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Report

Chapter 5: Tax administration and domestic revenue in the digital era

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This document ('Tax administration and domestic revenue in the digital era') is chapter 5 of the 'Public finance in the digital era: Emerging themes' report.

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Abbreviations and acronyms

BEPS	Base erosion and profit-shifting
CIT	Corporate income tax
DPI	Digital public infrastructure
DRM	Domestic resource mobilisation
EFD	Electronic fiscal device
FFD	Financing for Development
GDP	Gross domestic product
ICT	Information and communications technologies
LIC	Lower-income country
LMIC	Lower-middle-income country
OECD	Organisation for Economic Cooperation and Development
PFM	Public financial management
PIT	Personal income tax
SMEs	Small and medium enterprises
UN	United Nations
UN DESA	United Nations Department of Economic and Social Affairs
VAT	Value-added tax

1 Introduction

Internet access can bring increasing participation in the digital economy[1]. Individuals and businesses may use the internet for a variety of purposes, including paying bills sending or receiving funds (including welfare or social protection transfers), buying or selling goods or services, and applying for loans or other financial services.

To the extent that some of these activities were informal in nature, when they take place through digital modes, they may become more visible than before. This shift towards digitised transactions has implications for governments' ability to trace and tax economic activity. Considering taxation as a key aspect of state capacity (Besley and Persson, 2011; Kleven et al., 2016; Benitez et al., 2023), the tax administration itself can also be a key adopter of digital tools and ways of working, towards more effective and efficient domestic resource mobilisation (Okunogbe and Santoro, 2023).

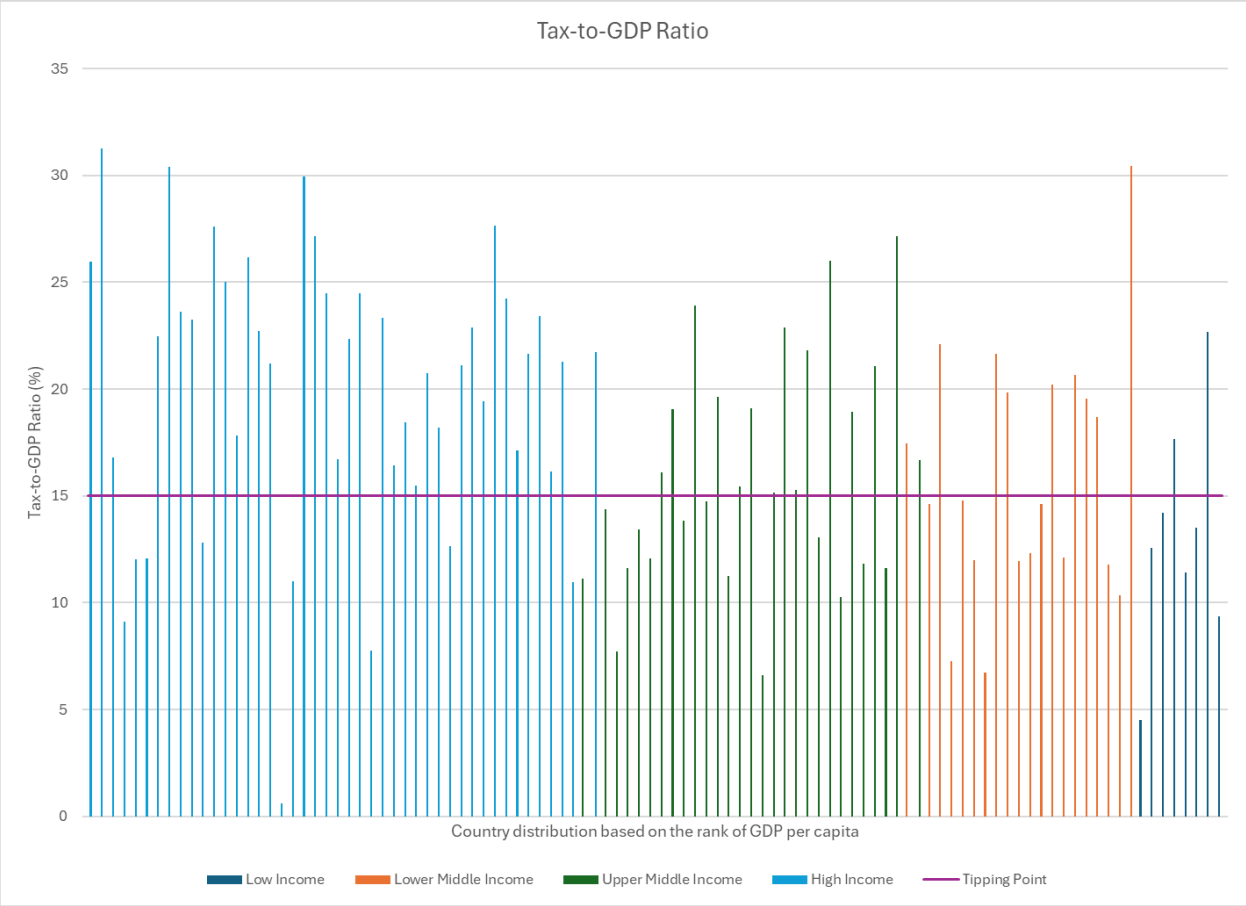
The IMF considers a tax-to-GDP ratio of approximately 13% a 'tipping point': below this, countries struggle to fund governance and service delivery goals, which in turn affects the social compact and reduces tax morale; above this threshold, a virtuous cycle sets in between taxation, public investment, and economic growth (Gaspar et al., 2016). A tax-to-GDP ratio target of 15% features prominently in the discussions leading up to the Fourth Financing for Development Conference (FFD4) (UN DESA, 2023) this June, in keeping with the focus on domestic resource mobilisation (DRM) in the Addis Ababa Action Agenda (UN, 2015), the outcome document of FFD3 in 2015.

