REVENUE CONSEQUENCES OF VAT MISREPORTING IN KENYA

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Revenue consequences of VAT misreporting in Kenya

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Abstract

This paper studies the evolution of Valued Added Tax (VAT) misreporting in Kenya during a period of sustained administrative reform using firm-to-firm transaction data from 2016 to 2023. We document widespread underreporting of VAT liabilities, especially on the extensive margin, as well as a sharp decline in this behaviour over time. Using a fixed-effects regression model that allocates reporting discrepancies to either buyers or sellers, we show how systematic misreporting varies across firm size, sectors, and tax offices. Eliminating firms' misreporting may have increased Kenya Revenue Authority's (KRA) tax revenue by up to KSH 648 billion (42% of VAT payable). The negative revenue impact has decreased significantly over time, highlighting improvements in KRA's tax capacity during a period of sustained reform.

Keywords: tax, VAT, tax avoidance, tax administration, Kenya

1 Introduction

How do countries build tax capacity over time? This paper studies the evolution of Value Added Tax (VAT) misreporting in Kenya during a period of sustained administrative reforms. We combine a uniquely long panel of firm-to-firm transaction data from the Kenya Revenue Authority (KRA) covering 2016–2023 with information on a sequence of technology-driven reforms aimed at strengthening VAT compliance. Rather than focusing on the short-run effects of a single intervention, our setting allows us to trace how reporting behaviour evolves over nearly a decade of incremental institutional change.

The setting of VAT in Kenya is ideal for two reasons. First, the VAT is among the most widely adopted tax instruments globally, currently used in over 160 countries. One reason for the VAT's popularity is its built-in "self-enforcing" mechanism: firms report both their sales and their purchases, allowing tax authorities to cross-validate declarations. Because both parties submit records of the same transaction to the tax authority, it is, in theory, possible to cross-check declarations and detect inconsistencies (Almunia *et al.*, 2025, 2024). In practice, however, the self-enforcing mechanism assumes a level of monitoring and enforcement capacity that tax authorities in low- and middle-income countries often lack. The necessary institutional features – like administrative capacity, monitoring systems, and the ability to process large volumes of transactional data – can only be introduced gradually over time. We document how sustained reforms of a VAT system can lead to long-run improvements in reporting behaviour, thereby deepening our understanding of the evolution of state capacity and tax compliance.

Second, VAT is a key revenue stream for the Government of Kenya, contributing 25.6% of total tax revenues in the 2020/2021 fiscal year (KRA, 2021). However, resource limitations, fragmented data systems, and weak enforcement structures have historically characterized the country's VAT administration (Global Financial Integrity, 2018). These enforcement challenges are evident at the macro level, where Kenya's VAT-to-GDP ratio has remained relatively stagnant at around 4%, significantly below the sub-Saharan Africa average of 6% (IMF, 2022). Therefore, Kenya has implemented a broad suite of reforms during the past decade, ranging from automated auditing tools, electronic invoicing systems, and pre-populated returns that gradually expanded KRA's ability to cross-check transactions and monitor and guide firms' reporting behaviour.

Our analysis documents four descriptive results. First, we show that at the transaction-level firms' VAT liability is underreported in approximately 57% of all transactions, overreported in 18% of transactions, and accurately reported in only 25%. This widespread misreporting seems to be driven by evasion on the extensive margin (transactions that are not double-reported), and it has decreased significantly over time. Second, we follow the method developed in Almunia *et al.* (2024) and use firms' *average* tendency to misreport as a seller and a buyer to identify *systematic* misreporters. We find that 60% of firms systematically underreport their VAT liability at the transaction level, 31% overreport, and only 9% report accurately. Third, we characterize the misreporting firms, showing that small firms underreport the most relative to their size, but we

also show that KRA could gain more tax revenue by eliminating misreporting among the largest firms, where the absolute value of misreporting is greatest. Finally, we show that misreporting might have resulted in up to KSH 648 billion in foregone revenue in nominal terms between 2016 and 2023, equivalent to 42% of VAT payable. Yet, the revenue impact of misreporting has declined markedly over time, highlighting KRA's improved tax capacity. Together, the descriptive evidence establishes a set of stylized facts about the dynamics of compliance under incremental reform.

2 Related literature

This paper contributes to several strands of literature. First, our analysis is most closely related to Almunia *et al.* (2024), who develop a methodology to detect and attribute VAT misreporting using matched buyer–seller data. We adopt their approach and contribute by leveraging a uniquely long firm-to-firm panel to document, for the first time, how VAT misreporting evolves over nearly a decade in a low-income country, and how sustained administrative reforms have nearly eliminated aggregate misreporting.

