper trails, and (iii) generate offsetting misreporting incentives for transacting pairs of firms. Paper trails and offsetting misreporting incentives are argued to especially benefit tax enforcement in LICs. But this only holds if the revenue authority has sufficient resources (manpower, training programs, etc) to "act on" these enforcement-friendly properties, and firms believe the revenue authority to have such resources.

We evaluate the actual performance of Uganda's VAT, using three years of tax-declaration level data from the Uganda Revenue Authority (URA). We show that the distribution of reported value added amounts is suspiciously low, with substantial consequences for tax revenue. This is despite the fact that firms are required to submit monthly reports on the amount bought from/sold to any transaction partner declared under the VAT – paper trails – to the URA. We use these to compare the amount reported by sellers and buyers and find widespread discrepancies. We investigate the potential drivers of these discrepancies, and what types of firms are more likely to report mismatching amounts. Finally, we discuss a pilot program to attempt to tackle the uncovered discrepancies currently being designed in collaboration with URA.

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1 Introduction

The optimal choice of policy instruments to raise tax revenues must often trade off production and revenue efficiency (Best et al., 2015). Value-added tax (VAT) systems, however, are typically considered to feature both of these properties, which partly explains why they have been widely adopted around the world (Keen and Lockwood, 2010). The predicted revenue efficiency of the VAT, compared to for example a retail sales tax, relies on two main ideas (Pomeranz, 2015). First, the VAT generates offsetting misreporting incentives for the two sides of a business transaction, limiting the existence of *collusive* evasion – where transaction partners coordinate to misreport a transaction – along the production chain. Second, the paper trail generated by the VAT in theory rules out *unilateral* evasion – a situation in which a firm misreports a transaction without coordinating with its transaction partner.[1] A growing literature provides empirical evidence that, in middle- and high-income countries, revenue authorities' access to paper trails does successfully limit unilateral evasion, especially for taxes in which most transactions are covered by information-reporting requirements, like the VAT;[2] and that unilateral evasion is not easily replaced by collusive evasion schemes in such high fiscal capacity contexts (Kleven et al., 2011; Brockmeyer and Hernandez, 2016; Naritomi, 2015).

These revenue efficiency arguments have been instrumental for the widespread adoption of VAT systems in low-income countries (LICs), where evasion concerns are particularly acute (Bird and Gendron, 2007). Yet, the enforcement power of paper trails relies on the revenue authority having the resources to make use of the information they possess to detect and sanction misreporting, and on taxpayers believing the revenue authority to have such resources (Almunia and Lopez-Rodriguez, 2015). This is an important qualifier because revenue authorities in LICs often operate on limited resources (Besley and Persson, 2013). Empirically, the extent to which these revenue efficiency arguments apply in LICs remains unclear because there is very little direct, micro-level evidence on the enforcement power of paper trails in such contexts. The possibility that the actual implementation of the VAT might be different in LICs compared to more developed countries is supported by the aggregate evidence in Figure 1. The figure shows that the share of VAT returns with negative or nil liability, which typically raise concerns of tax evasion, is much higher in LICs.[3]

[1] The retail stage, at which the self-enforcing mechanism breaks down, is typically seen as the Achilles' heel of the VAT.

[2] Carrillo, Pomeranz, and Singhal (2016) and Slemrod et al. (2015) show that the fact that not all activity is subject to paper trails under e.g. corporate income taxes (CITs) is an issue for enforcement.

[3] VAT returns with negative or nil liability should be the exception rather than the norm in the absence of tax evasion because businesses with a constantly negative value added are not viable, except in the case of exporting firms (exports are typically zero-rated).

In this paper, we provide evidence that paper trails, even though taxpayers are aware that these are available to the revenue authority, are not effective at curbing unilateral evasion schemes in Uganda.[4] Specifically, we exploit transaction-level data reported separately by sellers and buyers to study unilateral VAT evasion by Ugandan firms. We use data on the universe of monthly VAT declarations submitted electronically by VAT-registered firms (henceforth "VAT firms") to the Uganda Revenue Authority (URA) from 2012 through 2015. VAT firms are required to submit the usual monthly aggregates commonly reported in VAT systems (e.g. total VAT charged, total VAT paid, etc.). In Uganda, however, they are also required to attach the complete transaction-level record of their sales to, and purchases from, other VAT firms to their monthly declarations. In other words, firms are required to provide the paper trail that is conjectured to limit the extent of unilateral VAT evasion directly to the URA.[5] Comparing what sellers and buyers report, we find large discrepancies.

We begin the paper by documenting some motivating patterns for our analysis based on the monthly aggregates reported in most VAT systems. As in other LICs (see Figure 1), the share of VAT returns with non-positive liability is very high in Uganda. In fact, even when we sum up monthly declarations over the fiscal year, a large share of firms (30%) report a value added (sales minus purchases) that is negative or nil. Such a pattern raises concerns of widespread VAT evasion. However, the impact on VAT revenue is constrained by Uganda's regulation of VAT refunds, which encourages many firms to carry over sizable VAT credits from month to month and limits cases where firms can get VAT refunds.

We then turn to the analysis of the transaction-level data, in which we cross-check the VAT charged as reported by the seller and the VAT paid as reported by the buyer for each seller-buyer-month combination. We find that "misreporting", i.e., cases in which the reported VAT charged is lower than the reported VAT paid, is quite common among VAT firms in Uganda. This could be due to sellers underreporting their output VAT and/or to buyers overreporting their input VAT, either through voluntary evasion or because of mistakes made when filing their VAT returns. Our results show that the total VAT misreported – the sum of discrepancies for all misreporting cases within a fiscal year – is estimated to amount to 68.4% of the total VAT due in the most recent fiscal year. This figure is even higher among smaller firms (93.1%).[6] It also remains very high when we restrict our sample of analysis in different ways to explore the robustness and "anatomy" of our results. These results indicate

[4]Our current estimation strategy does not allow us to estimate the extent of collusive evasion. We discuss in the final section potential ways in which we will attempt to measure it.

[5]Such mandatory submission of transaction-level records is quite rare in VAT systems in developed countries, but is being increasingly adopted in other low- and middle- income countries.

[6]We refer to "smaller" firms as firms that are neither in the Large Taxpayer Office nor in the Medium Taxpayer Office.

that the URA does not have sufficient administrative and technical resources to make use of the information contained in paper trails, and that Ugandan firms may be aware that this information is not systematically cross-checked.

The exact revenue consequences from unilateral VAT evasion are difficult to quantify. Indeed, our methodology delivers a lower bound for the amount of VAT misreported because we are unable to detect instances in which sellers underreport sales to final consumers for example.

Furthermore, we also find many cases of "underreporting", i.e. where the reported VAT charged is higher than the reported VAT paid. These cases are most likely due to buyers intentionally underreporting their purchases, since sellers have no incentive to overreport their sales. It could be the case that buyers choose to simultaneously underreport their sales and purchases in order to appear small and avoid attention from the revenue authority (Carrillo, Pomeranz, and Singhal, 2016). We provide suggestive evidence that this may be part of the explanation for the prevalence of underreporting in Uganda: firms are more likely to be involved in underreporting cases (as buyers) if they are also involved in misreporting cases (as sellers). However we cannot rule out that some of the observed underreporting is due to mistakes or omissions by taxpayers.

The total VAT underreported – the sum of discrepancies for such underreporting cases within a fiscal year – is very large, albeit always considerably smaller than the total VAT misreported. A back-of-the-envelope calculation thus suggests that correcting both types of discrepancies (VAT misreported and underreported) would likely increase VAT revenue substantially.

In sum, the power of paper trails in enforcing the consistent reporting of transactions, and thus addressing concerns of unilateral tax evasion, was limited in Uganda during the period studied. Our evidence contributes to a literature that highlights the importance of taking the revenue authority's resources seriously when designing tax systems.

The results presented in this paper suggest that interventions strengthening the revenue authority's ability to use the information from VAT paper trails, and influencing firms' beliefs about the revenue authority's use of their paper trails, may improve the revenue efficiency of the VAT. We are currently designing, in collaboration with URA, a pilot program under which URA staff will be trained to use a computer program to automatically perform cross-checks of the transaction-level VAT data. In order to determine how to maximize the impact of such cross-checking, several ways to inform (subsets of) firms about the new procedures, and about consequences from misreporting, will be tried out. We plan to test whether this affects unilateral evasion, collusive evasion, and possible spillover effects increasing the compliance of the transaction partners of informed firms.

