The Impact of a Mobile Money Levy on Household Welfare

Evidence from Tanzania

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Abstract

This paper examines the welfare effects of Tanzania's 2021 levy on mobile money transfers, a policy that sharply increased transaction costs in a country where mobile money is the primary channel for financial access and remittances. Using two waves of the Tanzania National Panel Survey (2014/15 and 2020/22) combined with high-frequency phone survey data, a triple-difference identification strategy was implemented to isolate the impact of the levy on rural and urban households before and after its introduction. The findings show that rural households—who rely more heavily on mobile money and have fewer financial alternatives—experienced a 10–18 percent decline in per capita food consumption and a significant rise in food insecurity following the levy. Robustness checks using variation in bank penetration, shock incidence, and remittance dependence support these results.

The Impact of a Mobile Money Levy on Household Welfare: Evidence from Tanzania[*]

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1 Introduction

With the rapid expansion of mobile phones in low-income countries, there has been a parallel rise in the use of mobile money. Mobile money accounts are especially prevalent in Sub-Saharan Africa. In 2021, for example, about 33 percent of adults in the region had a mobile money account, compared to 10 percent globally (Demirgüç-Kunt et al., 2022). Mobile money transfers may help households pool risk and smooth consumption. So, increasing the price of the transactions may worsen household welfare by limiting their ability to cope with shocks.

In this paper, we study the welfare effects of a levy on mobile money transactions. In June 2021, the average mobile money transaction fee for a transfer value of USD 18 in Tanzania was approximately USD 0.50. This was slightly higher than the East Africa average of about USD 0.40. Tanzania introduced a mobile money transfer and withdrawal tax effective July 1, 2021. The levy was added on top of the VAT (18 percent) and fees (10 percent) (GMSA, 2021). Following the introduction of the levy, the average transaction fee for a transfer value of USD 18 increased to almost USD 1.20, a 140 percent increase. Responding to public concerns, the levy was reduced by about 30 percent, effective September 1, 2021. The average transaction fee for a transfer of USD 18 fell to about USD 1. We study the effect of this levy on household welfare.

The use of mobile money can improve household welfare through several channels. It can improve the ability of individuals to share risk by facilitating the creation of informal insurance networks. Mobile money can also facilitate trade, making it easier for people to pay for, and receive payment for, goods and services. It can similarly increase savings by providing a safe, convenient, and readily accessible means to store money.

Mobile money reduces the transaction costs associated with sending and receiving money, which is particularly beneficial in areas where access to banks is limited, transportation is expensive, and migration patterns have dispersed families and social networks. Governments, too, can use mobile money to deliver social welfare payments, subsidies, or emergency relief

funds directly to beneficiaries. In sum, mobile money can improve household welfare by helping households smooth consumption and manage risk through a safe, convenient, and affordable way to store, transfer, and access money.

There is a small but growing body of literature on the impact of mobile money. The seminal study by Jack and Suri (2014) underscored the transformative impact of mobile money (MM) usage on welfare in Sub-Saharan Africa (SSA). By analyzing the effects of reduced transaction costs on households' ability to cope with shocks, the authors demonstrated that mobile money users could maintain stable consumption levels despite economic shocks, unlike non-users whose consumption decreased by 7 percent. MM's ability to buffer household welfare from shocks has also been demonstrated in Uganda (Munyegera and Matsumoto, 2016), Tanzania (Riley, 2018), and Niger (Aker et al., 2016).

Beyond individual resilience, MM has been instrumental in expanding financial access for rural and low-income households, who historically have had limited access to formal financial services (Beck et al., 2008). MM replaced informal, sometimes risky, methods of money transfers, such as sending funds through bus drivers or acquaintances, with a secure and efficient alternative. This is evidenced by a decrease in informal money transfer methods in countries like Kenya, Uganda, and Mozambique (Waweru Kamau, 2017; Munyegera Matsumoto, 2016; Batista Vicente, 2013).

For small businesses and agricultural producers, MM has also opened new economic opportunities. By enabling quick, reliable transactions, MM has simplified market access for rural entrepreneurs, helping them reach buyers in distant locations and improve profitability (Sekabira and Qaim,2017). Despite these benefits, barriers to widespread MM adoption persist, particularly in the form of transaction fees, which can be prohibitive for low-income users (Holloway et al.,2017) .