Second, our study relates to the literature on development and state capacity, which emphasizes the central role of fiscal capacity in economic development (Besley *et al.*, 2013; Besley and Persson, 2009). Focusing on tax capacity, we connect to a large body of work documenting the importance of third-party information for fostering tax compliance (Almunia *et al.*, 2025; Kleven *et al.*, 2011; Pomeranz, 2015). While double-reporting is one of the key reasons for the VAT's popularity in low-income contexts (Brockmeyer *et al.*, 2024), several studies highlight its limitations when monitoring is weak (Bachas and Soto, 2021; Carrillo *et al.*, 2017; Naritomi, 2019). We contribute to this literature by showing that a tax administration's monitoring capacity can change rapidly in the span of less than a decade.

Third, we contribute to a long literature using administrative data to detect and measure the extent of tax evasion and avoidance, misreporting, and fraud in both domestic and international trade contexts (Almunia *et al.*, 2024; Carrillo *et al.*, 2023; Demir and Javorcik, 2020; Slemrod, 2019; Waseem, 2023; Wier, 2020). Compared to previous papers, our setting is unique in the combination of detail (firm-to-firm transactions) and length over which we can study tax compliance.

3 Institutional background

3.1 VAT system

VAT was introduced in Kenya in 1990. The Kenyan VAT system works under the input-output tax mechanism whereby the input tax refers to the tax paid on the purchases of goods or services, while output tax refers to tax charged on the sales. The tax payable is the difference between the output tax and the input tax. There are two tax rates: the 16 percent (General rate), which applies to all taxable goods and taxable services, and zero-rated supplies on specific supplies such as export of goods. Firms with annual sales below KSH 5 million do not have to register for VAT, but voluntary registration can be granted upon application for registration and approval.

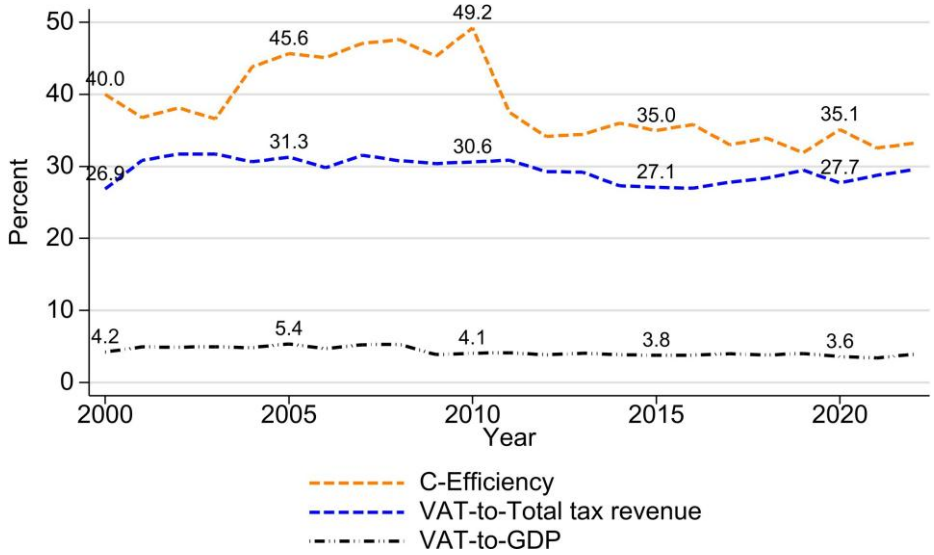

Figure 1: Kenya's VAT performance over time

Note: Authors' calculations based on tax administrative data from the KRA and KNBS.

3.2 VAT performance

Figure 1 shows that VAT revenue performance in Kenya has stagnated slightly during the past decades. The VAT-to-GDP ratio has fluctuated around 4% while the VAT contribution to total tax revenue has decreased slightly to just below 30%. This is below KRA's targets stipulated in the Sixth Corporate Plan of 9% and 35%, respectively.

There has also been a decline in C-Efficiency over time, which is defined as the ratio of *actual* VAT revenue to *potential* VAT revenue. The latter is measured as the revenue that would be collected if the standard VAT rate was applied to all final consumption with full compliance. The VAT gap (1 - C-Efficiency) is thus comprised of both a compliance gap, for instance due to misreporting, and a policy gap arising from exemptions and reduced rates.

These statistics raise two important questions. First, which factors have contributed to the disappointing VAT performance? Second, to what extent has Kenya's reform initiative contributed to improving the VAT performance? This study aims to answer these questions with a

focus on VAT misreporting. Specifically, we document the extent of VAT misreporting and estimate how Kenya's VAT reform journey has affected VAT payments and misreporting. We describe the most important reforms of this journey below.

3.3 Reforms to reduce VAT misreporting

Since the formation of the Kenya Revenue Authority (KRA) in 1995, several reforms have been adopted to enhance VAT compliance, lower the cost of compliance, and improve monitoring capacity. Some of the key technological reforms are listed in Table 1.