The rest of the paper is organized as follows. Section 2 presents the necessary institutional details and our data. Section 3 documents some motivating patterns based on monthly aggregates in VAT declarations. Section 4 presents the results of our analysis of the transaction-level data. Section 5 concludes by discussing the next steps for this research project.

2 Institutional Background and Data

We begin by presenting the relevant institutional details and the data used for our analysis.

2.1 Institutional background

Uganda is a LIC with an income per capita of $1,825 in PPP (World Bank, 2015). Its tax-to-GDP ratio (11%) is slightly below the average in Sub-Saharan Africa (15%), and considerably lower than the average in more advanced economies (25% in OECD countries; ICTD, 2015).[7]

The VAT was introduced in Uganda in 1996, and it currently contributes 34% of total tax revenue, a figure similar to the average in Sub-Saharan Africa (Uganda Revenue Authority, 2014; International Tax Dialogue, 2010). However, the IMF estimates that the VAT compliance gap–the difference between the potential net revenue and actual collections[8]– is very large in Uganda, at around 60% of potential VAT and 6% of GDP. For comparison, the VAT compliance gap in Mozambique is estimated to be 50% (IMF, 2011), and in Kenya 30% (Kenya Revenue Authority, 2010). In middle-income Latin American countries, the estimates are between 20% and 30% (IMF, 2014).

The Ugandan VAT has a fairly standard design. A general rate of 18% applies to all sales, with the usual exemptions for necessities and some services.[9] Firms with turnover above 50 million UGX ($13,700) are required to be registered for VAT, while smaller firms can choose to pay a simplified turnover tax.[10] As in other countries, exports are zero-rated, but the VAT applies to imports. VAT firms are required to submit monthly VAT declarations to the Uganda Revenue Authority (URA), for the domestic part of their business, and remittances

[7]Note that the ratio of tax administration costs to tax revenues (2.4%) is also comparable to the average in other LICs (IMF, 2013; Lemgruber, Masters, and Cleary, 2015).

[8]This includes both the "collection" gap and the "assessment" gap.

[9]For instance, unprocessed agricultural products and medical, educational and financial services are exempted from VAT. As is usually the case in VAT systems, a firm producing zero-rated goods may claim input tax credits, whereas VAT paid on inputs used in the production of exempted goods cannot be recovered (Uganda Revenue Authority, 2016).

[10]This turnover tax replaces both the VAT and the CIT. Firms below the registration threshold may choose to enter the VAT system on a voluntary basis. The threshold for mandatory VAT registration was raised to 150 million UGX ($41,100) in fiscal year 2015-16, but we do not use data from this fiscal year in our analysis.

of positive tax liabilities are due within 15 days of the declaration. Note that tax revenues are divided almost equally between the domestic VAT and the VAT on imports, which is directly paid at customs, but can be credited as input in the monthly declarations (Uganda Revenue Authority, 2014).[11]

Importantly, refunds in the case of negative VAT liabilities are restricted. Negative liabilities of less than 5 million UGX ($1,370) can only be carried over as offset against future VAT liabilities (indefinitely). When the stock of negative liabilities is above 5 million UGX, requesting a refund automatically triggers a desk audit by the revenue authority. The strict regulation of VAT refunds is common practice in LICs (Lemgruber, Masters, and Cleary, 2015).

There are two specific aspects of the VAT administration in Uganda that are at the core of our paper. First, all firms must file their monthly VAT declarations *electronically* since 2012.[12] As a result, the URA has detailed data in electronic format for all VAT firms in recent years. Second, VAT firms are required to submit detailed transaction-level records together with their monthly VAT declarations; spreadsheets listing each of their domestic sales and purchases. This implies that the URA receives two reports for each transaction between any two VAT firms – one from the seller and one from the buyer. In other words, the paper trails that are considered instrumental to the success of VAT systems in limiting unilateral evasion are available to the URA on a monthly basis. In general, however, the URA extracts and analyzes the transaction level information for a given taxpayer only in the case of an audit. The process is not automated, and is hindered by technological bottlenecks and low staff numbers. Interestingly, the mandatory submission of transaction-level records is not unique to Uganda. It exists in other East African countries, and it is being increasingly adopted in other low- and middle- income economies (e.g. in some Indian states). This feature of the VAT administration is much less common for VAT systems in developed countries, Spain and France being two rare exceptions. It is also controversial in policy circles because of the additional compliance cost imposed on firms (Ebrill et al., 2001).[13]

Finally, while the rules regarding VAT declaration and payment are similar across all VAT firms,[14] the URA categorizes firms in three different groups for monitoring and enforcement

[11]This treatment of the VAT on imports limits the scope of evasion schemes, for example of "carousel" fraud, but at the cost of exacerbating possible liquidity constraints of importers.

[12]Some firms in the Large Taxpayers Office (LTO) began reporting electronically in the year 2010, and the rest moved to electronic reporting gradually during 2011.

[13]The first attempt to request and use such transaction-level information for systematic cross-checks, in South Korea in the 1980s, is considered a failure because of the substantial administrative complexity and costs (Ebrill et al., 2001). However, the fast improvement in IT offers opportunities to utilize this information much more cost-effectively.

[14]With the exception that firms with an annual turnover below 200 million UGX ($55,026) may apply for their VAT to be calculated using cash basis accounting.

purposes: large taxpayers are handled by a specific Large Taxpayer Office (LTO); medium-size taxpayers are handled by a specific Medium Taxpayer Office (MTO); and smaller firms are handled by the offices spread out across the country.[15]

2.2 Data

Our analysis exploits the complete administrative data for the domestic VAT from the monthly declarations filed electronically between 2012 and 2015 (the relevant VAT form is in the Appendix).[16] We present results in the paper for the most recent complete fiscal year in the data, the 2015 fiscal year, which spans the 12 months from July 2014 to June 2015. Results are comparable in the earlier fiscal years.

We refer to data on monthly aggregates as *monthly summaries* (MS), which include the reporting period and the Tax Identification Number (TIN) of the firm, as well as information on e.g. total sales (amount and VAT charged), total purchases (amount and VAT paid) and total VAT liabilities.

We refer to the data from the spreadsheets detailing sales and purchases as *VAT schedules* (VS). Specifically, domestic sales are reported in schedule 1 (VS1), domestic input purchases in schedules 2 and 4 (VS2 and VS4),[17] and imports in schedule 3 (VS3). For each transaction, the VS data include the transaction date, the TINs of both the seller and the buyer, the value of the transaction and the VAT charged (when reporting a sale) or paid (when reporting a purchase). Firms are not required to submit detailed records but only monthly aggregates for sales to final consumers and transactions with non-VAT firms. Finally, the law stipulates that firms must report transactions within 30 days. In the data, about 80% of registered transactions are reported within one month of the transaction date and another 15% within two months, and the remaining 5% three or more months after the transaction took place.

Importantly, the information reported in the VS data is consistent with the information from the MS data, despite the fact that this is not automatically enforced in the electronic filing system. Specifically, the total VAT charged or total output VAT reported in the MS data is equal to the sum of the VAT charged on individual transactions reported by the same firm in the VS data and the reported VAT charged on sales to final consumers and non-VAT

[15]Small Taxpayers are entities with a turnover greater than 50 million UGX ($13,756), Medium Taxpayers are entities with a turnover above 2 billion UGX ($550,260), and Large Taxpayers are entities with a turnover greater or equal to 15 billion UGX ($4,126,950) and/or belonging to specific sectors such as oil and mining, banking, insurance, telecommunications and government departments. Taxpayers that do not fall into any of these categories are considered Micro Taxpayers.

[16]We are currently in the process of cleaning and analyzing data on payments for the VAT on imports.

