Innovations for Poverty Action

TANZANIA AFFORDABLE DIGITAL FINANCE RESEARCH INITIATIVE

The Hidden Costs of Taxing Digital Transactions: Lessons on Financial Inclusion

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Executive Summary

This report investigates the impact of mobile money taxation on user behavior, focusing on the case of Tanzania following the introduction of a transaction levy in July 2021. While previous work—most notably a GSMA report published in December 2021—has already documented a sharp decline in the volume and value of mobile money transactions immediately following the policy change, this report builds on those aggregate patterns by exploring the behavioral mechanisms that may have driven such a pronounced response.

Our analysis suggests that the magnitude of the observed usage decline cannot be fully explained by user price sensitivity alone. In fact, evidence from Uganda shows that even larger changes in transaction costs—such as substantial fee increases imposed by mobile money providers—did not trigger such sharp and immediate behavioral responses. This contrast suggests that another mechanism may be at play in the Tanzanian case. We propose that the mobile money levy acted not only as a financial burden but also as a trust shock, undermining users' confidence in mobile money as a safe and reliable financial tool.

To explore this hypothesis, we combine multiple data sources. First, we use data from the FinScope Tanzania surveys (2017 and 2023) to assess changes in users' perceptions of mobile money security and reliability. While the wide time gap between waves limits our ability to causally link changes to the 2021 tax, the data reveal a general decline in trust in the Mobile Money system across nearly all demographic groups — a pattern that could also reflect the influence of other concurrent shocks, such as the COVID-19 pandemic and broader macroeconomic uncertainty during the same period. The decline is similar in both urban and rural areas. It appears slightly more pronounced among men, largely due to their initially higher levels of reported trust. The largest decline, however, is observed among younger users aged 30 and below.

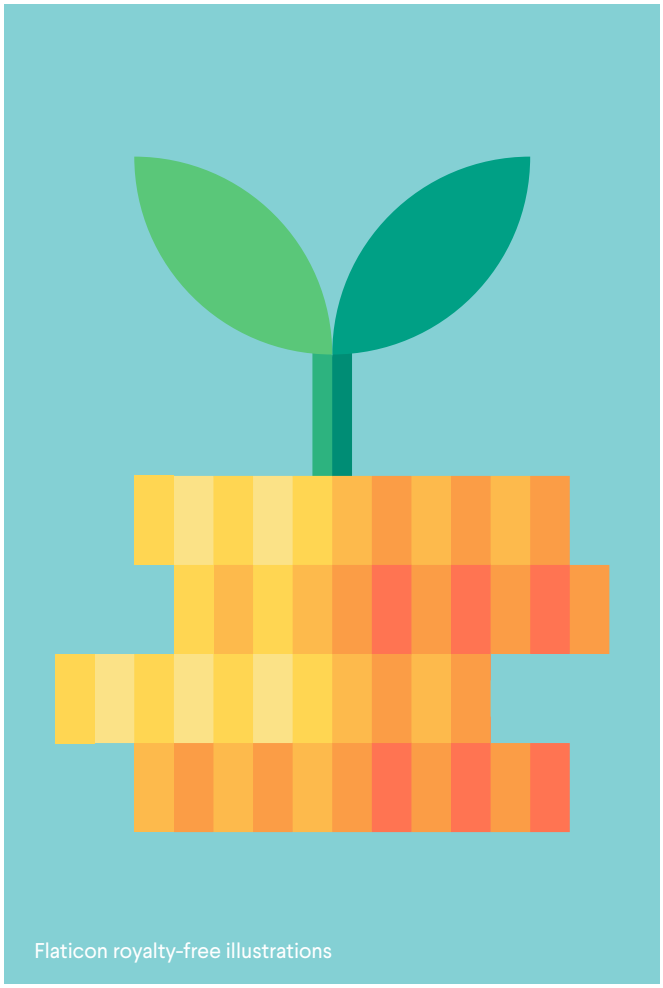
Second, we employ a causal identification strategy using the Tanzania National Panel Survey (NPS) 2020/21, following a difference-in-differences framework similar to Rasul and Bassi (2021). These data allow us to compare reported mobile money usage before and after the levy's introduction across treated and control groups. While the time window is relatively short and the sample limits the statistical power of subgroup analyses, our findings point to a decline in mobile money usage following the tax, especially among urban users who are more likely to have access to substitutes such as bank accounts or agent banking. We do not find evidence of differential effects by gender or age.

To further interpret the Tanzanian case, we incorporate a comparative analysis using transaction-level data from Uganda, where a similar mobile money tax was introduced in 2018. In Uganda, we observe sharp declines in usage and substitution toward other financial services, particularly among urban users with more available alternatives. The Ugandan experience thus serves as a relevant parallel and methodological proxy, helping to contextualize the Tanzanian findings and to highlight common patterns in user response.

Our results suggest that taxation-induced price increases can have unintended behavioral consequences when implemented in environments where trust in digital financial systems is fragile. The erosion of trust—whether in mobile money providers, government policy, or the predictability of the financial system—can trigger usage declines that far exceed what would be expected from the cost increase alone. As such, even modest levies may generate substantial disruptions in digital financial inclusion, especially when introduced abruptly or without adequate communication.

Finally, the report highlights the importance of incorporating trust-sensitive assumptions into digital tax design. Revenue expectations and policy frameworks should not rely exclusively on price elasticity models, but also account for behavioral responses driven by perceived fairness, policy stability, and institutional credibility. In contexts like Tanzania and Uganda, where mobile money plays a foundational role in financial access, neglecting these behavioral dimensions risks undermining both fiscal outcomes and financial inclusion goals.

In addition to the main findings, the report includes three appendices that provide further depth and transparency. Appendix A presents all cleaned and processed FinScope Tanzania survey data (2017 and 2023) and the Tanzania National Panel Survey data, along with the replication code in Stata and Python, to enable full reproducibility and support future research. Appendix B turns to structural constraints, examining spatial disparities in mobile network and electricity infrastructure between 2000 and 2024. Despite near-universal 2G coverage, large segments of rural Tanzania continue to lack consistent access to 3G/4G broadband and household electricity—conditions that limit users' ability to engage with smartphone-based financial services. Appendix C analyzes the role of mobile money within Tanzania's wider financial ecosystem, showing—based on FinScope 2023—that mobile money generally complements other financial tools such as banks, MFIs, savings groups, insurance, and pensions.



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1. Introduction

1.1 Introduction and Policy Context

Over the past decade, mobile money has emerged as a cornerstone of Tanzania's financial system, substantially expanding access to financial services among underserved groups. Since the introduction of M-Pesa and related services in 2008, mobile money has fueled formal financial inclusion, particularly for women, rural residents, and the informal workforce. By 2023, FinScope data show that 72% of adults used mobile money services, contributing to a rise in formal inclusion to 76% of the adult population (FinScope Tanzania, 2023).

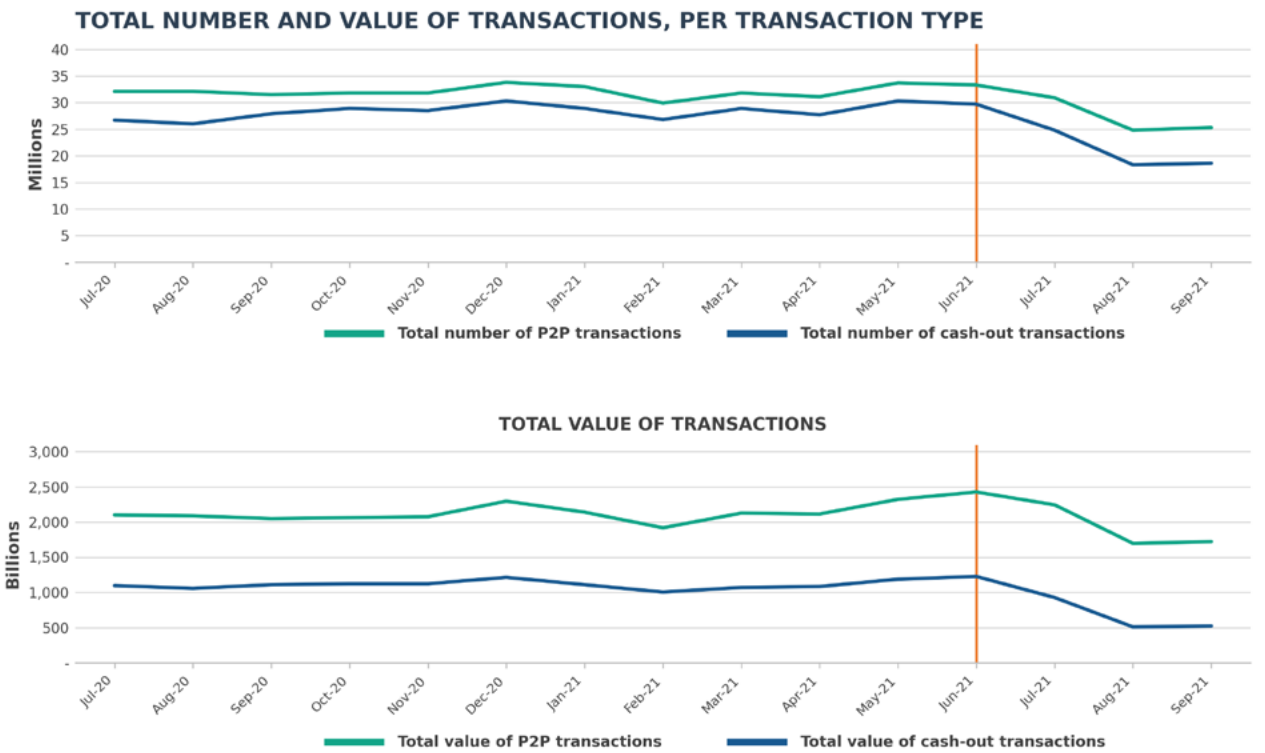
However, the growing prominence of mobile money has also drawn the attention of policymakers seeking new sources of revenue. In July 2021, amid fiscal pressures exacerbated by the COVID-19 pandemic, the Government of Tanzania introduced a controversial Mobile Money Tax (often called an e-levy) on mobile money transactions. This tax—enacted through the Finance Act 2021—imposed an additional fee on mobile money transfers and withdrawals, on top of pre-existing taxes (18% VAT and 10% excise duty on mobile money service fees). The levy was structured as a tiered charge ranging from TSh 10 to TSh 10,000 per transaction, with transactions below TSh 1,000 exempted. Effectively, this meant that sending or withdrawing money via phone became more expensive for all users, as the levy was deducted per transaction in addition to normal provider fees. Government leaders promoted the policy as a "patriotic levy" to fund development projects such as rural roads, water access, and classrooms. The Finance Minister projected that the new levies would raise approximately TSh 1.25 trillion to support the TSh 36.68 trillion 2021/22 budget (Telecompaper, 2021).

According to the GSMA's *Tanzania Mobile Money Levy Impact Assessment* (2023), the introduction of the mobile money levy in July 2021 led to significant and immediate declines in transaction volumes. Person-to-person (P2P) transactions dropped by 38% between June and August 2021, and cash-out transactions fell by 25% during the same period. The total value of P2P transactions declined by approximately 60%, while the value of cash-outs fell by 30%. While some recovery occurred over time, neither transaction volumes nor values had fully returned to pre-levy levels as of March 2023. The same report documents that many users adjusted their behavior to minimize tax exposure, including reducing the frequency of transfers and splitting transactions into smaller amounts.

This report offers a descriptive and exploratory evaluation of the implications of the levy. Rather than claiming to identify definitive causal impacts, the study highlights the observed patterns in user behavior, trust, and substitution effects across the financial ecosystem. Our core contribution is to provide disaggregated empirical insights across demographic groups and regions, combining FinScope survey data (2017, 2023), evidence from the Tanzania National Panel Survey (2020/21), and transaction-level analysis from Uganda's 2018 mobile money tax. In addition, Appendix B presents complementary evidence on the role of digital infrastructure—specifically mobile network coverage and electricity access—as enabling conditions for financial inclusion. These factors are critical to understanding the uneven diffusion and resilience of mobile money use across the country. Particular emphasis is placed on the urban–rural divide and the enabling (or constraining) role of infrastructure. The report seeks to inform tax policy design, financial inclusion strategies, and digital finance regulation. This aligns with broader debates in the African policy landscape, where mobile money taxes—if poorly designed—have been found to be regressive and counterproductive to inclusive development goals (Wales & Niesten, 2024).

Figure 1.

Monthly mobile money transactions in Tanzania, 2020–2021
Total number and value of P2P and cash-out transactions over time



SOURCE: GSMA (2023), Tanzania Mobile Money Levy Impact Assessment

1.2 Mobile Money and Financial Inclusion in Tanzania

Mobile money uptake in Tanzania catalyzed a dramatic shift in the structure of financial inclusion.[1] According to FinScope Tanzania, 60% of adults were using mobile money services in 2017, compared to just 17% using bank accounts. By 2023, mobile money usage had risen to 72%, while bank usage reached 22%, indicating a persistent and substantial gap between mobile and traditional financial service usage. Women's financial exclusion dropped from 30% to 19% between 2017 and 2023, and the gender gap in financial inclusion shrank from 10 to 3 percentage points. In Zanzibar, mobile money usage grew from 38% to 78% of adults over the same period. These advances reflect how mobile money became the de facto financial infrastructure for much of the population, often in the absence of formal banking options.

Mobile money also supported broader development outcomes. Studies across East Africa link mobile money adoption to poverty reduction, enhanced resilience, and economic empowerment, particularly for women and microentrepreneurs (Jack & Suri, 2014). As discussed by the World Bank (2022) and FSDT (2019), digital wallets have served as safe havens for savings, tools for household budgeting, and mechanisms for small-scale enterprise finance.

1.3 Taxing Mobile Money: Evidence and Design Considerations

The Tanzanian case is part of a broader regional trend. Clifford (2020) documents that mobile money taxes have been introduced in multiple Sub-Saharan African countries and are frequently associated with declines in transaction volumes. In Uganda, transaction volumes dropped by nearly 50% after a mobile money tax was introduced in 2018 (Lees & Akol, 2021). CGAP and GSMA reports echo concerns that such taxes may reverse inclusion gains.

In The *Tanzanian Model for Taxing Mobile Money: Scrap it, Reform it, or Let it Be?* (ICTD Policy Brief 13, September 2024), Wales and Niesten examine the evolving design of Tanzania's taxation framework for electronic payments, including mobile money. They assess how excise duty, VAT, and the mobile money withdrawal levy interact to shape the overall tax burden. Their brief evaluates the framework against principles such as simplicity, efficiency, and equity, and provides reform options.

In a related study, *Exploring the Development of Mobile Money Markets and Revenue Collection from Digital Financial Services Taxes in Africa* (ICTD Policy Brief 12, August 2024), Niesten and Wales analyze mobile money market growth and DFS taxes across countries including Ghana, Kenya, Nigeria, Tanzania, Uganda, and Zimbabwe. They highlight that while DFS taxes can mobilize revenue, their yield has been modest and volatile, and they often introduce forecasting challenges or deter market growth.

Mpofu (2022) argues that African governments face a dilemma: the need to mobilize domestic revenue while safeguarding financial inclusion. He suggests that moderate, well-designed taxes with built-in protections for low-income users may be justifiable. In Tanzania's case, however, the 2021 levy compounded an already complex and burdensome cost structure, layered atop 18% VAT and 10% excise duty. Critics, including Makoye (2021) and Mensah & Bhalla (2022), contend that the levy contradicted Tanzania's own financial inclusion goals as outlined in the NFIF 2018–2022, which had explicitly promoted mobile money as a tool for equitable access.

1 See Appendix C for an overview of how mobile money fits within the broader financial ecosystem in Tanzania, including its interaction with banks, MFIs, SACCOs, savings groups, and digital credit services.

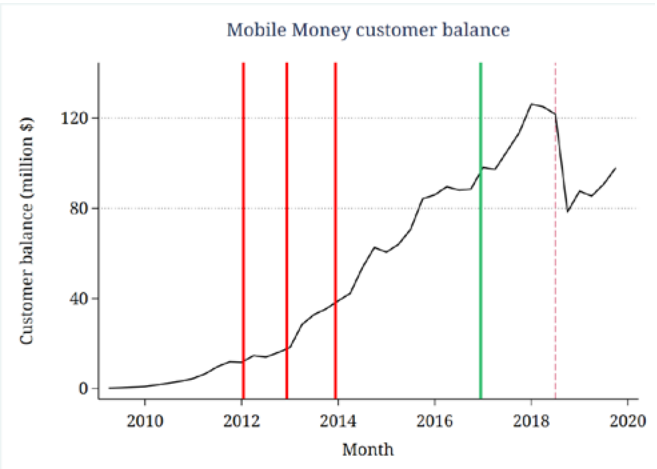
1.4 Beyond Price: Understanding the Unique Impact of Mobile Money Taxation

The premise of this report is that mobile money taxation affects behavior not only through the expected price channel, but also through changes in perceptions of trust, fairness, and policy transparency. The case of Uganda helps demonstrate why a purely price-based explanation falls short.

Mobile money fees in Uganda have changed numerous times over the past decade. According to data compiled by Brunnermeier, Limodio, and Spadavecchia (2025), mobile money operators such as MTN and Airtel—which together hold 98% of the Ugandan mobile money market—implemented substantial fee increases between 2012 and 2014. On-net person-to-person (P2P) fees rose by an average of 2% in 2012, and by 1% in each of 2013 and 2014.In **2017**, these fees were **reduced by 1%.** Yet, none of these pricing adjustments produced any visible change in the growth trajectory of mobile money usage. As shown in **Figure 2**, mobile money customer balances continued to grow steadily across the period 2010–2018, following a consistent upward trajectory. This is noteworthy given that one might reasonably expect a decline in usage following the cost increases in 2012–2014, or a surge in uptake after the cost reduction in 2017. The fact that neither occurred suggests that users may have been relatively insensitive to gradual or operator-driven fee changes — possibly because such changes were poorly advertised, difficult to detect, or perceived as routine. While Tanzanian regulations do require mobile network operators to notify users of tariff or fee changes — commonly via SMS, websites, or through agent networks — the actual *effectiveness* of these disclosures remains uncertain. In practice, many users, particularly in rural areas or with limited literacy, may not fully register or understand these changes, reducing the salience of incremental pricing adjustments. Mobile money operators rarely publicize changes in fee structures; users must proactively seek out updated pricing on operator websites or infer changes from transaction receipts. As a result, many users may not even be aware when pricing has changed.

Figure 2.

Mobile Money Customer Balances in Uganda, 2010–2020



NOTE: This figure displays the total value of mobile money balances held by customers over time, expressed in millions of US dollars. Vertical red lines indicate increases in transaction costs—solid lines correspond to fee hikes imposed by operators (2012, 2013, 2014), while the dashed line marks the introduction of the Mobile Money Tax in 2018. The green solid line indicates a fee reduction implemented by operators in 2017. These markers distinguish changes in transaction costs driven by private sector pricing from those introduced through taxation.

SOURCE: Author's calculations

This resilience suggests that mobile money users in Uganda have historically exhibited relatively low price elasticity, at least with respect to small, opaque, and unadvertised fee changes by operators. Fee schedules are typically hard to access or interpret: users would have to actively consult operator websites, perform manual cost comparisons, or track transaction receipts to understand changes. While mobile money providers in Uganda are legally required to disclose fee changes under the **National Payment Systems Act, 2020** and its implementing **Regulations (2021)** — which mandate that customers be notified of changes at least seven days in advance — the law leaves open the mode of communication. This lack of specificity may limit the effectiveness of these disclosures, especially for users without regular digital access or financial literacy. As a result, many users may not have even perceived the prior fee increases at all.

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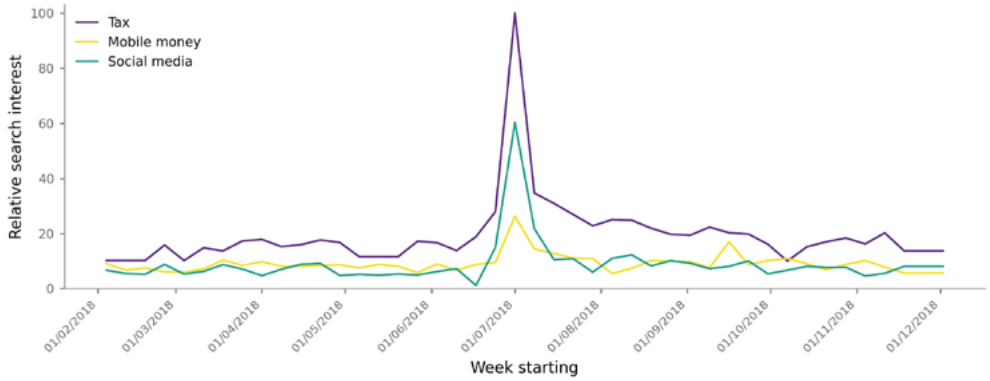
The situation was starkly different with the 2018 mobile money tax, which introduced a 1% government-imposed levy on withdrawals. Though this charge was roughly comparable in size to past fee adjustments, its impact was immediate and dramatic. Within a single quarter, mobile money account balances dropped by the equivalent of USD 40 million. This is particularly striking given that mobile money balances had previously shown uninterrupted growth across multiple years.

What explains this discontinuity? A critical distinction lies in the visibility and perceived origin of the tax. While operator fees changed quietly, the mobile money tax entered public discourse with significant media attention, political contestation, and visible protest. The tax was debated in Parliament, contested by civil society, and opposed by prominent figures such as musician-turned-politician Bobi Wine. In July 2018, police used tear gas to disperse demonstrators in Kampala protesting both the mobile money tax and an associated social media tax (Reuters, 2018).

This heightened public awareness is further reflected in search behavior. As shown in Figure 3, Google search interest in the terms “tax,” “mobile money,” and “social media” spiked dramatically in the weeks around the policy’s announcement and implementation. There is little evidence of similar search interest or public discourse around previous operator-led fee changes.

Figure 3.