KRA introduced electronic tax registers (ETRs) in 2005 with the objective of improving record keeping among firms and thus enhancing tax compliance. At the beginning of 2018, KRA introduced the VAT Automated Audit (VAA), which – like our paper – detected inconsistencies between sales and purchases declared in VAT returns on iTax and automatically disallowed input taxes on unresolved invoices. Due to implementation challenges and criticism from taxpayers, KRA had to discontinue the VAA after a few months.[1] The Tax Invoice Management System (TIMS) was rolled out in 2021 to VAT-registered firms to improve reporting accuracy. This was followed by an entirely software-based enhancement called the Electronic Tax Invoice Management System (eTIMS), which was gradually rolled out to all persons conducting business in Kenya from 2023. eTIMS is a simple and flexible software solution that is hoped to improve and automate accurate VAT reporting.

Table 1: Technology-driven reforms to VAT administration

Reform	Objective and mechanism	Year
Electronic Tax Registers (ETR)	Record sales electronically at the point of sale to improve VAT reporting and traceability.	2005
VAT Automated Audit (VAA)	Cross-match buyer and seller declarations and disallow unresolved input VAT discrepancies.	2018
Tax Invoice Management System (TIMS)	Validate electronic tax invoices and transmit invoice information to KRA in real or near-real time.	2021
Electronic Tax Invoice Management System (eTIMS)	Expand electronic invoicing through software that generates and transmits invoices to KRA.	2023
VAT Auto-Populated Return (VATAR)	Pre-fill VAT returns using information already available to KRA to improve filing accuracy.	2024

[1] The VAA disallowed, for instance, input VAT deductions even if the detected discrepancies between buyer and seller declarations arose due to small rounding errors.

4 Data

The analysis relies on several administrative datasets provided by KRA and covering the period 2016-2023.

Table 2: Monthly VAT transactions data

Dataset	Sales		Purchases		Linked	
	Obs. (million)	Sales (billion)	Obs. (million)	Purchases (billion)	Obs. (million)	Double-reported (share)
	(1)	(2)	(3)	(4)	(5)	(6)
Year						
2016	1.6	235	5.5	374	5.9	0.18
2017	2.2	284	5.7	384	6.4	0.23
2018	2.8	329	6.2	401	7.0	0.28
2019	3.6	391	7.1	449	8.1	0.32
2020	4.1	391	6.9	415	8.0	0.36
2021	4.9	544	7.8	542	9.1	0.38
2022	5.2	629	7.9	615	9.3	0.40
2023	6.0	711	8.1	696	9.7	0.44
Total	30.3	3,513	55.2	3,876	63.5	0.34

Transaction-level VAT data — Our main data source is transaction-level VAT data, submitted by firms in iTax as part of their monthly VAT returns. The monthly filings must include detailed spreadsheets where firms list each sale and purchase to and from other VAT-registered entities. In theory, KRA thereby receives two reports for each transaction – one reported from the buyer and one from the seller – although, in practice, some transactions are only reported by one firm, which could imply misreporting on the extensive margin.[2]

The transaction data for each firm is split between a dataset containing the reported sales and one containing the purchases. Each dataset contains anonymized tax IDs of the seller and the buyer; timestamps for the tax period, filing and invoice date; the amount transacted; the VAT schedule (general rated, other rated, zero rated, exempted); and the corresponding input or output VAT. Sales (purchases) to (from) final customers and non-VAT entities are recorded as totals.[3]

We aggregate the transaction-level sales and purchases data to monthly firm-to-firm totals for two reasons. First, there are no reliable invoice numbers for earlier years, which makes it impossible to link individual transactions. Second, the data is extremely big and monthly aggregates are computationally more feasible to work with.[4] Going forward, we refer to these monthly

[2] If a VAT return has been amended by the firm or KRA, we use the latest version of the return in the analysis.

[3] Some of the recorded transactions involve non-VAT trade partners. This is presumably because the firm submitting the VAT return does not know the VAT status of their trade partner and therefore records the transaction and the ID of the trade partner anyways.

[4] We use the recorded invoice date, not the tax period, to allocate transactions into a month. This increases the possibility that we link transactions correctly, because firms might allocate the same transaction into different tax

aggregates as "transactions".

Table 2 shows the number and total value (in nominal KSH) of the monthly transactions recorded in each dataset. There is a rapid growth of both sales and purchases over time. In the early years, the number and value of transactions in the purchases data were significantly higher than in the sales data, but the difference gets smaller over time. To compare the transaction amount reported by buyers and sellers in each month, we link the two datasets using the month and IDs for buyer and seller. The result is reported in Columns (5)-(6) of Table 2. In total, we observe 63.5 million monthly firm-to-firm transactions. Of those, 34% are reported by both the buyer and the seller, and this double reporting is growing over time.

Firm-level VAT data — We combine the transaction-level VAT data with data on firm-level monthly aggregates that are automatically calculated based on, and submitted alongside, the transaction-level spreadsheets. The two datasets can be linked with the anonymized taxpayer ID. Importantly, the firm-level VAT data contains information on each firm's monthly VAT liability, calculated based on the input and output VAT derived from the transaction-level spreadsheets as well as information on withholding credits, negative liabilities carried forward from previous months, etc. We use this data to calculate the revenue impact of VAT misreporting, which must take negative carry forwards into account. We also observe the entire filing history of these monthly aggregates.

