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Domestic revenue mobilization and informality

Challenges and opportunities for sub-Saharan Africa

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Abstract: Effective domestic revenue mobilization has gained renewed urgency, especially in the light of the need to recover from the COVID-19 pandemic. In taxation debates, the 'informal sectors' have hitherto been assumed to be a part of the problem and implicitly mistaken for lucrative tax bases. First, I critically interrogate current conceptualizations of informality to highlight how the informality that materially affects revenue mobilization goes beyond the hitherto narrow focus on the visible informal sectors. I then demonstrate that informality is only one among many factors negatively associated with tax revenue mobilization in sub-Saharan Africa. I also maintain that better scores on government quality and technology adoption in government systems can play a role in mitigating informality, but a limited one because deeper structural factors sustain informality. I argue for a re-articulation of the concept of informality when it is included in revenue mobilization research, including frank discussions on perennial measurement and data quality issues. Simultaneity in policy strategies is necessary, given that informality is multifaceted. It seems more appropriate to prioritize the securing of livelihoods and the building of local fiscal contracts, including on a quid-pro-quo basis, than tax surveillance, especially given that those who operate in shadow economies tend to be outside national safety nets.

Key words: domestic revenue mobilization, shadow economies, tax revenue, informal sectors, informality, technology, government quality

JEL classification: H20, E26, O17, O55

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1 Introduction

The COVID-19 pandemic significantly reduced domestic revenue mobilization (DRM) in most low-income countries (LICs) and, at the same time, increased the need for such revenues. The 2022 World Development Report aptly puts 'mobilising resources for the recovery' as its policy priority (World Bank 2022a). Where these resources will come from remains an important question. Sustainable DRM remains a necessary goal in the light of recent events, prompting donor countries to focus on pressing domestic needs, as seen in the United Kingdom's cuts to aid in 2021 (Dajani et al. 2021). The task of recovering from the pandemic and rebuilding will likely be daunting, especially given that the pandemic has brought an economic slowdown that undermined the robustness of already weak fiscal systems. This is particularly so in LICs, where tax bases were already limited on account of high levels of informality.

Arguably, the pandemic revealed latent conceptual and policy deficiencies in the way researchers and policy-makers frame possibilities and challenges concerning informality, especially in connection with the latent vulnerabilities of people in so-called informal sectors. Incomes from self-employment and informal jobs plummeted, driving more people into consumption poverty (Barletta et al. 2022; Danquah et al. 2021). The fiscal ramifications were particularly severe for LICs, with limited fiscal capacities. Almost all countries needed economy-wide expansionary fiscal policies (Alon et al. 2020; World Bank 2022a), yet those LICs with the highest informality were also the ones that did the least in terms of offering fiscal stimulus packages, despite the obvious needs of many of their citizens (Elgin et al. 2020). According to Fjelstad and Therkildsen (2020), the International Monetary Fund's (IMF) optimistic aim of a 5 per cent increase in tax-to-GDP by 2030 was 'unrealistic before COVID-19: it is even more so now'. I assert that the pandemic has necessitated a need to rethink the nexus between DRM and informality. This is particularly important given the inherent contradiction between calls to tax the allegedly untaxed informal sectors and, as seen with regard to the pandemic, the apparent immiseration that any shock can bring to those informally employed.

The conceptualization of informality is itself a problem (Gallien and Van Den Boogaard 2021), leading to potentially misconceived policy prescriptions. The dominant view is that the informal sectors are standing in the way of effective revenue mobilization. I stress in this study that for revenue mobilization, the informality that slows or reduces revenue collection is not confined to the so-called informal sectors but is pervasive across both formal and informal spheres through evasion, avoidance, and other means that high-net-worth individuals and large firms use. By focusing on broader informality, I provide insights into how policy-makers and researchers can better articulate problems of informality that are material for revenue mobilization.

More widely, there is a need to consolidate our knowledge of the relationship between DRM and informality in a way that transcends the narrow focus on the informal sectors. For taxation, compliant and non-compliant behaviour cuts across registered and unregistered firms (Kanbur and Keen 2014; Moore 2022). The nexus between informality and tax revenue collection has rarely been interrogated in its own right, except in the problematic supposition that the informal sectors harbour tax dodgers and that everyone in them needs to be registered. Measurement issues and unavailability of data have been the main limitations (Ulyssea 2020), but with the recent emergence of comprehensive estimates of the size of shadow economies (Elgin et al. 2021; Ohnsorge and Yu 2021), these discussions remain essential.

The paper explores the nexus between DRM and informality in sub-Saharan African (SSA) countries. Informality is broadly defined to incorporate all shadow economies rather than only the

so-called informal sectors. The focus is motivated by the facts that the SSA region lags behind other world economies on revenue mobilization, and that it records the largest shadow economies, of which the informal sectors are only a part. I use the government revenue dataset (UNU-WIDER 2021) and estimates of the size of shadow economies based on Elgin et al. (2021) and Ohnsorge and Yu (2021) to provide an empirical basis for further discussion on potential policy options and research on how cash-strapped governments may interact not only with the informal sectors but also with informality as a wider problem bearing on taxation matters. The study's novelty is its systematic exploration of DRM and informality datasets to complement a growing literature linking informality to both formal and informal taxation in LICs.

I show that while a higher prevalence of informality is negatively associated with DRM, this is equally true of other factors associated with underdevelopment. I maintain that better scores on government quality and technology adoption in government systems can play a role in mitigating informality. However, improvements in government quality and a technology boost cannot and should not be premised on doing away with informality but on working with it, especially in the informal sectors, where informal work provides a lifeline for many in SSA. In comparison with improvements in government quality scores, an incremental technology boost shows limited results, confirming the limits of 'tech solutionism'.

With regard to policy, I argue that discussions need to avoid abolitionist attitudes towards the informal sectors and deal with informality as a wider structural phenomenon. In this wide spectrum of informality, efforts need to focus on where substantial wealth is. This implies that rather than trying to tax street vendors, it may be necessary to devise other intermediate 'taxless' forms of development financing (Ang 2022) while securing livelihoods for these vulnerable people, especially for those in subsistence informality. If registration and formalization efforts have ancillary benefits, as they surely do, taxation cannot be essentialized.

In Section 2, I explore the conceptualization issues on informality in addition to theoretical debates on structural transformation. The aim is to highlight conceptual issues as well as showing that informality cannot be separated from wider development issues affecting revenue mobilization. Section 3 explains the data and methods and describes the empirical analysis. This is followed by a brief discussion in Section 4. Section 5 engages with research and policy implications and relates the discussion to insights from the recent literature. Section 6 concludes.

2 Theoretical and conceptual debates

2.1 Conceptualizing informality—a hit-and-miss affair

The concept of informality is highly debated because it means different things in different settings. If the literature was 'in a mess' in 2009, as argued by Kanbur (2009: 5), it does not seem that things are better now, in 2022. The need for a new research and policy agenda that transcends a disciplinary focus remains apparent (Gallien and Van Den Boogaard 2021). It is perhaps in relation to taxation where this mess is most costly because harmful tax policies may be recommended for the vulnerable while wealthy individuals and large firms remain untouched. In developing countries, informal transactions occur across small and large firms, both registered and unregistered; hence there is no need to focus on which is informal. For this reason, targeting the informal sectors is tackling only a small part of a big issue. It follows that for taxation there is a need to understand the extent of a broad range of informal activities and transactions, whether they are strictly in small unregistered businesses or large formal ones. This implies that informality, as used in this study, goes beyond the informal sectors to also capture informal economic activities in the formal economy. This is a broader way to include all activities that are not recorded in official economic activities.

Informality manifests itself in different forms, which is a relevant starting point for progress towards understanding the taxation–informality link. Otherwise, policy recommendations may be premised erroneously on arguments like why Malawi does not tax the way Denmark does or that the revenue problem can be solved by eliminating the informal sectors. Within LICs, what drives informality will determine what revenue strategies are feasible. This implies that, with regard to taxation, success will be contingent on the type of informality at hand. Synthesizing the conceptual debates in the literature on informality and acknowledging taxonomic limitations, I choose here to parsimoniously explain three categories, aiming to prove that when it comes to taxation, it is not the visible 'street vendor informality' but all shadow economic activities that matter. The categories are also not mutually exclusive, given that many overlaps exist and there are degrees of informality (Gallien and Van Den Boogaard 2021).

Subsistence informality

Often, the unemployed need to make a living through subsistence activities. For SSA and other developing regions, this category is the largest, yet revenue prospects are also low. This category is dominated by people who have barely completed secondary school (Mugoda et al. 2020). As the lowest tier of informality, it consists of people who hardly get by and perhaps represents a 'dead end' rather than a 'stepping-stone' type of informality (Danquah et al. 2021: 21). Due to its visibility, it intuitively constitutes what the vogue term 'informal sector' captures but at the same time it is only a small part of wider informality.