Google Trends for "Tax," "Mobile Money," and "Social Media" in Uganda, 2018



NOTE: Google Trends gives the relative popularity of a search query for a defined location and time period. The data is indexed to 100, where 100 indicates the maximum search interest across the terms, time period, and geographical area. We assume that search indicators provide representative information about the behaviours of the literate and internet-enabled segment of the population (who may be more likely to be mobile money users). There is relatively limited interest in these terms before July, even in May when the Mobile Money tax proposals were discussed in Parliament

SOURCE: Google Trends calculations from Lees and Akol (2021)

This comparison highlights the broader point: it is not just the monetary size of the cost increase that matters, but how it is communicated, perceived, and framed. The government-imposed tax was highly salient, broadly interpreted as a public signal about changing policy priorities, and may have undermined confidence in the predictability of the mobile money system itself.

This context justifies the central question of this report: if a similar tax in Tanzania also triggered an outsized behavioral response, can price alone explain the observed usage drop? Or did users interpret the tax as a sign that mobile money was no longer a trusted or stable service? The evidence from Uganda supports the latter hypothesis. In what follows, we examine how trust—as a behavioral and policy-relevant construct—may help explain the depth and distribution of user responses to the Tanzanian mobile money levy. While our focus is on trust in mobile money as a financial service, it is important to note that these reactions may also reflect a broader skepticism toward government motives—especially in contexts where institutional trust is already fragile.

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1.5 The Role of Trust in Digital Finance

Trust is the invisible infrastructure of any financial system. In the context of digital finance in low-income countries, it is especially critical. Mobile money in Tanzania, as in many other Sub-Saharan countries, expanded not only due to convenience and network reach but also because users came to perceive it as safe, dependable, and affordable (GSMA, 2021).

This report explores whether the mobile money tax disrupted that perception. In Section 3, our analyses on FinScope data show that the share of respondents agreeing that "paying for goods and services using your phone is safer than carrying cash" declined significantly between 2017 and 2023. The decline is observed across nearly all demographic groups, including both urban and rural users. It is more pronounced among men, who had higher baseline trust levels, and most notable among respondents under 30.

We stress that these trends should not be interpreted causally. The long time span between survey waves and the lack of a clean counterfactual limit our ability to isolate the impact of the levy. However, the findings are consistent with other contexts. Research from Ghana (Amoah et al., 2023; Baah-Peprah et al., 2024) shows that poorly explained digital finance taxes can erode trust, especially among less financially literate users. In Uganda, trust also declined following the 2018 levy, as transaction volumes dropped by over 40% (Lees & Akol, 2021).

A related ICTD study, *How Tanzania's Levy on Mobile Money Affects Small Businesses* (Working Paper 213, 2023), finds that micro and small enterprises more aware of the levy exhibited greater distrust. Perceptions of policy opacity and poor communication appear to have exacerbated this sentiment. In response to mounting public dissatisfaction, the government revised the levy several times. By June 2023, it had removed the charge on mobile money transfers, retaining it only on withdrawals.

1.6 Literature Review: Trust in Financial Systems and User Behavior

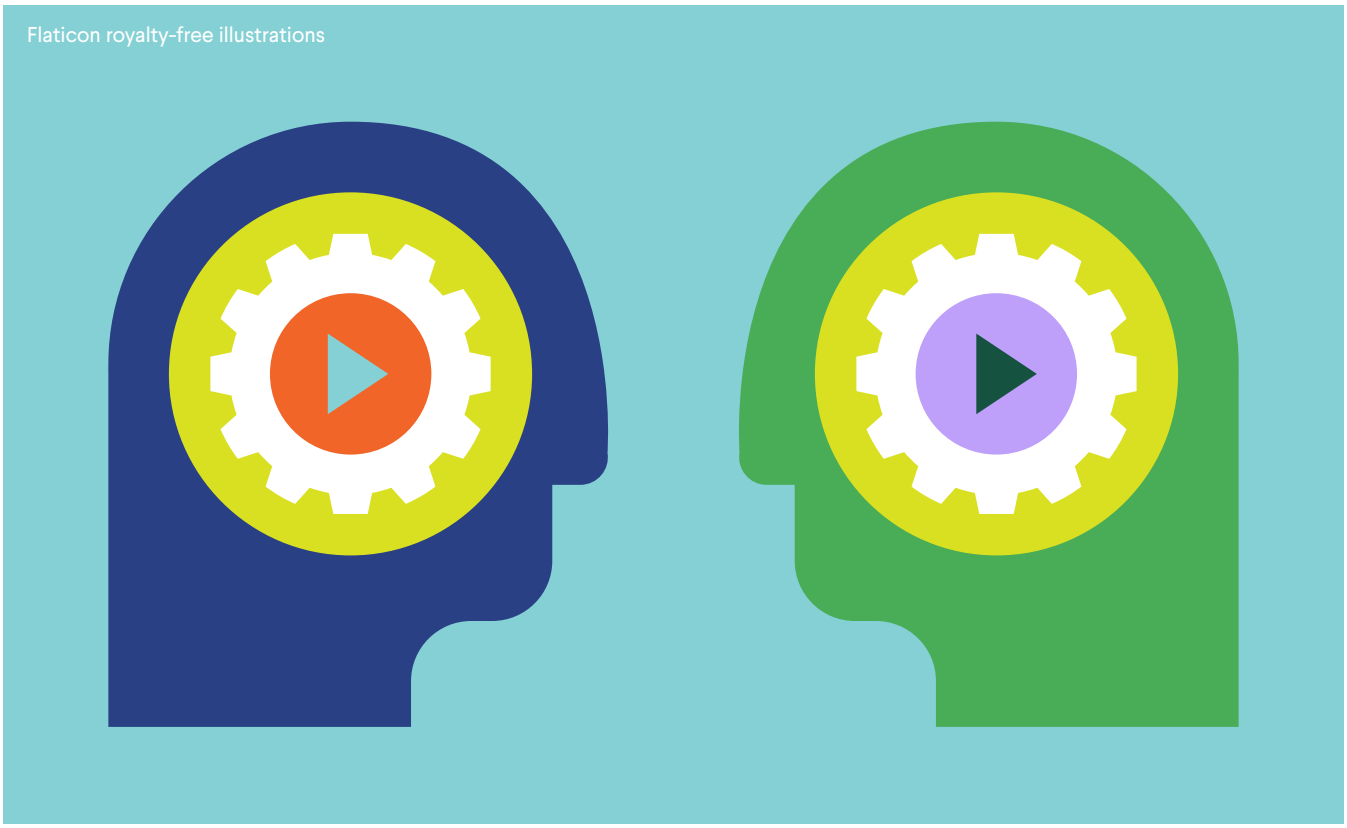
A robust body of recent literature in development and behavioral economics underscores the pivotal role of trust in shaping individuals' engagement with formal financial services. This literature spans analyses of general financial systems as well as digital platforms like mobile money, often with a focus on low-income economies.

1.6.1 TRUST AS A DRIVER OF FINANCIAL INCLUSION

Multiple studies have documented that higher trust in financial institutions correlates with greater uptake of financial products. Using cross-country data from the Global Findex, Xu (2020) finds that *social trust* is a significant positive determinant of various measures of financial inclusion (such as owning an account or saving at a financial institution). Notably, the positive effect of trust persists even after controlling for differences in countries' institutional quality and individuals' education levels. In other words, where formal institutions are weak or education is low, trust plays a compensatory role in encouraging people to use financial services (Xu, 2020). This implies that in a country with governance challenges, interpersonal and institutional trust can bridge some gaps – but it also suggests that if trust is undermined, the fallout can be severe in such settings. Confirming these patterns, a recent micro-level study by Heyert and Weill (2024) covering 28 developing countries finds a strong positive impact of *trust in banks* on financial inclusion outcomes. Individuals who expressed confidence in banks were significantly more likely to use formal financial services (such as having bank accounts or mobile money), across all demographic groups (Heyert & Weill, 2024). These findings align with earlier evidence that those who trust financial institutions have markedly higher financial participation rates than those who do not – trust can account for sizeable differences in inclusion outcomes (Sholevar & Bachmann, 2025). Taken together, these studies provide a clear message: trust is not a "soft" factor, but rather a measurable and critical ingredient in bringing people into formal financial systems. A lack of trust, conversely, is a barrier to inclusion, often manifesting in continued preference for cash and informality.

1.6.2 TRUST IN DIGITAL FINANCIAL PLATFORMS

Focusing specifically on digital finance and mobile money, researchers have explored how trust issues influence adoption and usage in developing economies. Mobile money – which often involves entrusting one's cash to a mobile operator's system – requires users to believe that the system is secure and that the virtual value is as good as cash. **Perceived risk** is therefore a key consideration. If users fear that digital funds could vanish due to fraud, technical glitches, or hidden charges, and hence that they might not recover the full value they deposited, they will be hesitant to use mobile money regularly. Ghosh (2021) and others note that trust is a "major driving force" for people's decision to use formal financial services in the developing world. Studies on technology adoption have similarly found trust to be a mediator between intention and actual usage of mobile financial services. For instance, research on African micro-entrepreneurs has shown that trust in the mobile money provider and system reliability boosts the frequency of mobile money use, thereby deepening financial inclusion for those businesses (Sholevar & Bachmann, 2025). In contrast, distrust — whether due to past negative experiences or general skepticism — tends to reduce usage intensity. Even individuals who have opened a mobile money account may keep balances low or transact infrequently if they harbor doubts about the system's safety. In low-income contexts, there are documented cases of users cashing out immediately after receiving digital payments, precisely because they do not fully trust the electronic format. While it is true that users may continue using mobile money despite low trust — particularly in areas with no viable alternatives — the data suggest that actual declines in usage following the 2021 levy were concentrated in better-connected, urban areas where alternatives such as cash agents, banks, or informal mechanisms are more readily available. In this sense, trust erosion alone is not sufficient to explain behavioral change; it acts as a critical enabling factor when substitution options exist. This behavior underscores how critical sustained trust is to realizing the benefits of digital financial inclusion. In Uganda, public backlash and protests over the 2018 mobile money tax led to a partial retreat — the rate was halved — but no structured measures were introduced to rebuild trust in the system.



1.6.3 BEHAVIORAL RESPONSES TO TAXATION IN LOW-TRUST ENVIRONMENTS

The introduction of a tax can be a decisive moment for user trust, and literature at the intersection of public economics and behavioral economics provides insights here. A core finding is that citizens' *willingness to comply* with taxes (or policies generally) is heavily influenced by their *trust in government* and belief that the policy is fair. In a low-trust environment, new taxes often face resistance that goes beyond the monetary cost. Amoah et al. (2023) investigate Ghana's recent electronic levy ("e-levy") on mobile money transactions and find that trust in government is a key driver of whether people are willing to pay this tax. Using surveys, they show that Ghanaians with higher trust in any of the three arms of government (executive, legislature, judiciary) were significantly more likely to accept and intend to comply with the e-levy. Trust in the executive branch had the strongest effect, suggesting that confidence in the leadership's decision-making and honesty was crucial for public buy-in.[2] This aligns with broader theories of **tax morale,** which posit that people are more compliant when they perceive the government as legitimate, transparent, and working in the public interest. Conversely, if people suspect government incompetence or corruption, they may view a new tax as illegitimate and seek ways to avoid it. In extreme cases, as some African examples show, they might opt out of the taxed activity entirely (for example, reverting to cash transactions to avoid a mobile money tax). A recent study by Baah-Peprah and colleagues (2024) reinforces this point: they found that **perceived trust in government and the perceived burden of the tax were significant determinants of attitudes toward a mobile money tax.** People who distrusted the government or felt the tax was too burdensome developed negative attitudes and were less inclined to continue using mobile money under the new tax regime.

2 efdinitiative.org

1.6.4 INSTITUTIONAL TRUST AND PARTICIPATION IN FORMAL FINANCE

Institutional trust refers to confidence in entities like governments, central banks, or financial regulators – essentially, the environment in which financial services operate. In the developing world, institutional trust can be quite low due to historical experiences (e.g. bank failures, unstable policies, or political repression). Research has shown that low institutional trust correlates with lower usage of formal financial channels. When examining why people remain unbanked, surveys (e.g., FinScope and Afrobarometer) often find a fraction of respondents citing "don't trust banks" or "don't trust the system" as a reason, alongside more tangible barriers like cost or distance.
A recent cross-country analysis by Zins and Weill (2016) found that in Africa, trust in the legal system and banks was positively associated with owning a formal account, even after controlling for income and education – highlighting trust's independent role in fostering inclusion. Moreover, trust can affect not just whether someone initially joins the formal financial sector but whether they stay and deepen their engagement. If a policy shock (like a sudden tax) causes institutional trust to plummet, we can expect users to scale back their participation. This is consistent with patterns observed after financial crises: studies note that trust in banks declines after crises or scandals, leading to withdrawals and reluctance to invest for years thereafter. While mobile money taxation is a different scenario, the underlying behavioral insight is similar – a breach of trust (through a policy perceived as harmful or unjust) can induce people to disengage from formal financial services.

In summary, recent literature firmly establishes that trust is a linchpin of financial inclusion, and that **taxation policies interact with trust in complex ways.** Trust in financial platforms and institutions encourages usage, whereas low trust or breached trust leads to avoidance. Particularly in low-income countries, where trust in government and formal institutions may already be tenuous, policies like a mobile money tax carry the risk of exacerbating distrust. Users may interpret such taxes as signals that the system is not on their side, prompting behavioral responses (protest, non-compliance, or exit from the service) that can roll back gains in financial inclusion. The literature reviewed provides a theoretical and empirical basis for expecting that Tanzania's July 2021 mobile money tax could undermine user trust – the next sections examines whether this expectation played out in practice, drawing on documented evidence and case studies from Tanzania and other African countries.

2. Data and Limitations

This report combines descriptive and causal methods to explore the behavioral effects of Tanzania's 2021 mobile money tax. We use three main sources of data:

- the 2017 and 2023 waves of the FinScope Tanzania survey;
- the 2020/21 wave of the Tanzania National Panel Survey (NPS);
- a high-frequency transaction-level dataset from Uganda covering the full year of 2018, alongside the 2018 Uganda National Panel Survey.

Together, these data allow us to evaluate shifts in trust, financial usage patterns, and substitution behaviors—though each comes with important constraints.

2.1 FinScope Tanzania (2017 and 2023)

Our first source of evidence comes fro›m the nationally representative FinScope Tanzania surveys, conducted in 2017 and 2023. These surveys track financial inclusion, access to financial services, and user perceptions across multiple dimensions. We use these data to assess potential long-term shifts in trust associated with the introduction of the mobile money tax.

One of our key outcome variables is respondents' agreement with the statement: "Paying for goods and services using your phone is safer than carrying cash." We treat this measure as a proxy for perceived trust and safety in mobile money. Although the time gap between the 2017 and 2023 surveys is substantial—and the latter is conducted nearly two years after the introduction of the tax—the data allow us to document broad shifts in trust across the population.

We use descriptive analysis and OLS regressions to examine how these perceptions evolved across demographic groups, including age, gender, and urban/rural residence. The results show a generalized decline in trust across all groups, with the sharpest deterioration observed among younger respondents under 30. The decline appears slightly more pronounced among men, although this is likely driven by their higher baseline trust in 2017. While we do not interpret these results as causal, they offer suggestive evidence of a weakening of confidence in mobile money services over time.

2.2 Tanzania National Panel Survey (2020/21)

To investigate short-term behavioral responses to the tax, we turn to the 2020/21 wave of the Tanzania National Panel Survey (NPS), a multi-topic household survey conducted by the National Bureau of Statistics in partnership with the World Bank.[3] This dataset includes information on household financial practices, including whether respondents use mobile money.

The NPS was conducted between mid-2020 and late 2021, providing a unique window into financial behavior before and after the July 2021 introduction of the mobile money levy. We exploit this timing using a difference-in-differences strategy, following the empirical approach outlined by Bassi and Rasul (2021). Specifically, we compare reported mobile money usage among respondents interviewed before the levy to those interviewed after, while controlling for observable characteristics.

Our findings point to a relative decline in mobile money usage at different levels among urban respondents compared to rural respondents in the post-levy period. This result is consistent with the idea that urban users—who typically have more access to formal financial services—may have been more elastic in their response to the tax. However, the limited number of observations in the post-policy period and the overall short duration of the survey fieldwork constrain our ability to draw strong conclusions. In particular, the sample size does not support precise subgroup analysis by gender, age, or region, and the tight time frame prevents identification of medium- or long-term effects.

2.3 Transaction-Level Evidence from Uganda

To overcome some of the data constraints in Tanzania, we complement our analysis with a rich empirical case from Uganda, where a similar mobile money tax[4] was introduced in July 2018. Our analysis in Uganda uses several datasets. First, we exploit the universe of mobile money transactions from one of Uganda's largest providers, comprising over 50 million records spanning all of 2018. These data include detailed information on transaction type, value, timing, and sender/receiver identity, allowing us to track individual-level usage patterns over time. Second, we use the Uganda National Panel Survey (2018), a nationally representative household survey that includes questions on financial access and mobile money use. Eventually, we use administrative data from Bank of Uganda on usage of cash and banking services, including banking agents.

The administrative dataset permits us to observe real-time changes in mobile money behavior across transaction types—cash-in, cash-out, and person-to-person transfers—and to identify users' geographic locations for a large sub-sample (around 1.5 million users). We supplement this with district-level indicators on cash reliance and formal banking access, enabling us to explore substitution dynamics following the tax.

It is important to note, however, that our transaction-level data only cover the calendar year 2018, limiting our observation window to a few months before and after the tax's introduction in July. As a result, our findings reflect short-term behavioral responses and cannot speak to longer-term adaptation or recovery.

We find that mobile money usage dropped sharply after the tax, particularly among urban users. These users appear to have partially substituted toward banking services—often through mobile-enabled agent banking networks—and to have increased their reliance on cash. The Uganda case therefore offers both a causal benchmark and a methodological template for interpreting Tanzanian dynamics, especially where data limitations preclude similarly robust identification strategies.

3 https://microdata.worldbank.org/index.php/catalog/5639

4 While both Uganda (2018) and Tanzania (2021) introduced taxes on mobile money transactions, their policies differed significantly in design and implementation. Uganda initially imposed a 1% tax on all mobile money transactions—including deposits, transfers, and withdrawals—which led to widespread public protests and a notable decline in usage. In response, the government amended the policy within weeks, reducing the tax to 0.5% and limiting its application solely to withdrawals. In contrast, Tanzania's levy, introduced in July 2021, applied to both mobile money transfers and withdrawals, with rates ranging from TSh10 to TSh10,000, depending on the transaction amount.

2.4 Limitations and Data Needs

While this report presents a diverse set of data sources and empirical strategies, several limitations remain. The FinScope survey waves are conducted six years apart and far from the tax's implementation date. Although they allow us to observe broad shifts in user trust, they do not support identification of the tax's direct effects. The Tanzania NPS offers a stronger temporal match, but its short panel duration and limited sample size make it difficult to quantify heterogeneous effects.

Critically, our ability to draw policy-relevant conclusions about the impact of Tanzania's mobile money levy is constrained by the absence of transaction-level administrative data. Access to anonymized transaction records from mobile money operators—before and after the introduction of the tax—would enable robust causal estimation and subgroup analysis. In particular, we would need data on user behavior over time, matched with basic demographic characteristics (such as age, gender, and location). This is the structure currently adopted by the Bank of Uganda and the Bank of Rwanda, which have built secure, anonymized transaction-level datasets in partnership with mobile money providers to inform regulatory analysis.

We have formally requested access to such data from the Bank of Tanzania, which would allow us to rigorously evaluate the policy's impact across demographic groups and regions. While we recognize the importance of data protection and institutional procedures, we respectfully emphasize that making this kind of evidence available would greatly enhance the country's ability to assess, learn from, and improve mobile money taxation frameworks.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3 Empirical analysis

3.1 Trust: FinScope Tanzania 2017 and 2023

We use the 2017 and 2023 FinScope Tanzania surveys to measure shifts in trust and safety perceptions. Our key dependent variable is whether respondents agree with the statement: *"Paying for goods and services using your phone is safer than carrying cash."*

This question captures perceived transactional safety and is available in both survey waves. We begin by presenting descriptive results, then estimate a linear probability model. The regression includes controls for gender, age, location, income bracket, and education level:

$$\text{Agree}_i = \alpha + \beta \cdot \text{Tax}_i + \gamma \cdot X_i + \in_i$$

where $Agree_i$ is a dummy variable equal to 1 if individual i agrees that mobile money is safer than cash; Tax_i is a binary variable equal to 1 for observations after the tax was introduced; X_i is a vector of individual controls; and $_i$ is the error term. Standard errors are **robust** to heteroskedasticity and clustered appropriately to account for potential intra-group correlation.

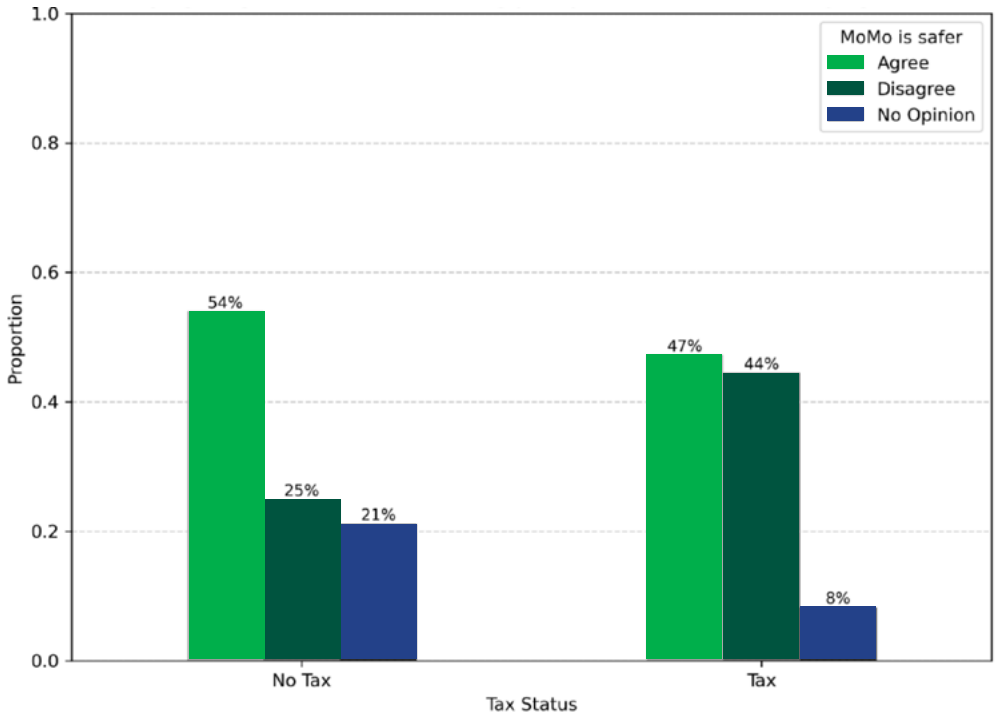
3.1.1 DESCRIPTIVE TRENDS IN TRUST

We begin by **descriptively documenting** how perceived safety of mobile money evolved between the **2017** and **2023** FinScope Tanzania surveys. The indicator is respondents' agreement with the statement: "Paying for goods and services using your phone is safer than carrying cash." Because FinScope is a repeated cross-section conducted six years apart, this comparison should be interpreted as a **long-run trend in perceptions,** rather than a clean before/after estimate of the 2021 levy.