Taxpayer Register — We obtain background information on firms from KRA's taxpayer registry. The registry contains information on sector and industry; location; tax service office; date of business commencement and registration with KRA; and whether the taxpayer is an individual. The information is provided when firms register for tax with the KRA. We use the information to characterize the segments of Kenya's tax base where misreporting is most pronounced.

periods.

5 Methodology

In this section, we first describe how we classify transaction-level misreporting and, subsequently, how we estimate whether a firm tends to systematically misreport transactions.

5.1 Transaction-level misreporting

For each month t, let y^s_{sbt} denote the output VAT declared by firm s from its sales to buyer b. Conversely, let y^b_{sbt} denote the input VAT reported by b from its purchases from s in month t. Let $d_{sbt} = y^s_{sbt} - y^b_{sbt}$ be the misreporting discrepancy in a given month. Whenever $d_{sbt} < 0$, one or

both firms are underreporting their VAT liability: s may be underreporting its output VAT, b could be overreporting its input VAT, or both firms could be underreporting their VAT liability. This results in a reduced VAT liability for the firms and will (in most cases) translate into a tax revenue loss for KRA. Conversely, when $d_{sbt} > 0$, one or both firms are overreporting their tax liability by either underreporting input VAT or overreporting output VAT. We use this framework to document the extent of VAT misreporting in Kenya in Section 6.1.

It is important to highlight that a negative discrepancy does not always imply underreporting of VAT liability by the transacting firms. In KRA VAT returns, sellers may (incorrectly) aggregate transactions under the category "Total sales and VAT to customers not registered for VAT" rather than reporting each sale with the buyer's tax ID. In such cases, the buyer reports the purchase, but the corresponding sale is not recorded at the transaction level, leading to an observed negative discrepancy ($dsbt < 0$) even though the sale has been declared in aggregate. Accordingly, our estimates capture misreporting at the firm-to-firm transaction level; however, the associated revenue implications may differ if such aggregated ("lazy") reporting were fully accounted for.

5.2 Firm-level misreporting

It is impossible to know which firm is misreporting when looking at a single transaction in isolation. We follow the method developed in Almunia *et al.* (2024) and use firms' *average* misreporting tendency as a seller and a buyer to identify *systematic* misreporters. We estimate the following fixed effects regression:

$$d_{sbt} = \alpha + \delta_s + \lambda_b + \omega_t + e_{sbt}, \tag{1}$$

where ω_t denotes month fixed effects, α is a constant, and e_{sbt} is the error term. δ_s and λ_b are firm-level fixed effects for sellers and buyers, respectively. They measure each firm's average tendency to misreport as a seller and a buyer, controlling for all time-invariant characteristics of its trade partners.[5]

For each firm i, we then construct a firm-level measure of misreporting R_i as the weighted sum of i's estimated tendency to misreport as a seller and a buyer:

$$R_i = n_i^s(\widehat{\delta_i} + \hat{\alpha}) + n_i^b(\widehat{\lambda_i} + \alpha), \tag{2}$$

where n_i^s and n_i^b denote the number of transactions conducted by i as a seller and a buyer. When $R_i < 0$, we take it as evidence that firm i is systematically underreporting its tax liability. When $R_i > 0$, we label i as an overreporter.[6]

[5] Since the fixed effects can only be identified within a "connected set", we limit our estimation sample to firms in the largest connected set.

[6] To allow for some measurement error, we set R_i equal to zero if KSH $0 < |R_i| <$ KSH 10,000.

6 Main results

In this section, we first show descriptive evidence on transaction-level misreporting. In the next section, we describe the reporting behaviour of firms and explore the characteristics of misreporters.

6.1 Transaction-level misreporting

Figure 2 shows a graphical illustration of the input and output VAT declared by buyers and sellers. Following Almunia *et al.* (2024), we group the monthly transactions into a grid and colour each cell according to the number of observations that fall in that cell. The darker the blue color, the more observations. Observations above the 45-degree line represent instances of overreporting, while observations below the line indicate underreporting. For observations on the line, sellers and buyers report the same amount.