Subsistence agriculture dominates this category, but rural–urban migration has also led to a rise in urban informality, many such migrants being regarded as 'penniless entrepreneurs' (Banerjee and Duflo 2007: 162). Urban subsistence has grown immeasurably over the last two decades, dominated by hawkers in transport nodes and at traffic lights. Most people in this category cannot substantially contribute to the state coffers because they are below tax thresholds. In rural areas, the category is also pervaded by administrative inefficiencies caused by low population densities (Beach and Van Den Boogaard 2022). Usually, the benefits do not outweigh the costs of any system of taxpayer registration.

The pandemic dealt a major blow to this category, and securing livelihoods through various interventions seems more appropriate than tax surveillance. This is especially true of those in urban areas, who were affected by the lockdowns more than their rural counterparts.

The excluded/exited

This category includes those wanting to grow beyond subsistence. Small firms and workers involved often encounter several barriers to registering their businesses. The regulatory burden is the most cited (Delechat and Medina 2021; La Poerta and Shleifer 2014). The cumbersome process of aligning with the rules means that the informal sectors remain a more flexible and better option. It is also often the case in LICs that these firms or workers operate with relatively low human capital and technology levels. The formalization burden means that these people are 'excluded', and those who do enter the formal sector often opt to exit (Nyakuwa 2018). Unlike those at the subsistence level, some in this category are potential taxpayers, if they are not already burdened by informal taxes and other tax-like fees and levies (Van Den Boogaard et al. 2019).

Easing regulations and simplifying the processes may act as incentives for registration, but balance is also needed because any aggressive taxation policies may kill the proverbial golden goose through exit options. Market development is critical for this category. Within LICs, it is also naive to limit such efforts to the informal sphere, because the excluded are often enmeshed in the supply

chains of large formal firms. For most of those in service provision, such as hair salons, catering, and other face-to-face activities, the pandemic also dealt a blow through loss of revenue.

Evaders, avoiders, and those 'above the law'

This group is usually within tax thresholds and should be paying taxes since their operations have grown beyond subsistence. While some are in informal sectors, many under-filers (icebergs) and non-filers (ghosts) exist in the formal sector in developing regions (Moore et al. 2018) in addition to 'those to whom regulation does not apply' (Kanbur 2017: 959), reflecting the problem of defining informality. To a greater extent, those who operate in this tier interact with the formal sector in many ways, belying the formal–informal dichotomy.

Due to its size and scale, this category has the largest potential for additional revenues. Informal transactions in this category often involve large sums, reflecting the taxable capacity. If one accepts the notion that the informal sectors are a 'goldmine' for revenues (Monye and Abang 2020), a segmented view of informality will point to this category as the possible source of these 'pockets' of untaxed revenue. Presumptive taxes are often based on, for instance, passenger-carrying capacity (transport) or occupancy of a room in business centres (Dube and Casale 2019). The establishment of large taxpayer units in revenue departments is a move in the right direction in terms of dealing with this category, yet balance is needed to avoid 'hunting in the zoo' (Moore et al. 2018).

The above discussion highlights that, while informality as a concept is intuitive to use in policy and research, it has several qualitative layers, which make any blanket policy tool blunt. A segmented view or partition of informality has gained prominence in policy debates (ATAF 2021; Kanbur 2017). However, it remains of limited usefulness, as the data have not been refined to such categories. The advantage of using shadow economy estimates is that these capture all the above categories.

The above categories interact with the formal sphere to varying degrees, which implies that informality shapes fiscal contracts in SSA. Fiscal contracts involve state–society reciprocity, which allows voluntary compliance by citizens with their tax responsibilities in exchange for public goods and services. This implies a two-way relationship in which the state earns the taxpayer's cooperation (Levi 1988). Income tax has often been regarded as an outcome of functional fiscal contracts in Europe (Besley and Persson 2010, 2014), but how SSA fiscal contracts can be characterized remains a subject of debate, especially with regard to whether European versions are desirable or politically feasible (Gwaindepi 2021; Robinson 2022). The post-colonial fiscal contract in SSA has remained far from perfect, especially if European versions are used as benchmarks. The role of informality is critical. For instance, highly informal economies also provided the least assistance during the pandemic, further weakening the existing contracts.

If the formalization drive is radical, it may only increase nil-filing through the growth of so-called active ghosts (Mascagni et al. 2022), which might affect the consolidation of fiscal contracts. Embracing informality, and understanding it, will be more important than insisting on Weberian order (e.g. by formalization) before conditions are ripe. Robinson (2022), for instance, argues that 'tax aversion' in SSA is partly due to the fact that, historically, the social contract has never been about taxes. Development by formalization can be a misfit to many of the LICs in SSA, where informality itself should be viewed as the seed and basis upon which economies will ultimately develop in ways that could trigger demand for formalization from below. Informality is thus 'an important milestone on the transformation path […] that needs more support' (Fox and Pimhidzai 2011: 30). Informality can easily re-manifest in different forms (Levy 2010). The main underlying

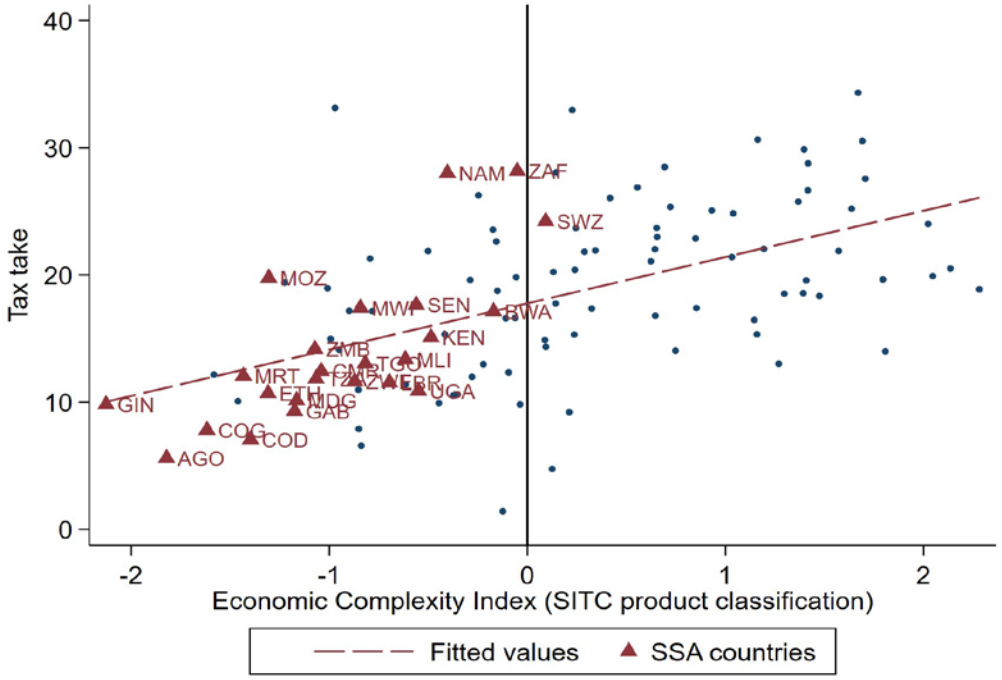
issue is that economic structure is the main factor driving informality. I briefly explain this in the next section.

2.2 Economic structure and taxation

Discussions about taxation and informality should be contextualized within the wider discussion of structural transformation, which speaks to how economies have moved up the ladder of industrialization. For instance, in the taxation and development literature, GDP per capita is one of the proximate drivers of taxation (Fenochietto and Pessino 2013; Ohnsorge and Yu 2021; Özgür et al. 2021; Tagem and Morrissey 2021). Richer economies are expected to tax more because they have bigger tax bases or so-called tax handles (Mkandawire 2010). It follows that richer economies also have low levels of informality, given their tendency to develop information capacity that allows them to know more about individuals and firms.

The literature on structural change and industrialization has demonstrated the prevalence of premature de-industrialization where manufacturing peaks at low income levels (Newfarmer et al. 2018). In other words, most developing countries are 'running out of industrialisation opportunities sooner' than the newly industrialized Asian nations (Rodrik 2016). The rise of China as the factory of the world has also reduced the prospects of labour-intensive industrialization in many SSA LICs, especially given that modern manufacturing tends to rely on higher skill sets. Fewer firms in typical manufacturing sectors means fewer people with these traditionally stable blue-collar jobs, hence reducing taxable capacity. Using the Economic Complexity Index, Figure 1 illustrates the importance of the structure of the economy: that when economies improve their production systems towards greater product complexity, the tax handles and, eventually, tax revenues increase. This provides a more detailed picture than using income levels (e.g. GDP per capita), which hide details about where the taxable capacity lies in the economy. For instance, oil-rich economies may have higher income per capita but perform poorly on tax collection.

Figure 1: Tax take and economic complexity



Source: author's illustration based on UNU-WIDER (2021); Economic Complexity Index data from World Bank (2022b).