Furthermore, faced with significant fiscal challenges and limited domestic revenue, many SSA countries have begun taxing MM as a new source of public revenue (Matheson Petit, 2021). While proponents argue that these taxes offer a convenient, transparent way to capture revenue from digital financial growth, the broader welfare effects of MM taxation

remain underexplored.

Existing studies suggest that mobile money taxes often disproportionately affect lower-income users, who have fewer financial alternatives, and the taxes are regressive (Akua et al., 2022; Clifford,2020; CSBAG, 2018; IMF, 2019; Munoz et al., 2022; UNCDF, 2021). Mobile money taxes also impact Digital Financial Services agents (DFS) with reduced transaction volumes, leading some to halt operations (Clifford, 2020; Katusiime, 2021).

While existing literature offers valuable insights into the behavioral responses to MM taxation, such as decreased DFS use and a shift back to cash, its welfare implications remain poorly understood. Most studies concentrate on transaction volumes and financial inclusion without delving into the broader impacts on income security, poverty, and resilience among low-income users. This paper attempts to fill the gap in the literature on how MM taxes affect welfare outcomes, particularly for those most reliant on MM for economic stability and security.

The rest of the paper is organized as follows. Section 2 provides the country context on the use of mobile money and describes the implementation of the levy. We describe the data and identification strategy in Section 3 and present our results in Section 4. Finally, we discuss the results and conclude in Section 5.

2   Context

Tanzania, a lower-middle-income country with an annual per capita income of USD 1,057.7 (2015 USD), has achieved notable economic growth, recording a 5.2 percent increase in 2023 despite substantial global disruptions, such as the COVID-19 pandemic and ongoing geopolitical tensions. The country's economy remains primarily agrarian, with agriculture employing approximately 66 percent of the population and contributing 26.5 percent of Tanzania's GDP. Nonetheless, financial inclusion, particularly in rural areas where 65 percent of the population resides, has remained a persistent challenge. In 2006, over half of Tanzanian adults lacked access to financial services, with few holding traditional bank accounts

(FinScope, 2006).

The emergence of mobile money in 2008 marked a pivotal shift in the financial landscape of Tanzania. By 2013, the rate of formal financial access had increased dramatically from 9 percent in 2006 to 57 percent, while rural financial access surged from 5 percent to 45.5 percent. The rapid uptake of mobile money platforms transformed financial accessibility nationwide, with mobile money usage expanding from just 1 percent in 2006 to 50 percent by 2013. In 2017, 78 percent of adults in rural areas and 86 percent of the national population resided within 5 km of a financial service access point. By 2023, 89 percent of Tanzanians lived within a 5 km radius of a financial access point, with rural access reaching 83 percent and universal urban access (FinScope, 2023). The spread of mobile money agents, many of whom represented multiple providers, was instrumental in meeting this new standard (Finscope, 2017). Without mobile money, access to formal finance in rural areas would have been about 14.5 percent in 2023. Furthermore, mobile money has facilitated a substantial increase in remittances, with over 55 percent of Tanzanians now participating in remittance transactions—90 percent of which occur via mobile money (Finscope, 2023).

Against this backdrop, in July 2021, the Tanzanian government introduced a mobile money transaction levy, applicable to transfers and withdrawals, with exceptions for business and government payments. Despite reductions to this levy in August 2021 and subsequent adjustments in July and September 2022, transaction fees rose significantly, with increases of up to 369 percent depending on transaction size. Off-network and cash-out fees surged, while person-to-person (P2P) on-network fees for transactions over TZS 10,000 (USD 4.3) rose two to four times their initial cost. For example, fees for transfers between TZS 40,000–49,999 (USD 17 – USD 22) increased by 369 percent, from TZS 407 to TZS 1,907 (USD 0.18 – USD 0.83). As a result, the tax component of mobile money fees grew from 23 percent to an average of 60 percent of total transaction costs (GSMA, 2023).

These fee increases had an immediate impact on mobile money usage, with many Tanzanians shifting to cash-based alternatives. Monthly P2P transactions fell by 38 percent, from 30 million in June 2021 to 18 million in September 2021, while cash-out transactions

declined by 25 percent, from 33 million to 25 million. Consequently, monthly mobile money revenues dropped by 16 percent, from TZS 73 billion to TZS 61 billion, before stabilizing at around TZS 65 billion from October 2021 onward (GSMA, 2023).[1]

This return to cash-based transactions may affect lower-income and rural Tanzanians in particular, for whom mobile money is often the primary and only access to financial services. According to the 2017 FinScope survey, 60 percent of Tanzanians relied on mobile money for financial services, compared to only 13 percent who used commercial banks. Further, mobile money is the most preferred channel for remittances, with about 9 in 10 Tanzanians sending remittances through it (FinScope, 2023). On the other hand, only 14.5 percent of the rural population uses bank services compared to 34 percent in urban areas. Given the low bank penetration rates and predominance of remittance flows through mobile money, an increase in the price of mobile money transfers may force many people to shift to cash-based methods for risk-sharing, reducing their ability to insure against shocks.