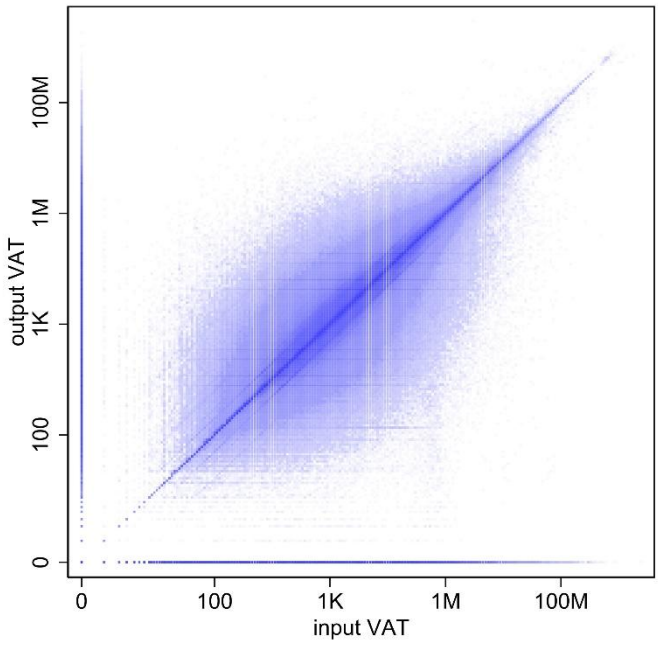

Figure 2: Discrepancies in VAT transactions, 2016-2023

Note: Authors' calculations based on tax administrative data from the KRA. Created with inspiration from Almunia *et al.* (2024).

The extent of misreporting is quantified in Table 3. Firms' VAT liability is underreported in 57% of all transactions, overreported in 18% of transactions, and accurately reported in only 25%.[7] This widespread misreporting seems to be driven by the extensive margin, that is, instances where one of the firms does not record a transaction at all. Double-reported transactions account for only 8% and 29% of underreported and overreported transactions, respectively. In contrast, 96% of transactions with no discrepancy are reported by both the seller and the buyer. We report the total value of the misreporting in the bottom row. The total net underreporting of

[7] These statistics align with what has been found in Uganda (Almunia *et al.*, 2024).

VAT is KSH 363 billion in nominal terms. This is, however, not the same as the revenue impact of misreporting, since misreporting need not affect firms' VAT obligation if they have

	Underreported (1)	Overreported (2)	Accurately reported (3)	All (4)
No. of transactions (million)	36.3	11.6	15.6	63.5
Share of transactions	0.57	0.18	0.25	1.00
— *of which double-reported*	0.08	0.29	0.96	0.34
Value (KSH billion)	-1,198	836	0	-363

negative liabilities carried forward. We discuss this in detail in Section 6.3. Moreover, the revenue consequences will also be smaller to the extent that misreporting is due to "lazy" sellers who lump individual transactions together and declare them as sales to customers not registered for VAT.

Table 3: Discrepancies in VAT transactions, 2016-2023

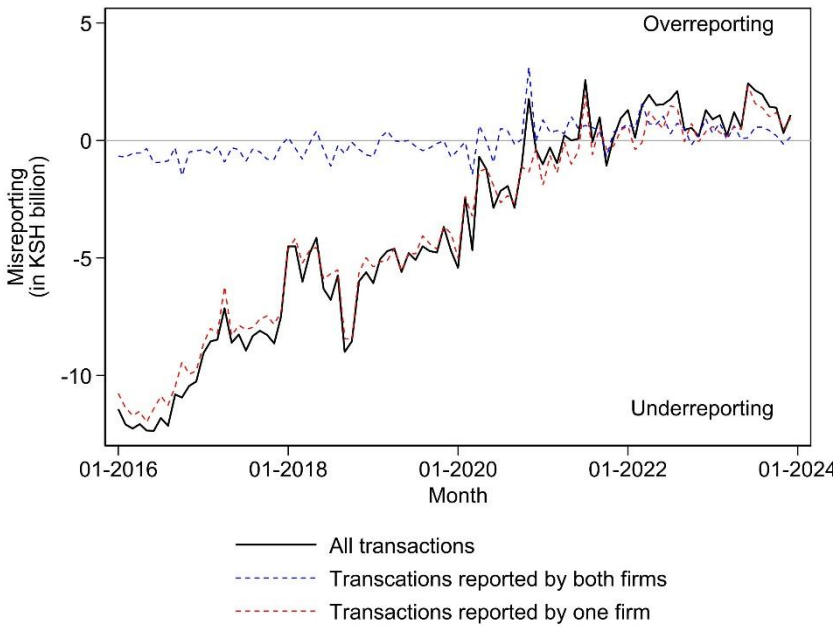

Figure 3: Total seller shortfall by month

Note: Authors' calculations based on tax administrative data from the KRA. Created with inspiration from Almunia *et al.* (2024).

The aggregate misreporting is substantial, but it has decreased remarkably over time. Figure 3 plots the aggregate monthly misreporting ($d_t = \sum_{sb} d_{sbt}$). Across all transactions (black line), the monthly misreporting has fallen from more than KSH 10 billion being underreported every month in the first quarter of 2016, to slight overreporting at the end of 2023. This trend is almost entirely driven by a fall in underreporting at the extensive margin. While aggregate misreporting in double-reported transactions has fluctuated around zero (blue line), there is a sharp decline in

underreporting in transactions that are only reported by one firm (red line).[8]

6.2 Firm-level misreporting

Who are responsible for the misreporting described in the previous section? We now turn to classify firms as underreporters (i.e., firms that systematically misreport to lower their VAT liability), overreporters (i.e., firms that systematically misreport to increase their VAT liability), and accurate reporters (i.e., firms that do not misreport on average) using Equations 1-2. The classification is shown in Table 4. We find that 60% of firms are systematic underreporters, 31% overreport their VAT liability systematically, and only 9% report accurately. This is even though we allow for measurement error by setting Ri equal to zero if the absolute value falls below KSH 10,000.