Figure 1 shows how LCIs cluster in low complexity levels and tax levels. SSA countries are shown by their ISO codes. The more complex the production processes, the more high-value the activities. These require, among other things, patents and financial intermediation, thereby increasing third-party information trails, which states can access for taxation purposes. Tax enforcement is bound to be successful if 'third-party information covers a large fraction of taxable income' (Kleven 2014). At low complexity, production and trade are mainly in low-value-addition and raw material trade—avenues where informality prevails. Where third-party information is weak, taxpayers who are 'willing to cheat' are also able to do so (Kleven et al. 2011).This implies that LICs can be stuck in a vicious cycle, which flows as follows:

> Undiversified economic structure → reliance on the exports of primary products → limited local product value chains networks → underdeveloped third-party information trails → persistent informality.

High levels of informality and self-employment imply that the availability of information trails is limited. Part of the high informality in SSA is due to a large portion of people reliant on subsistence farming. LCIs produce largely within the primary sectors (agriculture, mining, fisheries, and tourism), with limited value addition. One implication is that even formally registered firms engage in informality at sites of extraction, especially mining firms. In addition, mining firms may receive undue exemptions when formal and informal arrangements (at times through traditional institutions) are interlinked in ways that create opportunities for patronage. The informal arrangements became more complicated during lockdowns, further reducing revenue possibilities. For this reason, highly informal economies had the lowest COVID-19 fiscal incentive packages despite their citizens requiring more help (see Figure A2 in the Appendix). This is why targeting informality broadly is more important for revenue generation than merely focusing on the informal sectors. The next section provides an empirical exploration of the available datasets that can shed light on the DRM–informality nexus.

3 Data and empirical analysis

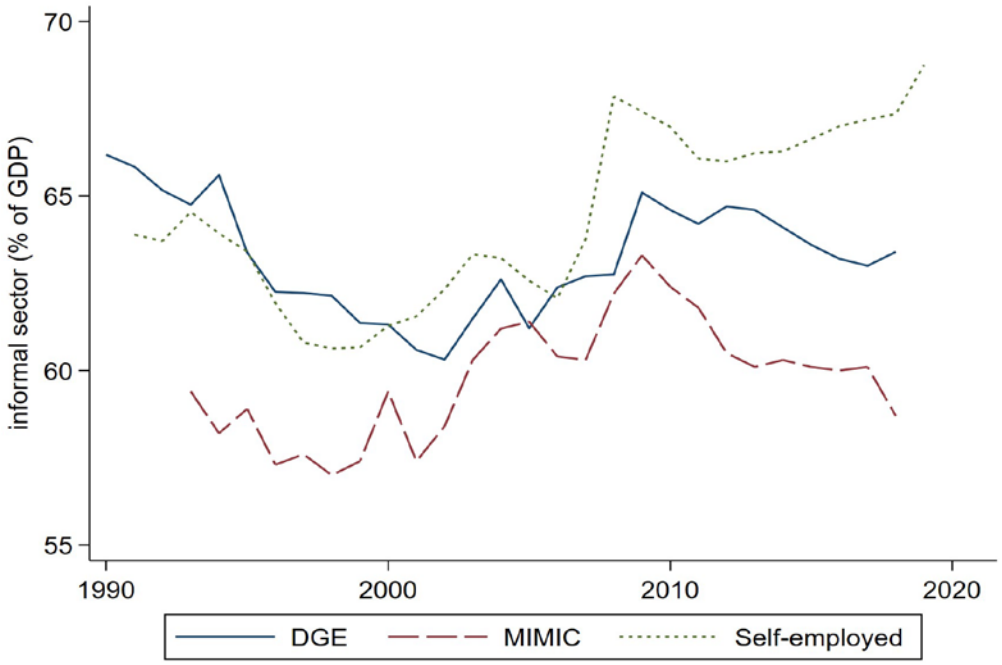
3.1 Data

The study encompasses two areas of research, DRM and informality, measured broadly through the size of the shadow economy in each SSA country. I use the Government Revenue Dataset (GRD) (UNU-WIDER 2021) and recent estimates of the size of shadow economies (Elgin et al. 2021; Ohnsorge and Yu 2021).

Informality is notoriously difficult to measure—particularly so for many LICs in the SSA region. Even though direct informality measures are desirable, surveys are expensive and survey data sporadic. One relatively consistent direct measure is the International Labour Organization's (ILO) self-employment (as a share of total employment). Its problem is that it records only self-employed people, many of whom are not informal workers or non-compliant in tax terms. It also misses informal transactions by large firms and thus excludes a significant chunk of informality that affects revenue mobilization. For this reason, I use the model-based indirect estimates of Elgin et al. (2021) and Ohnsorge and Yu (2021). Using estimates, especially those produced by macro-modelling, comes with limitations. Data for developing regions are patchy and often of low quality, even for the known formal sector. This implies that while data get better over time, the available 'poor numbers' (Jerven 2013) must be used with honesty and caution for policy implications—particularly data produced by macro-models, which carry many assumptions and ad-hoc specifications.

To illustrate how measuring informality remains far from an exact science, I use Zimbabwe as an example, as it is among the most informal economies in the world (ATAF 2021). Figure 2 shows two model-based estimates—the Dynamic General Equilibrium (DGE) and the Multiple Indicators Multiple Causes (MIMIC)—together with self-employment estimates from the ILO.

Figure 2: Same country, many measures: the Zimbabwean example



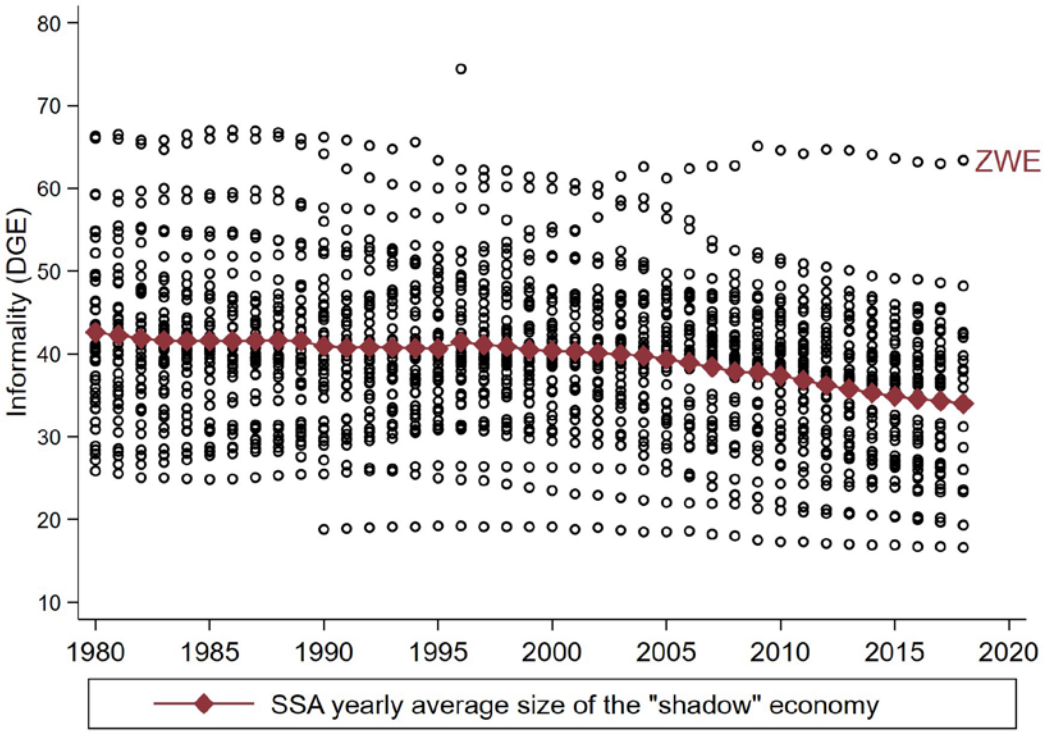
Source: author's illustration based on data from Elgin et al. (2021) for the DGE and MIMIC estimates and ILO harmonized data from the World Bank (2022b) for self-employment.

Figure 2 highlights the considerable differences between the MIMIC estimate, DGE estimate, and self-employment measure. For example, the MIMIC estimate shows that, since 2010, informality has decreased, while the DGE estimate shows a decrease from 2010, but an increase over the last few years. Since Zimbabwe had a coup in 2017, resulting in a worsening economic situation, it is illogical that informality decreased drastically, as shown by the MIMIC estimate, and it is likely that the self-employment and DGE estimates are closer to reality. The MIMIC approach has limitations such as its reliance on GDP as a cause and indicator variable and the fact the model's coefficients are sensitive to alternative specifications (Elgin et al. 2021: 7). I therefore use the DGE estimate, which covers a wider range of shadow economic activities. The choice of the DGE is based on how well it shows patterns for Zimbabwe as the most informal economy in SSA.[1]

Using the DGE estimates, Figure 3 shows the general trend across SSA countries, which is that informality has declined only modestly, even during the phases of fast economic growth, with Zimbabwe (ZWE) highlighted for its divergent trend. The average size of the informal economy in SSA declined from 43 per cent in 1980 to approximately 39 per cent in 2018. While development economics theories posit that informality will vanish, its modest decline over this long period points to the fact that it is normal for many countries at the periphery (Kanbur 2017).