[17]Inputs corresponding to administrative expenses are reported separately in VS4 for accounting reasons, to allow tax auditors to distinguish them from other inputs. However, the VAT rate applicable to these expenses is 18%, the standard rate.

firms in 97.4% of the monthly declarations. Similarly, the total VAT paid or total input VAT reported in the MS data is equal to the sum of the VAT paid on individual transactions reported by the same firm in the VS data in almost 100% of the monthly declarations. This indicates that the transaction-level records constitute meaningful paper trails for firms' VAT declarations and liabilities.

3 Motivating Empirical Patterns

In this section, we present empirical patterns based on the MS data, which motivate our analysis of the VS data in the next section.

3.1 Aggregate statistics

Table 1 displays aggregate statistics based on the MS data for the 2015 fiscal year. Column (1) reports the difference between the total output VAT and the total input VAT for all VAT firms in the data across all months of the year. Column (2) reports the total VAT offsets carried over from the previous fiscal year. Column (3) reports the total VAT liability for the 2015 fiscal year, i.e. the difference between columns (1) and (2). The amount in column (3) would also correspond to the total net VAT due – the total amount to be remitted to the URA minus the total amount to be refunded by the URA – if there was no regulation of VAT refunds. A consequence of these regulations can be seen in the difference between the amounts in columns (3) and (4), the latter corresponding to the effective total net VAT due given these restrictions.

The first row in Table 1 displays these statistics for all VAT firms with at least one monthly declaration during the 2015 fiscal year. The total net VAT due is about 25% higher than the total VAT liability. The difference highlights two distinctive features of the context. First, the restrictions on VAT refunds appear to play an important role for VAT revenues. From a normative perspective, such revenue gains must be weighed against the possible tightening of liquidity constraints for firms requesting refunds for genuine negative liabilities. Second, many firms must be reporting a non-positive value added. Otherwise, the regulation of VAT refunds would be less consequential, as the VAT credits carried over from the previous year would simply offset positive tax liabilities incurred during the year. This raises the possibility of substantial VAT evasion, especially given the fact that persistent non-positive value added is unsustainable for firms over time.

The next rows in Table 1 display the same statistics for various subsets of firms. We see that the total VAT liability and the total net VAT due are heavily concentrated among a

small group of relatively large firms. The top 10% of firms (respectively, LTO firms), as defined by total sales reported during the year, is responsible for 732,500.3 million UGX i.e. 94% (respectively, 639,044.4 million UGX i.e. 82.1%) of the total VAT liability and 837,030.9 i.e. 85% (respectively, 707,127.3 i.e. 72.9%) of the total net VAT due. They account for a smaller share of the total net VAT due because the restrictions on VAT refunds appear less consequential in their case. Larger firms may be more likely to have positive value added and/or to qualify for and ask for refunds in case of negative VAT liabilities. Accordingly, the VAT credits carried over from the previous year amount to only about 10.8% (respectively, 9.9%) of the difference between the total output VAT and total input VAT for the top 10% of firms (respectively, LTO firms), compared to about 16.9% for all VAT firms. Conversely, restrictions on refunds play a more important role for VAT revenues from smaller firms. The difference between the total net VAT due and the total VAT liability amounts to 32.6% of the total VAT liability for MTO firms, and to an astounding 360% of the total VAT liability for other (smaller) VAT firms. Accordingly, the VAT credits carried over from the previous year amount to a higher share of the difference between the total output VAT and total input VAT for these firms; 20.2% for MTO firms and 71% for other VAT firms. It thus appears that limiting VAT refunds may, other things equal, be necessary to collect some VAT revenue from smaller firms in LICs. However, these firms are also more likely to be liquidity constrained, highlighting the challenge for a compliant small firm trying to operate in such a context.

3.2 Distribution of value added and VAT liability

Table 2 displays information on the distribution of total value added, of the difference between the total output VAT and the total input VAT, and of total VAT liability, across all VAT firms in the data and all months of the 2015 fiscal year. The total value added is the difference between the total value of sales and purchases reported in the MS data, including for goods that are not subject to any VAT (e.g. exports). The statistics in Table 2 provide additional evidence supporting our interpretation of the patterns in Table 1.

The first panel considers again all VAT firms with at least one monthly declaration during the 2015 fiscal year and the following panels consider LTO firms, MTO firms, and all other VAT firms, as in Table 1. Column (1) shows that 30% of VAT firms report a total value added for that year that is non-positive, and that among those it is actually equal to zero for 14% of firms. Instances of non-positive value added are much less common among larger firms, suggesting again that VAT evasion is more prevalent among smaller firms.

The actual VAT liability incurred during that year, i.e. without accounting for VAT credits carried over from the previous year, is non-positive for 33% of VAT firms, and equal

to zero for 15% of firms (Column (2)). As seen in columns (1) and (2), these percentages are similar for smaller firms. However, negative values are much more common for larger firms. This is driven by the larger share of exporters among large firms and the fact that exports are zero-rated. Finally, Column (3) shows that only about half of VAT firms incur positive VAT liability over the year. The difference between column (2) and (3) highlights the importance of VAT credits carried over from the previous year. For each group of VAT firms, these essentially double the share of firms with negative values compared to column (2).

3.3 Regulation of VAT refunds and persistence of negative VAT liabilities

The evidence above indicates that rules regulating the reimbursement of negative VAT liabilities are effectively restricting the prevalence of VAT refunds. We present additional supportive evidence in Figure 2. The figure displays the share of the firms that have negative VAT liability observed in the 2015 fiscal year that request a VAT refund in a particular month. Each dot represents a bin of firms defined by the size of their negative VAT liability. Firms are only allowed to ask for a VAT refund if their negative VAT liability reaches at least 5 million UGX ($1,370) and they are willing to undergo a desk audit, as discussed above. Figure 2 shows that firms are aware of these rules: firms with negative VAT liabilities on the wrong side of the refund threshold do not ask for a refund. Yet, even when they are potentially eligible for a VAT refund, only 8.6% of firms actually request one. This share increases by only about 5 percentage points at the threshold, and reaches 15% for firms with very large negative VAT liabilities. Finally, note that the share actually receiving a VAT refund is even lower, at around 5.5% among eligible firms.

In general, we expect sustainable businesses to have positive value added (at least for non-exporters), and therefore restrictions on VAT refunds not to be very binding. Firms would then simply accumulate VAT credits during short spells with negative value added and use them in subsequent periods with positive value added to offset the associated VAT liabilities. Any losses from the possible tightening of liquidity constraints would then be limited. In fact, firms allowed to ask for a VAT refund may, unless they experience a large negative shock, prefer to carry over the amount to the next period, as long as the VAT refund involves some administrative cost, such as a desk audit.

Table 3 provides further evidence that the situation described in the previous paragraph does not apply in Uganda. The table displays the transition probabilities between positive and negative or nil VAT liabilities from month to month for all firms making a VAT declaration

in the 2015 fiscal year.[18] We see that there is a lot of persistence in reported VAT liabilities. Firms with a positive VAT liability in one month are very likely to have a positive VAT liability in the following month. This is consistent with the expectation that most firms should have positive value added.[19] However, firms with a negative or nil VAT liability in one month are also very likely to have a non-positive VAT liability in the following month. This reinforces the evidence in Table 2 that many firms report a negative value added even at the *yearly* level in Uganda. Moreover, a firm with a succession of months with a positive value added may remain with a negative VAT liability for a long time if it carries large VAT offsets from the previous years.

In sum, the evidence in this section indicates that patterns in the MS data are consistent with aggregate patterns documented for other LICs (see Figure 1). Moreover, it allows us to better understand some of the mechanisms generating these aggregate patterns, such as the suspiciously high share of firms reporting a non-positive value added and the strict regulation of VAT refunds. This evidence also serves as a motivation for our analysis of the VS data. If firms expect the revenue authority to have limited resources to analyze its paper trails, they may undertake unilateral evasion schemes despite the paper trails. In other words, firms might misreport some transactions that are reported by other VAT firms (underreporting sales or overreporting purchases).

4 Inaccurate VAT Reporting and Paper Trails when the Revenue Authority is Resource-constrained

In this section, we exploit the transaction-level (VS) data to study the extent of unilateral inaccurate VAT reporting that occurs in Uganda despite the availability of detailed paper trails.