Table 4: Type of firms by reporting behaviour

	Obs.	Percent
Underreporters ($R_i < 0$)	134,015	60%
Overreporters ($R_i > 0$)	70,057	31%
Accurate reporters ($R_i = 0$)	19,135	9%
Total	**223,207**	**100%**

To understand the characteristics of misreports, Panel (a) of Figure 4 plots the relationship between firms' R_i statistic and their total sales in 2023.[9] In absolute terms, underreporting increases with firm size. The largest firms underreported their VAT liability with more than KSH 15 million, on average, from 2016 to 2023. In relative terms, the pattern is reversed, however. We normalize R_i in Panel (b) by dividing by firms' total sales in 2023. This exercise reveals that, relative to the amount transacted, large firms underreport less than small firms. Some of the smallest firms underreport their VAT liability with an amount equivalent to one or even two times their annual sales. Together, these results imply that even though small firms underreport their VAT liabilities more intensely, KRA could gain more tax revenue by eliminating misreporting among the largest firms.[10]

In Figure 5, we show estimates of total misreporting over total sales in 2023 in different economic sectors in Panel (a) and different tax service offices (TSOs) in Panel (b). We find the highest underreporting intensity in Waste Management and Construction and the lowest in Financial & Insurance Activities. The TSOs with the highest misreporting intensities are Kisumu and Eldoret, while the underreporting intensity is low at offices such as the Medium Taxpayer

[8] Understanding how the reforms listed in Table 2 have contributed to the decline in misreporting is an important avenue of research that we will address in future iterations of this paper.

[9] For ease of interpretation, we drop outliers (top/bottom percentile) in terms of Ri from the sample when plotting the data.

[10] These results should be interpreted with some caution, since the firm-level misreporting statistic Ri is calculated on historical data. It is not unreasonable to think that firms' reporting behaviour changes over time, rather than being static, as we have assumed here.

Office (MTO), the Large Taxpayer Office (LTO), the Digital Economy Office, and the Public Sector Division.[11]

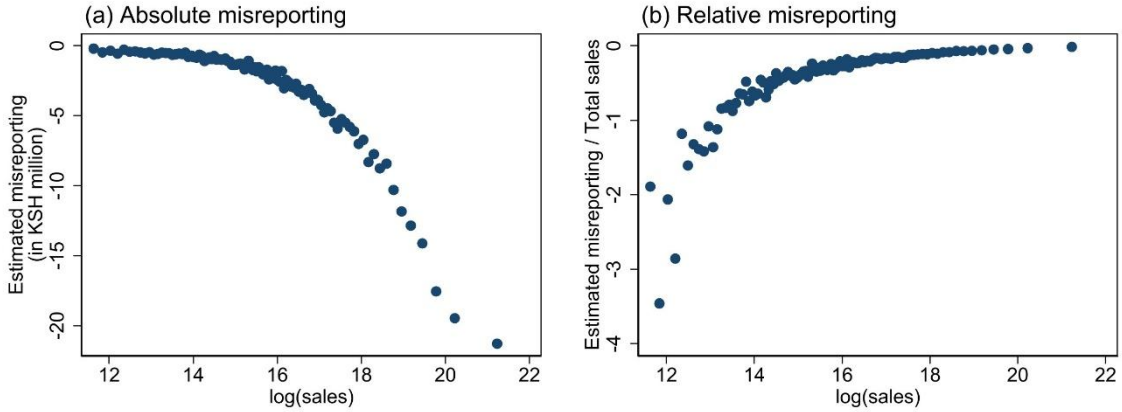

Figure 4: Misreporting and firm size in 2023

Note: Authors' calculations based on tax administrative data from the KRA. Created with inspiration from Almunia *et al.* (2024).

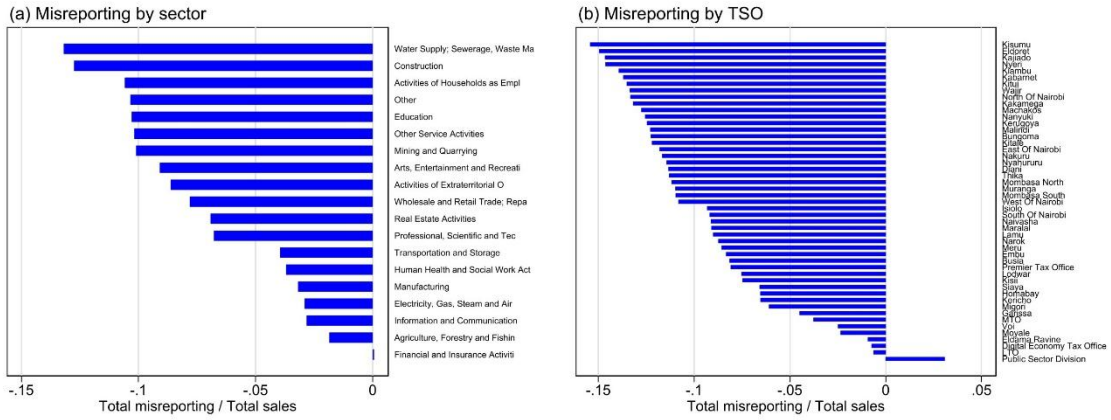

Figure 5: Misreporting by sector and TSO in 2023

Note: Authors' calculations based on tax administrative data from the KRA.