As of 2022, 40 countries are below or only slightly above a 15% tax-to-GDP ratio (World Bank, 2022) (see Fig. 1, below). The majority are LICs and LMICs; of the upper-middle-income countries in this category, most are somewhere between 10–15%. This suggests that they could cross the threshold with relatively modest improvements; while any tax potential estimate has to be read with caution, improvements to the tax administration's capabilities are a common thread in any projected gains (McNabb et al, 2024).

[1] "The digital economy refers to a broad range of economic activities that use digitized information and knowledge as key factors of production. The internet, cloud computing, big data, fintech, and other new digital technologies are used to collect, store, analyze, and share information digitally and transform social interactions. The digitization of the economy creates benefits and efficiencies as digital technologies drive innovation and fuel job opportunities and economic growth. The digital economy also permeates all aspects of society, influencing the way people interact and bringing about broad sociological changes." (Asian Development Bank, 2018.)

As a result, there is considerable interest in digitalisation as an enabler of higher tax revenues. Each of the major sources of tax revenue – personal income tax (PIT), corporate income tax (CIT), and indirect taxes such as VAT or customs duties – could potentially be managed in more effective and efficient ways through the adoption of digital technologies.

Figure 1 Tax to GDP Ratio, World Bank data (2022)



Note: The graph includes data from 102 countries. The World Bank's tax revenue data, sourced from the International Monetary Fund's Government Finance Statistics Yearbook, focuses on taxes collected by the central government, such as income taxes, corporate taxes, and value-added taxes (VAT). It often excludes Subnational Taxes and Social Security Contributions. As a result, the World Bank's reported tax-to-GDP ratio figures may appear lower than those of the OECD, which includes some of these components in its estimates.

In this chapter, we look at how the adoption of digital technologies and digital-era ways of working enhances the tax administration's capabilities. We also look at how digital transactions can generate valuable third-party data, which can be used to triangulate estimates of economic activity, and to identify instances of fraud or misreporting. Where taxpayers believe that compliance is easy, and successful evasion is difficult, we expect to see a rise in collections.

There are two aspects of taxation we do not look into. One is about local government taxes, such as property tax; Chapter 4 of this report, which looks at the role of local governments in the digital era,

touches upon these. The second is the conversation around the digital economy leading to base erosion and profit-shifting (BEPS), mostly by large multinational firms (OECD, n.d.). Here, the debate is heavily geopolitical, and we restrict our discussion to countries' domestic policy experiences and innovations.