4.1 Methodology

We quantify discrepancies in the reporting of transactions at the seller-buyer-month level. For each month (defined using transaction dates), we sum up the values across all domestic transactions a given seller and buyer reported by each of the two firms, separately. We define "misreporting" as a situation in which the total VAT charged (as reported by the seller) is *lower* than the total VAT paid (as reported by the buyer). This type of discrepancy, which

[18] We only look at cases with two adjacent monthly VAT declarations which explains why we have fewer than $11 \times 14,856$ observations.

[19] Looking at firms with a positive VAT liability in the previous month mechanically excludes big exporters from that subsample.

can be due to underreporting of output VAT by the seller or overeporting of input VAT by the buyer, implies a potential revenue loss for the government. It is important to note that our methodology does not allow us to formally distinguish between voluntary evasion and mistakes or omissions made by taxpayers, but the revenue consequences of the two are the same. Our measure of misreporting is also a lower bound on the extent of potential unilateral VAT evasion because we also cannot identify misreporting of sales to final consumers and non-VAT firms, which do not report transactions to the URA. Finally, the measure does not capture instances of collusive evasion, where both seller and buyer misreport the transaction by the same amount.

We also consider the possible "underreporting" of purchases, defined as a situation in which the total VAT charged (as reported by the seller) is *higher* than the total VAT paid (as reported by the buyer). This type of discrepancy is likely not (intentionally) driven by sellers since they have no incentive to overreport their sales. In contrast, buyers may for example choose to simultaneously underreport their sales and purchases in order to appear small and avoid attention from the revenue authority (Carrillo, Pomeranz, and Singhal, 2016).The presence of underreporting is another reason why our measure of misreporting may be a lower bound. It also reduces the revenue consequences of inaccurate VAT reporting given that, in contrast to misreporting, underreporting implies a potential revenue gain for the government. Here again, we cannot rule out that some of the discrepancies are due to mistakes made by taxpayers when filing their VAT returns.

After estimating the extent of misreporting and underreporting, we explore the possible impact on the total net VAT due that would arise from correcting all the discrepancies found. We consider a hypothetical scenario in which the URA corrects firms' VAT liability in each month by the amount of VAT misreported and underreported for each firm in that month. We start by correcting VAT declarations in the first month of the fiscal year and then repeat the process sequentially to the last month of the fiscal year, making sure to update the offsets carried forward in each month adequately. Given the regulations on VAT refunds, the impact of the correction on total net VAT due will not be equal to the difference between the total VAT misreported and underreported. For instance, correcting the VAT liability downward in a given month may have no direct impact on the net VAT due in that month if the original VAT liability was already negative, unless the VAT liability falls below the eligibility threshold for a VAT refund. Even in that case, we saw in section 3.3 that only 5.5% of eligible firms actually get a refund.[20] Note that this exercise requires us to assign the VAT misreported and underreported for each seller-buyer-month combination to either the

[20]Note that our exercise does not take into account possible consequences for the following fiscal year, in case correcting the VAT liability changes the offsets carried over to the next year.

seller or buyer in the relevant month. We assign cases of underreporting to the buyer, for the reasons discussed above. It is less clear to what extent misreporting is driven by sellers' versus buyers' behavior. In our baseline scenario we assign misreporting to the seller, but we show in the Appendix that the conclusions are similar if we assign misreporting to buyers instead.

We begin by presenting results for the *full sample*, which includes all VAT firms found as sellers in the MS data or the VS data – 15,408 firms in the 2015 fiscal year. Some of the firms in the full sample do not make any VAT declaration themselves, but are reported as sellers in the VAT declarations of buyers. We later investigate the robustness of our results and the importance of different margins of evasion by replicating our analysis for different subsamples of VAT firms.

4.2 Distribution of discrepancies for the full sample

Figure 3 displays the distribution of reporting discrepancies in the full sample for the 2015 fiscal year, both for each seller-buyer-month combination (left panel) and for the average at the seller-buyer level across all 12 months (right panel). In both panels there is a large spike at zero, corresponding to cases where the amount reported by sellers and buyers match. There is, however, substantial mass on both sides of zero. Positive values correspond to cases of misreporting, and negative values to cases of underreporting. The fact that the distributions shown in the two panels are relatively similar suggests that the misreported and underreported amounts detected at the monthly level are not simply due to inconsistencies in the transaction dates reported by buyers and sellers.

4.3 Misreporting and underreporting in the full sample

We show results from quantifying the amount of misreporting and underreporting in the full sample in the first column of Table 4. Panel A considers cases of misreporting, where the total VAT paid as reported by the buyer is larger than the total VAT charged as reported by the seller. The total VAT misreported – the sum of discrepancies for all misreporting cases – is very large: UGX 663.9 bn, or 68.4% of the total net VAT due for all firms in the full sample. Assigning misreporting cases to the sellers in the sample would imply that 59.9% of sellers (9,231 sellers) misreport in at least one seller-buyer-month case, and that the misreported VAT amounts to 80.4% of the total net VAT due for these misreporting firms. This latter figure is also very high if we instead assign misreporting cases to buyers (72.7% – see the Appendix). We thus conclude that, regardless of the methodological assumptions made, the estimated extent of VAT misreporting is very high in Uganda, despite the availability of

detailed paper trails.

Panel B considers cases of underreporting, where the total VAT paid as reported by buyers is lower than the total VAT charged as reported by sellers. We find that underreporting is also widespread in Uganda, but the amount of VAT underreported is much lower than the amount misreported. Specifically, 67.2% of firms in the sample are found to underreport purchases in at least one seller-buyer-month case, and the underreported VAT amounts to 50.4% (respectively, 54.8%) of the total net VAT due for firms in the full sample (respectively, for underreporting firms).

Finally, panel C computes the impact on the total net VAT due from correcting all the identified cases of misreporting and underreporting, following the methodology described above. Again assigning misreporting cases to the sellers, we find an increase of UGX 367.7 bn, or 37.9%, in the total net VAT due. This figure is very similar (38.4%) if we assign misreporting to buyers instead. The impact on the total net VAT due is bigger than the difference between the total VAT misreported and underreported because of the restrictions on VAT refunds.[21]

We show similar results in Table 5 for LTO firms, MTO firms, and all other VAT firms, separately. We find evidence of misreporting for each group of firms. The total VAT misreported is also systematically larger than the total VAT underreported. Absolute amounts are unsurprisingly larger for larger firms, but the relative extent of discrepancies is particularly high among smaller firms: the total VAT misreported, the total VAT underreported, and the impact on the total net VAT due amount to 93.1%, 82.9%, and 60.0% of the total net VAT due for these firms. The fact that these numbers are particularly high for smaller firms is consistent with the descriptive statistics in Tables 1 and 2 discussed in the previous section.

Overall, the analysis in this sub-section has shown that the revenue authority having access to paper trails does not constrain firms in Uganda to report their transactions accurately. The power of paper trails to address concerns of unilateral tax evasion thus appears to be limited in countries where the revenue administration has limited resources to fully exploit them. The exact revenue consequences from unilateral VAT evasion are difficult to quantify, given that we observe both misreporting and underreporting and that our estimates of both behaviors constitute lower bounds, but they are likely substantial. As noted above, there is also uncertainty related to the fact that some of the discrepancies observed may be due to mistakes and omissions, rather than voluntary tax evasion. However, overall the evidence from the Ugandan experience suggests that the revenue efficiency advantage of the VAT, relative to alternative taxes, may be smaller in LICs than in more developed countries.

[21] In other words, VAT due after correction would be smaller if refunds were automatic, i.e. if the URA paid a taxpayer back each time there was a negative VAT liability.

4.4 Robustness and anatomy of the results

In columns (2) through (5) of Table 4 we explore the robustness and anatomy of the results for the full sample. We begin by restricting attention to firms in the sample that actually filed any part of a VAT declaration when we compute the amounts of VAT misreported and underreported in each month of the 2015 fiscal year (column (2)). This restriction excludes almost 500 firms that never filed a VAT declaration that year, but appeared in the full sample because other firms reported them as sellers in the VS data. Almost all firms that filed reported some output VAT, as can be seen from the fact that the results are very similar when we further restrict to firms that reported some output VAT in column (3). Our estimate of the total VAT misreported (respectively, of the impact on the total net VAT due) remains high but is reduced to about 48.5% (respectively, a 23.1% increase). The difference between these numbers and those for the full sample in Column (1) suggests that some unilateral evasion likely occurs on the "declaration margin": some firms either charged some VAT but failed to declare any of it, or they correctly did not declare any output VAT but are used as hypothetical sellers for fictitious purchases by other firms.