6.3 Revenue consequences

In this section, we quantify the revenue consequences of VAT misreporting for the KRA. The revenue impact is estimated by calculating the change in VAT liabilities that would have occurred without any misreporting. Importantly, the revenue consequence is not equivalent to the difference between total underreported VAT and total overreported VAT (KSH 363 billion, see Table 3). Because many Kenyan firms have negative VAT liabilities (also known as "credits carried forward"), small increases in their liability need not affect their net VAT payable. To take this into

[11] It is important to note that these statistics do not tell us about the absolute value of misreporting in these sectors and TSOs.

account, we follow Almunia *et al.* (2024) and use the estimated fixed effects to correct each firm's monthly VAT liability by assigning reporting discrepancies to the seller, the buyer, or a share to both firms. We start by correcting the VAT liability in the first month where we observe each firm, updating the carry forwards accordingly for the subsequent month. Then, we update the VAT liability in the next month, considering the updated carry forwards while also assigning the blame for any new reporting discrepancies according to the estimated fixed effects.

The process is continued iteratively until the last observation for each firm.[12]

Table 5: Revenue impact (2016-2023)

	Nominal KSH in billion	% of reported
Reported VAT payable	1,546	100
Potential VAT payable without misreporting	2,194	142
Revenue impact (reported - potential)	**-648**	**-42**

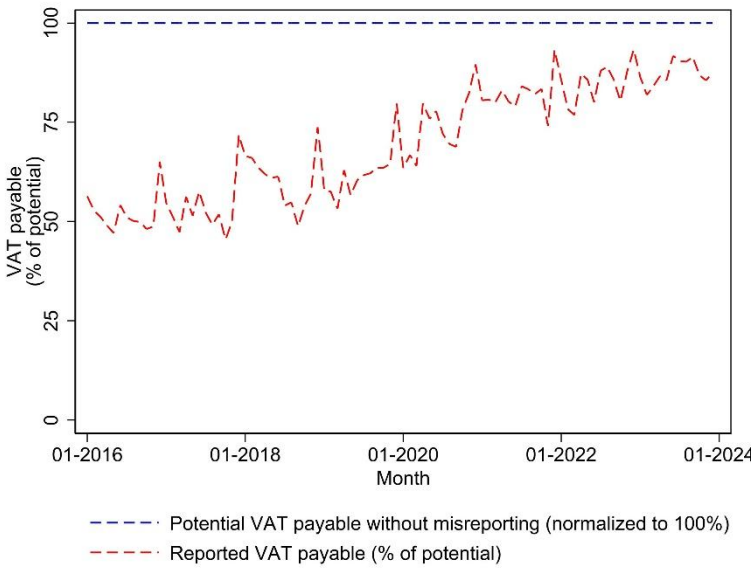

Figure 6: Revenue impact over time

Note: Authors' calculations based on tax administrative data from the KRA.

Our estimates for the entire period (2016-2023) are shown in Table 5. Assuming that all positive VAT liabilities would have been paid, we estimate that KRA has lost KSH 648 billion in foregone VAT revenue in nominal terms.[13] This is equivalent to 42% of the VAT payable during

[12] See Almunia *et al.* (2024) for further details.

[13] We refer to positive VAT liabilities in a month as VAT payable. Firms in Kenya cannot get negative VAT liabilities refunded, unless they trade in zero-rated goods, have withholding credits, or incur bad debt. The current estimates do not take into account the potential revenue impact of refunds.

the same period. This is comparably higher than in Uganda, where Almunia *et al.* (2024) find that eliminating misreporting would increase tax revenues by an amount equivalent to 28% of VAT collections. The aggregate estimate masks a significant improvement over time, however. Figure 6 shows the month-by-month estimates of the revenue impact. The blue line, normalized to 100% in each month, represents the "potential VAT payable" if all misreporting was eliminated. The red line shows the VAT payable that was actually reported by firms, normalized as a percentage of the potential. In 2016, KRA recorded only around 50% of the potential VAT payable in each month, but at the end of 2023, reported VAT payable accounted for more than 80% of potential VAT payable without misreporting. It is important to note that these estimates are based on an assumption that the discrepancies observed in the data reflect genuine changes in firms' VAT liabilities, rather than "lazy" reporting by sellers who lump individual transactions together and declare them as sales to non–VAT-registered customers. The estimate can thus be seen as an upper bound for the revenue impact of misreporting over time.