2 A digital-era tax administration

Okunogbe and Santoro (2023) examine the adoption of digital technologies in tax administration, and identify three broad areas of work: ‘defining compliance’ (expanding the tax base – whether entities or transactions); ‘facilitating compliance’ (making assessment and/or payment simpler); and ‘monitoring compliance’ (automating checks and improving audits).

They also identify potential challenges, including the lack of a strategy or roadmap for technology adoption; this is important, because the best effects are achieved by creating an ‘integrated (and automated) tax administration system’. Currently, many countries are setting up data analytics capabilities within their tax administrations:

- Zambia’s Bulk Intelligence Data Analysis program aims to develop actionable insights from the vast amount of data it sweeps up through various sources.
- Senegal’s tax data lab, set up in 2021, grew out of collaborations with researchers who were using administrative data for tax-related interventions; finding similar challenges in accessing, cleaning, and using such data, they helped set up a unit (staffed by six data scientists) within the tax intelligence department. This unit produces data sets for analysis and research, conducts its own analyses, and has developed guidelines for standardising digital records of manual or non-standard data. (Czajka et al., 2022)
- Honduras, as part of sweeping reforms of the tax administration in 2016, created a new Fiscal Studies department, which uses data from the economy to forecast the impact of tax reforms. The department publishes monthly and quarterly reports using VAT data, which is often the best high-frequency data available on firms’ status and behaviour (Bachas and Jensen 2023).

These data collection and analytics capabilities can be deployed towards all three of the aspects of compliance – defining, facilitating, and monitoring.

Facilitating compliance through e-filing and e-payment

Most countries have adopted measures to digitise their tax administrations, with an initial focus on facilitating compliance. The share of taxes filed online has been rising – albeit with considerable variation across countries: 80–90% in advanced economies, against 30–50% in lower-income and developing countries (Okunogbe and Santoro, 2023).

In Rwanda, Megersa et al. (2023) note that e-filing and e-payment of tax returns has been mandatory since 2015, supported by a web-based platform (for computer or smartphone users) and a feature-phone based application. While adoption levels were low in 2020[2], a COVID-related surge has led to close to 90% adoption. This seems to have wiped out gender gaps in adoption, and reduced the likelihood of taxpayers filing through an intermediary, even with reports of technical difficulties, slow processing and rejected declarations.

Eswatini adopted mandatory e-filing in September 2020, and e-payment in April 2021. Santoro et al. (2024) find that about 40% of taxpayers complied. Given that a very low number of taxpayers used e-filing before this mandate, this still represented a sharp increase in registrations for tax online[3] – especially for CIT, with larger, more tech-savvy firms more likely to register.

Once registered, payers are less likely to file nil returns, more likely to declare higher turnover and taxable income, more likely to file returns on time, and more likely to pay their entire assessed liability. Despite this, overall tax liability has stayed the same, suggesting that firms use other means to reduce their liability; for instance, those who filed income tax returns were also much more likely to file VAT (which they can claim as deductions).

Expanded visibility for defining the tax base

When a large proportion of the economy is informal, the government has limited visibility into its workings; this means limited data to inform policy design and implementation. The digital economy is information-rich, and tax administration can use such information to expand the tax base, conduct targeted enforcement, and fine tune tax rates and policies.

'Third-party information' (information on the economic activity of an entity, shared by those who transact with that entity) is particularly valuable. This information can come from multiple sources, including tax filings, as well as records of transactions, including receipts and

[2] 19% of CIT and 40% of PIT payers, respectively, were not familiar with either the web or feature phone applications.
[3] More than 1700% increase in a two-year period.

banking records. It can give tax authorities visibility into taxable entities and transactions that they were hitherto unable to observe.

VAT filings are a valuable source of third-party information because of their 'self-enforcing' nature (Jensen, 2024). As VAT is charged on value added, each entity in a supply chain has an incentive to overstate its input costs and understate its sales volumes and revenues. Its customers, however, will want to overstate what they bought. Combined with CIT filings, VAT records can thus enable tax authorities to triangulate and verify business' claimed transactions, costs, and profits.