Figure 3.1 shows the distribution of responses to the trust question across the two survey waves. In 2017, 54% of respondents agreed that mobile money was safer than cash, while 25% disagreed. By 2023, agreement had fallen to 47% and disagreement had risen to 44%. The neutral category collapsed from 21% to 8%, suggesting a hardening of attitudes.

Figure 3.1

% of answers to the statement: "Paying for goods and services using your phone is safer than carrying cash"



NOTE: This figure reports the share of respondents who agreed, disagreed or have no opinion on the statement. The figure display the shares both for the wave of the FinScope survey that was administered before the tax was introduced (No Tax), and after the tax was implemented (Tax).

These changes may reflect growing dissatisfaction or concern, but we emphasize again that they are not necessarily attributable solely to the 2021 tax. Other changes between 2017 and 2023 could also influence public sentiment.

Figure 3.1 presents the aggregate results. Across the full sample, **agreement declines between 2017 and 2023,** while disagreement rises. This pattern is consistent with a deterioration in perceived safety over the period; however, the **2017–2023 interval contains multiple concurrent shocks and market changes,** so the figure should not be read as attributing the shift in perceptions to any single factor.

What is particularly striking is the polarization that emerges **in 2023. In 2017**, the majority of respondents agreed with the statement; by **2023,** disagreement increases and responses become more dispersed across categories.

Interpretation and limitations (FinScope trust trend). The comparison in Figure 3.1 is **descriptive:** FinScope Tanzania is a repeated cross-section (2017 and 2023), not a panel, and the surveys are separated by six years. Over this interval, Tanzania experienced **major macroeconomic, public-health, regulatory, and market developments** (including the 2021 levy and its subsequent adjustments), any of which could affect perceived safety and trust in mobile money. For this reason, we do not interpret the 2017–2023 change as causal evidence of the levy's effect. Instead, we use FinScope to (i) describe **long-run perception shifts** and (ii) examine **heterogeneity patterns** (e.g., urban/rural, gender, age) that remain informative even in the presence of confounders.

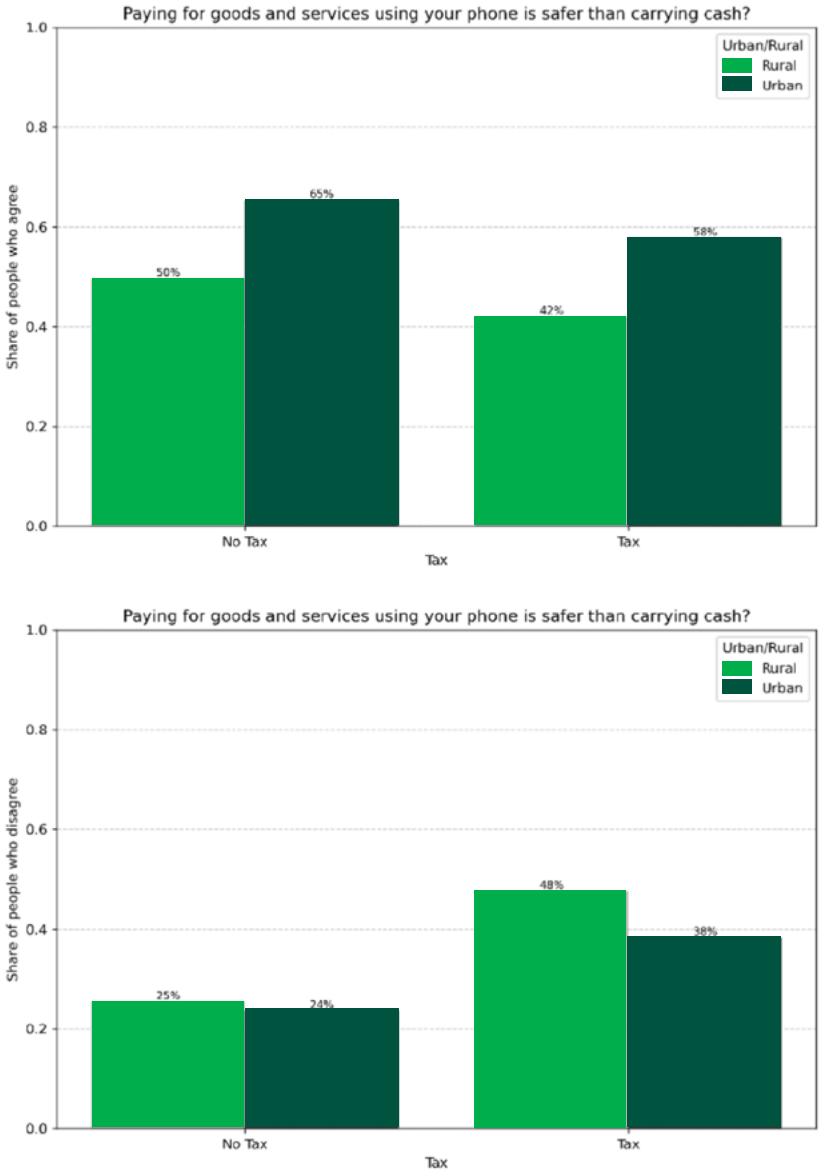
The following descriptive breakdowns document **how the 2017–2023 shift in perceived safety varies across population groups.** These patterns are **suggestive** of heterogeneous experiences over a period that includes the levy among several contemporaneous changes, but they should not be interpreted as identifying the levy's causal effect on trust.

3.1.1.1 URBAN VS. RURAL DISPARITIES

Figure 3.2 disaggregates results by urban and rural residence. The decline in trust is more pronounced in rural areas: agreement fell by 8 percentage points (from 50% to 42%), while disagreement rose by 23 points (from 25% to 48%). Among urban respondents, agreement declined more modestly (from 65% to 58%), with a 14-point increase in disagreement.

Figure 3.2

% of agreement and disagreement to the statement, by urban and rural areas



NOTE: The figure present two panels. On the left we present the share of survey respondents who agree with the statement, before and after the tax and by development where they reside. Similarly, on the right panel, we show the share of survey respondents who disagree with the statement. In light grey we present the share over survey respondents who reside in rural areas, in dark grey the share over survey respondents in urban areas.

These differences suggest that rural users may have interpreted the tax as a more serious breach of affordability and predictability, compounding existing barriers to trust.

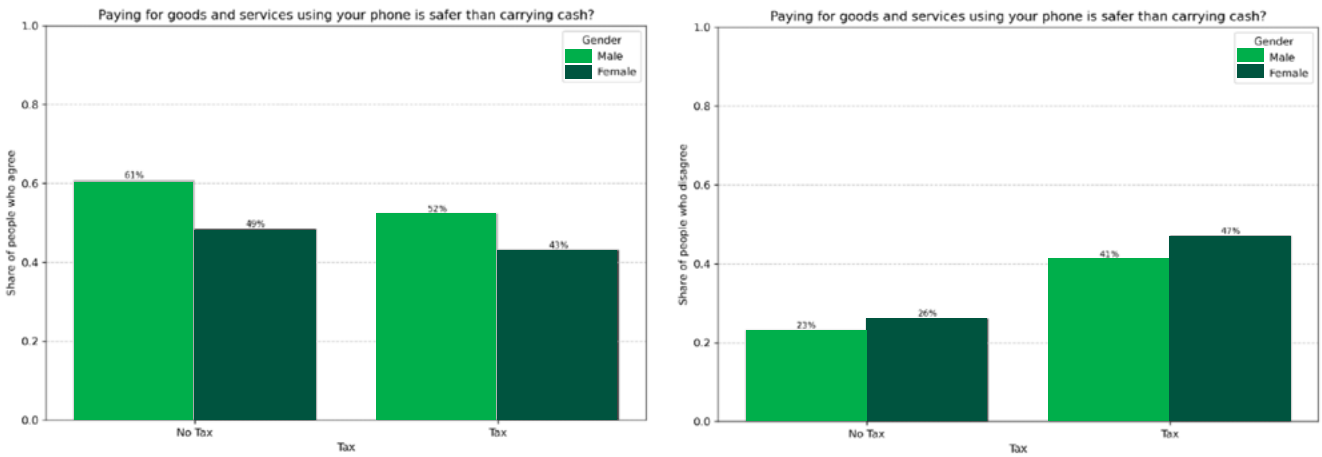
These sharper trust declines among rural respondents may reflect underlying structural disadvantages that heighten sensitivity to sudden policy changes. Rural users in Tanzania typically have **lower levels of digital literacy, weaker access to customer support,** and **fewer service alternatives,** which can exacerbate feelings of vulnerability when transaction costs rise unexpectedly. Research has shown that **limited consumer protection mechanisms and lack of transparency in digital financial services** tend to disproportionately affect rural and low-income populations (GSMA, 2020; Ghosh, 2021). Moreover, because rural communities often rely on mobile money as their **primary—sometimes sole—formal financial tool,** any perception of instability or cost unpredictability may be interpreted as a more fundamental breach of trust.

3.1.1.2 GENDER-BASED DIFFERENCES

Women consistently expressed lower trust in mobile money than men. In 2023, 52% of male respondents still agreed that mobile money was safer than cash, compared to only 42% of women.

Figure 3.3

% of agreement and disagreement to the statement, by gender



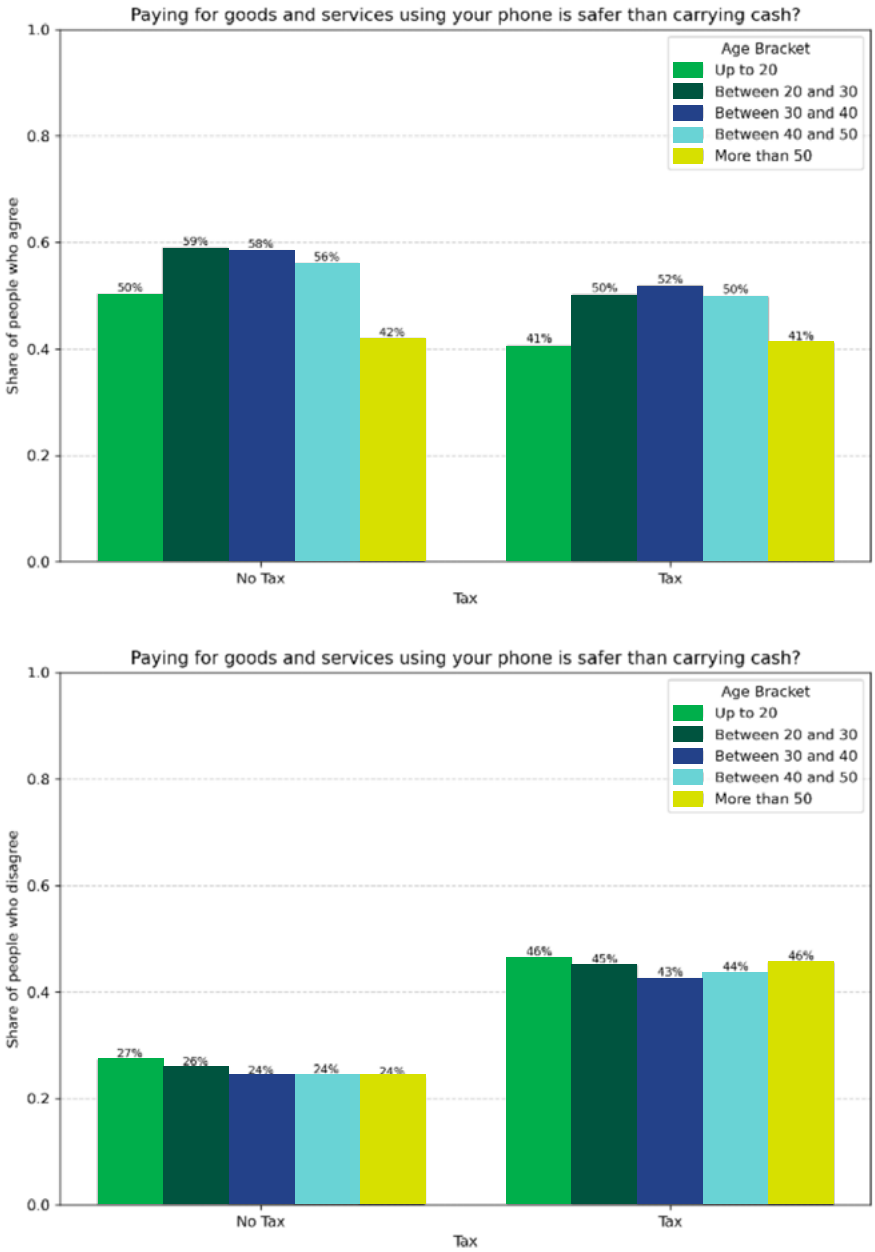
NOTE: The figure present two panels. On the left we present the share of survey respondents who agree with the statement, before and after the tax and by gender. Similarly, on the right panel, we show the share of survey respondents who disagree with the statement. In light grey we present the share over male survey respondents, in dark grey the share over female survey respondents.

3.1.1.3 AGE COHORT DYNAMICS

Younger users (under 30) registered the most substantial declines in trust, and we register a decline in the agreement rate of about 10%. Older cohorts, especially those over 50, showed smaller absolute changes.

Figure 3.4

% of agreement and disagreement to the statement, by age group



NOTE: The figure present two panels. On the left we present the share of survey respondents who agree with the statement, before and after the tax and by age group. Similarly, on the right panel, we show the share of survey respondents who disagree with the statement. The scale of grey indicates older age groups as it darkens.

3.1.2 REGRESSION RESULTS

We now turn to regression results. Table 3.1 presents coefficients from the baseline model. The post-2021 dummy is associated with an 8.2 percentage point decline in agreement with the safety statement, significant at the 1% level. While no established benchmark exists for "typical" variation in trust over time, this 8.2 percentage point decline represents a 16% drop relative to the 2017 baseline mean of 50% agreement, suggesting a substantial erosion in perceived safety.

Table 3.1

Effect of the Mobile Money Tax on Perceived Safety – Full Sample and Urban/Rural Subgroups

	Whole sample (1)	Urban (2)	Rural (3)
Tax	−0.082***	−0.084***	−0.082***
	(0.007)	(0.013)	(0.008)
Constant	0.547***	0.657***	0.498***
	(0.005)	(0.009)	(0.006)
Individual Controls	Yes	Yes	Yes
Obs.	19327	5911	13416
Adj. R sq.	0.072	0.050	0.055
Cluster St. err	Robust	Robust	Robust

NOTE: This table reports OLS estimates of the probability of agreeing that mobile money is safer than cash. Column (1) presents the full sample. Columns (2) and (3) show separate regressions for urban and rural respondents. All regressions include controls for gender and age group. Standard errors are robust.

We also examine interaction effects by demographic group. Table 3.2 shows that the decline in trust is largest among males (-9.4pp), followed by youth under 20 (-11.3pp). These patterns are consistent with the descriptive trends.

Table 3.2

Effect of the Mobile Money Tax on Perceived Safety – Heterogeneity by Gender and Age

	Gender		Age bracket				
	Male (1)	Female (2)	Up to 20 (3)	Between 20 and 30 (4)	Between 30 and 40 (5)	Between 40 and 50 (6)	More than 50 (7)
Tax	−0.094***	−0.074***	−0.113***	−0.107***	−0.089***	−0.076***	−0.033**
	(0.011)	(0.009)	(0.022)	(0.013)	(0.015)	(0.017)	(0.015)
Constant	0.613***	0.495***	0.512***	0.598***	0.595***	0.568***	0.433***
	(0.007)	(0.007)	(0.016)	(0.009)	(0.010)	(0.013)	(0.011)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	8477	10850	2123	5264	4392	3139	4409
Adj. R sq.	0.057	0.066	0.024	0.078	0.059	0.057	0.065
Cluster St. err	Robust	Robust	Robust	Robust	Robust	Robust	Robust

NOTE: This table reports OLS estimates of the effect of the tax across subgroups defined by gender and age. The dependent variable is a binary indicator for agreement with the statement that mobile money is safer than cash. All regressions include controls for urban/rural status and age or gender, respectively. Standard errors are robust.

3.2 Usage: Tanzania National Panel Survey 2020/2021

To evaluate the short-term behavioral effects of the mobile money tax, we use data from **Wave 5 of the Tanzania National Panel Survey (NPS)**, conducted between mid-2020 and the end of 2021. The NPS is a nationally representative household panel survey implemented by the Tanzania National Bureau of Statistics in collaboration with the World Bank. Wave 5 captures household and individual-level characteristics, including financial behavior and mobile money use, before and after the July 2021 introduction of the mobile money levy.

We exploit this high-frequency survey structure to estimate the tax's short-run effects using a **difference-in-differences (DiD)** strategy, following the methodological approach introduced by Bassi and Rasul (2021). Specifically, we construct an interaction between a post-tax time dummy and an indicator for whether the respondent lives in an urban area. This allows us to estimate the **differential effect of the tax on urban users** compared to rural users, who serve as a control group. We argue that this urban-rural contrast is analytically meaningful, as urban users generally have greater access to alternative financial channels such as banks and agent networks, and may thus exhibit a higher elasticity of substitution in response to the tax.

We control for time fixed effects and cluster standard errors at the **week level,** in line with the original Bassi and Rasul specification, to account for correlated shocks within survey weeks and to fully exploit the time dimension surrounding the policy introduction.

The DiD model is specified as follows:

$$Y_{idt} = \alpha_t + \beta \mathit{Post\ Tax}_t \times I[\text{Urban}]_d + \mathcal{E}_{idt}$$

The Difference-in-differences regression estimating the effect of the mobile money tax on urban versus rural users. Y_{idt} denotes a mobile money usage outcome for individual i at time t, $\mathit{Post\ Tax}_t$ is a post-tax dummy, $I[\text{Urban}]_d$ is an indicator for urban location, and α_t capture time fixed effects.

We analyze five dependent variables related to mobile money: (1) whether the respondent uses mobile money at all, (2) whether they use it to send money, (3) to receive money, (4) to save for emergencies, and (5) to access credit. These measures capture both intensive and extensive engagement with mobile money services. The results are reported in Table 3.3.

Table 3.3

Effect of the Mobile Money Tax on Urban Users Relative to Rural Users (NPS 2020/21)

	Use Mobile Money (1)	Send Mobile Money (2)	Receive Mobile Money (3)	Save for emergencies through Mobile Money (4)	Credit through Mobile Money (5)
Tax × Urban	−0.041	−0.040	−0.006	−0.044	−0.028
	(0.035)	(0.048)	(0.039)	(0.039)	(0.020)
Time FE	Yes	Yes	Yes	Yes	Yes
Obs.	4153	2989	2991	2977	2971
Adj. R sq.	0.160	0.071	0.082	0.058	0.050
Cluster St. err	Robust	Robust	Robust	Robust	Robust

The estimates are consistently negative across all outcomes. Urban respondents show a relative decline in mobile money usage compared to rural respondents in the months following the tax's introduction. The coefficients range from –0.041 (for general mobile money use) to –0.044 (for saving through mobile money), though none reach conventional levels of statistical significance, hence indicating a differential relative decrease of 4% in urban areas.

These patterns are consistent with the hypothesis that urban users are more responsive to the tax due to better access to substitutes—such as banks, agents, and cash transactions. The mobile money levy effectively increased the cost of digital transactions, and urban users, being less constrained by infrastructure or service availability, appear more able to reduce or reallocate their usage in response. Our findings resonate with earlier work by Economides and Jeziorski (2017), who show that mobile money adoption in Tanzania cannot be explained solely by income or price dynamics. Their study emphasizes the importance of non-price factors, such as convenience and reliability, particularly in rural areas where traditional banking infrastructure is limited. This supports our interpretation that behavioral responses—especially related to trust—are central to understanding shifts in DFS usage post-levy.

While the NPS interview timing provides a useful window around the levy's introduction, the **short post-policy period** and the structure of the fieldwork limit precision and make seasonal confounds a relevant concern—addressed here through interview-period fixed effects. Accordingly, we interpret the NPS DiD estimates as **supportive, short-run evidence consistent with disruption,** not as definitive causal effects. In the next section, we therefore turn to transaction-level administrative data from Uganda to study substitution mechanisms in greater detail using substantially richer behavioral information.

Inference and robustness to interview-week clustering. Because identification in this design comes from interview timing, one natural concern is that outcomes may be correlated within interview weeks. We therefore tested specifications that cluster standard errors at the **interview-week** level (mirroring the logic used in related timing-based designs). In the Tanzania NPS Wave 5 fieldwork, however, the effective number of interview weeks in the narrow window around the levy is limited, making week-level clustering **numerically unstable** and, in practice, leaving the point estimates and substantive interpretation unchanged. For transparency, we therefore report our preferred inference based on the survey-design clustering level, while interpreting the NPS DiD results as **suggestive** given the short post-period.

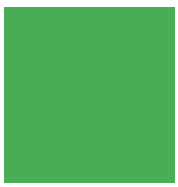
While the short duration of the NPS fieldwork and the limited post-policy sample size reduce our statistical power, this section provides suggestive evidence of differentiated tax effects by location. In the next section, we turn to transaction-level administrative data from Uganda to explore how such substitution mechanisms may operate in greater detail, using richer behavioral and geographic information.

3.3 Usage: transaction-level data from Uganda

In July 2018, Uganda implemented a 1% tax on all mobile money transactions, including deposits, withdrawals, and person-to-person (P2P) transfers. This measure was introduced as part of the 2018/19 budget to expand the tax base and raise domestic revenues from a rapidly growing digital finance sector.