Strong public pushback led to a 30 percent reduction of the levy in September 2021, followed by further adjustments in early 2022. In July 2022, the levy was broadened to include bank-to-bank and bank-to-wallet transfers, though capped at TZS 4,000. The decisive reform came in the Finance Act, 2023, which eliminated the levy on all transfers, restricting it solely to cash withdrawals. As of 2025, Tanzania's mobile money levy therefore applies only to withdrawals, while transfers remain exempt.

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[1]In contrast to the industry data, the survey data show no decline in the share of households using mobile money after July 2021. However, this may be an artifact of how the question is framed. The survey asked if anyone in the household had used a mobile money service to make a transfer over the last 12 months. To the extent that the transfer occurred before the levy was introduced, the question will fail to capture the change in demand since the introduction of the levy.

3 Data and Identification Strategy

3.1 Data

We use three datasets for the analysis: the fourth and fifth waves of the Tanzania National Panel Survey (NPS), and longitudinal high-frequency phone surveys rolled out in 2020 after the onset of the COVID-19 pandemic. The two NPS waves were conducted in 2014/15 and 2020/22, respectively. They are the fourth and fifth rounds of surveys in a series of nationally representative household panel surveys that collect information on a wide range of topics, including agricultural production, non-farm income-generating activities, consumption expenditures, and a wealth of other socioeconomic characteristics. The 2020–22 wave was based on a stratified, multi-stage cluster sample design covering Dar es Salaam, other Mainland urban areas, rural Mainland, and Zanzibar, and included 4,709 households (23,592 individuals) with a booster sample from major cities to strengthen urban estimates. By the end of data collection for the fifth round of the NPS, 3,052 of the original 3,352 NPS 2014/15 refresh panel households had been located and successfully re-interviewed for a total household attrition rate of 9.1 percent.

The high-frequency survey on the other hand was launched to address data and knowledge gaps related to the COVID-19 pandemic, and between February 2021 and April 2024, 11 rounds were completed. The survey sample is drawn from several earlier face-to-face surveys, including the Mainland Household Budget Survey (HBS) 2017/18, the Zanzibar HBS 2019/20, and the panel component of the fourth wave of the NPS. The inclusion of the NPS panel component allows some households in wave 5 of the NPS to be matched with those from the high-frequency survey.

The timing of the fifth wave of the NPS is well-suited to our analysis because it spans both the period before and after the introduction of the levy. Data collection ran from December 2020 through January 2022, while the levy came into effect on July 1, 2021. We classify treatment status based on the actual interview date: households interviewed before

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July 1 were not exposed to the higher tariff (control), while those interviewed on or after July 1 were exposed to the policy shock (treatment). In total, 4,709 households were interviewed in round five, of which 2,638 (56 percent) were interviewed before July and 2,071 thereafter. Households are interviewed in the same month across waves, which helps control for the possible seasonal variation in consumption.

The outcome variables are adult equivalent food consumption and food security indicators. We focus on food consumption because it has a recall period of 7-days, so it is more sensitive to the change in levy. Total consumption includes the consumption of non-food items with a month or 12 month reference period which comprise the effects of household decisions made before the shock. We use four measures of food security. The first is if the household worried in the last 7 days that it would not have enough food. The next three measures are constructed from eight food security indicators in increasing severity. A household is considered to have experienced "negative change" if it had to rely on less preferred food or limit the variety of foods. "Reduced intake" is when a household had to limit portion sizes, reduce the number of meals eaten in a day, or restrict consumption by adults. Finally, "severe deficit" comprises borrowing food or relying on help from friends or relatives, having no food at home, or going a whole day and night without eating.

Table 1 reports the summary statistics for a few key variables for the two survey waves by area. Average nominal adult equivalent consumption was approximately 127,000 Tanzanian shillings (TZS) in 2014/15 and 104,000 TZS in 2020/21. While consumption was higher in wave 5 in nominal terms, it was lower in real terms. Real adult equivalent total consumption was about 4 percent lower in Wave 5 compared to Wave 4. The decline in food consumption was sharper. Real equivalent consumption in 2020/21 was about 74 percent of 2014/15 (Table 1). This decline is attributed to inflation and the financial strains induced by COVID-19 related economic slowdown in 2020 and 2021 (Amankwah et al., 2024).