[1] That said, DGE approaches are subject to ongoing debates about overhauling macro-economic models (Vines and Wills 2021), partly ignited by the failure of macro-economic models to predict the 2008 crisis, as per the Lucas critique.

Figure 3: Estimates of shadow economies in SSA



Source: author's illustration using data from Elgin et al. (2021).

One clear pattern revealed in Figure 3 is the heterogeneity across countries, with Zimbabwe (ZWE) having the highest level of informality. Overall, informality is resilient, and the low rate at which jobs are created in SSA does not seem to promise that many will be absorbed by the formal sector. In this context, it seems odd to prioritize formalization as a solution. In the light of the de-industrialization debates (Diao et al. 2019; Gollin 2018; Rodrik 2016), it is plausible that GDP growth may occur without a proportionate reduction in informality, especially if the growth is from higher-productivity sectors, which require skills that only a few have.

3.2 Empirical approach

So far, the informality dataset has been used to understand the drivers of informality, but I use it together with the GRD to explore the DRM–informality nexus. I take an open approach given that informality, development, and taxation continue to be largely a chicken-and-egg situation as far as core causal and core indicator variables are concerned (Kanbur 2017; Medina et al. 2017; Ulyssea 2020). I therefore explore the DRM–informality nexus with a non-causal correlational analysis in a panel framework of the form:

$$Tax_{it} = \beta_1 + \beta_2\, Informality_{it} + \vartheta_{it} + \omega_i + \mu_t + \varepsilon_{it} \qquad (1)$$

where Tax_{it} is the dependent variable that captures the tax take (i.e. the tax share in GDP), focusing on the non-resource taxes excluding social contributions. Informality is explored using estimates from the DGE model (Elgin et al. 2021). ϑ_{it} represents various time-varying and time-invariant controls and factors that have a bearing on taxation (income levels and administrative and policy indicators such as quality of governance and corruption). ω_i is the country effects and μ_t is the time effects. ε_{it} is an overall error term.

The main analysis relates to three basic hypotheses. First, I analyse the relationship between taxation and the shadow economy across the panel of 30–40 SSA countries from 1980 to 2020 (depending on data availability).

Hypothesis 1: Higher levels of informality are associated with lower tax shares, ceteris paribus. This is based on Equation 1. The hypothesis is confirmed if $\beta_2 < 0$ and is statistically significant.

Second, I analyse how quality of government can mitigate the effect that informality has on taxation by interacting informality with measures of government quality. The second hypothesis is therefore as follows:

Hypothesis 2: The influence of informality on taxation is conditional upon the quality of governments, ceteris paribus.

The main indicator used is overall government quality (Donner et al. 2020). This is mainly because debates focus on what governments can or should do about informality, at times with external assistance. Government quality is a composite index that groups the scores of steering capability, resource efficiency, and consensus building—features that inherently drive robust fiscal capacity and contracts. I alternate this measure with a political institution measure—based mainly on the different democratic measures from the varieties of democracy (V-Dem) dataset (Coppedge et al. 2020). Revenue mobilization requires administrative capacity, but politics is also important given the need for representatives to win the hearts of the electorate (Meltzer and Richard 1981). For this analysis, I augment Equation 1 as follows:

$$Tax_{it} = \beta_1 + \beta_2\, Informality_{it} + \beta_3\, Informality_{it} * Gvt.Qual + \omega_i + \mu_t + \varepsilon_{it} \quad (2)$$

The marginal effect of informality on taxation conditional on the quality of government is given by:

$$\frac{\partial Tax}{\partial Informality} = \beta_2 + \beta_3\, Gvt.Quality \quad (3)$$

Hypothesis 2 is confirmed when $\beta_2 > \beta_3$.

Third, I seek to determine whether the adoption of ICT in government systems mitigates informality's influence on taxation. This is in line with the recent literature arguing that technology has the potential to aid weaker governments through taxpayer portals and improved database management, which enable e-filing and e-payments (Arewa and Davenport 2022; Munoz et al. 2022; Santoro et al. 2022). For the level of ICT adoption, I use a composite measure of e-government, which captures the extent to which governments use online services and the general level of internet penetration and use by the public (United Nations 2020). This deepens prospects of extensive information trails with many possibilities for improved taxation of digital services and the growing use of taxes on mobile transactions. The hypothesis is as follows:

Hypothesis 3: The influence of informality on taxation is mitigated by the absorption of ICT technologies in government systems, ceteris paribus. As in H2 above, Equation 1 is augmented as follows to test H3:

$$Tax_{it} = \beta_1 + \beta_2\, Informality_{it} + \beta_3\, Informality_{it} * E\_govt + \omega_i + \mu_t + \varepsilon_{it} \quad (4)$$

The marginal effect of informality on taxes conditional upon the adoption of ICT will be given by

$$\frac{\partial Tax}{\partial Informality} = \beta_2 + \beta_3\, E\_Government \quad (5)$$

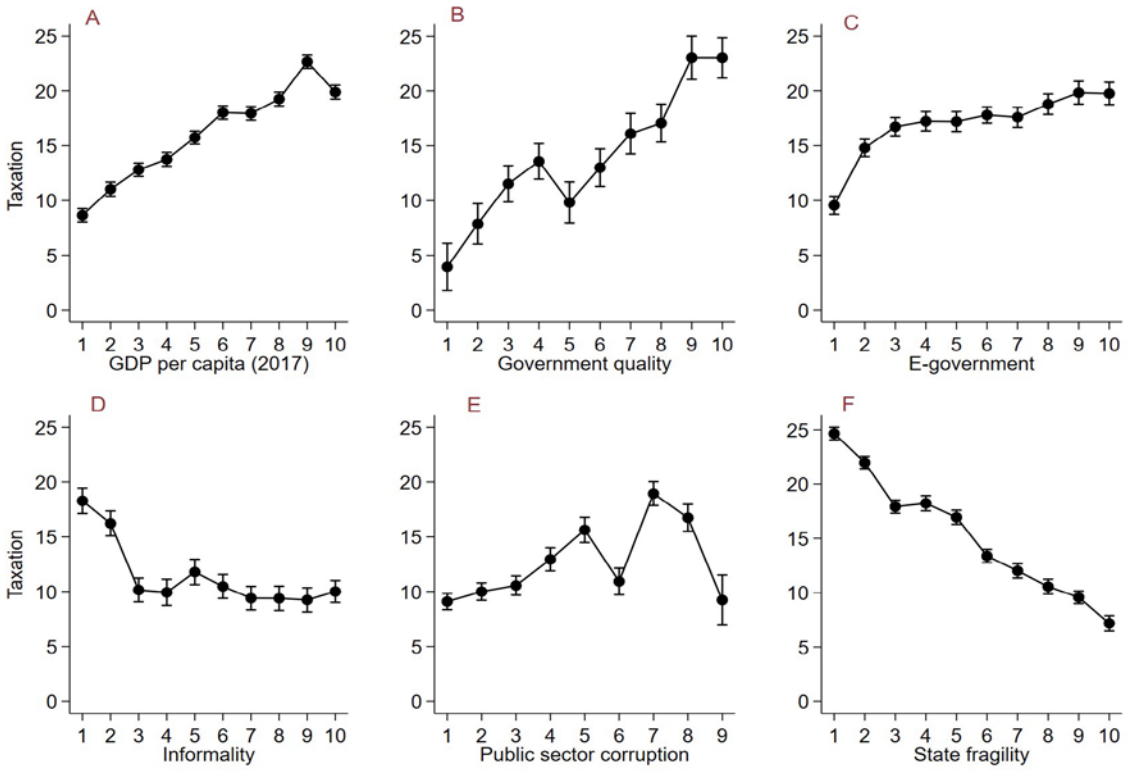
Hypothesis 3 is confirmed when $\beta_2 > \beta_3$.

In essence, the core of the analysis seeks to dwell on two dimensions of government: (a) its general quality and (b) the adoption of technology in government systems. This is essential because the debates on informality have centred on the need to eradicate informality either by boosting state capacity to register and monitor citizens or by adopting enabling technologies that allow states to tax the informal sectors electronically (e.g. via e-levies on mobile transactions) and to use ICT to ease other administrative obstacles. The overarching question is whether better-quality and tech-savvy government systems can deal with the challenges associated with revenue collection in the context of high informality.

3.3 Analysis

I begin by following the basic version of Equation 1 and plotting the adjusted predictive margins of tax revenue against the distributions of some important tax correlates (Figure 4). To do this, I rank the data into 10 deciles from the lowest (decile 1) to the highest level (decile 10). Using the data for the 1980–2020 period, I demonstrate that informality is not isolated from other issues that affect DRM.