7 Conclusion and policy recommendations

This paper examines the extent, characteristics, and revenue consequences of VAT misreporting in Kenya during a period of sustained administrative reforms using firm-to-firm VAT transaction data from 2016 to 2023. First, we show that at the transaction level, firms' VAT liabilities are underreported in 57% of transactions, overreported in 18%, and accurately reported in only 24%, with most discrepancies arising on the extensive margin where transactions are not double-reported. Crucially, the discrepancies have decreased dramatically over time. Second, applying the method of Almunia *et al.* (2024), we use firms' average misreporting tendencies as buyers and sellers to identify systematic misreporters, finding that 60% underreport, 31% overreport, and only 9% report accurately. Third, we characterize these firms, showing that although small firms underreport most relative to their size, the largest firms account for the largest absolute tax losses. Finally, we estimate that misreporting might have caused up to KSH 648 billion in foregone tax revenue between 2016 and 2023 (≈42% of VAT payable), though this impact has declined sharply over time, reflecting improvements in KRA's enforcement capacity.

7.1 Policy recommendations

The findings of this paper highlight several areas that policymakers could strengthen to limit the revenue consequences of VAT misreporting in Kenya.

Conduct targeted and risk-based compliance checks and audits — Our analysis shows that it is possible to use double-reported transaction-level VAT data to estimate taxpayers' tendency to misreport in business-to-business transactions. It is important to keep in mind, however, that the reporting requirements on firms have changed significantly in recent years with the introduction of TIMS, eTIMS and the VATAR. It may therefore not be feasible to use this paper's analytical framework one-to-one, but our analysis highlights how KRA could use similar approaches to conduct targeted, risk-based compliance checks and audits.

Perhaps most intriguingly, the analysis in this paper showed how to produce a firm-level misreporting estimate (R_i), thereby allowing for *firm-level targeting*, as opposed to size-, sector-, or TSO-based targeting. Estimation of firm-level misreporting could, in theory, be integrated and automated in KRA's IT systems and thereby assist officials in selecting specific firms for compliance checks and audits.

Alternatively, our analysis identifies several *groups of firms* that could be targeted. First, large firms appear to account for most misreporting in absolute terms. This suggests that the highest revenue impact from misreporting may be found among these firms. Second, we find that, in relative terms, smaller firms misreport more, and the same is true for firms operating in sectors such as Waste Management and Construction as well as in smaller tax service offices such as Kisumu and Eldoret.

Exploit third-party data through improved data integration — Kenya has made substantial progress in reducing VAT misreporting through digital technology. Systems such as eTIMS and VATAR strengthen compliance in business-to-business transactions through better invoice-level reporting and cross-validation, while also increasing visibility of other transactions, including some sales to final consumers. However, important gaps remain. As enforcement improves in well-monitored areas, firms are likely to shift evasion to less controlled margins. Business-to-consumer transactions, for instance, are not double-reported, allowing firms to conduct transactions outside of eTIMS and underreport sales. Imports face a similar single-reporter issue, and deductions cannot be cross-checked against seller (exporter) declarations.

KRA should strengthen internal and external data integration to close these loopholes using third-party information. This would involve controlled integration of VAT reporting systems with selected internal and external third-party data sources. Data from banking and payment systems could help KRA monitor business-to-consumer transactions. Integrating VAT and customs data would help KRA verify whether firms hold valid import certificates when claiming deductions from imports. Procurement data from large taxpayers and institutions could also prove useful. Ultimately, enhanced data integration would improve detection of VAT misreporting, reduce reliance on resource-intensive audits, and enhance the accuracy and integrity of VAT declarations.

Build analytical capabilities — To fully exploit the potential of expanded and higher-quality data, it would be beneficial for KRA to strengthen its analytical capacity through sustained investment in both people and systems. Building staff capabilities – particularly in data science, economics, and risk analytics – is essential to translate data into actionable compliance insights. In parallel, KRA should continue embedding analytical capabilities into IT systems such as VATAR to automate routine checks, flag anomalies, and integrate data across sources. These systems could support real-time or near-real-time analytics and feed into user-friendly dashboards that enable continuous monitoring of compliance risks.

Help small firms comply through taxpayer education and simplified filing — Our analysis reveals that smaller firms are less compliant in relative terms, i.e., they tend to misreport a larger share of their sales. Since misreporting is often driven by unreported transactions (the extensive margin), non-compliance among small firms may partly reflect capacity constraints or limited understanding of VAT requirements, rather than purely deliberate evasion. To address this, KRA

could strengthen targeted taxpayer education programs aimed at small firms, focusing on basic VAT principles, record-keeping, and the use of digital tools such as eTIMS. Complementing this, the adoption of simplified filing regimes or pre-filled returns (such as the VATAR) could also reduce compliance costs and errors.

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