The 2018 mobile money tax was initially set at **1% on the value of all mobile money transactions** (including deposits, transfers, and withdrawals) and was rapidly revised to **0.5% on withdrawals only** following public backlash. The public backlash was swift: media coverage documented declines in transaction volumes, agent activity, and user engagement. Within weeks, the tax was revised and limited to a 0.5% charge on withdrawals only. Nonetheless, the damage to trust and usage patterns persisted.

The implementation was opaque, with little prior consultation. Its introduction was widely viewed as both regressive and disruptive, especially among rural and lower-income users who had previously depended on mobile money as a primary financial tool (UNCDF, 2021).



3.3.1 DATA AND EMPIRICAL FRAMEWORK

Our analysis uses two core datasets. First, we draw on the universe of mobile money transactions from one of Uganda's main providers, covering over 50 million records in 2018. The data include transaction type, timestamp, value, and metadata on sender/receiver identity and location. This allows us to reconstruct user behavior over time and match users to district-level characteristics.

Second, we use the 2018 Uganda National Panel Survey (UNPS), a nationally representative household survey conducted over a 12-month period. The UNPS collects information on financial access and use, including mobile money and banking services. It permits us to evaluate behavioral responses using a timing-of-interview design, identifying whether individuals were surveyed before or after the policy change.

The administrative data allow us to observe real-time behavior across transaction types: cash-in (deposits), cash-out (withdrawals), and P2P transfers. For a subset of 1.5 million users, we can identify their geographical location. This supports heterogeneity analysis, focusing on differences in substitution potential across geographies.

In addition, we supplement the transaction data with geographically disaggregated measures of cash usage and access to traditional banking services. This enables us to analyze substitution dynamics across districts—specifically, whether users in areas with greater access to banks or heavier reliance on cash shifted away from mobile money in response to the tax. These contextual indicators strengthen our interpretation of behavioral adjustments and allow for a richer heterogeneity analysis of substitution patterns following the policy change.

3.3.2 IDENTIFICATION STRATEGY AND RESEARCH DESIGN

We adopt a quasi-experimental strategy exploiting the July 1, 2018 introduction of the tax. Our first approach uses an event study to test for pre-trends and the dynamics of behavioral change. We then implement a difference-in-differences (DiD) model that compares changes in mobile money usage across areas with varying access to substitutes. Specifically, we use **ATM density as a proxy for substitutability**, based on the premise that areas with more ATMs offer users more viable alternatives to mobile money for withdrawing and storing value. As we show later in the analysis, there was a notable post-tax uptake in **banking agents,** who increasingly served as intermediaries for deposits and account access. In a context where **POS (point-of-sale) infrastructure remains underdeveloped,** ATMs provide the most accessible and secure way to withdraw funds stored via banking agents. High ATM density enables users to **store funds digitally via banks but still operate in cash** when needed, without having to carry cash over long distances. In this sense, **ATMs act as a withdrawal infrastructure that enables a shift away from mobile money,** making it possible for users to substitute safely and conveniently. By comparing areas with high and low ATM access, we can thus more credibly estimate how substitution capacity shapes behavioral responses to the tax. The assumption is that districts with more ATMs offer easier **substitution away from mobile money. In this context, substitution refers primarily to users shifting from mobile money-based transfers and storage to a combination of banking agents for deposits and ATMs for cash withdrawals.** As we show later, the tax led to increased use of banking agents for deposits, higher ATM withdrawal activity, and greater cash use — suggesting that users stored funds through bank infrastructure and relied on cash for payments. The tax thus induces a differential behavioral response depending on financial infrastructure.

The United Nations Capital Development Fund (UNCDF), in partnership with PHB Development, conducted semi-structured interviews with 303 individuals in Western and Central Uganda to assess the effects of the 0.5% tax on mobile money withdrawals introduced in 2018. The findings revealed that while some users with higher incomes were able to switch to alternative financial services like agent banking, many rural and lower-income individuals lacked access to such alternatives. Consequently, these users continued to rely on mobile money services despite the additional tax burden, as they had no other viable options for conducting financial transactions.

3.3.3 ECONOMETRIC SPECIFICATION

The main DiD specification is:

$$Y_{idt} = \alpha_i + \alpha_t + \beta Post\ Tax_t \times I[\text{High ATM density}]_d + \varepsilon_{idt}$$

Where we define individual i in district d in the pre or post policy period defined by t, and where

- Y_{idt} is the outcome variable for user i at time t, such as transaction value, number of withdrawals, etc.
- $Post\ Tax_t$ is a binary indicator equal to 1 for dates after the tax implementation, and 0 before.
- $I[\text{High ATM density}]_d$ indicates whether the individual resides in a district in the upper quartile of the ATM density distribution. We assign to each user the ATM density (calculated as number of ATMs over the districts area) of the district where she resides. We define $I[\text{High ATM density}]_d$ as a dummy indicating whether the users i in district d is in the highest 25 percentile of the users' distribution of ATM density. We use the subscript d as there are no users in the same district assigned to a different value of the dummy variable.
- α_i are **user fixed effects,** controlling for time-invariant heterogeneity across individuals or accounts.
- α_t are **time fixed effects,** capturing aggregate shocks, seasonality, or temporal trends.
- ε_{dt} is the idiosyncratic error term.

The coefficient β captures the **average treatment effect of the tax,** identifying the discontinuity in behavior coinciding with the tax policy change. It has to be read as the difference in the effects of the tax on urban users (high ATM density) with respect to rural users (low ATM density). It captures the **differential impact of the tax in urban against rural areas,** where substitution options may be more limited and mobile money usage more critical for financial access

The coefficient β captures the differential effect of the mobile money tax on users residing in districts with high ATM density relative to those in areas with low ATM availability. A statistically significant estimate of β would indicate that the behavioral response to the tax — such as reductions in usage or shifts to alternative services — is conditional on the ease of substituting mobile money with formal financial infrastructure. In other words, it quantifies whether users in urban areas, where access to ATMs is typically higher, are more resilient (yet more elastic) to the tax shock compared to rural users, for whom mobile money often represents the only accessible financial service.

To capture time-specific dynamics, we estimate an event study:

$$Y_{idt} = \alpha_i + \alpha_t + \sum_{\tau=1, \tau \neq 5}^{T} \beta_\tau \text{Month}_\tau \times \mathbf{I}[\text{High ATM density}]_d + \epsilon_{idt}$$

In this framework:

- Month_τ is a set of **binary indicators for each month** in the observation window, where the month immediately preceding the introduction of the tax is omitted and serves as the **reference period.**
- The coefficients β_t of the interaction terms $\text{Month}_t \times \text{I}[\text{High ATM density}]_d$ capture the **time-varying differential effect** of the tax in high-ATM districts relative to low-ATM districts.

Here, time dummies interact with infrastructure indicators to estimate evolving treatment effects. Pre-treatment flatness and post-treatment divergence provide confidence in the validity of our assumptions.

3.3.4 ECONOMETRIC ANALYSIS

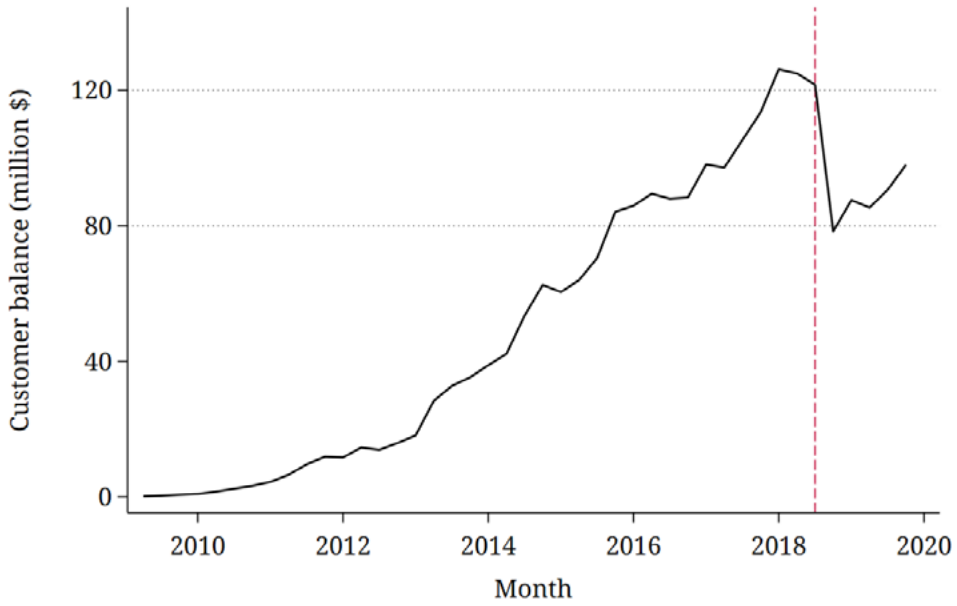
This section presents the empirical evidence on how the mobile money tax reshaped financial behavior across different population segments and institutional infrastructure. We organize the analysis around three key substitution mechanisms: reduced mobile money use, increased use of banking agents, and a shift toward physical cash. The data underpinning the analysis consist of (i) individual-level administrative transaction records, (ii) district-level banking data, and (iii) nationally representative survey data from the Uganda National Panel Survey (UNPS).

3.3.4.1 MOBILE MONEY USAGE BEFORE AND AFTER THE TAX

3.3.4.1.1 Transaction-Level Data

The initial evidence highlights a sharp contraction in mobile money usage following the introduction of the tax. In Figure 3.5, using aggregate data provided by Bank of Uganda, we observe a sharp and immediate decline in the total balance held in mobile money accounts following the July 2018 tax introduction—amounting to a reduction of approximately USD 40 million in the first quarter alone, as also previously shown by Akol and Lees (2021). However, our transaction-level dataset is limited to the remainder of 2018 and does not capture the longer-term recovery and growth that the industry experienced in subsequent years.

Figure 3.5
Mobile Money customer balance



NOTE: This figure plots the quarterly customer balance of mobile money, expressed in US $. It represents the value of mobile money detained by users.

To quantify these patterns, we estimate a difference-in-differences model focusing on the intensive margin of mobile money use. The outcome variables include: (i) the log of the average daily amount sent, received, deposited, and withdrawn by each individual in a month, and (ii) net deposits (defined as deposits minus withdrawals), standardized due to the presence of negative values. We restrict the sample to users who were active in both the pre-tax and post-tax periods. The key treatment indicator is a post-tax dummy, interacted with a binary indicator for residence in a high-ATM-density district. As explained, this specification allows us to compare the behavioral response of users with and without easy access to banking alternatives.

Table 3.4

Intensive margin: performed transactions

	Sent (1)	Received (2)	Deposits (3)	Withdrawals (4)	Net (5)
Tax dummy$_t$	−0.689***	−0.607***	−0.662***	−0.256***	−0.035***
	(0.006)	(0.004)	(0.003)	(0.002)	(0.000)
Tax dummy$_t$ × High ATM density$_d$	−0.103***	−0.117***	−0.040***	−0.060***	−0.004***
	(0.009)	(0.007)	(0.004)	(0.003)	(0.001)
User FE	Yes	Yes	Yes	Yes	Yes
N. of users	142522	225365	585690	691428	768061
Obs.	285044	450730	1171380	1382856	1536122
Adj. R sq.	0.438	0.349	0.407	0.448	0.225
Mean Dep. Var. High ATM	2900.033	2497.483	5883.921	5804.549	−220.917
Mean Dep. Var. Low ATM	2253.829	1849.746	4292.215	4178.469	−171.947

NOTE: In this table, we use our difference-in-differences approach and we show how mobile money users in high ATM density districts respond to the introduction of the mobile money tax at the intensive margin, relatively to users in low ATM density districts. High-ATM-density users transact between 4% and 12% less with respect to low-ATM-density users, after the tax. We estimate the effect on the sample of users that performed transactions of a given type before and after the tax. Column (1) show the effects on the amount of mobile money sent, column (2) on the amount received, column (3) on the amount deposited, column (4) on the amount withdrawn. For columns (1)-(4) outcome variables are the log of the average daily amount. In column (5) we use as outcome variable the standardized value of the difference between deposits and withdrawals. Standard errors are clustered at the individual level. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

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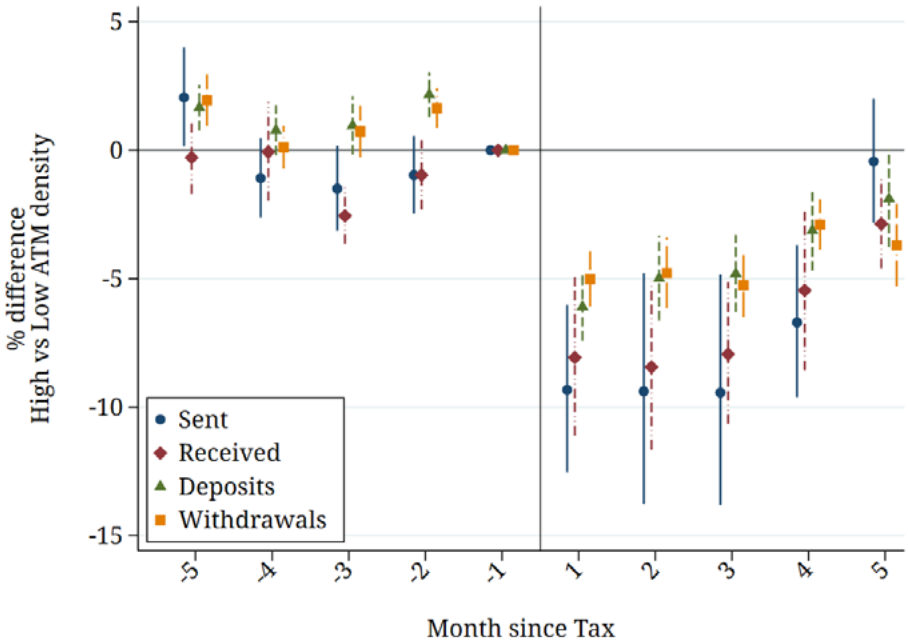
The results in Table 3.4 show a statistically significant reduction in transaction values across all categories. In high-ATM-density districts, users transacted between 4% and 12% less compared to their counterparts in low-ATM-density areas. The strongest effect is observed for withdrawals, consistent with the tax's initial design that applied to both withdrawals and transfers. Net deposits also decline, confirming a broader retreat from mobile money storage.

We further estimate an event study model to capture the dynamics of adjustment over time. The outcome is the log of the average daily transaction value in a given month, and the coefficients represent the differential evolution between high- and low-ATM-density users relative to the pre-tax baseline month (May 2018).

Figure 3.6

Differential effect of the tax on users in high ATM density districts



NOTE: This figure plots the coefficients β of the event study approach. We use as outcome variable the log of average daily value of mobile money transactions in a month at the individual level. We differentiate between type of transactions. We already express the y axis in terms of % change. We use May as the baseline month. Data for June and July are excluded due to issues with data collection. Standard errors are clustered at the individual level, and the figure reports 95% confidence interval.

Figure 3.6 shows no significant pre-trends and documents an immediate and persistent decline in transaction values post-tax, especially in withdrawal activity. These effects are interpreted as both a mechanical price response and a behavioral adjustment to perceived policy uncertainty. Although the government partially reversed the tax within weeks, usage did not recover, consistent with salience effects and reference dependence (Chetty et al., 2009; Dupas et al., 2018).

We exclude **June and July** because of documented data-quality issues in those months (rather than modeling discretion), and the event-study exhibits **stable coefficient paths within the pre-policy period and within the post-policy period,** so the estimated discontinuity reflects a persistent level shift that does not hinge on the excluded window or a fragile choice of reference month. June and July are excluded due to documented measurement issues, and the resulting event-study displays stable pre- and post-policy coefficient paths, indicating that the discontinuity is not driven by the excluded window nor by a sensitive normalization to the baseline month.

3.3.4.1.2 Survey Data

To complement administrative evidence, we exploit data from the 2018/19 Uganda National Panel Survey. We adopt the timing-of-interview design from Bassi and Rasul (2017), exploiting variation in interview dates before and after the tax to identify behavioral responses.

We focus on binary outcomes for recent mobile money usage (past week), and estimate a linear probability model with district and time fixed effects, controlling for individual characteristics. Standard errors are clustered at the week level, as the source of variation lies in the timing of interviews.

The results in Table 3.5 confirm a statistically significant drop in usage: individuals in high-ATM-density districts are up to 9 percentage points less likely to report using mobile money after the tax. This decline aligns with administrative data and reinforces the conclusion that access to banking alternatives shaped user responsiveness to the tax.

Table 3.5

Mobile Money usage - Survey data

	Send (1)	Transfer cash (2)	Withdraw (3)	Pay utilities (4)	Pay school (5)
Tax dummy$_t$ × **I**[High ATM density]$_h$	−0.061*	−0.019*	−0.093***	−0.036**	−0.019*
	(0.034)	(0.010)	(0.030)	(0.015)	(0.010)
District FE	Yes	Yes	Yes	Yes	Yes
Date FE	Yes	Yes	Yes	Yes	Yes
Obs.	5044	5047	5060	5043	5044
Adj. R sq.	0.224	0.117	0.246	0.160	0.046
Mean Dep. Var.	0.336	0.021	0.320	0.030	0.010

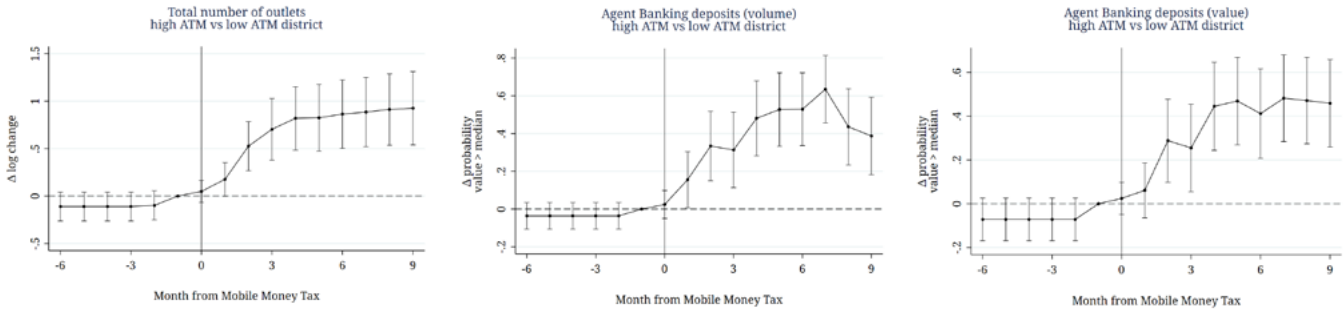
NOTE: This table reports the coefficients of the difference-in-differences approach on the survey data of UNPS. The outcome variables are dummy variables taking value 1 if the individual used a given mobile money service in the past week. We control for individual's characteristics such as gender, age and marital status. Time and district FEs are included. Standard errors are clustered at the week level, as suggested by Bassi and Rasul (2017). ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

3.3.4.2 EVIDENCE OF SUBSTITUTION: INCREASED BANK DEPOSITS

The contraction in mobile money activity coincides with a marked expansion in banking agent networks. Banking agents are a decentralized branchless banking innovation enabling deposits and withdrawals on behalf of formal banks. Their spread is demand-driven, reflecting user preferences and infrastructure readiness. We first present an event study showing that agent deployment increased more in high-ATM-density districts after the tax.

Figure 3.7

Banking agents: high- vs low-ATM density



NOTE: In this panel we plot the coefficients of the event-study approach, where we use as outcome variable the log number of banking agents (top left), a dummy for banking agents' deposits volume (top right) and value (bottom) above median. All outcome variables are at the district level. The plotted coefficient represents the differential between high- and low-ATM density district, with respect to the reference period. We use as reference the month before the introduction of the mobile money tax. Standard errors are clustered at the bank level and we report 90% confidence intervals.

The results in Figure 3.7 show an upward shift in both the number of agents and deposit activity in districts with dense ATM infrastructure. These districts are more likely to contain users familiar with the formal banking system and banks with greater branch and ATM presence—making them more attractive for new agent deployment.

We complement this with a difference-in-differences model at the district-month level, whose results are presented in Table 3.6. We look at the number of deposits and whether districts had unusually high deposit activity. The outcome is either the log number of deposits or a dummy for above-median deposit volume. Standard errors are clustered at the district level.

Table 3.6
Banking agents deposits

	Volume			Value		
	Δ Level ('000) (1)	Δ Log (2)	Δ Pr > median (3)	Δ Level ('000) (4)	Δ Log (5)	Δ Pr > median (6)
Tax dummy$_t$ × High ATM density$_c$	0.323**	2.164***	0.390***	0.098*	6.748***	0.395***
	(0.142)	(0.369)	(0.064)	(0.050)	(1.271)	(0.066)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1495	1495	1495	1495	1495	1495
Adj. R sq.	0.484	0.683	0.528	0.500	0.664	0.539
Mean Dep. Var.	0.076	1.098	0.146	0.023	4.863	0.157

NOTE: This table reports the coefficients of the difference-in-differences approach. The outcome variables are the number and the value of deposits made by customers to Banking Agents. They are expressed in level, log, or as a dummy indicating whether the value is below or above the median as proposed in Chen and Roth (2023). Time and district FEs are included. Standard errors are clustered at the district level. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

The tax catalyzed a shift toward branchless banking channels, particularly for banks with pre-existing infrastructure advantages. The results are consistent with a model of technology adoption with complementarity (Crouzet et al., 2019), where users pivot to available alternatives when frictions in a dominant technology arise.

3.3.4.3 EVIDENCE OF SUBSTITUTION: INCREASED USE OF CASH

3.3.4.3.1 Increased Cash Demand at the District Level

We use monthly issuance data of physical cash from the Central Bank to private banks, disaggregated by bank-district pairs (defined as "branches"), to assess whether demand for physical currency rose in the wake of the mobile money tax. Higher cash issuance by the Central Bank reflects increased demand from private banks — itself a likely response to heightened withdrawals by customers. This likely means people were withdrawing and using more physical cash for daily purchases instead of mobile money. Indeed, in addition to increased use of banking services, users may have turned to physical cash as a functional substitute for mobile money for transactions — using bank agents to store funds and ATMs to withdraw cash for in-person payments, given the limited POS infrastructure in Uganda.