Figure 4: Predictive margins of taxation against covariates



Source: author's illustration based on data for informality from Elgin et al. (2021); corruption from Transparency International (2021); GDP per capita from the World Bank (2022a); government quality from IIAG (2020); state fragility from Marshall and Elzinga-Marshall (2017); e-government from the United Nations (2020).

Panels A to C indicate that GDP per capita, government quality, and e-government positively correlate with taxation, as confirmed by the tax and development literature (Besley and Persson

2013; Mkandawire 2010). Panels D to F indicate that informality, corruption, and state fragility negatively correlate with tax collection. The patterns of corruption (E) deserve further explanation. I use public sector corruption, which seems benign at lower levels but, eventually, stifles the amount of tax that can be collected. It has been argued that at low levels of corruption, the positive relationship shows that some form of corruption actually 'greases the palms and wheels', but at higher levels it becomes a sludge or sand rather than grease (Ang 2020: 10–11). Corruption has also been noted to incentivize 'exit' from the formal sector, since it shows a dysfunctional fiscal contract in which taxpayers lose trust and tax morale (Joshi et al. 2014). For instance, professionals in Kenya are recorded as saying that paying tax is 'pointless' in the face of unaccountable leadership (Ogembo 2020).

I then explore the nexus between informality and taxation through a step-wise non-causal correlation analysis (Table 1). The variable descriptions and descriptive statistics are found in Tables A1 and A2 in the Appendix. From column 1 to 7, I add more variables in the specification to show changes to the coefficient of informality.

Table 1: Stepwise correlations of the tax take and covariates

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Informality	-1.670**	-1.878***	-1.667**	-1.789**	-1.482**	-1.834**	-1.639**
	(0.693)	(0.695)	(0.730)	(0.744)	(0.726)	(0.811)	(0.807)
Gvt_quality		1.434**	1.432**	1.324**	1.336**	1.088*	1.075*
		(0.615)	(0.618)	(0.623)	(0.607)	(0.654)	(0.648)
GDP_PC			1.843	1.254	-1.086	-2.330	-1.215
			(1.583)	(1.630)	(1.653)	(2.222)	(2.237)
Agric. (% of GDP)				-0.847*	-0.610	-1.033*	-1.029*
				(0.483)	(0.472)	(0.580)	(0.575)
E_Government					1.305***	1.131***	1.198***
					(0.259)	(0.285)	(0.284)
Public_sect_man						0.704*	0.594
						(0.394)	(0.392)
Oil rents (%GDP)							-1.006***
							(0.360)
Constant	11.12***	11.28***	13.33***	13.23***	12.71***	10.68***	12.30***
	(0.363)	(0.367)	(1.671)	(1.698)	(1.656)	(2.749)	(2.783)
Observations	505	505	498	493	493	405	405
R-squared	0.125	0.135	0.141	0.146	0.194	0.201	0.218
N	43	43	42	42	42	35	35
Country FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES

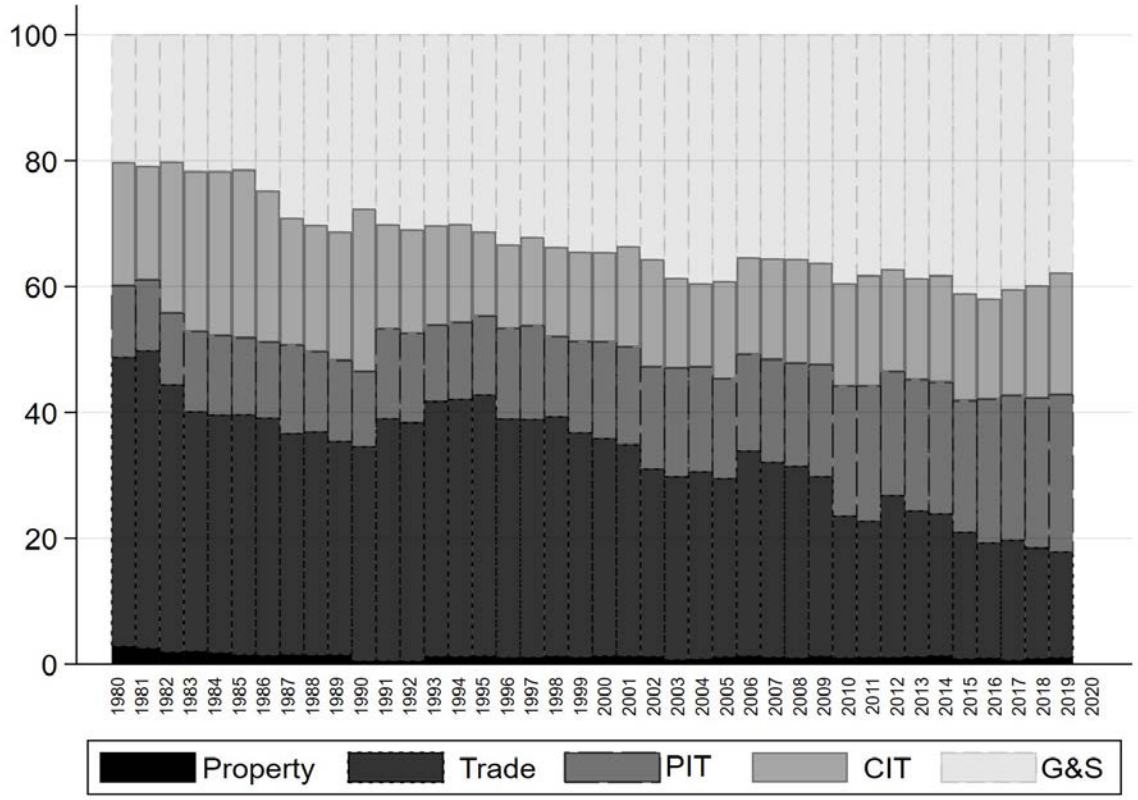
Note: robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations.

The first broad observation is that, with or without controls, an increase in informality has a negative relationship with tax by central governments.[2] Government quality (Gvt_quality) is consistently positive, as expected. This is also true with an alternative specification that uses different measures of the systems of democracy at work (V-dem dataset) (Coppedge et al. 2020). GDP per capita, as one important proxy for the tax base, is positive only in columns 3 and 4 and hardly significant, as theory predicts it to be (La Poerta and Shleifer 2014). Since the study deals with SSA countries, this is plausible because, with de-industrialization, growth can be driven by sectors that do not absorb labour in substantial ways, leaving many to work informally (Newfarmer et al. 2018; Rodrik 2016). The share of agriculture value addition, the adoption of ICT by governments (e-government), and public sector management show the expected correlations. The share of oil rents in GDP also shows that revenue mobilization efforts are minimized when a nation has access to mineral revenue. Oil economies, such as Nigeria, experience higher levels of informality, which emanates from underlying economic structures that lean on exports of natural resources with limited diversification, limiting the tax base.

The above gives a generic picture of the entire tax take without tax composition but, to measure informality, decomposing the tax take is critical because not all sources of tax revenues are affected to the same extent by a rise in informality. The decomposition is also important because most SSA countries rely only on a few tax heads for revenue generation. Figure 5 depicts a stylized pattern of tax composition and the changes since 1980 for SSA countries.

Figure 5: Average ordinary tax composition in SSA



Note: PIT is Personal Income Tax; CIT is Corporate Income Tax; G&S is taxes on goods and services.

Source: author's illustration based on data from UNU-WIDER (2021).

[2] In this table (and others), the number of countries and observations vary due to data limitations.

Trade taxes started in 1980 at approximately 50 per cent and were later largely replaced by taxes on goods and services (G&S). Over 65 per cent of revenue in LICs comes from indirect taxes—mainly VAT and excise taxes. The dependence on VAT has raised concerns about its implicit gender bias, especially given that women mostly work in informal micro-firms, which cannot benefit from VAT claims (ATAF 2022: 31). This also implies that a pandemic such as COVID-19 or any crisis will affect women more. There is evidence that personal income tax (PIT) is growing, but this is not the case with corporate income tax (CIT), and research has pointed to generous tax incentives and undue exemptions granted to firms due to tax competition in the region (Gwaindepi 2021; Moore et al. 2018; ATAF 2022). Property taxes do not show any improvement and clearly remain a potential revenue source for SSA countries. Their potential lies in their stability as an immobile tax base, especially in big cities, where estate businesses will likely continue to grow.

To show how various revenue sources relate to informality, Table 2 provides a baseline estimation, which confirms that informality is negatively correlated with all tax components except property tax, which is insignificant and also a minuscule component across SSA, as previously discussed. CIT shows the highest magnitudes, while trade taxes and taxes on goods and services are the lowest. The results appear to show expected outcomes. International trade taxes are relatively easy to collect at borders, where efforts to reduce smuggling and evasion readily yield results. This is different from inland revenues such as PIT and CIT, which require considerable administrative capacity to monitor transactions and pockets of untaxed incomes and wealth.