To do so, the tax administration requires the capability to analyse information received from all these entities. If businesses believe that there is a 'paper trail' of their transactions, and that tax authorities are capable of accessing and analysing these records, they become more likely to file more correct and complete tax returns. The increase in digital transactions makes more transactions subject to such 'audit risk', leading to more accurate tax filings. (Pomeranz, 2015).

Beyond banking records, a major source of third-party information comes from the use of e-invoicing and electronic fiscal devices (EFDs). These are devices that record information on sales, including both the value of the sale and the value of the tax, and share it directly with the tax administration. They could be further combined with digital payments, such as through mobile money or point-of-sale devices, which provide a second source of data against which reported sales information could be corroborated.

EFDs can be applied in sectors that traditionally have a higher share of informal transactions. In Pakistan, Asad et al. (2023) find that adoption of an electronic invoice monitoring system (e-IMS) by the restaurant industry leads to an increase, on average, in reported sales by 40%, in tax liability by 25%, and in value added per unit output by 0.4%, relative to baseline data.

The increase in tax liability is notable, given that restaurants can adjust their reported input costs to reduce their tax liability. They could also bypass the device entirely by transacting in cash, without receipts.

In Zambia, for instance, where the Revenue Authority rolled out EFDs to all VAT-registered firms, Siwale et al. (2021) find that even firms with an EFD may still issue informal receipts, or no receipts at all. Buyers and sellers can negotiate a discounted price on the condition that no invoice is issued; conversely, if a buyer insists on a receipt, sellers may charge a higher price to offset the increase in tax

liability.[4] Third-party records will not be created if both parties agree to an invoice-free transaction.

To counter this trend, the ZRA has experimented with incentivising buyers to request receipts. They offered a small prize, through a lottery, for small, non-VAT-registered firms who buy from VAT-registered wholesalers. They observed nearly a 50% increase in tax invoices requested and retained by these small firms. Combined with an EFD, this kick-started the paper trail and self-enforcing properties of VAT (Dillon et al., 2023).

Monitoring compliance through fraud detection

A combination of incentives and targeted enforcement can drive higher compliance. With better data, tax authorities can target potential tax evaders more accurately, concentrating enforcement resources on high-value cases. This can also have a demonstration effect: If taxpayers believe that the tax authority has data-driven intelligence, they are less likely to attempt to manipulate their returns, leading to more accurate data and higher collections.

In Ecuador, tax authorities focused on clients of 'ghost firms' (ones that issue fake invoices, so their clients can claim inputs costs and pay lower VAT). The clients of these ghost firms tend to be among the larger and richer firms (and individuals) in a country, making them high-value enforcement targets. The Ecuadorian Internal Revenue Services notified companies suspected of misreporting that invoices from ghost firms were found in their filings, and gave them a window to file revised returns. About one in four notified firms filed revisions, leading to around an 80% rise in declared profits, and a total increase in CIT of around US $20 million in a 90-day period (Carillo et al., 2023).

Identifying 'ghost firms' (or their clients) is a strong use case for applied machine learning in tax administration. Machine learning models can be trained to pick out the patterns associated with ghost firms, using the rich data available in sales tax and CIT filings. For instance, Barwahwala et al. (2024) trained a model to classify suspected ghost firms in Delhi, India. While their model returns fairly accurate results, they find that the tax administration remains hesitant to incorporate its outputs – a reminder that data alone is not sufficient, and that changes in tax authorities' processes are needed.

[4] In this survey, 90% of respondents reported getting a receipt in formal stores; of those 90%, 69% reported getting a tax invoice – suggesting that ~60% of formal store sales generate tax invoices. In informal stores, only 21% of respondents reported getting a receipt; of those 21%, 28% reported getting a tax invoice, which amounts to barely 6% of sales generating tax invoices. The authors caution that these are based on respondents' impression of what was a formal tax invoice, and that a majority of respondents said they were not confident they could distinguish an informal receipt and a formal tax invoice.