Mobile phone ownership increased significantly between the two rounds. The share of households that reported owning at least one cell phone increased from 77 percent to 86 percent. This was driven almost entirely by a greater penetration of mobile phones in rural

areas, rising from 69 percent to 81 percent.

The use of mobile phones expanded the use of mobile money as well. In 2014/15, about 54 percent of households used a mobile money service to transfer money over the previous 12 months. This fraction had increased to 73 percent in 2020/21. Within both years, the penetration was lower in rural areas. About 40 percent of rural households used mobile money in wave 4, while 83 percent of urban households did the same. By wave 5, the use of mobile money in urban areas was almost universal, with 92 percent using it. In contrast, about 64 percent of rural households used it. The Global Findex Database, which shows access to financial services based on nationally representative surveys, shows a similar growth in mobile money accounts. Between 2014 and 2021, the share of adults in Tanzania with a mobile money account rose from 32 percent to 45 percent (Demirgüç-Kunt, 2022).[2]

The most common use of mobile money services was to send and receive money. In round 5, 64 percent of households that used mobile money did so to send money, and 83 percent to receive money. The next most important function of mobile money was buying airtime (for oneself or others), receiving payment for goods and services, and storing or saving for emergencies. Households also used it frequently, with about 21 percent of households using it once a week or more often.

In contrast to mobile money, use of other financial services was not common. The ownership of bank accounts was low, and it hardly increased in the intervening years. Only about 20 percent of households owned a bank account in the two rounds.[3] Nevertheless, the ownership rate was three to four times higher in urban areas, where almost 40 percent of households had at least one person with an account, whereas in rural areas it was 9 percent or 13 percent in waves 4 and 5, respectively. The use of less formal financial services was also limited. The share of households with a household member in a credit or savings group was about 5 percent. This ratio was equally low in rural areas (4 percent) and urban areas

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[2]The definition of the indicator could explain the difference in the levels between the NPS and Findex surveys. The NPS asks use of mobile money while the Findex survey asks about ownership of a mobile money account.

[3]A bank account includes an account with a commercial bank, a credit union, or other similar institutions.

(6 percent).

Risk is also a dominant feature of the lives of Tanzanians. In both surveys, households were asked to report if they had been negatively affected by an event in the last 12 months. In wave 4, more than three-quarters of households (76 percent) reported a negative shock in the last 12 months. The incidence was lower in round 5, but still, a majority of households (58 percent) reported experiencing a shock. Rural households were slightly more likely to experience a shock in both rounds.

Table 1 also provides more details about the remittance patterns and channels. About a fifth of households in wave 5 received remittances. The most popular channel to send remittances is mobile money. In wave 5, almost half the remittance transfers were through mobile payments. The use of bank accounts was minimal, accounting for less than 2 percent of all transfers. Using informal means of sending money is also common, with about 27 percent of transfers channeled through friends or relatives. According to FinScope 2023, approximately 34 percent of Tanzanians sent money and 44 percent received money in the 12 months leading up to the interview. Overall, the report indicates that about 55 percent of Tanzanians engaged in remittance transactions during that period, with 9 out of 10 of these transactions conducted via mobile money.

The size of remittances was also meaningful. Remittances were on average 15 percent of total household food consumption in waves 4 and 5. This share was higher in urban areas in both rounds, although the rural-urban gap was much larger in wave 5 (Table 1). We cannot tell from the available data what share of remittances is consumed. However, in waves 4 and 5, 88 percent and 87 percent of households that received remittances through mobile money used some of it for consumption, which suggests that remittances are an important component of the household budget.