Table 2: Informality and tax composition

Variables	Tax take	Property	PIT	Trade	CIT	G&S
Informality	-1.332***	-0.00764	-0.566***	-0.299*	-1.209***	- 0.423***
	(0.185)	(0.0174)	(0.0888)	(0.166)	(0.191)	(0.120)
Constant	11.90***	0.246***	1.670***	5.175***	1.429***	2.868***
	(0.550)	(0.0580)	(0.247)	(0.520)	(0.451)	(0.383)
Observations	1,420	780	937	1,265	891	1,228
R-squared	0.174	0.049	0.175	0.084	0.107	0.331
N	46	40	43	46	40	46
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Controls	NO	NO	NO	NO	NO	NO

Note: robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations.

In line with Hypotheses 2 and 3, I investigate how two main factors mitigate the limiting effect of informality on revenue mobilization. The first is government quality. In the face of high levels of informality, the capacity of the state to monitor and detect tax evasion associated with informality determines the tax revenue that can be realized. High-capacity states can raise more revenue in the presence of informality than low-capacity states. For overall taxes (tax take), the influence of informality is reduced when it is interacted with government quality, as shown by the sizes of the coefficients (i.e. $\beta_3 > \beta_2$) (Column 2 in Table 3). This is to be expected because nations that are highly informal, but with good institutions, should be able to deter evasion and also possess the capacity to collect in the presence of informality. Higher scores in quality of government imply that the states are capable of designing fair and effective tax systems. When the revenues are used to provide public services, taxpayer compliance and cooperation increase, with possible dividends for nation-building (Prichard 2010; Sebele-Mpofu 2020). This is something that the tax effort literature has revealed (Gwaindepi 2021a; McNabb et al. 2021). Alternative measures of government using the V-dem dataset for political institutions show similar outcomes (Table A4 in the Appendix). It is important to observe that the coefficient on tax on goods and services (G&S)

becomes positive (Column 2 in Table3). The dominance of VAT in this category is influential for this outcome. Consumption taxes such as VAT are difficult to avoid or evade—even by those who are strictly in the 'informal sectors'—as long as they consume goods that are linked to the main retailers and traders who are registered for VAT.

Table 3: The role of government quality and technology

Variables	Tax take	G&S	Property	PIT	Trade	CIT
Informality	-1.069	0.366	0.00280	-0.231	-0.776	-0.0488
	(0.894)	(0.380)	(0.121)	(0.278)	(0.791)	(0.206)
Gvt_Quality	0.583***	0.130	0.00898	0.00965	0.569***	0.147**
	(0.215)	(0.0976)	(0.0251)	(0.0910)	(0.204)	(0.0659)
E_Government	0.744**	-0.0781	0.0184	0.251**	0.975***	0.0929
	(0.305)	(0.139)	(0.0358)	(0.106)	(0.285)	(0.0751)
Informality*Gvt_Qual	-0.127	0.567***	-0.141***	0.0635	-0.865***	0.0457
	(0.223)	(0.107)	(0.0321)	(0.0798)	(0.216)	(0.0558)
Informality*E_Gvt	0.440**	0.238***	0.0242	0.175**	0.0488	0.0396
	(0.208)	(0.0896)	(0.0276)	(0.0728)	(0.185)	(0.0480)
Constant	17.05***	5.548***	1.186**	5.375***	3.646	5.319***
	(3.273)	(1.316)	(0.510)	(1.168)	(2.776)	(0.827)
Observations	353	335	170	200	344	209
R-squared	0.290	0.402	0.460	0.510	0.212	0.497
N	31	33	24	25	33	25
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES

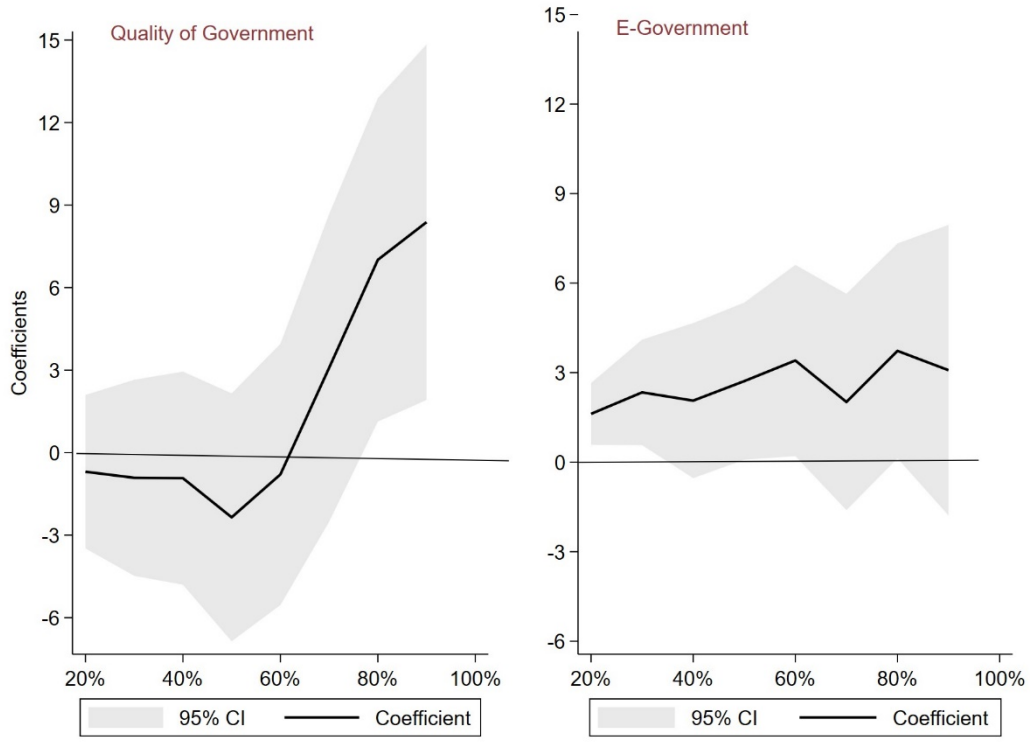
Note: robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 Tax take is the tax-to-GDP share; G&S is tax on goods and services, PIT is personal income tax; CIT is corporate income tax.

Source: author's calculations.

Second, the interaction of informality and e-government (informal*E_Gvt) shows a positive correlation signalling the potential of technology in increasing revenue collection in the face of high informality. Debates on ICT-driven taxation and the taxation of digital financial services and e-commerce have increased in academic and policy circles (Munoz et al. 2022; Santoro et al. 2022; Arewa and Davenport 2022). Despite the prevalence of informality in SSA, the region is also experiencing leaps in mobile-based e-commerce with avenues for taxation. Illustrative cases for this are Zimbabwe's and Ghana's 2 per cent and 1.5 per cent, respectively, e-levies on electronic transactions. Due to their effectiveness, these e-levies raised fears of over-taxation, especially in Zimbabwe, which faces several economic challenges (Gwaindepi 2021a; Mangwaya 2022). The instant 'technical' extraction of revenues that technology allows needs to be considered in the light of the properties of good and fair tax systems. Without the consideration of fairness, technology can become a tool of injustice (Lees and Akol 2021; Meagher 2018a).

I further explore the government quality and technology factors by analysing how incremental changes affect outcomes on revenue. This is done to trace the cumulative effects of these two factors by ranking government quality and use of ICT in government systems from the lowest to the highest scores. The results are shown in Table A3 in the Appendix; Figure 6 presents the plot of the coefficients for each.

Figure 6: Incremental changes in government institutions



Source: author's illustration based on data for quality of government from IIAG (2020); e-governance data from the United Nations (2020).

In the first specification, the quality of government is explored from low to high quality, and the first (lowest) level is the base. Compared with the first level (10 per cent), the quality of government becomes positive from the 70 per cent level and statistically significant at the 80 per cent level. This implies that positive incremental changes in government quality do not yield improvements at lower levels but, eventually, these pay off, as seen by improvements in taxation. Specification 2, with E_Government, shows that, relative to the lowest levels, there are potential gains for taxation as technological deepening in state systems occurs, especially when it reaches 80 per cent, where the coefficient becomes the highest. What can be observed is that, unlike quality of government, technology has the potential to yield results in the short term. The main difference between the two seems to be that government quality has the potential to yield more in the long run than a technology boost in state systems can achieve. This is in line with cautions about 'tech solutionism', often pushed by external aid through big projects (Arewa and Davenport 2022). Technology yields results, but it cannot fix many qualitative issues in governments such as corruption. However, equally important are the properties of good tax systems, such as fairness and equity. The results are also in line with observations on sales registration machines (SRMS), which have boosted compliance and accuracy in Ethiopia's tax records but with severe challenges due to other poor administration issues (Mascagni et al. 2018).

4 Discussion

The evidence presented in this study is non-causal but important for ongoing debates on pressing revenue needs for recovery from the pandemic (World Bank 2022a). High levels of informality are negatively associated with DRM in SSA, but so are other factors, proving that informality is only one factor amongst many. I support this by showing that the link between DRM and informality

cannot be separated from the effects of other development issues pervasive in LICs, such as dependency on the primary sectors (e.g. agriculture and mining). This points to the likelihood that persistent structural issues sustain informality as a necessary livelihood strategy for many who cannot access formal employment. Due to the structural issues, broader informality matters more than the hitherto narrow focus on the informal sectors.