Box 1 Tackling tax evasion through tax withholding and split payment mechanisms

According to the European Public Prosecutor's Office (EPPO) 2024 report, 53% of the 'VAT gap' in the EU was down to VAT fraud, leading to €89 billion in losses for member states. To address these concerns, the EU and other jurisdictions are increasingly using tax withholding or split payment mechanisms, where the VAT amount (or part of it) is retained by the buyer, and paid to the tax authorities directly.

The mechanism is well-established. Bagchi and Dušek (2021) look at withholding of personal income tax by state governments in the United States between 1947 and 1987. They find that, holding tax rates constant, withholding led to an immediate and permanent increase in income tax collections of about 29%.

Split payments are mainly operationalised through digital banking. For instance, in 2019 Poland made it mandatory for some businesses (in the fuel, steel, and electronics sectors) to maintain two bank accounts: one for transactions with buyers, the other to collect and transfer VAT payments. These reforms, coupled with the binding provision of electronic VAT return filing, have contributed to Poland reducing its VAT gap from 14.2% in 2018 to 8.4% in 2022 (EU VAT Gap Report 2024).

Brazil expects to roll out a similar mechanism by 2026, under which payment service providers will split payments, as well as verify whether suppliers have VAT credits to offset against the VAT due on a transaction. Asian countries have integrated digital payment methods with split payments for real-time tax collection, such as the Golden Tax system in China and the goods and services tax network (GSTN) in India.

Withholding is effective for the same reason as EFDs: it is a source of third-party information. While the split payment may not cover the full VAT liability, it gives tax authorities information on transactions and liabilities, expanding effective coverage and shifting the behavioural incentives for would-be evaders. Similarly, it creates incentives for a business that has VAT credits to file returns in order to claim refunds.

Taxing digital transactions directly can be regressive

In the context of increasing use of digital transaction systems, especially mobile money, some countries have tried introducing a digital transactions levy. Evidence so far suggests this is not a good idea, both because it tends to be regressive (smaller transactions, over time, mean paying a larger tax), and because the adoption of mobile money itself is fairly elastic in most developing countries.[5]

Ghana's e-levy, introduced in May 2022, is estimated to have caused a net tax loss of GHS 1.4 million (~US$ 90,000) in a year (Penteriani, 2023). This was seen in the reduction in both transaction volumes and values; the only transaction that increased in both volume and value was cash-out (i.e. withdrawing cash from one's account), which was not subject to the levy. This suggests that people reverted to cash, especially for small-value transactions.

Fras (2024) discusses a similar trend in Zambia, after an e-levy was introduced there in 2024, and recommends that the ZRA focus on using the paper trail from digital transactions to improve enforcement, rather than trying to raise money from taxing the transactions themselves. This is especially because, in the informal economy, digital payments are often the only form of traceable information (Bernad et al., 2023).

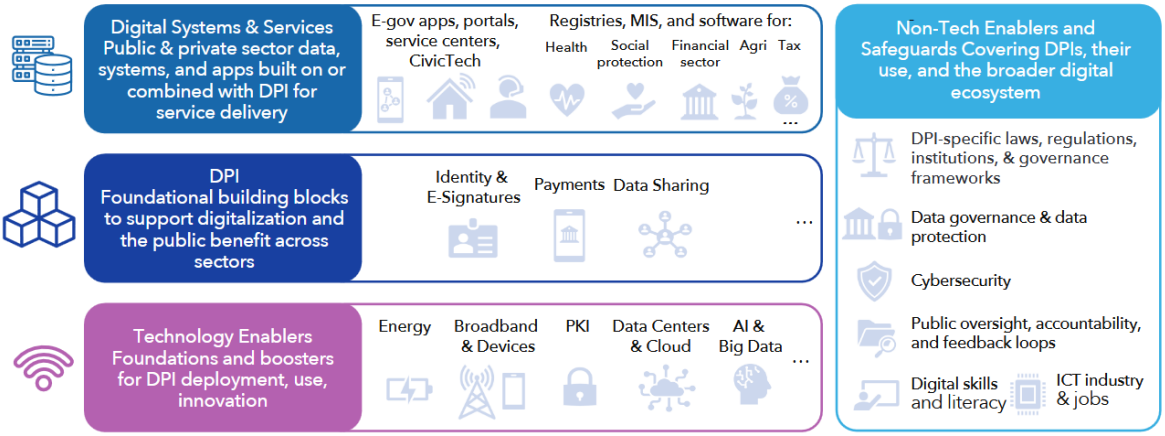
These e-levies are distinct from the (existing and proposed) digital services taxes, including the collection of VAT on cross-border digital services. Most countries that have introduced such taxes focus on large firms (based on global revenue thresholds), and target income from services such as advertising, data sales, and platform subscriptions. To the extent that these are more likely to be used by higher-income individuals, such taxes are less regressive than a flat tax on mobile money. These taxes can be seen as measures countries are taking to counter profit-shifting by large multinationals, and we do not discuss them further.