In Table 3.7, we estimate a DiD model comparing districts in the top quartile of ATM density against all others, with the outcome being the log value of cash issuance. Our preferred specification includes branch fixed effects and district-month fixed effects to control for seasonality and unobserved time-invariant factors.

Table 3.7
Cash issuance

	Log cash withdrawn	
	(1)	(2)
Post Tax$_t$ × High ATM density$_d$	0.304***	0.231***
	(0.061)	(0.055)
Branch FE	Yes	Yes
Time FE	Yes	Yes
District × Month FE		Yes
Obs.	2622	2622
Adj. R sq.	0.543	0.542
Mean Dep. Var.	21.745	21.745

NOTE: This table reports the coefficients of the difference-in-differences approach. The outcome variable is the log value of cash issued by the Central Bank to private banks. The unit of observation is the private bank-district pair, that we define as branch. We control for branch and time FEs in column (1), and add branch-month FEs in column (2) to account for seasonality. Standard errors are clustered at the district level. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Results indicate a statistically significant and economically meaningful increase in cash issuance in high-ATM-density districts of about 30% with respect to low-ATM-density districts. This supports the hypothesis that mobile money was replaced by physical cash for day-to-day transactions in areas with easy cash access.

3.3.4.3.2 Increased Usage of ATMs at the Bank Level

Lastly, we use quarterly data on ATM withdrawals at the bank level to examine whether institutions with larger ATM networks experienced an increase in withdrawals after the tax.

In Table 3.8, we implement a DiD model where treatment is defined as being in the top quartile of ATM market share in the pre-policy period. The dependent variable is the total value of ATM withdrawals (in billion UGX). Fixed effects for banks and quarters are included, and standard errors are clustered at the bank level.

Table 3.8
ATM withdrawals

	ATM withdrawals	
	Log (1)	Log (2)
Post Tax × **I**[ATM Market share]	0.029**	
	(0.012)	
Post Tax × Market share of urban ATMs		0.003***
		(0.000)
Bank FE	Yes	Yes
Time FE	Yes	Yes
Obs.	263	263
Adj. R sq.	0.984	0.992
Mean Dep. Var.	0.025	0.025

NOTE: This table reports the coefficients of the difference-in-differences approach. The outcome variables are the value of ATM withdrawals (in billion UGX). The unit of observation is the private bank at quarterly level. We control for bank and time FEs. Standard errors are clustered at the bank level. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

The results confirm that banks with more extensive ATM infrastructure saw a disproportionate rise in cash withdrawals post-tax. This pattern complements our findings on agent banking and further reinforces the substitution story: mobile money's role in money storage (deposits and withdrawals) -and, consequently, payments, was increasingly taken over by physical cash accessed via banks.

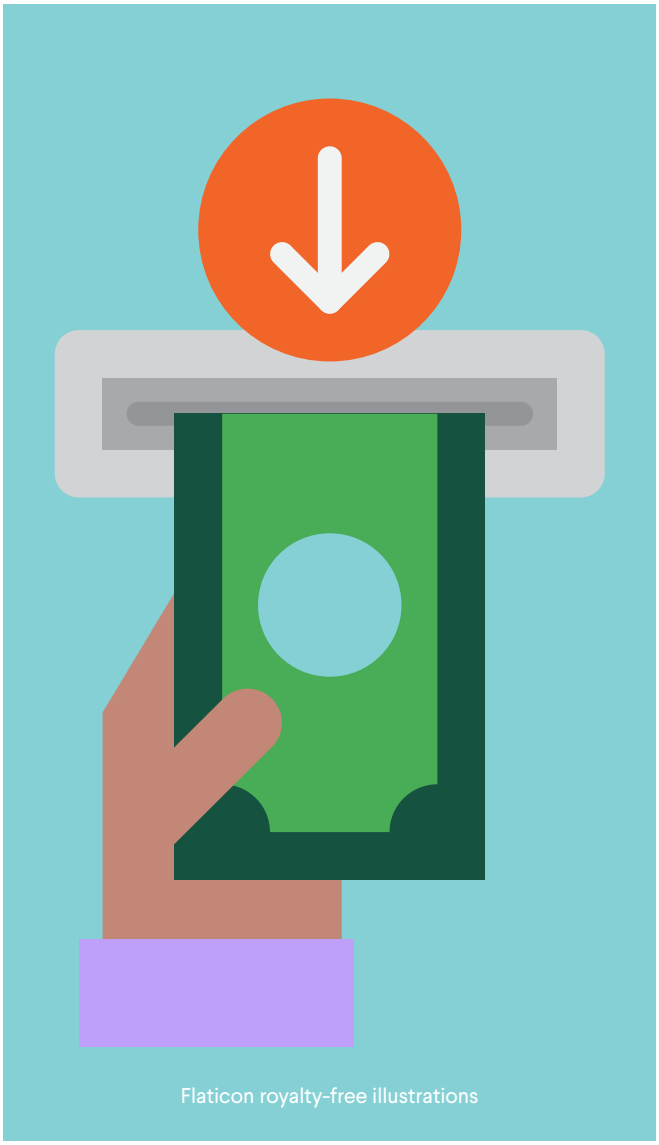
3.3.5 TRANSPORTABILITY AND EXTERNAL VALIDITY: INTERPRETING UGANDA EVIDENCE FOR TANZANIA

The Uganda evidence is included to clarify mechanisms—in particular, how a salient, government-imposed transaction tax can generate abrupt behavioral responses (reduced usage, cash retrenchment, and substitution toward bank channels) when users have access to alternatives. Importantly, Uganda is not treated as a one-to-one quantitative proxy for Tanzania. Tanzania's own trends are documented using Tanzania-specific sources (FinScope, administrative/industry evidence, and the NPS timing-based analysis), while the Uganda transaction-level evidence is used primarily to interpret why sharp discontinuities can emerge and which substitution margins are most likely to activate.

The table below summarizes key differences in policy design and timing that directly affect the comparability of magnitudes across the two settings.

Mobile money tax design: Uganda (2018) vs. Tanzania (2021–2023)

Dimension	Uganda (2018 reform episode)	Tanzania (2021–2023 reform episode)
Policy instrument	Mobile money transaction tax (excise-type levy on transactions)	Electronic transaction levy ("e-levy" / mobile money levy)
Introduction	July 2018	July 2021
Initial tax base	All mobile money transactions (e.g., deposits, transfers, withdrawals)	Mobile money transfers and withdrawals (tiered per transaction)
Initial rate structure	Ad valorem (percentage of transaction value)	Tiered fixed charge by transaction amount
Immediate revisions	Revised within weeks to 0.5% on withdrawals only	Revised multiple times; by 2023 the design increasingly shifted toward withdrawal-focused taxation (with reduced scope on transfers in later revisions)
Exemptions / thresholds	Limited exemptions at introduction; revision narrowed base to withdrawals	Small transactions exempt at introduction (threshold) and tiered schedule; subsequent scope adjustments over time
Interaction with other taxes on mobile money	Relevant interaction with provider fees and broader tax environment	Implemented on top of pre-existing taxes on service fees (e.g., VAT and excise on mobile money fees)
Salience / public visibility	High salience: public debate and protest coinciding with rollout	High salience: widely communicated and experienced as a new visible deduction per transaction



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Differences in financial infrastructure and substitution opportunities further limit mechanical transportability. In Uganda, the substitution patterns documented in this section—including increased reliance on bank deposits and higher ATM usage—imply that, at least for urban users, banking channels and cash access points were sufficiently available to serve as practical alternatives. In Tanzania, substitution opportunities are also present, but their availability varies sharply by geography and baseline financial access: urban and banked users are more likely to have feasible alternatives (bank transfers, ATM withdrawals, agent banking), while rural users often remain more dependent on mobile money agents and cash-based local economies. This matters because the behavioral impact of a transaction tax depends not only on the tax rate, but also on whether users can realistically re-route transactions through other channels.

For these reasons, the Uganda evidence should be interpreted as providing externally valid qualitative insights about mechanisms (salience, perceived policy risk, and substitution when alternatives exist), rather than as a basis for importing the magnitude of the Ugandan effects into Tanzania. A formal "re-weighting" of Uganda estimates to Tanzania's market structure would require transaction-level information for Tanzania (e.g., the distribution of transaction types and amounts, on-/off-net composition, and user composition by access to alternatives) that is not available in this study. Without such inputs, re-weighting would add an additional layer of assumption rather than strengthening identification. Accordingly, the report uses Uganda to inform the interpretation of behavioral responses, while Tanzania-facing conclusions remain grounded in Tanzania-specific data.

4 Explanation of results

The results from the three empirical sources—FinScope Tanzania (2017 and 2023), the Tanzania National Panel Survey (2020/21), and transaction-level data from Uganda (2018)—paint a coherent picture of how the introduction of a mobile money levy can trigger behavioral reactions that go well beyond price elasticity. Across all three datasets, we observe signs of user withdrawal from the mobile money ecosystem, often accompanied by shifts in financial behavior and growing skepticism toward digital financial services.

4.1 Declining Trust: Evidence from FinScope Tanzania

The FinScope data provide some of the clearest **indicative evidence** that the 2021 mobile money levy may have acted as a negative signal to users. While we cannot identify causal effects due to the six-year gap between survey waves and the absence of a counterfactual, the observed decline in perceived safety of mobile money—captured by agreement with the statement "paying for goods and services using your phone is safer than carrying cash"—is both statistically significant and widespread across user demographics. These patterns suggest a broad erosion of trust consistent in the years following the levy, though we interpret them as descriptive associations rather than definitive causal effects.

Importantly, this decline occurs in the **absence of major changes to mobile money service quality or infrastructure** during the same period (see Appendix B). The absence of parallel shocks to network access or operator performance strengthens the interpretation that the levy itself may have triggered a loss of confidence. The finding aligns with existing literature on financial inclusion and behavioral economics, which emphasizes that users, particularly those with limited formal financial experience, interpret new taxes as **signals of institutional fragility, policy instability, or systemic risk** (Xu, 2020).

The effect was broad-based, affecting both urban and rural populations, men and women, and all age groups. However, **younger respondents showed the most pronounced decline in trust, while women consistently reported lower levels of confidence than men,** both before and after the levy. These patterns reflect known differences in financial behavior: younger and female users tend to be more risk-sensitive in digital finance contexts, often due to limited buffers or negative prior experiences.

4.2 Early Usage Effects: Evidence from the Tanzania National Panel Survey

To better assess short-run behavioral responses, we turned to the Tanzania National Panel Survey (NPS), exploiting the 2020–2021 wave's timing around the introduction of the levy. Using a difference-in-differences design (as described in Section 3.2), we identify a **relative decline in mobile money usage among urban users,** as compared to rural users, in the period following the tax.

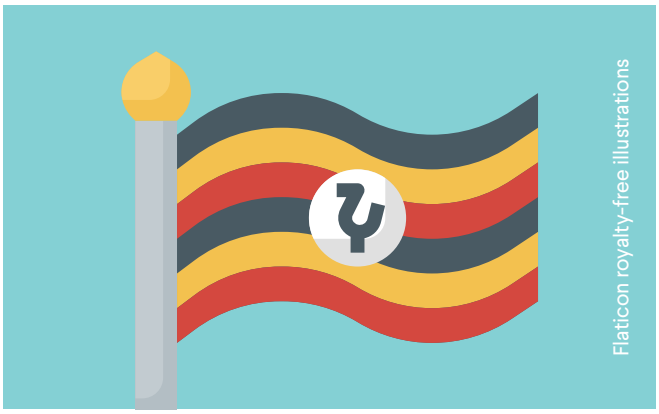
This urban–rural divergence may have two underlying explanations. First, **urban users face lower barriers to substitution,** with greater physical and digital access to alternatives such as cash, banks, or informal agents. Second, **urban users may have been more aware of the tax** through media coverage, peer networks, or public discourse. Higher connectivity, denser population, and more active protest activity in cities could plausibly amplify awareness and responsiveness.

While our dataset does not allow us to distinguish cleanly between these mechanisms, the substitution hypothesis is more testable—and we address it directly in the analysis using Ugandan transaction-level data. In all cases, the findings from Tanzania point to a geographically unequal behavioral response to taxation, with **urban users more likely to disengage from mobile money** in the face of rising transaction costs.

4.3 Substitution and Retrenchment: Causal Evidence from Uganda

To validate and further unpack the behavioral mechanisms observed in Tanzania, we analyze detailed administrative and survey data from Uganda, where a comparable mobile money levy was introduced in mid-2018. Both Uganda and Tanzania exhibit structural similarities that make cross-country comparison meaningful. In 2021, **45% of adults in Tanzania** and **53% in Uganda** owned a mobile money account, according to the Global Findex database—highlighting widespread usage in both countries. Banking access remains limited, particularly in rural areas, where mobile money has become the primary channel for financial transactions. Both countries also operate under evolving regulatory frameworks aimed at balancing financial innovation with consumer protection. These parallels in mobile money penetration, financial infrastructure, and regulatory orientation provide a strong foundation for using Uganda as a reference case to interpret behavioral responses in Tanzania.

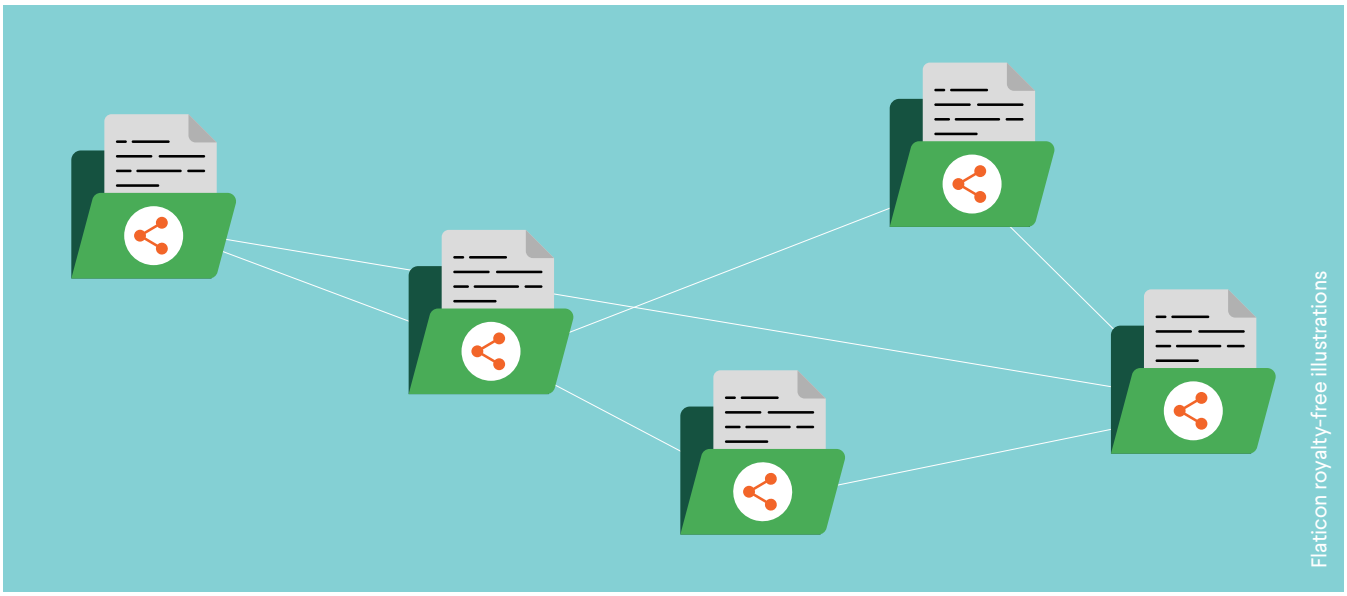
Uganda's data environment allows for more rigorous causal identification. We draw on the full universe of mobile money transactions from one of the country's main providers, along with nationally representative household survey data from the 2018 Uganda National Panel Survey.



Three key findings emerge from this analysis:

1. **Immediate and sizable decline in usage:** Mobile money account balances fell by the equivalent of **$40 million (equal to 30% of the total value of balances) within the first quarter** after the tax was enacted. This indicates a sharp and measurable contraction in user engagement, consistent with users withdrawing funds or ceasing activity altogether.
2. **Urban users drive the decline:** The drop in mobile money transaction volume was **around 10 percentage points greater in urban areas** than in rural ones. This replicates the pattern observed in Tanzania and strongly supports the interpretation that urban users are more responsive to mobile money price changes, due to their access to substitutes.
3. **Substitution mechanisms are active and visible:**
    - **Banking channels:** In the months following the levy, there was a rapid expansion in banking agent coverage and a marked increase in deposits made via agent banking, particularly in urban districts. This shift suggests that users did not simply reduce financial activity—they redirected it through alternative channels.
    - Cash usage: Complementing the shift to banking, there was a surge in ATM withdrawals and reported cash use, especially in cities. These shifts indicate a partial return to cash-based transactions, a reversal of previous digital inclusion trends.

These substitution effects—toward both banking and cash—underline the broader policy risk of poorly timed or opaque taxes: they may cause users not just to reduce digital engagement, but to disengage from formal financial services altogether. While these behaviors were most visible in Uganda's urban areas, the lessons are relevant to Tanzania given the structural and infrastructural similarities.



4.4 Interpreting Across Contexts

Across all three data sources, a consistent story emerges. Mobile money taxes can significantly alter user behavior. In Tanzania, we see this in the form of declining trust and early signals of reduced usage. In Uganda, where data allow stronger identification, we observe a clear pattern of user retrenchment and substitution.

These responses appear **geographically and demographically asymmetric,** with **urban users reacting more strongly,** likely due to their greater access to alternatives and higher exposure to information. This asymmetry should be carefully considered in future tax policy design, especially if inclusion and equity remain central objectives.

In the following section, we discuss broader policy implications, including the potential for trust-sensitive tax design and the importance of institutional transparency in safeguarding digital financial inclusion.

4.5 Limits to mechanisms decomposition (salience vs. provider/ agent channels)

Limits to mechanism decomposition (salience vs. provider/agent channels). With the data available for Tanzania, we cannot cleanly decompose the observed post-levy disruption into (i) a **pure price channel** operating through operator tariff schedules and the tax wedge, versus (ii) a **salience/uncertainty channel** operating through perceptions of policy risk and trust, versus (iii) **provider and agent dynamics** such as changes in agent commissions, liquidity constraints, cash-out frictions, or operational responses that may have coincided with the reform period. Doing so would require high-frequency administrative series that are not available in this study, including operator tariff schedules and fee changes by product, agent commission schedules, and agent liquidity/float measures around the reform. Accordingly, our discussion of salience and trust should be read as a **plausible interpretation consistent with the observed patterns and comparative evidence,** not as definitive attribution. More broadly, we do not claim that "trust explains everything": the levy may plausibly affect behavior through both price and salience/uncertainty channels, particularly in settings with limited public awareness of the tax system and highly visible transaction deductions.

5. Policy Implications and Recommendations

5.1 Reframing Taxation as a Trust Shock

The introduction of the mobile money levy in Tanzania in July 2021 provides an instructive case of how fiscal policy interventions can trigger sharp behavioral responses not solely attributable to cost increases. As documented using FinScope survey data (2017, 2023), the levy appears to have functioned as a negative trust signal. Even without deterioration in service quality or infrastructure (see Appendix B), many users responded to the new charge with a reduction in confidence.

This response is consistent with broader research findings. Trust in financial systems is shaped not only by their reliability or security but by their perceived fairness and transparency (Xu, 2020). From the user's perspective, a new tax on transactions—especially one layered on top of existing VAT and excise charges—can signal unpredictability and risk. This reaction might even be amplified in contexts like Tanzania, where many users have limited financial literacy and lack access to alternative services.

Tax policy in digital finance must therefore be treated not only as a tool for revenue generation, but as a trust intervention. Poorly designed fiscal instruments can erode confidence in the system, creating durable behavioral distortions. Price increases from taxes are not experienced in the same way as commercial fee adjustments from providers. Whereas the latter are expected market behaviors, the former might be interpreted through a political and institutional lens. When policy-driven charges appear arbitrary or opaque, they undermine the psychological foundations of financial inclusion.

This distinction matters. Users may tolerate fee changes introduced by providers—especially when they perceive competition or service quality—but react strongly to taxes they view as externally imposed or unjustified. Research in Uganda confirms this dynamic. Following the 2018 mobile money tax, transaction volumes collapsed, and public trust deteriorated—despite the modest size of the levy (Lees & Akol, 2021).

The experience in Uganda reinforces the idea that awareness, attribution, and perceived intent shape behavioral reactions to pricing changes. As Brunnermeier, Limodio, and Spadavecchia (2025) document, on-net P2P fees in Uganda increased by 2% in 2012, and by 1% in both 2013 and 2014, yet mobile money usage remained on a steady growth path. A 1% fee reduction in 2017 likewise had little discernible effect. By contrast, the 2018 tax was followed by a $40 million decline in mobile money account balances within one quarter. Clearly, this pattern cannot be explained by price elasticity alone.

The key differentiator appears to be the perceived nature of the cost. Provider fees are embedded, opaque, and often absorbed without strong reaction. By contrast, taxes—especially when introduced abruptly—are politicized, visible, and potentially interpreted as coercive. As such, they damage not just affordability but trust. In Tanzania, confusion over the source of the increased transaction cost likely compounded this issue.

In short, the psychological interpretation of policy-driven pricing matters as much as the pricing itself. This distinction is not only theoretical; it has major implications for financial inclusion, revenue design, and the sustainability of digital finance ecosystems.

5.2 The Uneven Burden of the Levy

Our empirical analysis suggests that urban users were more responsive to the mobile money levy than rural users, likely due to their greater access to substitutes such as bank accounts, ATMs, and agency banking. This responsiveness is not necessarily a signal of greater harm: users who can substitute services may adjust without permanently reducing financial inclusion. However, rural and low-income users—those most reliant on mobile money and least connected to alternatives—appear to have borne the brunt of the tax without options to escape it.

This creates a distributional paradox. Those least equipped to avoid the tax are also those least able to afford it. In this sense, the tax may be regressive not only in income terms but in its structural effects on financial inclusion. Poorer and more remote users, already marginalized from the formal financial system, are effectively taxed for lack of choice. In Uganda, through our analysis we show that while urban users substituted toward banking agents and increased cash use, rural users remained dependent on mobile money, effectively absorbing the new costs.