In Appendix Table A1, we restrict attention to subsets of the sample used in Column (3) of Table 4 to show that our results are not driven by two possible sources of measurement error. First, we would overestimate the extent of misreporting if some firms report their output VAT accurately in the MS data but report some sales to VAT firms as sales to final consumers or to non-VAT firms. This type of "mistake" is in fact tolerated by the URA for firms with a very high volume of customers, such as telecoms. We thus replicate our analysis for the subset of firms that do not report any sales to final consumers or to non-VAT firms during the year. We lose about two-thirds of our sample, accounting for more than 85% of the total net VAT due. However, our conclusions are unchanged. The total VAT misreported and the impact on the total net VAT due amount to 61.3% and 34.5% of the total net VAT due in this sample, respectively.

Second, we would overestimate the extent of underreporting if some firms fail to report the input VAT that they are in fact not allowed to use as VAT credits. Firms selling exempted goods or services, for instance, are only allowed to claim credit for VAT paid on inputs used for taxable sales. To address this concern, we replicate our analysis for the subset of firms that should be allowed to use all their input VAT as VAT credits in every month of the year given the information in their monthly declarations. We lose about a fifth of our sample and 40% of the total net VAT due. However, our qualitative conclusions are again unchanged. The total VAT underreported amounts to 45.3% of the total net VAT due in this sample. The total VAT misreported and the impact on the total net VAT due also remain around 46.5% and 22.8% of the total net VAT due in this sample, which is similar to the findings in

Column (3) of Table 4.

We then restrict attention to firms declaring some positive sales to VAT firms in the VS data (Column (4)), and those that are also reported as a seller by at least one of their reported buyers (the "reciprocal reporting" sample, analyzed in Column (5)). These selection criteria reduce the sample size by about one-half (Column (4)) and two-thirds (Column (5)), but the remaining firms account for most of the total net VAT due. The extent of misreporting remains sizable among the selected firms. For instance, the total VAT misreported still accounts for 42.7% (Column (4)) and 39.1% (Column (5)) of the total net VAT due, and is still larger than the total VAT underreported. The relative impact on the total net VAT due, 19.4% in Column (4) and 17.4% in Column (5), is also slightly lower than in Column (3).

Finally, we show in Appendix Table A1 that we even find evidence of misreporting at the "intensive margin", when we only consider differences between VAT charged and VAT paid for seller-buyer pairs that acknowledge trading with each other in a given month. We conclude that our estimates of VAT evasion are unlikely to be completely accounted for by measurement error or reporting mistakes.

4.5 Why do firms underreport purchases?

The widespread underreporting of purchases in Uganda's VAT may at first appear puzzling since the underreporting firms are leaving VAT credits on the table. One possibility pointed out by Carrillo, Pomeranz, and Singhal (2016) is that firms that underreport their sales may also underreport their purchases so as to fly under the radar of the revenue authority.[22]

Table 6 displays the results from a simple exercise at the firm-month level. We regress a dummy for the firm underreporting in a given month on a dummy for the firm misreporting in the same month, assigning misreporting cases to sellers. We use the samples from columns (4) and (5) of Table 4, wherein all firms report positive sales to VAT firms in the VS data; this allows us to control for an alternative "mechanical" explanation for a possible under/misreporting correlation driven by a firm's size.

The estimated correlation between underreporting and misreporting is strongly positive in both samples, even when we control for the output VAT for sales to VAT firms. The correlation is also strongly positive for LTO firms, for MTO firms, and particularly for other VAT firms. This represents suggestive evidence that misreporting firms are more likely to also be underreporting, which would be consistent with the strategy of trying to appear small

[22]Carrillo, Pomeranz, and Singhal (2016) propose a theoretical framework to support this hypothesis, where the evasion detection probability depends on the declared profit rate, rather than on the level of reported sales and reported inputs, independently. They argue that this formulation is consistent with the actual audit behavior of revenue authorities.

while not declaring the full VAT liability. It is worth noting, however, that the main results presented above indicate that the overall amount of misreporting is larger than the overall amount of underreporting.

5 Concluding Remarks and Way Forward

In this paper, we have studied several aspects of the implementation of the VAT in Uganda. First, we show that a large share of firms submit nil or negative VAT declarations regularly, which is suggestive of a high level of evasion. Then, exploiting rich transaction-level data, we provide evidence of systematic discrepancies in the amounts reported by buyers and sellers. We argue that these discrepancies are likely due to voluntary misreporting in order to evade taxes, although some may be due to reporting mistakes. Taking into account the existing regulations on VAT refunds, we calculate the revenue consequences of correcting all these discrepancies, finding potential revenue gains (robust to changes in the subsamples of firms and transactions used). These results suggest that the availability of VAT paper trails is currently insufficient to deter Ugandan firms from misreporting in their VAT declarations. We conclude from this analysis that the revenue authority's ability to exploit the VAT paper trails and improve tax enforcement could be strengthened by changing the firms' beliefs about the extent to which the information is being used.

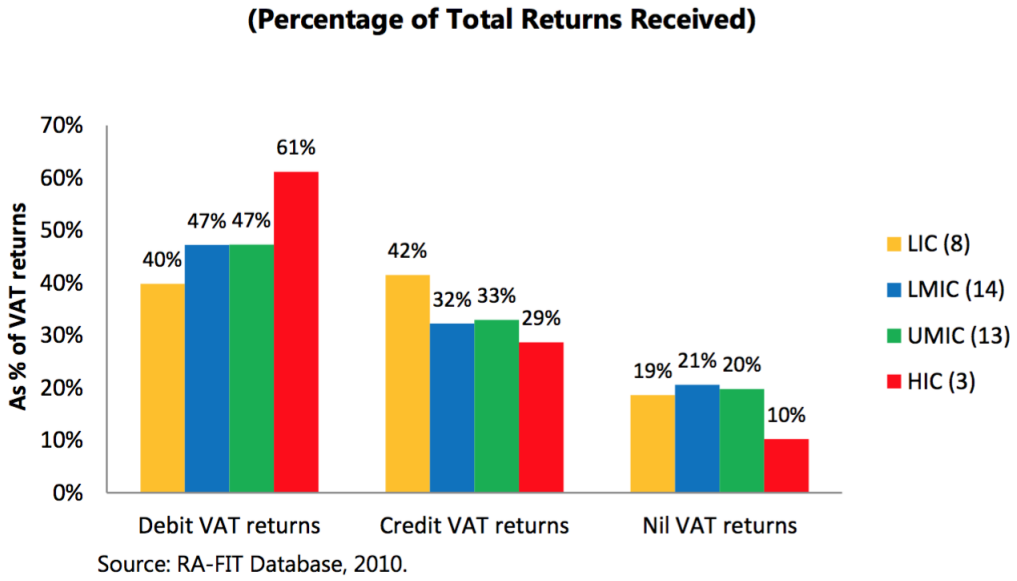
This research project is still work in progress. We are currently finalizing the misreporting analysis, accounting also for misreporting of VAT on imports, and attempting to distinguish intentional misreporting from taxpayer mistakes. The next step thereafter is to help the URA design a good system for (i) automatically conducting cross-checks of seller and buyer reports and (ii) informing and persuading taxpayers that they should expect their reports to be cross-checked and that they should report VAT due accurately. We are currently designing, in collaboration with the Domestic Taxes (DT) and the Research, Planning and Development (RPD) departments of the URA, a pilot compliance program to study how best to do so. First, we will train URA staff to use a computer program – designed in collaboration with the URA – to automatically perform cross-checks of the transaction-level VAT data. Second, we will attempt to shift firms' beliefs about URA's enforcement level.

Determining the optimal design of a new cross-checking and information-provision system is a complex task. It requires taking all the details of the nature of misreporting we have uncovered into account. While we hope to develop a system to conduct cross-checks of *all* seller-buyer reports, the plan is to try out different information provision systems on different subsets of randomly chosen groups of firms. By studying the results of these different systems, we can determine what the optimal system that should eventually be rolled out to all firms

should look like.