[5] Interestingly, even some of the leading adopters of digital payments are now asking citizens to keep and use some cash, as a precaution in case of cyberattacks on digital payments systems. https://www.theguardian.com/technology/2025/mar/16/sweden-cash-digital-payments-electronic-banking-security

3 Digital Public Infrastructure (DPI) as a driver of digital transactions

A focus on creating traceable digital footprints and facilitating the exchange of money (and data) is also seen in recent discussions on Digital Public Infrastructure (G20, 2023). What many see as the core DPI package – identity, payments and data exchange systems – is directly relevant to all of the trends discussed above: widening the tax base, making tax compliance easier, and using multiple information sources to identify potential tax evasion (Scarpini et al., 2024). DPI can help countries design and roll out digital systems faster and at lower cost, expanding the footprint of digital activity more rapidly, bringing potential benefits in terms of ease of access (and, again, taxability) (Santoro et al., 2024).

Figure 2 The World Bank's vision of a DPI ecosystem



Source: Clark et al. (2025)

Digital ID can also enable coordination within government, and the combining of data from multiple sources. However, the more data from different sources government can compile, the greater the risks to privacy, and few countries have robust legal safeguards to define and monitor permissible uses. Similarly, the use of national IDs for tax purposes may require new legislation or policy changes; for

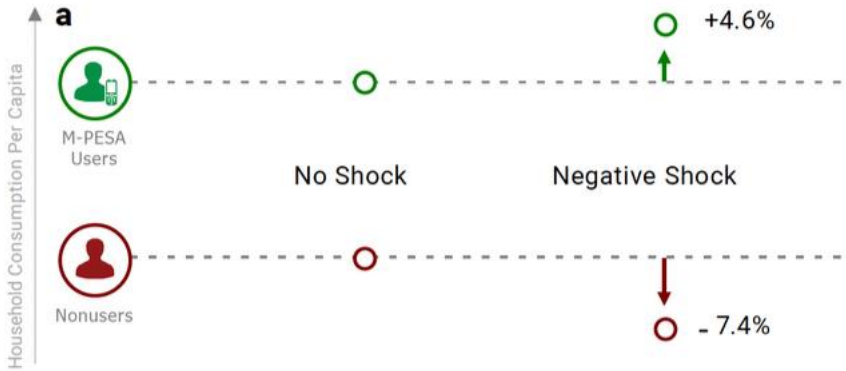
instance, whether they will replace tax ID – which would require harmonising existing tax databases with the new national ID.

Technical compatibility is an important consideration in such use cases. While an ID DPI might have the ability to plug into other systems as a digital building block, the systems it is supposed to plug into must have the capability to integrate it. Digital systems for taxation tend to be among the older IT systems in government, and such integration can be a non-trivial challenge.

Digital payments systems are more widespread. They are typically used along with cash, rather than replacing cash outright. (Suri et al., 2023.) This is in part because mobile money systems are not costless; most charge some kind of transaction fee. In India, while the government subsidises person-to-merchant payments, payment service providers bear an estimated 0.25% transaction cost per transaction (Reserve Bank of India, 2022).