Policy responses must therefore be spatially and demographically targeted. Investment in digital infrastructure—especially mobile broadband and off-grid electricity—remains essential to ensuring that rural users can eventually access viable substitutes. Appendix B shows persistent coverage gaps and energy constraints in many areas. In the short term, however, policy should focus on protecting vulnerable users through exemptions, tiered thresholds, or rebates — such as partial refunds — on taxes applied to low-value transactions.

5.3 Lessons from Uganda: Design, Elasticity, and System Fragility

Uganda's experience with a similar mobile money tax in 2018 offers several cautionary lessons. The tax was initially imposed at 1% on all mobile money transactions but quickly revised to 0.5% on withdrawals only after a sharp and unexpected drop in usage. The Uganda Revenue Authority reported a UGX 48 billion shortfall in projected revenue soon after the policy was enacted, and survey data confirmed a persistent decline in trust and usage (Lees & Akol, 2021).

The challenges in tax implementation was not simply a matter of price elasticity. As we have documented, the record of past pricing changes (Brunnermeier et al., 2025) shows that users had historically absorbed similar or greater fee adjustments without comparable behavioral shifts. This suggests that the behavioral disruption induced by taxation is tied to its attribution, salience, and communicative framing. Digital tax measures are experienced as more than economic frictions—they are social signals that influence how users perceive the legitimacy and predictability of financial systems.

Moreover, digital taxation policies that fail to account for geographic or institutional barriers to substitution risk compounding inequality. In urban areas, banking infrastructure enabled some degree of behavioral adjustment. In rural areas, users lacked viable alternatives and remained exposed to the full fiscal burden. This not only creates welfare distortions but undermines trust in financial and public institutions alike.

5.4 Recommendations for Tax Design in Digital Finance

These findings lead to a set of core recommendations for policymakers seeking to balance revenue generation with the stability and inclusiveness of digital financial systems. The recommendations below are grounded in observed behavioral patterns and institutional dynamics documented in this report, particularly around transparency, trust erosion, substitution behavior, and data limitations.

First, governments must prioritize transparency and public communication. Evidence from both Tanzania and Uganda suggests that when users are not clearly informed about the origin, purpose, and implementation of a tax, they interpret it as an arbitrary cost, triggering sharp declines in usage. The Tanzanian case showed widespread confusion, and FinScope data captured a broad erosion of trust following the 2021 levy. Users need to understand not only that a tax exists, but who imposed it, what it funds, and how it fits into broader development goals. Without this clarity, price changes become opaque shocks rather than deliberate policy actions. Consultations with civil society and coordinated messaging with providers can help establish trust before rollout (Wales & Niesten, 2024).

Second, governments should avoid abrupt tax introductions and instead follow a sequenced and consultative approach. The sharp usage decline observed in Tanzania, particularly in urban areas where alternatives exist, highlights the risks of sudden reforms. By contrast, gradual and participatory processes—such as pilot testing and impact assessments—can help users adapt and mitigate unintended effects. This is especially important in contexts where digital financial services are still building public legitimacy.

Third, taxation should be viewed not only as a technical fiscal instrument but as a behavioral and social intervention. The observed responses in both countries suggest that users react not just to the price signal, but to what the tax represents. In trust-sensitive environments, even modest transaction costs can trigger disproportionate behavioral change. Thus, any tax on digital services must be evaluated in terms of its effect on user confidence and perceived system fairness—not just revenue potential.

Fourth, improved data access and infrastructure for real-time monitoring are critical. In Tanzania, the absence of transaction-level data severely limited the ability to assess disaggregated or causal impacts. In Uganda, the availability of high-frequency data enabled identification of substitution patterns, particularly among users with access to bank agents and ATMs. Regulatory collaborations with providers—such as anonymized data-sharing agreements—are essential for responsive and evidence-based policy design.

Fifth, while this report does not provide direct evidence on alternative tax structures, the findings do underscore the need to consider distributional impacts. For example, usage declines were more severe in areas where users had alternatives, suggesting that vulnerable populations with limited options may be forced to continue usage despite affordability concerns. While not evaluated empirically in this report, proposals such as tiered exemptions or safeguards for low-value transactions could be explored through future impact modeling or pilots. These recommendations should, however, be treated as suggestive rather than conclusive, given current data constraints.

Finally, it is important to recognize that many of these recommendations require state capacity and political will that may not always be present. Pressures to mobilize revenue quickly, limited regulatory bandwidth, or resistance from vested interests may constrain the implementation of transparency measures, participatory processes, or progressive tax design. Acknowledging these constraints does not diminish the importance of these principles, but highlights the need for realistic, incremental reform strategies that account for institutional context.

6. Conclusions

This report has examined the effects of Tanzania's 2021 mobile money levy through the lenses of trust, usage patterns, and policy design. Drawing on FinScope survey data (2017, 2023), the Tanzania National Panel Survey (2020/21), and high-frequency administrative data from Uganda's 2018 mobile money tax, we offer an integrated and comparative analysis of how digital finance users respond to fiscal shocks.

Our central finding is that taxation in digital finance cannot be interpreted solely through the lens of price elasticity. The observed decline in mobile money usage and perceived safety in Tanzania following the 2021 levy cannot be conclusively attributed to price increases alone. Uganda's experience highlights that in times when provider-driven fee changes of similar or even greater magnitude occurred, no such drop in mobile money usage was observed. This contrast suggests that the response to taxation involves more than cost considerations: it reflects trust, attribution, and perceived fairness.

The FinScope survey analysis indicates a significant and broad-based decline in perceived safety and trust in mobile money services between 2017 and 2023. The effect is observed across all demographics, with particularly notable drops among young users under 30. Women reported consistently lower levels of trust compared to men, although the relative decline was more pronounced for men, likely due to a higher starting point. These trends point to the importance of user perceptions, shaped not just by policy content but by communication, transparency, and institutional credibility.

The Tanzania National Panel Survey enabled a causally identified short-term analysis using a difference-in-differences design. Results show that urban users reduced mobile money usage more than rural users following the tax. While these patterns are consistent with the idea that urban users have more accessible alternatives, such as banks or cash agents, the Tanzanian survey data do not allow for a direct test of substitution mechanisms. We can only document that urban users experienced a greater decline. Tanzanian transaction-level data would have been crucial to assess whether these behavioral differences stem from substitution or other mechanisms, and to evaluate the differential impact of the levy across demographic groups, such as age and gender. However, since these data have not been made available we turn to Uganda's case to validate and interpret these findings.

Our analysis of transaction-level data from Uganda provides a crucial benchmark and validation of the mechanism suggested by Tanzanian survey data. Using over 50 million mobile money transaction records from 2018, we document a substantial decline in mobile money usage following the introduction of the tax. Mobile money account balances dropped by $40 million in the quarter immediately after the policy took effect. Urban users exhibited the sharpest decline—more than 10% relative to rural users—while also displaying clear substitution behaviors. They increasingly turned to cash withdrawals and agent-based banking services, particularly in districts with more developed banking infrastructure. These results reinforce the idea that access to alternatives plays a central role in determining the elasticity of response to mobile money taxation.

These findings illustrate the fragility of digital financial ecosystems in the face of poorly communicated or abruptly implemented policy changes. While fees and taxes may appear similar in financial terms, they are experienced differently by users. Provider-driven price adjustments tend to be absorbed with resignation; policy-driven taxes, especially when opaque, often trigger distrust.

From a policy standpoint, Tanzania's experience reinforces the importance of pre-policy communication, transparency, and institutional coordination. Trust is not a byproduct—it is a central input to the functioning of digital financial systems. This report calls for a recalibration of how digital finance taxation is conceived and implemented: not just as a fiscal tool, but as a behavioral and institutional intervention.

Going forward, Tanzania would benefit from improved data access and transparency. Transaction-level administrative data—disaggregated by geography, gender, and age—are essential for monitoring the equity and effectiveness of policy interventions. In parallel, investment in rural infrastructure and financial alternatives is needed to reduce structural exposure to fiscal shocks. Until such reforms are undertaken, taxation risks entrenching exclusion rather than enabling inclusion in the digital economy.

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Appendix A: Data and Code Availability

This Appendix details the data and code made publicly available to promote transparency, replicability, and further research based on the analyses conducted for this book. We are committed to supporting the research community by providing access to the core materials used in our empirical work, wherever permitted by data licensing agreements.

A.1 Folder Structure

The project folder is organized as follows:

- **/data/final_data/**: Contains the cleaned and harmonized datasets derived from FinScope surveys and infrastructure data.
- **/figures/**: Contains all the figures produced by the analysis scripts, organized by topic.
- **/codes/**: Contains all Stata (.do) and Python (.py) scripts used for cleaning, harmonizing, and analyzing the data.

A.2 Available Data

We make publicly available two key datasets:

- **FinScope Tanzania 2017 and 2023 Survey Data:**

  The FinScope surveys are nationally representative financial inclusion surveys, covering Tanzanian adults aged 16 and above. The datasets, provided in .dta, .csv, and .sav formats, include variables related to mobile money usage, banking, insurance, savings behavior, and demographic characteristics. Full details on the data structure, weights, and variable definitions are provided in the accompanying FinScope documentation.

- **Electricity Grid Infrastructure Data:**

  We use administrative-level electricity access data from official Tanzanian sources. The dataset captures the presence of electricity connections at the district level and is used to explore the interaction between financial inclusion and infrastructure development.

A.3 Unavailable Data

Due to data licensing restrictions, two datasets used in the book cannot be shared:

- **Mobile Network Operator Coverage Data (GSMA):**

  We used proprietary coverage data provided by the Global System for Mobile Communications Association (GSMA) and Harper Collins, spanning 2010–2021. This dataset offers raster-level (approximately 250×250 meters) coverage information for 1G, 2G, 3G, 4G, and 5G technologies across Africa. Access to this data was obtained under a strict Non-Disclosure Agreement (NDA), and we are therefore unable to make it publicly available.

- **Mobile Money Transactions Data (Uganda):**

  We had access to the universe of mobile money transactions from one of the two major providers in Uganda (MTN or Airtel) for the year 2018. The dataset includes over 50 million transactions and allows reconstruction of the mobile money transfer network. District-level location information for a subset of users was also available. Access to these microdata was granted under a Non-Disclosure Agreement with the Bank of Uganda, and we cannot share the data externally.

A.4 FinScope Data Harmonization and Cleaning

Given that FinScope Tanzania 2017 and 2023 surveys differ slightly in questionnaire structure and coding, we harmonized the two datasets to ensure comparability across years.

The harmonization process, fully documented in the Stata script "1_merge datasets.do", involved the following steps:

- Selection of common variables across survey waves, focusing on mobile money usage, financial access, financial instruments, and demographics.
- Renaming of variables to achieve consistent naming across years.
- Construction of harmonized indicators, including:
  - **mobile_money:** Use of mobile money services.
  - **mfi:** Access to microfinance institutions.
  - **pension:** Access to pension services.
  - **insurance:** Use of insurance services.
  - **sacco:** Membership in Savings and Credit Cooperatives (SACCOs).
  - **capital_markets:** Engagement in capital market instruments.
  - **savings_group:** Participation in savings groups.
  - banks: Access to traditional banking services.
- Creation of derived demographic variables, such as:
  - **urban_rural:** Classification into urban or rural residency.
  - **gender:** Male or female respondents.
  - **age_bracket:** Age categorized into groups ("Up to 20", "20–30", "30–40", "40–50", "More than 50").
  - **education_level:** Highest education attained.

Additionally, sampling weights were appropriately applied to both surveys, adjusting for oversampling strategies (especially agro-economic zones in 2023 and five regions in 2017).

The cleaning scripts are fully transparent and reproducible, ensuring that future researchers can replicate or extend the work with minor modifications.

A.5 Code Files Provided

The "scripts/" folder contains the full codebase necessary to replicate our results:

- **Data Cleaning and Harmonization:**
  - "1_merge datasets.do": Merges the raw FinScope data files, constructs harmonized variables, and applies sample restrictions.
  - "2_clean dataset.do": Conducts final cleaning and preparation of the analysis dataset.
- **Empirical Analysis:**
  - "3_analysis_trust.do": Stata script analyzing trust in mobile money, perceptions of safety, and network effects.
  - "4_analysis_trust.py": Python script producing figures on mobile money usage by gender, age, education, and location, before and after the mobile money tax.
  - "5_analysis_access.py": Python script analyzing access to technology (phones, smartphones, internet) and how it evolved across survey years.
  - "6_analysis_financial_tools.py": Python script studying the uptake and cross-usage of financial tools (banks, MFIs, pensions, insurance) and mobile money borrowing behavior.

All figures in the book are generated by these scripts and are reproducible with the shared dataset.

Appendix B: Infrastructure Evolution and Spatial Distribution in Tanzania: Mobile Networks and Electricity

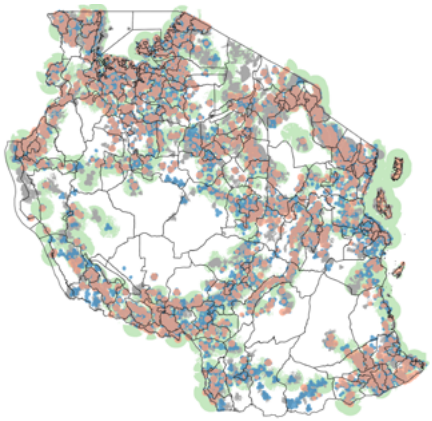
B.1 Historical Evolution of Mobile Network Infrastructure

Over the past two decades, Tanzania's mobile network infrastructure has undergone a rapid and extensive transformation. The liberalization of the telecommunications market in the early 2000s enabled the rollout of 2G networks (GSM), which by the mid-2010s covered over 85% of the population and are now nearly universal (TCRA, 2022). This laid the foundation for USSD-based services, including early mobile money.

Coverage expanded through the presence of four main operators: Airtel, Vodacom, Tigo, and Zantel. In Figure 4.1, we present coverage for these four main telecom companies: while for privacy reasons individual operator names are not attached to coverage maps, the extent of their combined reach is critical to understanding access to mobile financial services.

Figure 4-1

2G Coverage, overall

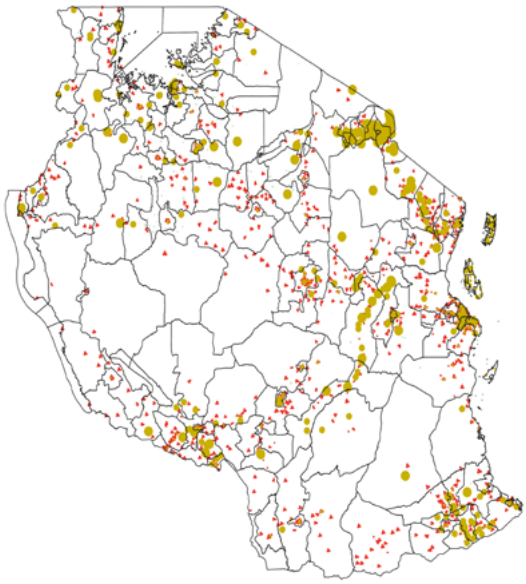


NOTE: In this picture, coverage from all operators is presented, hence showing any place covered by 2G.

3G broadband began its rollout in 2007, initially confined to urban areas, but gradually extended into secondary cities and district centers throughout the 2010s. A major acceleration came in 2015, when Halotel launched with a rural-first strategy, investing over $700 million to expand 2G/3G networks and introducing service in 1,500 villages for the first time. These private efforts were reinforced by public infrastructure investments—most notably the National ICT Broadband Backbone (NICTBB), a 25,000+ km national fiber network completed around 2018 with World Bank support (World Bank, 2020).

3G coverage grew from approximately 35% in 2013 to over 80% by 2022, with rural areas receiving progressively better access as operators densified their networks and upgraded infrastructure.

Figure 4-2
3G Coverage, overall



NOTE: We overlaps the maps from all operators, hence showing any place covered by 3G. All the colored spots correspond to an area covered by 3G.

Government policy played a central role through targeted subsidies and regulatory incentives. The Universal Communications Service Access Fund (UCSAF), funded by levies on operator revenues, co-financed tower construction in underserved regions and supported rural broadband expansion. As part of the Digital Tanzania Project, UCSAF is supporting the deployment of 758 new rural towers and the upgrade of more than 300 existing ones to 3G/4G.

Despite progress, spatial gaps remain—particularly in sparsely populated and geographically remote regions where infrastructure deployment is less commercially viable.

B.2 Spatial Disparities in 3G Coverage

The expansion of 3G coverage has not occurred evenly. Mobile broadband is nearly universal in major cities like Dar es Salaam, Mwanza, and Arusha, where the population density and commercial returns justified early investment. In contrast, rural regions—especially in the Western Zone (e.g., Kigoma, Katavi) and Southern Highlands (e.g., Rukwa)—lag behind. In many of these areas, only town centers or highway corridors have 3G signal, while surrounding communities still rely on basic 2G, if covered at all.

By 2022, while 3G reached approximately 81% of the population, that remaining 19%—around 10 million people—was overwhelmingly rural. This population often lives in areas where population density is under 15 people per square kilometer, making it economically unviable for operators to extend infrastructure without subsidy (GSMA, 2021).

The correlation between network coverage and the national electricity grid is striking. Overlay maps reveal that both 2G and 3G rollouts have largely followed the path of electricity infrastructure. Areas connected to the grid—typically urban or peri-urban—were the first to receive 3G service. Remote districts, lacking both power and roads, often remain disconnected from mobile broadband.

B.2.1 ELECTRICITY ACCESS AS A COMPLEMENTARY INFRASTRUCTURE

Electricity access is widely recognized as a critical complement to mobile network infrastructure. Without it, even areas with mobile coverage may experience constraints in the regular use of digital financial services. Mobile phones—particularly smartphones—require frequent charging, and in off-grid rural communities, power sources are often limited to solar kits or fee-based charging services. These conditions can affect both users and service providers, including mobile money agents whose ability to operate point-of-sale devices may depend on access to electricity.

Nationally, Tanzania has made progress on electrification. As of 2022, approximately 45.8% of households had access to electricity from any source—up from 32.8% in 2016 (NBS, 2023). However, rural–urban disparities remain substantial. While more than 85% of urban households report access, rural access is around 36%, and roughly one-third of rural communities are not connected to the grid at all. Public investments, such as the Rural Energy Agency's TREEP initiative, and the expansion of off-grid solar solutions—often through public–private partnerships—have played an important role in extending access (REA, 2022). An estimated 42% of rural households use solar energy in some form, many through mobile money–based pay-as-you-go models. Still, affordability continues to be a limiting factor, particularly for households living in "electrified" areas who may be unable to bear the upfront costs of connection or solar installation.

This infrastructure gap has implications for the uptake and consistency of mobile financial service use. Even where mobile coverage is technically available, users may be unable to fully participate in digital platforms due to inconsistent access to power. This may impact smartphone adoption, the use of internet-based applications, and the frequency of mobile transactions.

Mobile and energy infrastructure together define the extent to which populations can participate in more advanced digital financial ecosystems. While basic services—such as USSD-based mobile money—were able to scale through 2G networks and basic handsets, newer services increasingly rely on smartphones and mobile broadband (3G and above). These include mobile apps for savings, credit, insurance, and merchant payments. In locations where 3G was deployed earlier, adoption of app-based financial tools has been more widespread, particularly among younger and urban users (Bahia et al., 2023). Conversely, areas reliant on 2G remain limited to basic services, suggesting that gaps in mobile broadband and electricity may reinforce existing divides in financial access.

Importantly, mobile broadband coverage alone does not guarantee digital participation. As of 2022, while 3G networks reached over 80% of the Tanzanian population, mobile internet usage was still under 30% (TCRA, 2023). This gap between infrastructure availability and usage—commonly referred to as the "usage gap"—is shaped by several factors, including smartphone affordability, digital literacy, and electricity access (GSMA, 2022). Regular phone use, especially among rural populations, can be constrained by the need to conserve battery power or pay for charging services. In these contexts, even well-intentioned infrastructure investments may deliver only partial gains in financial inclusion unless accompanied by interventions that address affordability and usability constraints.

The literature on digital development emphasizes the interaction between infrastructure, affordability, and user capability. The concept of the digital divide, as originally defined by Norris (2001), has expanded to include not only gaps in connectivity but also disparities in the capacity to use and benefit from digital tools. Empirical work in Sub-Saharan Africa confirms that mobile infrastructure can contribute to reduced transaction costs, improved market access, and enhanced welfare (Aker & Mbiti, 2010). In Tanzania, Bahia et al. (2023) find that the rollout of 3G between 2008 and 2013 led to measurable improvements in household consumption and reductions in poverty, especially among young men in newly covered areas.

However, benefits are not evenly distributed. Hjort and Poulsen (2019) document that broadband access tends to favour urban and better-educated populations. In Tanzania, mobile internet use and smartphone ownership remain more common among men, younger individuals, and residents of urban areas (FinScope, 2023; GSMA, 2020). In rural settings, cost continues to be a key barrier. The World Bank (2021) reports that even low-cost smartphones can represent a substantial share of monthly income for low-income Tanzanians. Similarly, electricity access remains a strong predictor of digital engagement in rural areas (GSMA, 2020). Without it, households may be less able to use mobile apps or other energy-intensive services on a daily basis.

These constraints have a bearing on financial inclusion outcomes. As the digital finance ecosystem matures—with increased availability of app-based loans, insurance, savings platforms, and investment tools—users who lack smartphones, internet access, or reliable electricity may face new forms of exclusion. In this context, infrastructure serves not only as an enabler but also as a potential gatekeeper to the benefits of digitization.

Tanzania's policy response has increasingly reflected this understanding. National frameworks such as the Digital Economy Framework, as well as programs like the Digital Tanzania Project, have emphasized the need for coordinated investments across connectivity, energy access, device affordability, and digital literacy. The Rural Energy Agency has pursued co-investments in electrification and telecom infrastructure, and some mobile operators have begun offering bundled packages that combine smartphones, solar products, and financial services. These efforts point toward a more integrated model of inclusion.

Nevertheless, challenges remain. For instance, while 3G coverage continues to expand, taxes on mobile phones and mobile services—including the 2021 mobile money levy—have increased the effective cost of participation for many low-income users. Without careful coordination between infrastructure development and pricing or regulatory policies, efforts to expand digital financial services may face diminishing returns, particularly among vulnerable populations.