In view of the importance they are given in policy debates over 'curbing' informality or reducing the 'problems' associated with informality, I focus on government quality scores and ICT adoption in government systems. I show that government quality matters in mitigating the negative role of informality on tax collection, especially at higher scores of government quality. Regarding ICT, the patterns point to the fact that absorption of technologies can significantly overcome some of the taxation challenges associated with informality, especially for VAT, which relies on electronic information trails (Fjeldstad et al. 2020). The taxation goal needs to be balanced with other important goals of financial inclusion, such as access to simplified banking and credit, which can improve the lives of the unbanked. This study also shows that governments cannot rely solely on being tech-savvy, since other qualitative attributes of governments matter for long-term fiscal capacity. ICT absorption yields results quicker than improvements in government quality scores. However, in the long run, better governments attain higher revenues. It is not easy to modernize the tax system with technology if other government facets are not developed or are fragmented in ways that make the sharing of information impossible. Conversely, while technology can facilitate the collection of taxes, this does not necessarily mean that other conditions of a good tax system are met, such as fairness and equity.

What tax reforms are viable is not only a question of technical know-how and capacity. As was seen in Uganda (Mascagni et al. 2022), taxpayer registration is only one amongst many requirements for robust fiscal systems. Aggressive and unaccountable taxation may cause informality to mutate as actors create new ways of evading taxes. Therefore, what drives informality in each context is important. If political instability drives an economic slowdown, eventually leading to informality, it may not be a case of simply bringing people back into the formal sphere, but of more elaborate development strategies to address base erosion. It is also important to caution that informality in most LICs in SSA has historical roots and cannot be simply 'governed' away or fixed with technology. For instance, most African capitals were built on the segregation that underpinned colonial urban managerialism.[3] Consequently, taxpayer registration is barely scratching the surface of these structural and deeply rooted problems. The technical ability to register informal taxpayers may yield other ancillary benefits that may 'impress someone' (Moore 2022: 13), yet expectations on revenue should remain modest.

It is no coincidence that with high informality comes low educational attainment, poor access to safe drinking water, and low life expectancy (Özgür et al. 2021: 45). Many small businesses and individuals trying to survive do not need an extractive stance but a supportive and inclusive one. This speaks to the bigger debates about the accountability of governments to their citizens and is especially relevant to informal taxpayers who, in many ways, are outside national safety nets and experience poor access to service delivery. In these countries, the informal spheres touch on many issues, such as poverty, unemployment, poor wages, and gender inequality. Policies aimed at tackling one area (e.g. taxation) can easily have unintended consequences in other areas (Levy

[3] Colonial taxation constituted an important fiscal inertia for many of these countries with inherited broken or unbalanced fiscal contracts (Gwaindepi 2022; Gwaindepi and Siebrits 2020; Mkandawire 2010; Sebele-Mpofu 2020), and debates on fiscal contracts have to be historically contextualized (Meagher 2018b).

2010). The solution to revenue shortfalls cannot be the only justification for policies directed at the informal sectors, which embody many of the development challenges.

5 Policy implications and future research agenda

I have explored the nexus between DRM and informality. Here I articulate ways in which future research and policy issues may be conceptualized, using both the insights generated by this study and discernible patterns in the DRM and informality literature.

The first is with regard to the macro cross-country studies on adequate revenue mobilization. This literature has advanced our understanding of DRM but not with clarity in its articulation of the revenue problems related to informality. First, the literature—usually spearheaded by World Bank and the IMF experts—argues implicitly that due to the low tax-to-GDP ratios in developing countries, more should be done to tax the 'informal sectors' (Awasthi and Engelschalk 2018; Delechat and Medina 2021; IMF 2021). The wider implication is that the informal sectors are mistaken for a lucrative tax base in tax policy debates. The second problem is a narrow focus that almost victimizes those in the visible informal sectors, at times through epithets such as 'cheaters', 'hidden taxpayers', 'underground', and 'non-compliant'. Research shows that informality is pervasive even amongst formally registered firms in most LICs (Kanbur 2017; Sen et al. 2022). I have shown that informality is a structural problem and cannot be isolated from other development factors that impede revenue collection. Concrete issues such as illicit financial flows, and avoidance by large firms and high net-worth individuals limit revenue mobilization more, and deserve greater attention, than the targeting of the informal sectors.

Although highly visible, 'street-vendor informality' is not the real problem if the aim is to raise adequate revenue. Even more critical to engage is the literature that shows that the informal sectors do actually pay—in ways not obvious to the DRM researchers. This literature has argued that a key issue is not whether the informal sectors pay taxes or not, but to whom, in what form, and under what conditions (Dube and Casale 2019; Gallien and Van Den Boogaard 2021; Meagher 2018b). Many payments of tax-like fees are made to both state and non-state actors. This literature argues that informal taxation dominates the informal sectors in addition to the formal indirect consumption taxes such as VAT (Van Den Boogaard and Santoro 2021). Radically taxing the informal sector without dealing with these hidden or less obvious 'taxes' may punitively amplify the burdens of those in the sector, especially women (ATAF 2022). Yet, even if these 'payments' were to be effectively captured by the states, they would be meagre as far as revenue mobilization is concerned (Moore 2022). This implies that, rather than trying to tax street vendors, it may be necessary to devise other, intermediate, 'taxless' forms of development financing (Ang 2022).

With regard to future research, this conclusion implies that researchers must remain open about the role, scope, and nature of informality in developing regions. DRM research often hardly engages with literature that explores informality in its full complexity and contextuality. This creates costly blind spots that drive research and perspectives equating the 'informal sectors' with hidden revenue 'goldmines'. At a deeper epistemic level, the formal Western worldview has cemented the 'formal is better' bias because those intervening in and researching Africa are often by-products of euro-modernity and its hegemonic intellectual episteme. This implies that 'taxation' language can be unfair to those being 'taxed' in non-formal ways through non-tax fees and other payments, privileging modern formal taxes and underestimating the real burdens in the informal sectors, where various payments are made but neglected because they do not exist in the official tax language or categories. Essentially, the challenge is that Weberian notions of formality and

bureaucratic order as the linchpin of modern states need to be weighed against the persistent informal 'order' prevailing in many of the LICs in SSA.

6 Conclusion

This study explores the nexus between domestic revenue mobilization (DRM) and informality, which goes beyond the hitherto narrow focus on the 'informal sectors'. I show that, while a higher prevalence of informality is negatively associated with DRM, this is equally true of other factors associated with underdevelopment. Rather than singling out the informal sectors, the solution to informality challenges should involve simultaneity in policy strategies to avoid winning in one area and losing in several others. This study has highlighted that revenue prospects in highly informal economies can be improved by focusing on government institutions and ICT absorption in government systems. However, due to persistent structural issues, good government institutions and technology absorption are still limited.

The study has research and policy implications. The phrase 'informal sector' is in vogue and has been brought to taxation debates in its vacuous form without conceptual clarity on what types of informality matter for taxation, creating grounds for narratives that erroneously equate the informal sectors with lucrative tax bases. This is a myth that the pandemic has exposed. In terms of tax revenues, all 'shadow' economic activities matter, and not only those in the informal sectors. I therefore argue for a re-articulation of the concept of informality when it is included in revenue mobilization research, including frank discussions about what we know about informality in SSA due to perennial measurement and data quality issues. With regard to policy, I contend that while central governments should deal with the so-called large taxpayers, whose informality can be material, there is potential in local development of municipal-level fiscal contracts. This includes mainstreaming or factoring-in the informal taxes or tax-like fees that already burden informal workers. The reason is that the local level is where intimate knowledge exists regarding where taxable incomes are. High levels of informality imply weaker fiscal contracts and a 'distant' state. Consequently, building trust through accountability at local level is critical. The visible benefits of tax compliance can be demonstrated through service provision, even on a quid-pro-quo basis, with the aim of nurturing fiscal contracts.

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Appendix

Table A1: Variables description and sources

Covariates	Description	Source
Informality	Estimates of the size of the informal sectors	Elgin et al. (2021)
State fragility	A combination of effectiveness and legitimacy	Marshall and Marshall (2017)
E-government index	Covers online services and telecoms infrastructure	United Nations (2020)
Public sector management	Budgetary efficiency and revenue mobilization	World Bank (2020b)
GDP per capita	GDP per capita (constant 2017)	World Bank (2020b)
Agriculture value added	Share of agriculture value addition	World Bank (2020b)
Oil rents (%GDP)	Oil rents as shares in GDP	World Bank (2020b)
Corruption	Public sector corrupt exchanges	Coppedge et al. (2020)
Deliberative-Demo	Deliberative democracy index	Coppedge et al. (2020)
Electoral-Demo	Liberal democracy index	Coppedge et al. (2020)

Source: author's construction.