Mobile money tends to be preferred for certain types of transactions, such as where money has to travel a large geographic distance – in Kenya, for instance, it was an average of 200 km. A second case is where money transfers are for dealing with shocks (see Fig. 3, below), where the speed of the transfer matters, as well as the ability to collect small amounts from multiple people (Jack and Suri 2014).

Figure 3 Mobile money use in response to shock



Source: Suri et al. (2025), Fig. 7a https://voxdev.org/voxdevlit/mobile-money-issue-2/impacts-mobile-money

Beyond ID and payments, data exchange – information flows between private individuals – can also have economic ramifications, especially in sectors affected by information asymmetries and monopsonies. For instance, many countries want to boost their small and small and medium enterprises (SMEs), and digital payments offer a pathway for SMEs to enter the formal financial system, especially to access credit – both through banks and through emerging mechanisms such as flow-based lending (Amoako-Adu and Eshun, 2018).

Especially where customers are using digital payments, SME accounting can be simplified. Of course, digital payments also make these businesses more visible to tax authorities. For businesses operating on narrow margins, a higher tax burden is the main reason for avoiding formalisation, whether through registration or digital payments.

4 An emerging research agenda

As connectivity grows, and as more people around the world become digitally fluent, the number of transactions through digital channels will increase. This creates opportunities for better tax administration as well as better service delivery, including in times of crisis, such as Togo's Novissi program (Debenedetti, 2021). There are many questions to explore at the intersection of tax policy and administration, digital technologies and the digital economy.

Who is making digital transactions?

Estimates of domestic revenue mobilisation and tax potential depend, necessarily, on the overall value of transactions expected to take place. This will require thinking in terms of expansion and transition: how many new entrants into the digital economy represent new economic activity, and how many transition from offline to online? What about flows in the reverse direction – that is, people taking activities offline instead? Precise answers to these questions are likely to be difficult to find, given challenges with modelling the informal sector. Understanding the direction and broad split (between new or incremental activity and value, and prior activity transitioning to digital channels) will still be valuable.

More broadly, what forms of digital transactions do governments wish to encourage, and what tools do they have available for doing so? What is the rationale for such forms of encouragement? For instance, how are the costs and benefits of a government subsidy of digital payment costs estimated? What works for encouraging individual citizens to take up digital transactions, and what works for businesses, may also be different. In either case, however, are they likely to take to digital channels when these are strongly associated with taxation?

What does a digital-era tax administration look like?

The main area of research here has to do with how digital taxation and digital transactions can generate a 'paper trail' – verifiable information that can be used for both tax policy and tax administration. How can governments design reporting systems and

taxes so as to take advantage of the self-enforcing and supply-chain-formalising properties of taxation? How can mechanisms such as electronic self-assessment, EFDs, and withholding be leveraged to improve both tax base and collection ratios?

A related question (and important caveat) is about state capacity. While digital systems generate large volumes of data which can potentially improve tax administration, the capacity to use this data has to exist – or be built – within government. Firms respond to *perceived enforcement capacity*, not the existence of data or paper trails alone. The choice of policies must be rational for existing levels of capacity – for instance, given capacity constraints, is non-filing preferable to nil-filing? (Amissah et al., 2024.)

This is especially true when the task is to combine data from multiple sources, in order to spot patterns, anomalies, or opportunities. What capabilities do governments need for such analyses, and how can these be developed, in-house or in cooperation with other stakeholders?

Taxation as an avenue for building digital-era capabilities in government

Setting up data exchange systems (and implementing DPIs more broadly) can be an expensive proposition, where the benefits are sometimes too distant and not sharp enough to justify the investment – at least from the point of view of the specific policymaker (Eaves and Vasconcellos, 2025).

Could taxation be a leading use case, where the projected outcomes (increased domestic revenue) allows for the creation of new digital tools (including DPIs) which may be leveraged by subsequent digitalisation efforts? Can potential benefits of this nature be incorporated into a roadmap or digital transformation strategy? How might countries' procurement rules and strategies shift if they have invested in creating their own DPI, which they then want to see reused across government and beyond?

At the same time, how might the lessons learned by tax authorities that take up such leading roles be shared, within government and across countries? Could this serve as an avenue for normalising the use of agile delivery processes in government IT projects?

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