In sum, the evidence suggests that infrastructure investment—while foundational—is not in itself sufficient to ensure equitable access to digital financial services. Complementary measures that address cost, capability, and access to power remain essential. Going forward, continued alignment between energy and telecom policy may play a key role in closing remaining usage gaps and supporting inclusive digital development. Equally, tax policy must be seen as part of the digital inclusion toolkit: poorly designed levies on transactions, devices, or services can undercut both user uptake and provider incentives, while carefully targeted tax reliefs and investment incentives can accelerate infrastructure rollout and expand access in underserved areas (Wales & Niesten, 2024; Wales, 2024).

B.3 Empirical Analysis

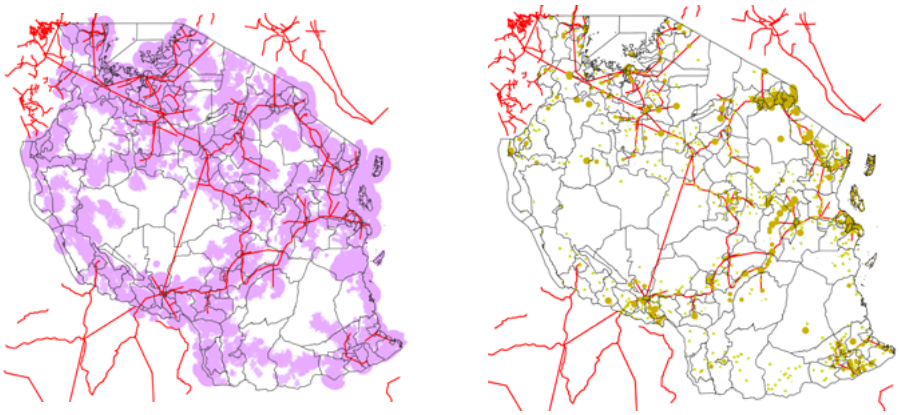
B.3.1 MOBILE NETWORK COVERAGE AND INFRASTRUCTURE ALIGNMENT IN TANZANIA

Figures from 2021 confirm that mobile network coverage is closely tied to the existing electricity grid. When overlaying 2G and 3G coverage maps with the national grid, a strong correspondence emerges. Areas along the grid corridor show dense mobile signal presence, while coverage drops sharply outside those corridors.

Figure 4-3
Tanzania's National Electricity Grid

NOTE: The red line corresponds to the electricity grid in Tanzania as of 2021.

Figure 4-4
Overlay: 2G and 3G Coverage and Electricity Grid (2021)



NOTE: We show evidence that both 2G and 3G follow the electricity grid, confirming the correspondence of coverage with urban areas and places with established infrastructure. On the left we show 2G and on the right 3G. The red line represents the electricity grid.

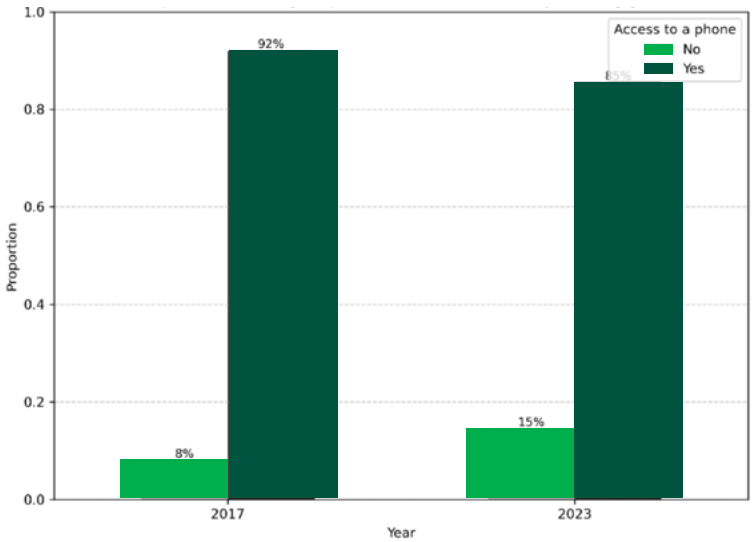
This pattern suggests that infrastructure rollout has followed established paths of connectivity and economic activity, reinforcing spatial disparities. While 2G coverage has become nearly universal, 3G is still concentrated in regions already advantaged by power access and road networks.

B.3.2 EVOLUTION OF MOBILE PHONE AND INTERNET ACCESS IN TANZANIA (2017–2023)

B.3.2.1 GENERAL ACCESS TO MOBILE PHONES

We begin by examining overall access to any type of mobile phone. As shown in Figure 4.6, **mobile phone access fell from 92% in 2017 to 85% in 2023** — a significant decline over a six-year period during which network coverage and digital policy initiatives were expected to expand access.

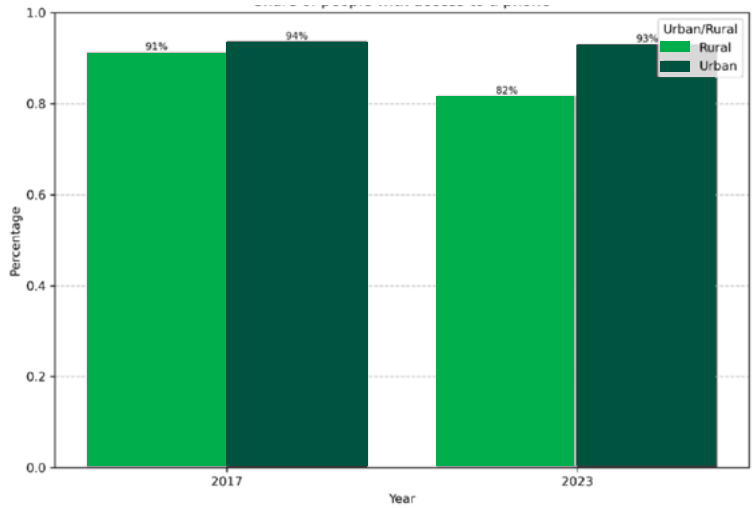
Figure 4-6
Proportion of respondents with access to a phone, 2017 vs. 2023



B.3.2.2 URBAN–RURAL DISPARITIES IN PHONE ACCESS

The aggregate decline is further revealed to be **concentrated in rural areas.** Figure 4.7 shows that rural access fell from 91% to 82%, while urban access only slightly decreased from 94% to 93%.

Figure 4-7
Phone access by urban/rural status, 2017 vs. 2023



B.3.2.3 TRANSITION FROM BASIC PHONES TO SMARTPHONES

Smartphone ownership remains relatively low, though it has grown since 2017. By 2023, about 22% of Tanzanians reported owning a smartphone. Urban residents are more than four times as likely to own one than rural residents. Among those who own a phone, the share with smartphones has grown, but basic and feature phones remain dominant in rural areas.

Figure 4-8

Proportion of respondents whose phone is a smartphone

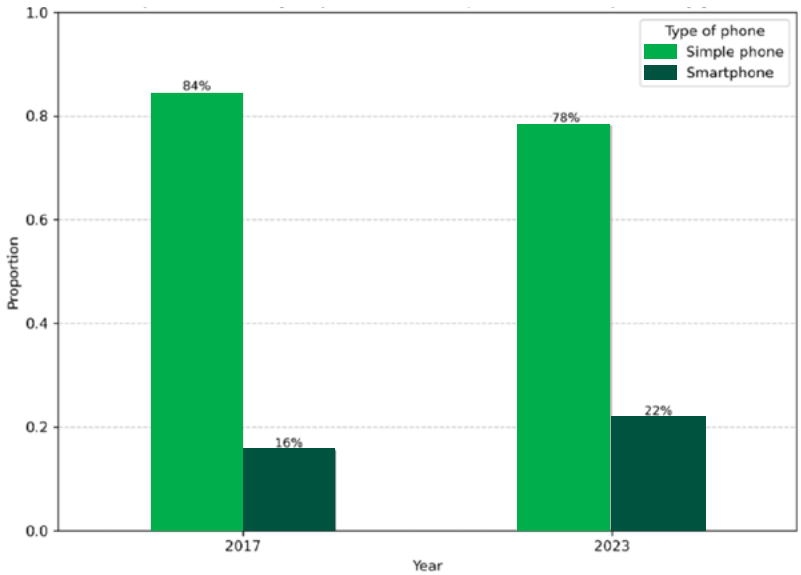
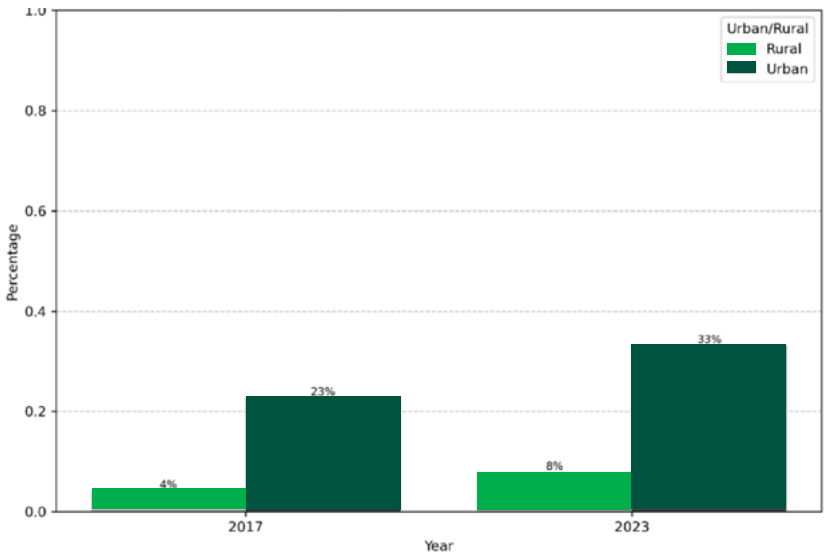


Figure 4-9

Share of smartphone users, rural vs. urban



Smartphone diffusion is shaped by electricity access, income, and network quality. In rural areas, where off-grid electricity is limited, users often prefer low-power devices with long battery life. Cost is a second constraint—smartphones, even low-end models, remain prohibitively expensive for many low-income users.

B.3.2.4 INTERNET ACCESS TRENDS

The FinScope data show that while mobile internet access rose overall, disparities by area persist. Urban users are much more likely to access the internet than rural ones. Moreover, internet access has grown faster in urban areas, increasing by 9% with respect to rural areas, where it has increased by 5% between 2017 and 2023.

Figure 4-10

Proportion of respondents with internet access, 2017 vs. 2023

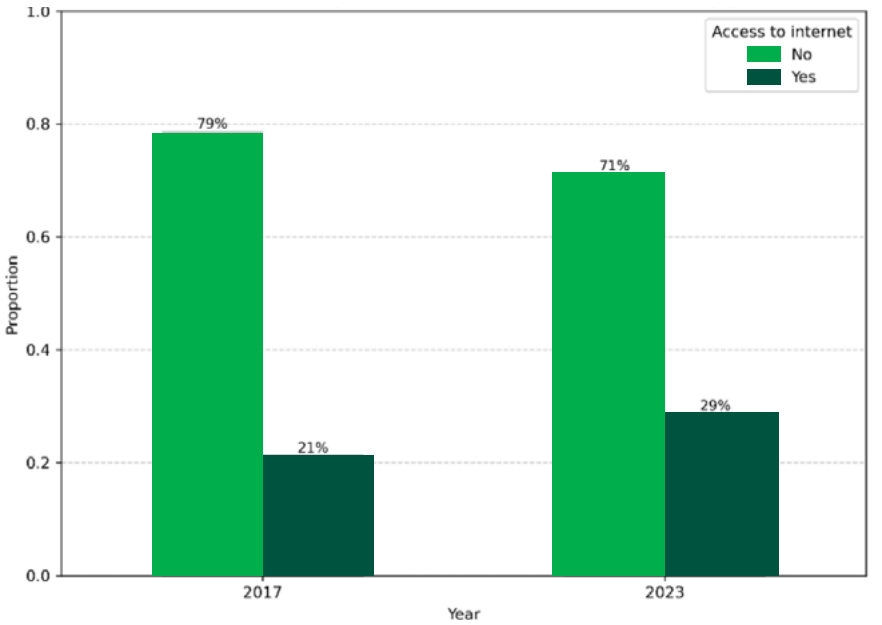
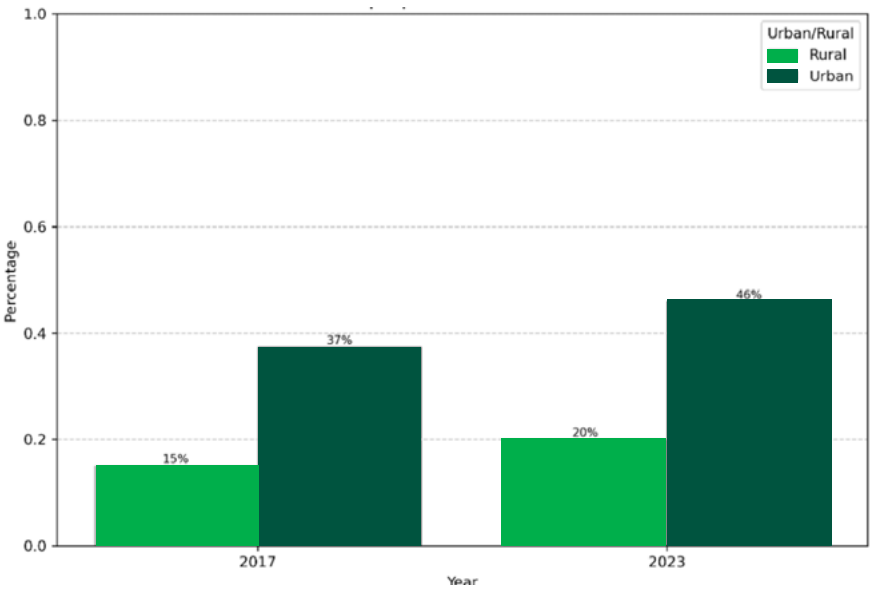


Figure 4-11

Internet access by urban/rural status



B.3.3 HETEROGENEOUS 3G COVERAGE AND MULTI-SIM MOBILE MONEY USAGE

B.3.3.1 UNEVEN ROLLOUT OF 2G AND 3G BY PROVIDER

Although the maps presented earlier show overall national 2G and 3G coverage, operator-level differences matter. Some providers invested heavily in rural 2G coverage, while others prioritized urban 3G/4G. As a result, individuals in regions with poor 3G signal from their main provider often compensate by using multiple SIM cards.

This uneven rollout affects user experience and influences financial inclusion. Mobile money services, for example, may only be reliably accessed with certain providers, encouraging users to hold multiple SIMs to improve service availability.

B.3.3.2 EVIDENCE OF MULTI-SIM MOBILE MONEY ADOPTION

FinScope 2023 data reveal widespread use of multiple mobile money services. Users often hold accounts with more than one provider—both to manage network reliability and to navigate differences in fees, interoperability, or agent proximity.

Table 4-1
Cross-Usage of Mobile Money Providers in Tanzania, 2023

Mobile Money Service	Total % using	% using also Tigo pesa	% using also Halo pesa	% using also Ezy pesa	% using also Airtel Money	% using also T pesa	% using also M-pesa
M-pesa	49.57	19.59	5.76	0.23	17.10	0.16	—
Tigo pesa	31.40	—	7.44	4.32	24.21	0.23	30.93
Halo pesa	8.72	26.79	—	3.16	22.60	0.65	32.74
Ezy pesa	3.78	35.84	7.30	—	7.30	0.64	3.00
Airtel	28.25	26.91	6.98	0.98	—	0.40	30.01
Tpesa	0.32	22.50	17.50	7.50	35.00	—	25.00

NOTE: The second column represent the share of the all mobile money users who use a specific service. For each service (on the rows) we calculated also the share of users who also use another service (on the columns). For example, 19.59% of M-pesa users also use Tigo pesa.

As shown in Table 4-1, cross-usage is common. For instance, 19.6% of M-Pesa users also use Tigo Pesa. Such overlap suggests that mobile money adoption is not exclusive and that users dynamically adjust to infrastructure gaps, agent availability, and relative costs across platforms.

B.4 Policy Implications

These findings highlight the layered nature of digital financial exclusion in Tanzania. While mobile network coverage has expanded significantly, effective and equitable access to digital financial services remains shaped by factors such as electricity, smartphone affordability, and data costs. Users frequently adapt—by changing SIM cards, queuing at charging stations, or avoiding data-intensive services—but such coping strategies underscore the persistence of systemic constraints.

Policy interventions must move beyond the traditional focus on signal expansion. Rural electrification programs, device affordability initiatives, and regulatory reforms promoting interoperability and low-data access are all critical levers to deepen financial inclusion. Yet physical infrastructure alone is not sufficient: digital connectivity must be matched by economic accessibility and supportive fiscal policies.

Tax policy plays a central role in this context. Evidence from across sub-Saharan Africa, including Tanzania, suggests that poorly designed taxes on digital financial services (DFS)—such as levies on transactions or high duties on smartphones—can deter both infrastructure investment and user adoption (Wales & Niesten, 2024). In contrast, strategic tax policy design can enable, rather than impede, inclusive digital growth. For instance, a balanced approach might involve standard-rate VAT on payment service provider (PSP) fees combined with narrowly targeted excise duties—such as on high-value cash withdrawals—while exempting or subsidizing smaller transactions critical to low-income users.

Moreover, fiscal instruments can be explicitly designed to encourage market development. As emphasized by Wales (2024), governments can use investment tax credits, depreciation incentives, and selective duty reliefs to spur infrastructure rollout, particularly in commercially marginal rural areas. These tools could be pivotal in enabling tower operators and service providers to expand coverage sustainably.

Thus, addressing digital financial exclusion requires not only infrastructure development but also a coherent alignment of fiscal and regulatory tools. Tanzania's tax framework should be re-evaluated through this lens: not merely as a source of revenue, but as a lever for shaping inclusive market outcomes.

Appendix C: Mobile Money in the Financial Ecosystem

The rapid expansion of mobile money in Tanzania has occurred alongside a rich network of financial service providers. From commercial banks and microfinance institutions to savings groups, and digital investment platforms, the ecosystem now reflects a complex interplay of formal, semi-formal, and informal tools. Mobile money's accessibility and flexibility position it as an entry point for many users who later engage with other financial products (FinScope Tanzania, 2023; GSMA, 2022).

Unlike in earlier narratives where mobile money was seen as a replacement for formal services, the more recent pattern in Tanzania suggests widespread complementarity. Users do not abandon older services—they stack them. For example, someone may use mobile money for day-to-day payments, belong to a local savings group, and maintain a bank account for longer-term deposits or salary transfers. In this layered system, mobile money acts as the connective tissue between actors in the financial landscape.

C.1 Trends in Usage of financial tools by Demographics

C.1.1 BANKS

Banks continue to dominate the financial sector in terms of total deposits and credit volumes, but their access barriers remain significant. In 2017, only 9% of rural adults and 30% of urban adults had access to a bank account (FinScope Tanzania, 2017). By 2023, the gap narrowed slightly, with some rural growth enabled by agent banking and mobile-to-bank interoperability.

Mobile money strengthens access to banking by offering users a remote channel for bank deposits, withdrawals, and balance checks. Integrated apps and USSD services now allow clients to transfer money between mobile wallets and bank accounts without visiting a branch. This synergy has proven particularly beneficial in areas where the nearest bank branch may be 20 kilometers or more away (World Bank, 2021).

Figure 5-1

Bank account usage by urban/rural respondents (2017 vs 2023)

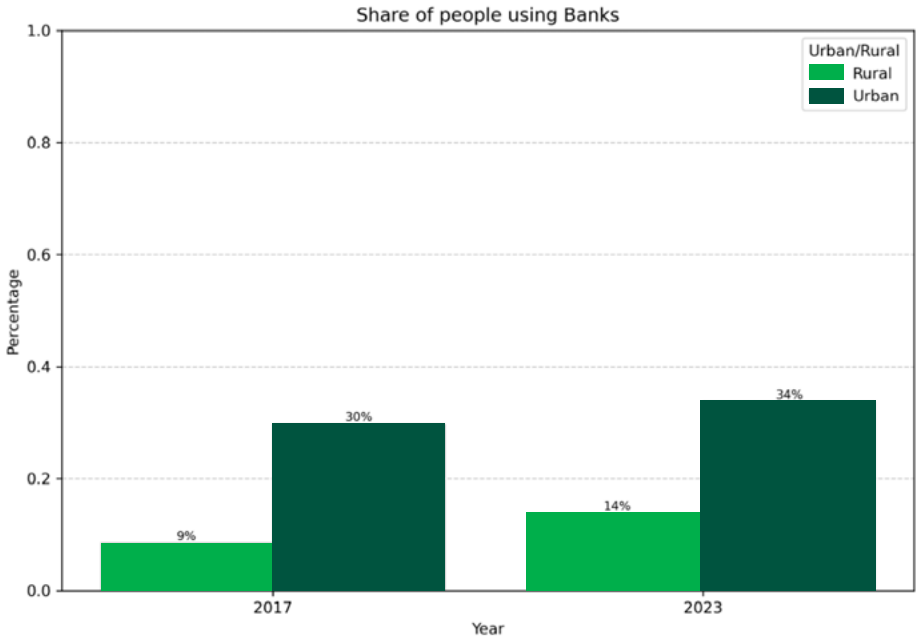
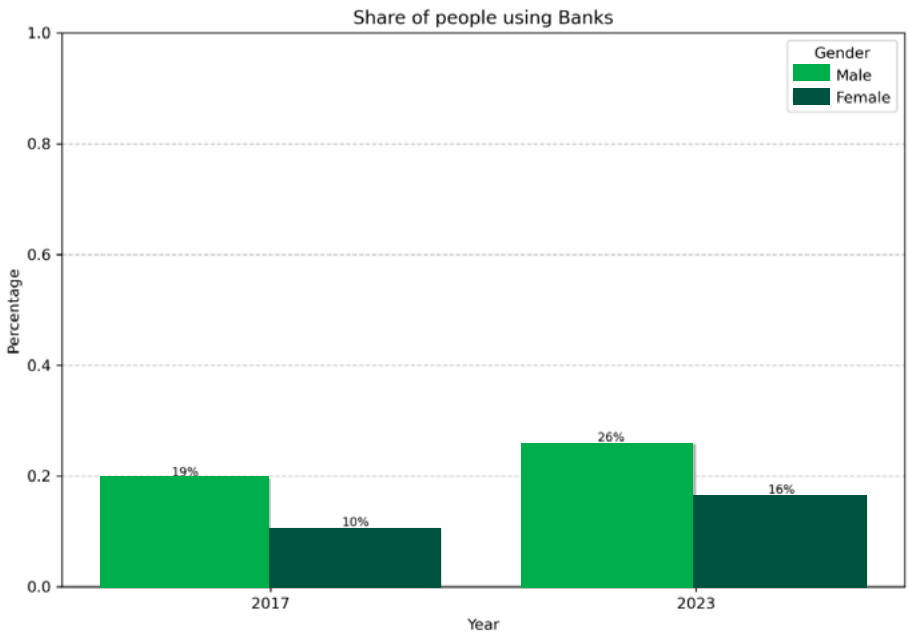


Figure 5-2

Bank account usage by gender (2017 vs 2023)



C.1.2 MICROFINANCE INSTITUTIONS (MFIS)

MFIs are a longstanding source of credit for informal workers and low-income earners, especially women. Their use remains more common in urban areas. In 2023, 12% of urban adults and 4% of rural adults reported using MFIs—only a modest increase from 2017 levels of 11% and 3% respectively (FinScope Tanzania, 2023).