Table A2: Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min.	Max.
Tax take	1,554	12.16676	8.001589	.5359582	54.02
Informality	1,689	39.67086	9.545048	16.6	74.45
Government quality	2,831	5.564912	.8221695	1.05	8.729167
GDPPC	5,393	9.094497	1.194508	6.079293	11.65172
Share of agriculture (% of GDP)	7,484	16.56547	14.3718	.0136239	79.04236
E-government	3,563	.4024554	.161762	0	.8333
Public sector management score	1,204	3.061628	.4905484	1.4	4.2
Oil rents (%GDP)	7,522	3.86262	9.9525	0	87.36999

Note: to deal with different units of measurement, the covariates are standardized in all tables.

Source: author's construction.

Table A3: Incremental changes in government institutions and technology

Variables	Quality of government	E-government
Informality	-5.634***	-1.783**
	(1.413)	(0.876)
20%	-0.693	1.618***
	(1.412)	(0.526)
30%	-0.914	2.339***
	(1.805)	(0.898)
40%	-0.928	2.062
	(1.962)	(1.319)
50%	-2.351	2.716**
	(2.282)	(1.337)
60%	-0.793	3.407**
	(2.404)	(1.628)
70%	3.081	2.018
	(2.832)	(1.841)
80%	7.010**	3.730**
	(2.977)	(1.829)
90%	8.380**	3.082
	(3.273)	(2.474)
Constant	5.096	12.83***
	(4.026)	(3.565)
Observations	219	353
R-squared	0.442	0.304
N	31	31
Country FE	YES	YES
Year FE	YES	YES

Note: standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations.

Table A4: The role of government quality and technology (V-Dem data)

Variables	Tax take	G&S	Property	PIT	Trade	CIT
Informality	-1.030	0.739**	0.104	-0.444*	-1.975**	0.0927
	(0.813)	(0.364)	(0.115)	(0.253)	(0.851)	(0.197)
Gvt_Quality	0.817	0.364	-0.0411	0.435	0.414	0.553**
	(0.766)	(0.353)	(0.0918)	(0.317)	(0.826)	(0.238)
E_Government	1.240***	-0.274**	0.0603	0.234**	1.751***	0.0482
	(0.302)	(0.129)	(0.0371)	(0.0920)	(0.299)	(0.0689)
Infomality*Gvt_Qual	2.911***	1.260***	-0.198**	0.932***	-0.652	0.194
	(0.897)	(0.374)	(0.0811)	(0.261)	(0.874)	(0.196)
Informality*E_Gvt	0.408*	0.297***	0.00527	0.224***	-0.0978	0.0273
	(0.213)	(0.0894)	(0.0311)	(0.0625)	(0.208)	(0.0447)
Constant	13.12***	7.781***	0.861*	4.343***	-2.513	5.641***
	(2.852)	(1.190)	(0.437)	(0.974)	(2.816)	(0.736)
Observations	405	368	190	221	386	230
R-squared	0.241	0.364	0.283	0.514	0.175	0.482
N	35	36	27	29	37	29
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES

Note: standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations.

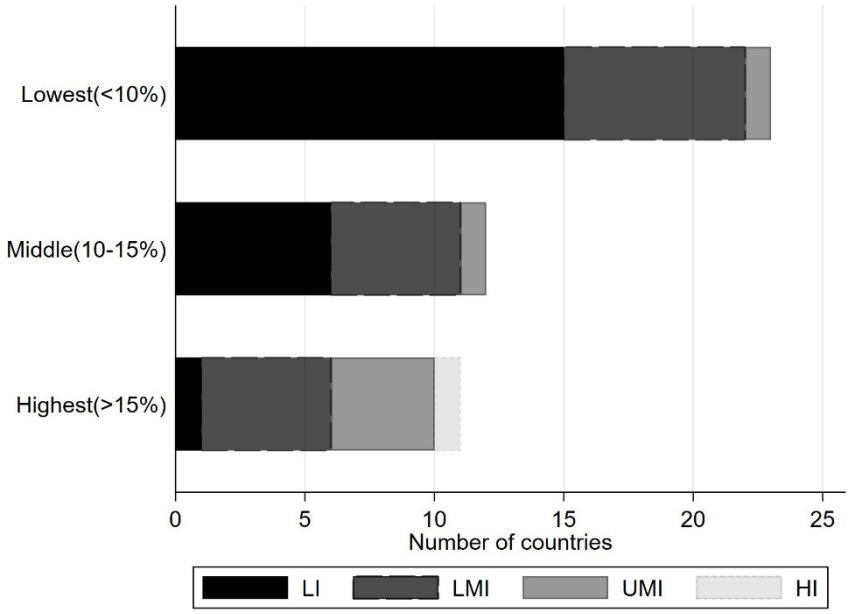
Table A5: Stepwise correlations of the tax take and covariates (V-Dem data)

Variables	1	2	3	4	5	6	7
Informality	-1.670**	-1.576**	-1.104	-1.150	-1.132	-1.618*	-1.506*
	(0.693)	(0.762)	(0.818)	(0.836)	(0.831)	(0.879)	(0.874)
Quality of governments		0.649***	0.625***	0.594***	0.572***	0.582***	0.601***
		(0.164)	(0.168)	(0.172)	(0.171)	(0.203)	(0.202)
Log of per capita GDP			3.554*	3.274	2.031	-0.127	0.802
			(1.985)	(2.042)	(2.100)	(2.379)	(2.396)
Agriculture share in GDP				-0.419	-0.348	-1.120*	-1.091*
				(0.470)	(0.468)	(0.578)	(0.574)
E_Government					0.604**	0.507*	0.570**
					(0.262)	(0.287)	(0.286)
Public sector management						0.503	0.383
						(0.450)	(0.450)
Oil rents							-0.854**
							(0.368)
Constant	11.12***	11.25***	15.60***	15.54***	14.94***	12.59***	14.02***
	(0.363)	(0.420)	(2.372)	(2.387)	(2.386)	(2.991)	(3.033)
Observations	505	408	402	398	398	353	353
R-squared	0.125	0.214	0.227	0.229	0.241	0.261	0.274
N	43	35	34	34	34	31	31
Country FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES

Note: robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

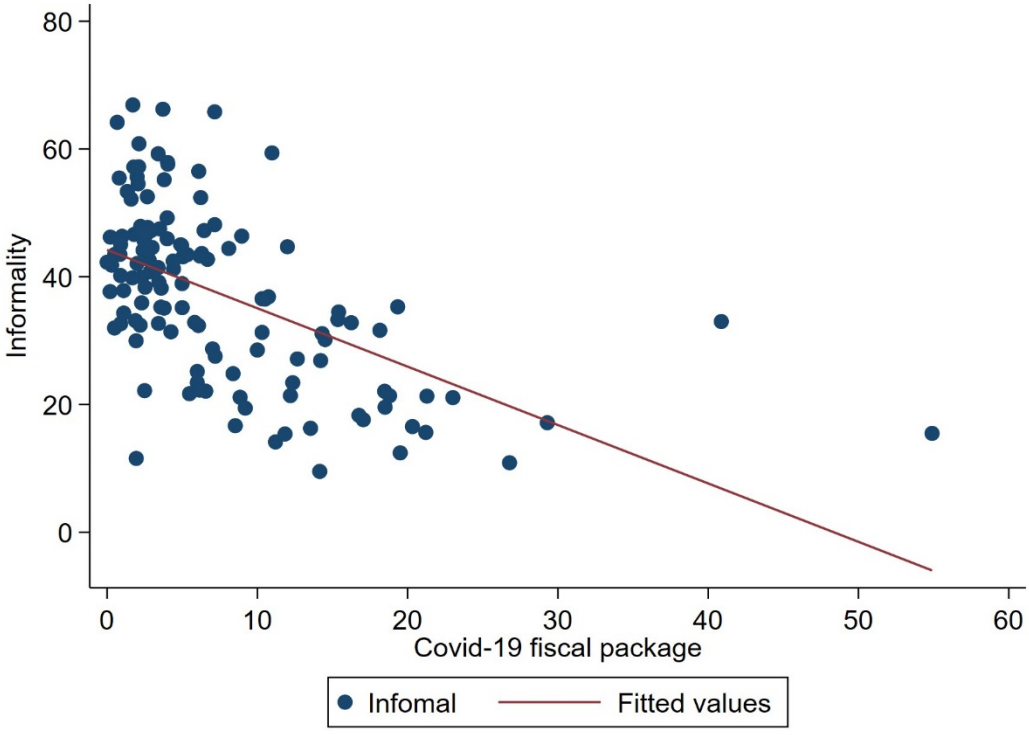
Source: author's calculations.

Figure A1: Distribution of SSA by average tax take and income since1980



Source: author's construction based on data from UNU-WIDER (2021).

Figure A2: Informality and COVID-19 fiscal response packages



Source: author's illustration based on fiscal package index from Elgin et al. (2020) and informality data from the World Bank (2022a).