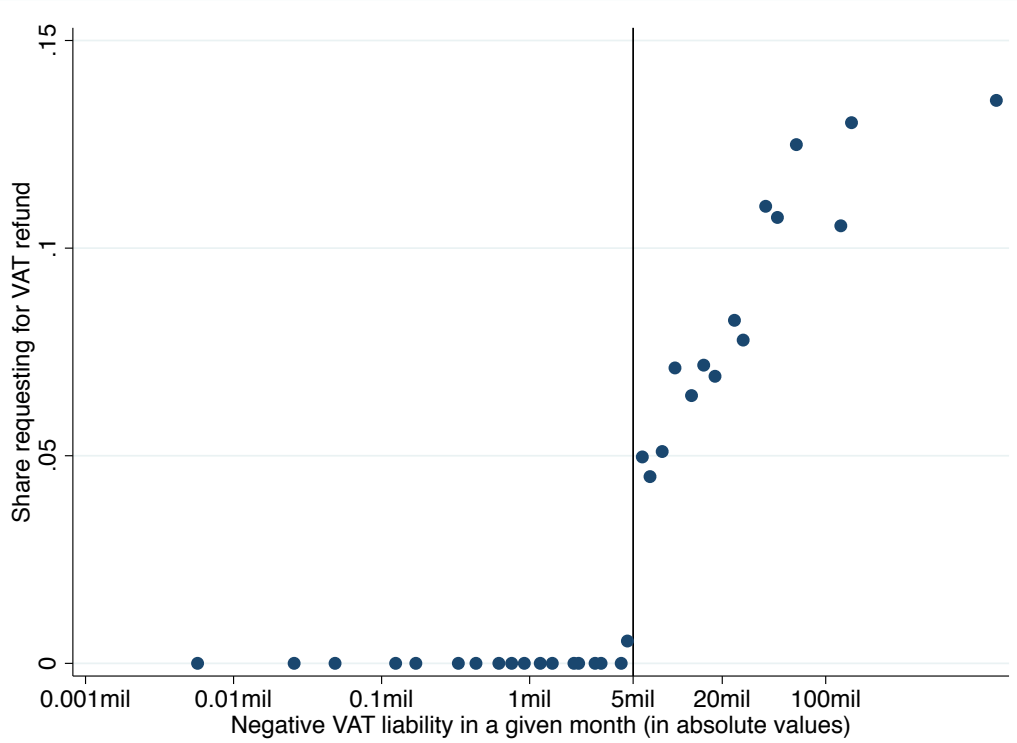
Figures

Figure 1: VAT return types by income group, 2010.



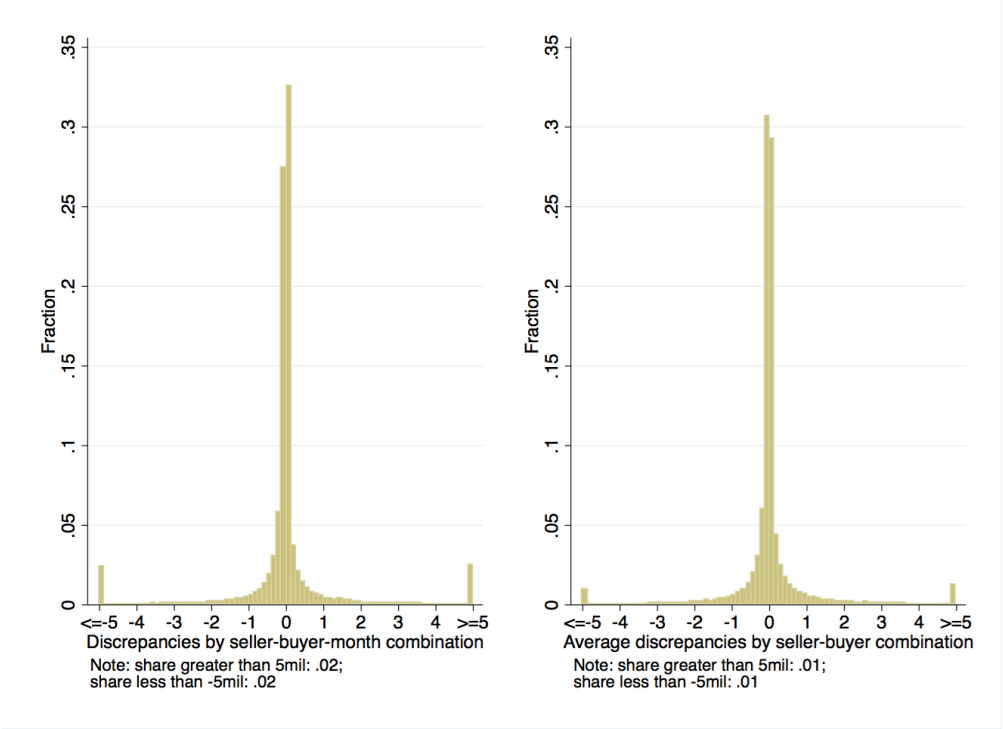
This figure is reproduced from IMF (2015). It displays the share of debit (VAT liability>0), credit (VAT liability<0), and nil (VAT liability$=0$) VAT returns in 3 high-income countries, 13 upper-middle-income countries, 14 lower-middle-income countries, and 8 low-income countries.

Figure 2: Negative VAT liability and requests for VAT refunds



Data source: VAT liability and request for VAT refunds for each firm in each month in the MS data for the 2015 fiscal year. This figure displays the share of firms asking for a VAT refund, aggregating firms by bins of VAT liability and only considering firms with negative VAT liability, and thus with VAT credits on net. Each bin includes 1% of these firms and dots are located at the average VAT liability (in absolute value) within the bin. The vertical line indicates the official threshold to ask for a VAT refund.

Figure 3: Distribution of Discrepancies in the Reporting of Transactions (full sample)



Data source: detailed records of transactions in the VS data for the 2015 fiscal year. All values are in millions UGX. This figure displays the distribution of discrepancies in the reporting of transactions by sellers and buyers for each seller-buyer-month combination (left panel) and for the average at the seller-buyer level across all 12 months of the 2015 fiscal year (right panel). The x-axis is the difference between VAT paid as reported by the buyer and the VAT charged as reported by the seller. Mass on the right of 0 (resp. on the left of 0) corresponds to what we label *misreporting* (resp. *under-reporting*).

Tables

Table 1: Aggregate statistics for the domestic VAT in 2015

	(1) Output VAT - Input VAT[1]	(2) VAT offsets from previous year [2]	(3) VAT liability (1) - (2)[3]	(4) VAT due[4]
All VAT Firms (N = 14,856)	936,597.5	158,486.4	778,111.1	970,532
Top 10% Firms[5] (N = 1,486)	821,126.6	88,626.4	732,500.3	837,030.9
LTO firms (N = 689)	709,390.8	70,346.4	639,044.4	707,127.3
MTO firms (N = 1,503)	144,069.8	29,123.1	114,946.7	152,430.4
Other VAT firms (N = 12,664)	83,136.9	59,016.9	24,120	110,974.3

Data source: total amounts across all firms in the MS data for the 2015 fiscal year.

All values are in millions UGX.

[1]: Total output VAT minus total input VAT.

[2]: Amount of VAT credits carried over as offsets from the previous fiscal year.

[3]: Total output VAT minus total input VAT minus VAT credits carried over from previous year.

[4]: Total VAT debits to be remitted to the URA minus total VAT credits to be refunded by the URA.

[5]: 10% of VAT firms with the largest amount of total sales reported during the year.