Mobile money enhances MFI operations by enabling digital disbursement and repayment. This reduces reliance on weekly in-person collection meetings, allowing institutions to extend their reach and cut costs. It also gives clients more flexibility in managing repayments. However, the scale of adoption remains limited, with mobile-based microcredit platforms growing faster than traditional MFIs.

Figure 5-3

MFI usage by urban/rural respondents (2017 vs 2023)

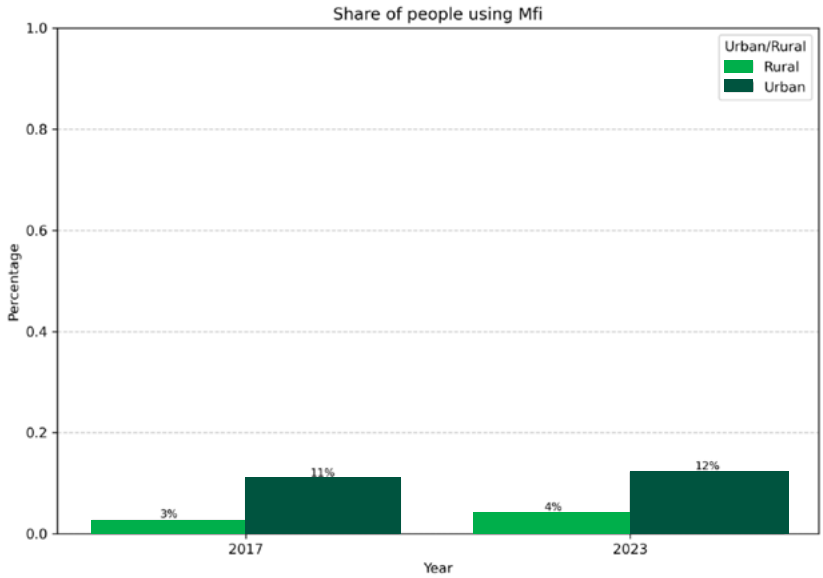
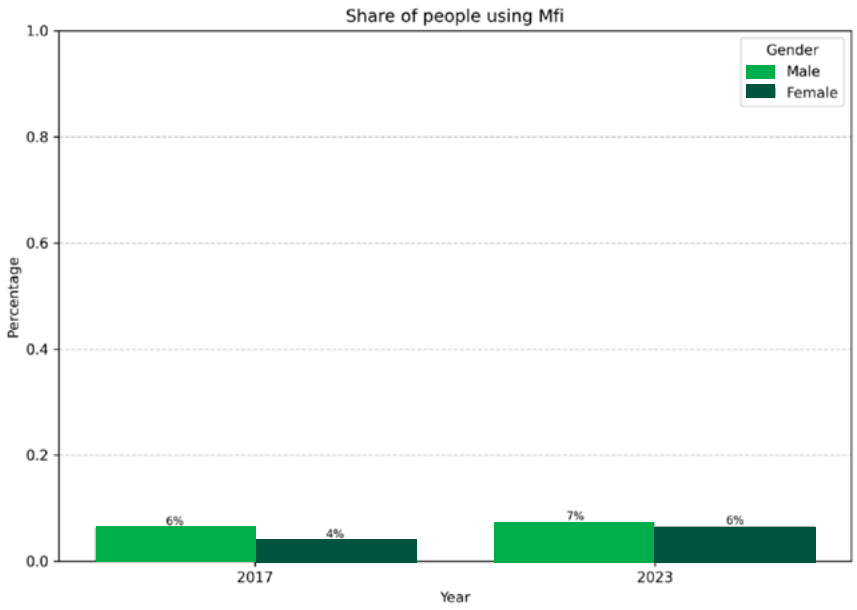


Figure 5-4

MFI usage by gender (2017 vs 2023)



C.2 Cross-Usage Patterns

Data from FinScope 2023 confirm that most users engage with more than one financial service. Among urban respondents, 81.7% used mobile money, and 31.1% also used a bank. Other overlaps included 14.8% with insurance and 11.4% with MFIs. In rural areas, mobile money penetration was 55.6%, with 10.2% also using banks, and 6.3% combining it with savings groups.

Table 0-1

Cross-usage of financial services among urban Tanzanians

	Mobile Money	MFI	Pension Fund	Insurance	SACCO	Capital Markets	Savings Group	Banks
Mobile Money	**81.7**							
MFI	11.4	**11.6**						
Pension Fund	7.4	1.6	**7.6**					
Insurance	14.8	2.7	5.1	**15.9**				
SACCO	2.0	0.4	1.1	1.4	**2.1**			
Capital Markets	0.5	0.1	0.2	0.4	0.0	**0.5**		
Savings Group	8.7	1.7	1.0	2.1	0.5	0.2	**9.7**	
Banks	31.1	8.6	7.2	10.2	1.7	0.4	3.8	**32.0**

NOTE: This table reports the percentage of urban respondents who simultaneously use pairs of financial services. Diagonal entries indicate the overall share of urban users adopting each service individually. Data source: FinScope Tanzania Survey, 2017 and 2023

Table 0-2

Cross-usage of financial services among rural Tanzanians

	Mobile Money	MFI	Pension Fund	Insurance	SACCO	Capital Markets	Savings Group	Banks
Mobile Money	**55.6**							
MFI	3.3	**3.4**						
Pension Fund	2.1	0.3	**2.3**					
Insurance	7.4	0.7	5.1	**11.4**				
SACCO	0.8	0.1	0.2	0.3	**1.0**			
Capital Markets	0.1	0.0	0.0	0.0	0.0	**0.1**		
Savings Group	6.3	0.5	0.4	1.7	0.2	0.0	**9.3**	
Banks	10.2	2.1	2.0	2.8	0.5	0.1	1.5	**11.1**

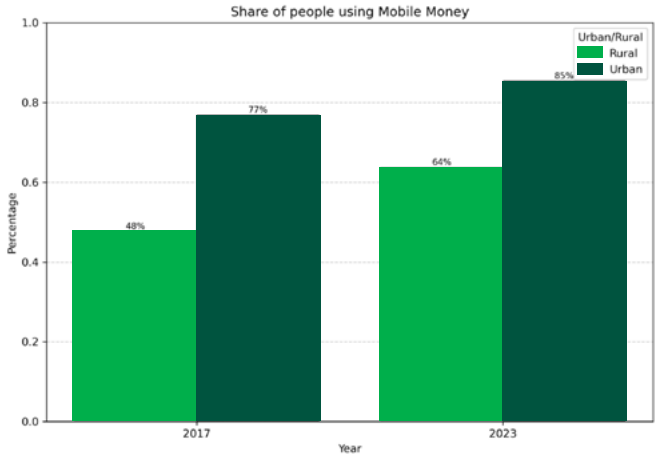
NOTE: This table reports the percentage of rural respondents who simultaneously use pairs of financial services. Diagonal entries indicate the overall share of rural users adopting each service individually. Data source: FinScope Tanzania Survey, 2017 and 2023.

C.3 Mobile Money

C.3.1 URBAN–RURAL TRENDS

The rural-urban divide remains pronounced but is narrowing. Mobile money usage in rural areas rose substantially from 2017 to 2023, closing much of the gap with urban users. However, rural residents still lag in formal service usage, especially bank accounts and insurance.

Figure 5-9
Mobile money usage by urban/rural respondents (2017 vs 2023)

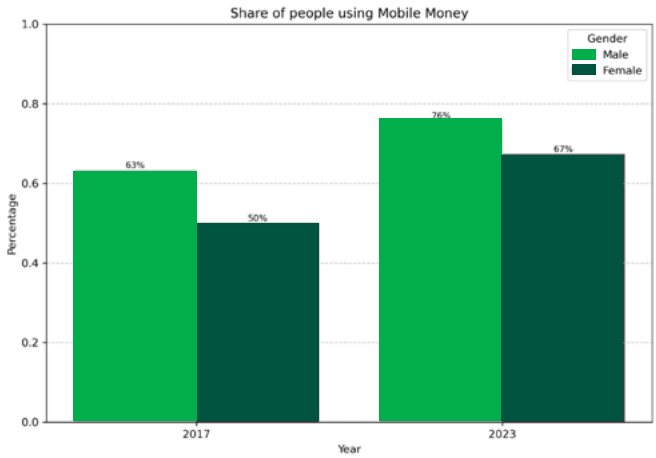


Mobile money's flexibility and proximity make it especially well-suited for rural populations, who face barriers such as distance and low income.

C.3.2 GENDER-BASED TRENDS

Between 2017 and 2023, **mobile money access equalized** across gender lines. Women's adoption rates rose quickly, driven by improvements in phone ownership and targeting by inclusion programs.

Figure 5-10
Mobile money usage by gender (2017 vs 2023)



While bank usage remains higher among men, MFI and group-based finance has been more prevalent among women. Insurance usage shows little gender difference.

C.3.3 MOBILE MONEY AND CREDIT

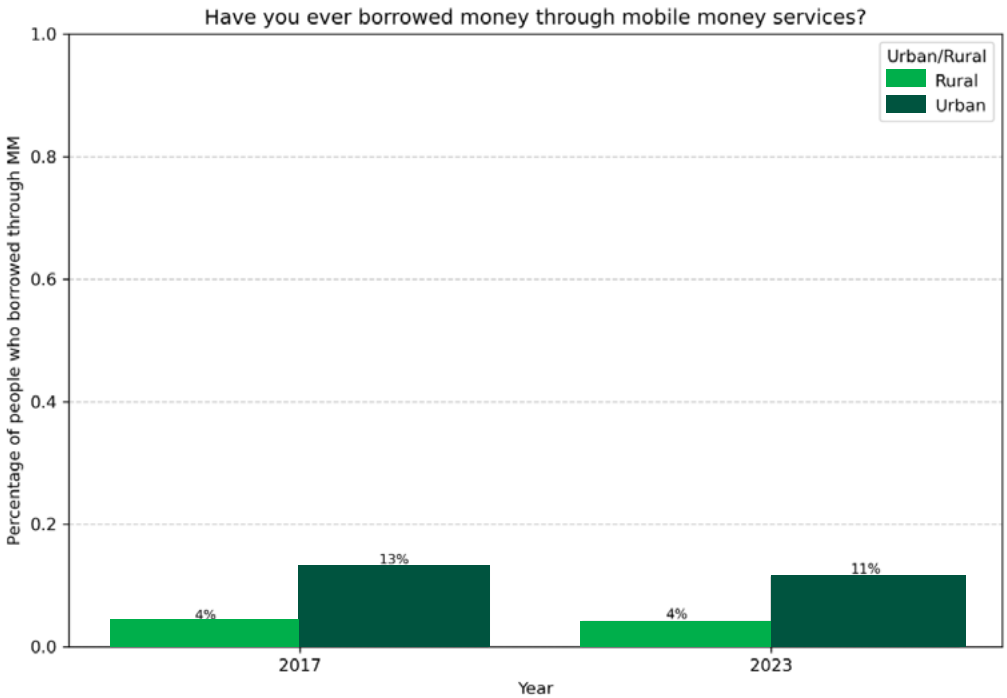
Tanzania has experienced a sharp increase in **mobile-based credit**, such as M-Pawa, Tigo Nivushe, and Airtel Timiza. These products allow instant borrowing without collateral, based on mobile usage history. As of 2023, digital loan accounts exceeded 95 million cumulatively (Bank of Tanzania, 2023).

Mobile credit serves as an entry point for borrowers previously excluded from bank loans. It is particularly popular among informal workers and micro-entrepreneurs. However, it also raises concerns about repayment behavior and credit risk, especially in urban areas where repeat borrowing is more common.

C.3.3.1 BORROWING TRENDS

Using FinScope data from 2017 and 2023, we observe modest changes in borrowing behavior. In urban areas, the proportion of adults who had ever borrowed via mobile money declined slightly from 13% to 11%. In rural areas, it remained stable at 4%.

Figure 5-2
Share of individuals who have ever borrowed money through mobile money services, disaggregated by urban and rural users. Based on FinScope Tanzania data, 2017 and 2023



Borrowing frequency shifted more noticeably. Among urban borrowers, those borrowing more than once per month dropped from 14% to 9%. In rural areas, borrowing frequency remained essentially unchanged.

Figure 5-3

Borrowing frequency through mobile money among rural respondents. Categories include less than once a month, monthly, and more than once a month. Data from FinScope Tanzania 2017 and 2023.

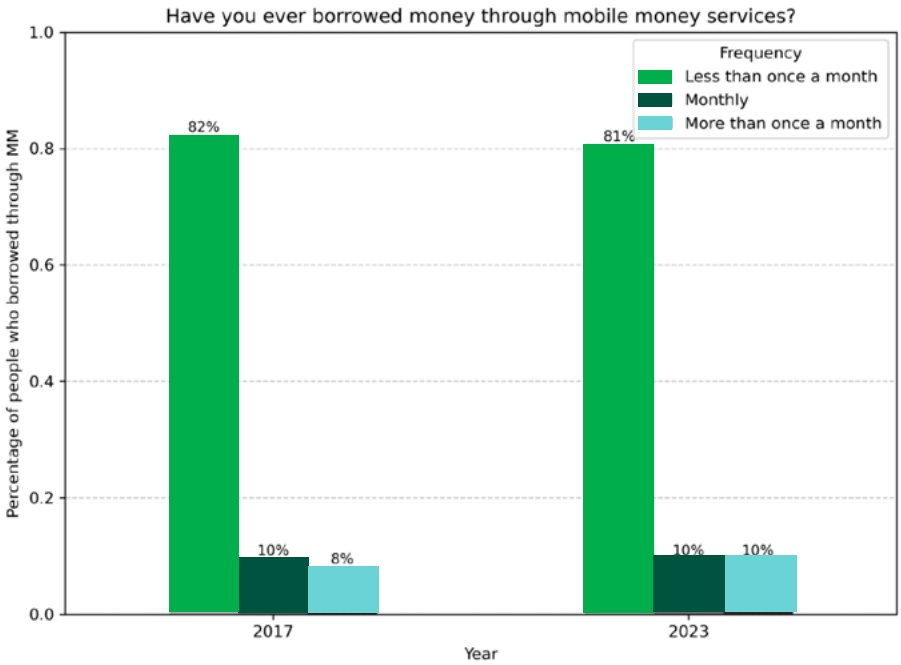
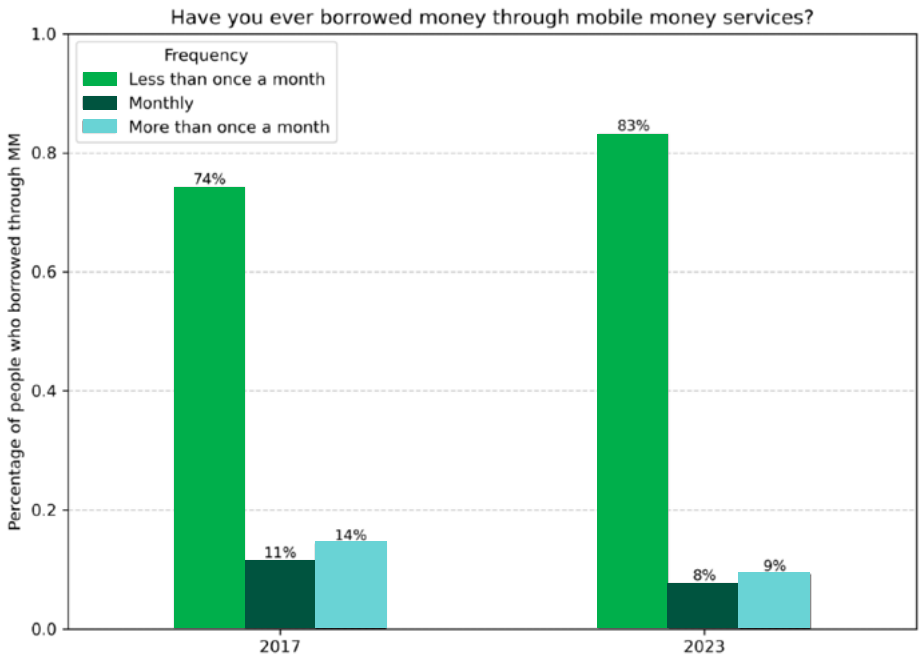


Figure 5-4

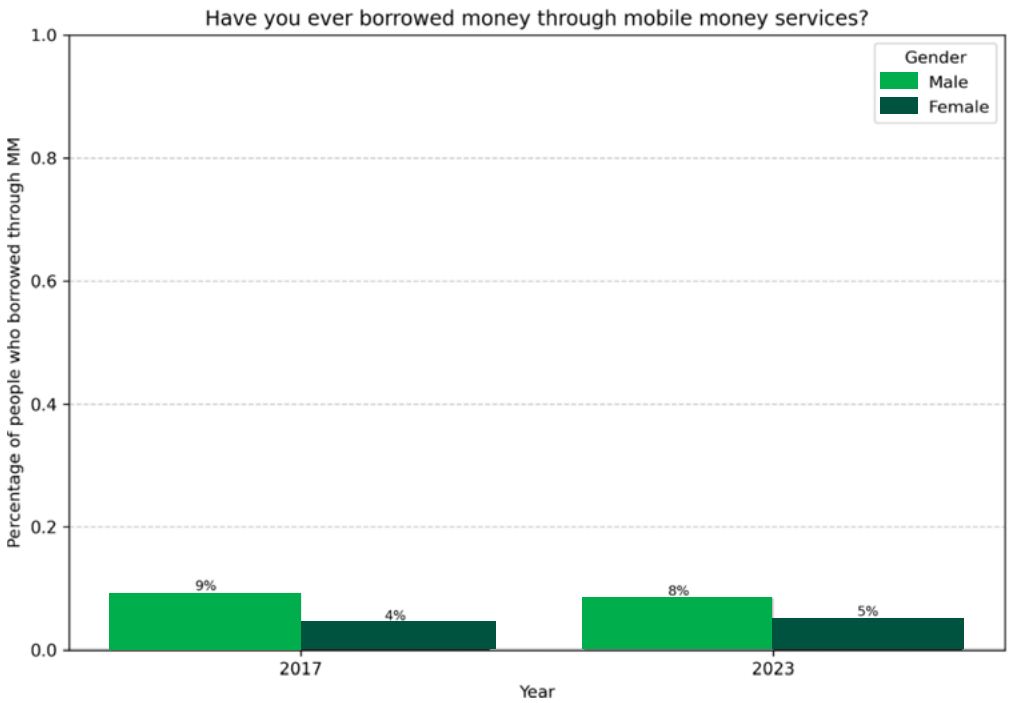
Borrowing frequency through mobile money among urban respondents. Categories include less than once a month, monthly, and more than once a month. Data from FinScope Tanzania 2017 and 2023.



By gender, borrowing trends remained flat. In 2023, 8% of men and 5% of women reported ever borrowing via mobile money—similar to 2017 levels.

Figure 5-5

Share of individuals who have ever borrowed through mobile money, disaggregated by gender. Based on FinScope Tanzania data, 2017 and 2023.



C.4 Summary

Mobile money in Tanzania has become a central feature of the financial services landscape, operating not as a replacement for other tools but as a flexible, widely used complement. Across both rural and urban populations, it serves as an entry point into broader financial ecosystems that include banks, MFIs, SACCOs, savings groups, insurance, and even pensions.

Descriptive evidence from the FinScope 2023 survey shows that mobile money is the most widely used financial service nationwide. Urban residents tend to combine it with more formal services like banks and insurance, while rural users more often pair it with informal tools such as savings groups. Cross-usage data confirm that service stacking is common: for example, 31.1% of urban mobile money users also use a bank, and 14.8% also have insurance products. In rural areas, mobile money is more often used in tandem with savings groups or informal finance arrangements.

Access patterns have changed markedly between 2017 and 2023. Rural mobile money usage rose substantially, nearly closing the gap with urban populations. However, gaps in bank and insurance access remain, with formal service usage still more concentrated in cities.

Gender-based differences have also narrowed. In mobile money access, women caught up with men by 2023. However, some disparities remain: men are still more likely to hold bank accounts, while women continue to dominate microfinance participation. Mobile money is often the first formal service used by women, and its simplicity, accessibility, and privacy make it well-suited for users with limited financial histories.

Digital credit has become widespread through mobile money platforms. Products like M-Pawa and Tigo Nivushe allow quick borrowing with limited barriers. Borrowing behavior—especially among urban users—shows some signs of decline between 2017 and 2023. The proportion of urban users who reported ever borrowing via mobile money declined slightly, and borrowing frequency among this group dropped as well. Rural borrowing patterns remained stable. These shifts may reflect broader changes in affordability, service terms, or user preferences.

Taken together, the FinScope data illustrate the dynamic evolution of Tanzania's financial ecosystem. Mobile money remains central to this transformation—acting as a bridge, an on-ramp, and a supplement to nearly every other financial tool. Patterns of usage vary across demographics and locations, but the broader trajectory points to greater connectivity, more layered usage, and a gradual integration of digital services into everyday financial life.