Table 2: Distribution of value added and VAT liability in 2015

		(1) Value added[1]	(2) Output-Input VAT[2]	(3) VAT liability[3]
All VAT Firms (N = 14856)	Share > 0	70.4%	66.9%	49.3%
	Share $= 0$	13.8%	14.9%	13.6%
	Share < 0	15.8%	18.18%	37.1%
LTO Firms (N = 689)	Share > 0	86.7%	70%	52.5%
	Share $= 0$	2.8%	3.9%	3.1%
	Share < 0	10.6%	26.1%	44.4%
MTO Firms (N = 1503)	Share > 0	85.1%	72.5%	51.8%
	Share $= 0$	3.9%	5.5%	4.6%
	Share < 0	11%	22%	43.6%
Other VAT Firms (N = 12664)	Share > 0	67.8%	66.1%	48.8%
	Share $= 0$	15.5%	16.6%	15.2%
	Share < 0	16.7%	17.3%	36%

Data source: total amounts for each firm in the MS data for the 2015 fiscal year.

[1]: Total value added over the fiscal year, including for goods that are VAT-exempt.

[2]: Difference between the total output VAT and the total input VAT over the fiscal year.

[3]: Total tax liability over the fiscal year, including VAT credits carried over from previous fiscal year.

Table 3: Transition Matrix for Firms' VAT Liability

		VAT Liability in month t	
		> 0	≤ 0
VAT Liability in month $t-1$	> 0	0.82 (N = 50,551)	0.18 (N = 11,466)
	≤ 0	0.16 (N = 11,626)	0.84 (N = 60,473)

Data source: VAT liability for each firm in each month in the MS data for the 2015 fiscal year.

Table 4: Misreporting, under-reporting, and impact on net VAT due

Sample	(1) Full Sample	(2) Filing at all	(3) Filing positive sales	(4) Some sales to VAT firms	(5) Reciprocal reporting
No. of firms	15,408	14,923	14,907	7,527	5,723
Total net VAT due	970,532	970,532	975,516	908,331	824,454
PANEL A: Misreporting					
Number of misreporting firms[1]	9,231	8,524	8,501	5,255	4,538
Total net VAT due from misreporting firms[1]	825,373	825,373	828,484	772,819	737,560
Total VAT misreported[2]	663,922	474,145	472,928	388,691	322,113
PANEL B: Underreporting					
Number of underreporting firms[3]	10,360	10,145	10,120	5,456	4,240
Total net VAT due from under-reporting firms[3]	892,053	892,053	896,860	848,858	784,468
Total VAT underreported[2]	488,894	426,826	424,651	274,416	214,285
PANEL C: Correcting misreporting and under-reporting					
Impact on total net VAT due[4]	367,696	223,814	223,049	175,841	143,577

Data sources: MS and VS data. All values are in millions of UGX.

[1] Assigning misreporting to sellers.

[2] Calculated by taking the difference between VAT charged in VS1 and VAT paid in VS24.

[3] Assigning underreporting to buyers.

[4] Assigning misreporting to sellers and correcting the VAT liability in each month of the year for the total VAT misreported and underreported.

Table 5: Misreporting, under-reporting, and impact on net VAT due for each group of firms

	(1)	(2)	(3)	(4)	(5)	(6)
	LTO firms		MTO firms		Other VAT firms	
Sample	Full sample	Reciprocal reporting	Full sample	Reciprocal reporting	Full sample	Reciprocal reporting
No. of firms	707	454	1,522	811	13,068	4,458
Total net VAT due	707,127	646,746	152,430	117,470	110,974	60,238
PANEL A: Misreporting						
Number of misreporting firms[1]	611	423	1,234	739	7,276	3,376
Total net VAT due of misreporting firms[1]	657,414	609,003	116,654	94,495	51,304	34,062
Total VAT misreported[2]	471,563	224,076	87,874	54,133	103,344	43,904
PANEL B: Under-reporting						
Number of underreporting firms[3]	688	442	1,399	770	8,242	3,028
Total net VAT due of underreporting firms[3]	700,247	645,301	138,239	106,877	53,567	32,290
Total VAT underreported[2]	318,264	158,785	77,222	32,835	91,951	22,665
PANEL C: Correcting misreporting and underreporting						
Impact on total net VAT due[4]	259,564	90,717	40,516	24,722	66,604	28,139

Data sources: MS and VS data. All values are in millions of UGX.

[1] Assigning misreporting to sellers.

[2] Calculated by taking the difference between VAT charged in VS1 and VAT paid in VS24.

[3] Assigning under-reporting to buyers.

[4] Assigning misreporting to sellers and correcting the VAT liability in each month of the year for the total VAT misreported and under-reported.

Table 6: Correlation between misreporting and under-reporting

	(1)	(2)	(3)	(4)	(5)	(6)
	All firms			LTO firms	MTO firms	Other VAT firms
	Firms with positive sales to VAT firms		Reciprocal reporting	Reciprocal reporting	Reciprocal reporting	Reciprocal reporting
	Outcome variable: dummy for under-reporting					
Misreporting	.2396***	.1587***	.1609***	.0914***	.096***	.1404***
	(.0072)	(.0067)	(.0078)	(.0325)	(.0198)	(.0085)
Output VAT		.0827***	.0911***	.0289***	.0373***	.0744***
		(.0017)	(.0019)	(.0048)	(.0062)	(.0029)
Obs	54056	54056	38960	4327	7227	27406
R-sq	.057	.157	.174	.077	.04	.078

Data source: VS data. Significance levels: * 10%, ** 5%, ***1%. Standard errors clustered by firm in parentheses. The table displays results from regressing a dummy for under-reporting in a given month on a dummy for misreporting in the same month (units of observation are firm-month pairs), assigning misreporting cases to sellers. We control for the main alternative mechanism for such a correlation, the reported output VAT for sales to VAT firms (in logs; all firms in these samples report positive sales to VAT firms in the VS data).

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A Appendix

A.1 Robustness checks for misreporting, under-reporting and net VAT due

Table A1 displays the results from four robustness checks that are discussed in the text.

In column (1) of Table 4 in the main text, we use the full sample, which includes all VAT firms found as *sellers* in the MS data or the VS data. In column (1) of Table A1, we use instead a sample that includes all VAT firms found as *buyers* in the MS data or the VS data. The resulting sample is much larger – 26,888 firms in the 2015 fiscal year, many of them never making any VAT declaration themselves. We then compute the amount of VAT misreported and under-reported for these firms. The total VAT misreported is the same as in column (1) of Table 4 because the underlying seller-buyer-month combinations considered are the same. The only difference in panel A is that we are now assigning the misreporting to buyers, so we have a different number of (resp. total net VAT due for) misreporting firms. Importantly, in so doing, the total VAT misreported remains very large compared to the net VAT due of misreporting firms (72.7%). The main difference is in Panel B. We now have many more buyers for which we investigate the extent of under-reporting of purchases. As a result the total VAT under-reported is much higher, although the difference is driven by firms who are not observed selling anything in the same month, and who are most likely not making any declaration themselves. This is why the impact on the net VAT due is actually quite similar in the columns (1) of both Tables 4 and A1.

In column (2) of Table A1, we restrict the sample in column (3) of Table 4 to firms that never reported selling to any final consumer or non-VAT firm in the 2015 fiscal year. This robustness check is aimed at addressing the following concern. We would overestimate the extent of misreporting if some firms report their output VAT accurately in the MS data but report some sales to VAT firms as sales to final consumers or to non-VAT firms. However, when we replicate the analysis using the sample in column (2) of Table A1, which does not suffer from such a potential mismeasurement issue, our conclusions are unchanged. The total VAT misreported and the impact on the total net VAT due amount to 61.3% and 34.5% of the total net VAT due in this sample, respectively.

In column (3) of Table A1, we restrict the sample in column (3) of Table 4 to firms that should be allowed to use all their input VAT as VAT credits in every month of the 2015 fiscal year given the information in their monthly declarations. This robustness check is aimed at addressing the following concern. We would overestimate the extent of underreporting if some firms fail to report the input VAT that they are in fact not allowed to use as VAT credits.

Firms selling exempted goods or services, for instance, are only allowed to use part of their input VAT as tax credits. However, when we replicate the analysis using the sample in column (3) of Table A1, which should be less likely to suffer from such a potential mismeasurement issue, our conclusions are unchanged. The total VAT underreported amounts to 45.3% of the total net VAT due in this sample. The total VAT misreported and the impact on the total net VAT due also remain around 46.5% and 22.8% of the total net VAT due in this sample.

Finally, in column (4) of Table A1, we use the same sample as in column (5) of Table 4, but we are only computing misreporting and underreporting for seller-buyer-month combinations in which both the buyer and the seller reported trading with each other in that month. We find evidence of misreporting and underreporting even at this "intensive margin." Interestingly, column (4) of Table A1 is the only instance in which the total VAT underreported is larger than the total VAT misreported. This indicates that misreporting is more likely than underreporting to take place at the extensive margin, one of the two parties failing to report any trade at all within some seller-buyer-month combination.

Table A1: Robustness checks

Sample	(1) Misreporting assigned to buyers	(2) Firms not selling to final consumers	(3) Firms with zero exempted sales	(4) Reciprocal reporting only
No. of firms	26,884	5,099	12,138	5,723
Total Net VAT due	970,532	131,638	576,001	824,454
PANEL A: Misreporting				
Number of misreporting firms[1]	10,958	2,180	6,649	3,841
Total Net VAT due from misreporting firms[1]	912,628	62,826	455,980	659,250
Total VAT misreported[2]	663,922	80,699	267,617	95,971
PANEL B: Under-reporting				
Number of underreporting firms[3]	22,237	2,634	7,846	2,969
Total net VAT due from underreporting firms[3]	892,053	94,477	516,037	720,939
Total VAT underreported[2]	655,336	65,537	261,263	116,614
PANEL C: Correcting misreporting and underreporting				
Impact on total net VAT due[4]	372,857	45,375	131,173	27,090

Data sources: MS and VS data. All values are in millions of UGX.

[1] Assigning misreporting to sellers.

[2] Calculated by taking the difference between VAT charged in VS1 and VAT paid in VS24.

[3] Assigning under-reporting to buyers.

[4] Assigning misreporting to buyers in column (1) and to sellers in the other columns, and correcting the VAT liability in each month of the year for the total VAT misreported and under-reported.

A.2 Monthly VAT Return

Uganda Revenue Authority	**Monthly Value Added Tax Return** *(This Form will be used by all persons who are registered for VAT under The VAT Act, Cap 349. To be completed and submitted by the 15th day of the month following the tax period. You will incur a penalty if you fail to submit a return.)*	**Form DT-2031**
	Please fill in CAPITAL letters where applicable and sign the declaration. For reference, see Instruction notes on the last page. If you have any query regarding any of the questions consult the nearest URA-DT tax office.	Period (Month/Year) ☐☐/20☐☐ **Toll Free Number 0800117000**

Section A – Taxpayer Information

1 Taxpayer's Legal Name		2. TAXPAYER IDENTIFICATION NUMBER
3. Are you an Investment Trader? Yes ☐ No ☐ *(If Yes, complete section B,E, F, H and I)*		
4. Did you transact during the last tax period? Yes ☐ No ☐ *(If No, complete Section B, H and I only)*		
5.a Bank	5.b Bank Branch:	5.c Account Number *(Only UGX Accounts)*

Section B – Filing Status

1. Is this a branch Return? ☐ Yes ☐ No *If "Yes" then provide the details of branch for which return relates*	1.a Name of Branch: 1.b Address of Branch:	
2. Whether Original Return or Amended Return ☐ ORIGINAL ☐ AMENDED	*If Amended, earlier return acknowledgement number and date:* 2.a Date *(Day/Month/Year)* ☐☐/☐☐/20☐☐	2.b Acknowledgement Number
3. Date of Submission *(Day/Month/Year)* ☐☐/☐☐/☐☐☐☐		
4. Reason for Filing Amended Return:		

Section C – Sales (Goods and Services)

Nature of Sales			Amounts (a)	Rates	VAT (b)
Zero Rated Sales	Local	1		0%	
	Exports	2		0%	
Exempt Sales		3			
Standard Rated Sales		4		18%	
Capital Goods sold (Business Assets)		5		18%	
Imported Services		6		18%	
Adjustment of output tax *(using debit / credit notes)*		7			
Total Output Tax[4b+5b+6b+7b]		**8.**			

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Taxpayer's Legal Name	TAXPAYER IDENTIFICATION NUMBER	

Section D – Purchases (Goods and Services)

Nature of Purchases			Amounts (a)	Rates	VAT (b)
Zero Rated purchases	Local	09		0%	
	Imports	10		0%	
Standard Rated Purchases	Local	11		18%	
	Imports	12		18%	
Administrative Expenses		13		18%	
Capital Goods bought (Business Assets)		14		18%	
Imported Services		15		18%	
Adjustment of Input tax *(using debit / credit notes)*		16			
Total Input Tax [11b+12b+13b+14b+15b+16b]		**17.**			

Section E – For Investment Traders Only

Nature of Purchases	Amounts (a)	Rates	VAT (b)
18. Land and Site Development		18%	
19. Building and Civil Works		18%	
20 Plant and Machinery Equipment		18%	
21. Pre-Operating Activities		18%	
22. Administrative Expenses		18%	
23 Others (Specify)		18%	
24 Total Input Tax [18b+19b+20b+21b+22b+23b]			

Section F – Calculation of Input Tax allowed

	Input Tax Credit Disallowed	Input Tax Credit Allowed
25. Input Tax directly attributable to Taxable Sales		
26. Input Tax directly attributable to Exempt Sales (disallowed)		
27. Apportionment *(If 25+26 is not equal to 17(b), then apportionment is required)*		
a) Normal Method of apportionment [[17b] x(1a+2a+4a+6a)/(1a+2a+3a+4a+6a)]		
b) Standard Alternative Method of apportionment [(17b-25-26)x(1a+2a+4a+6a)/(1a+2a+3a+4a+6a)]		
28. Input Tax Credit Allowed [*See Notes on this Section*]		

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Taxpayer's Legal Name	TAXPAYER IDENTIFICATION NUMBER	

Section G – Details of VAT Withheld and Paid

Details of VAT Withheld		
Payment Voucher Number	**Date of payment (a)**	**VAT Withheld (Ugx) (b)**
29. TOTAL		
Details of VAT Paid		
Payment Registration Number	**Date of payment (a)**	**VAT Paid (Ugx) (b)**
30. TOTAL		
31. Total VAT Paid / Withheld [29b+30b]		

Section H – Calculation of Tax Due

32. Total Output Tax [8]	
33. Input Tax Allowed [28]	
34. Offset brought Forward	
35. Total VAT Payable [32-33-34]	
36. Total VAT Paid [31]	
37. Net VAT Payable/Claimable [35-36]	
38. For amounts claimable, tick : Offset ☐ Cash Refund ☐ (See notes)	

Section I – Declaration

I, solemnly declare that to the best of my knowledge and belief, the information given in the return and the schedules thereto is correct and complete and that the particulars shown herein are truly stated and are in accordance with the provisions of the VAT Act. *(This return should be signed by an authorized person)*

Name:	**Signature:**
Designation:	
Date *(Day/Month/Year)* ☐☐/☐☐/**20**☐☐	

	Received By
Office	
Name	
Signature	
Date	

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Taxpayer's Legal Name	TAXPAYER IDENTIFICATION NUMBER	

Schedule 1: Output Tax Schedule for the Period

Serial No.	Name of registered Purchaser	TIN of Purchaser	Invoice Date	Invoice Number	Description of Goods/ Service	Amount before tax (A)	Local Excise Duty (B)	Total (A+B)	VAT charged
	Total sales to registered customers								
	Total sales to final customers								
GRAND TOTAL									

Schedule 2 - Input Tax Schedule for the Local Purchases:

Serial No.	Name of Supplier	TIN of Supplier	Invoice Date	Invoice Number	Description of Goods/ Service	Amount before tax	VAT paid
TOTAL							
Purchases on which VAT has not been incurred (Gross amounts)							

Schedule 3 –Input Tax Schedule for the Imports:

Serial No.	Name of Exporter	Country of Export	Assessment Number	Assessment Date	Description of Goods /Service	Amount before tax (A)	Excise Duty (B)	Total (A+B)	VAT paid
TOTAL									

Schedule 4 - Administrative Expenses:

Serial No.	Name of Supplier	TIN of Supplier	Invoice Date	Invoice Number	Description of Expense	Amount (Exclusive of VAT)	VAT Paid
TOTAL							
Non Creditable expenses (Gross amounts)							

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