Table 1: Summary Statistics by Area and Wave

Variable	Wave 4			Wave 5		
	Urban	Rural	Total	Urban	Rural	Total
Consumption (TZS)						
Per capita	150,736	79,225	103,926	181,527	101,152	127,215
Food	63,112	49,893	54,459	58,632	47,530	51,130
Consumption (2015 prices)						
Per capita	150,736	79,225	103,926	142,934	79,647	100,170
Food	63,112	49,893	54,459	46,167	37,425	40,260
Food Security						
Worried	0.328	0.359	0.348	0.313	0.307	0.309
Negative change	0.316	0.344	0.334	0.378	0.318	0.338
Reduced intake	0.262	0.275	0.270	0.290	0.253	0.265
Severe deficit	0.124	0.155	0.144	0.134	0.146	0.142
Household Characteristics						
Female head	0.316	0.274	0.289	0.284	0.255	0.264
Household size	4.043	5.106	4.739	4.051	5.070	4.740
Employment						
Wage work	0.405	0.060	0.179	0.431	0.191	0.269
Nonfarm work	0.403	0.049	0.171	0.409	0.146	0.231
Agriculture work	0.199	0.606	0.465	0.180	0.619	0.477
Education						
Primary	0.711	0.809	0.775	0.692	0.823	0.781
Secondary	0.405	0.160	0.245	0.493	0.229	0.314
Tertiary	0.052	0.006	0.022	0.101	0.022	0.048
Housing Quality						
Mud wall	0.227	0.641	0.498	0.152	0.534	0.410
Grass roof	0.048	0.350	0.246	0.021	0.196	0.139
Earth floor	0.180	0.749	0.553	0.103	0.606	0.443
Utilities						
Improved water	0.860	0.599	0.689	0.934	0.725	0.793
Improved sanitation	0.269	0.089	0.151	0.464	0.204	0.288
Electricity	0.546	0.071	0.235	0.696	0.161	0.334
Financial Inclusion						
Mobile money use	0.824	0.400	0.547	0.918	0.636	0.727
Bank account	0.389	0.094	0.196	0.385	0.130	0.213
Savings group	0.094	0.037	0.057	0.060	0.041	0.047
Shocks & Transfers						
Shock incidence	0.732	0.778	0.762	0.538	0.597	0.578
Received remittances	0.380	0.342	0.355	0.202	0.191	0.195
Remittances/Food (%)	0.172	0.131	0.147	0.250	0.101	0.153
Technology						
Mobile phone ownership	0.929	0.690	0.772	0.958	0.814	0.860
Observations (N)	1,254	2,090	3,344	2,149	2,560	4,709

3.2 Methodology

Our analysis compares per capita food consumption and food security indicators in rural and urban areas before and after July in the fourth and fifth rounds of the NPS. This setup closely resembles the strategy used by Muralidharan and Prakash (2017) to identify the impact on school enrollment of a program that provided bicycles to girls. We hypothesize that the impact of the levy will be stronger in rural areas because rural residents have fewer alternatives to mobile money, such as bank or SACCO accounts.

This is known as the triple difference (TD), or the difference-in-difference-in-differences (DDD), estimator, which is an extension of the difference-in-differences (DiD) estimator. DiD compares changes in outcomes before vs after a treatment between treated and control groups. However, if the treated and control groups evolve differently over time (violation of the "parallel trends" assumption), the DiD estimate may be biased. The DDD estimator purges the bias by subtracting a second DiD from the first, effectively controlling for confounding time trends that may affect different groups differently.

In our analysis, comparing the outcomes in areas with high and low exposure to MM levy (rural vs. urban) before and after the policy change gives the DiD estimates. However, if rural and urban areas have differential trends between the first and second half of the year, this estimate will be biased. To reduce this bias, we net out the wave 4 DiD estimate from the wave 5 estimate.

Our identification strategy rests on the assumption that rural households did not face differential levels of shocks after July in 2021. We use high-frequency survey data to test for this. Specifically, we use the third round of high-frequency surveys to check if there was a differential probability of rural households experiencing a shock after the policy went into effect.[4] We also assume that differential attrition between waves 4 and 5 does not bias the estimates.[5]

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[4]The questions on shocks were asked in round 3. The next round in which the shocks module is featured is round 8, conducted in August – September 2023.

[5]There is some difference in the baseline characteristics of households that are not reinterviewed in wave 5 (Annex Table 11), although it is not obvious if this will cause bias and in which direction.

The triple-difference estimate of the impact of mobile transfer levy on household welfare is estimated by the following regression:

$$y_{ilpw} = \alpha + \beta_1 X_{ijt} + \beta_2 L + \beta_3 P + \beta_4 W + \beta_5 (L \times P) + \beta_6 (L \times W) + \beta_7 (P \times W) + \beta_8 (L \times P \times W)$$

Here, y_{ilpw} is the dependent variable for household i in location L (urban or rural) during period P (before or after July) in wave W (fourth or fifth). The main parameter of interest is β_8, which captures the differential change for rural (vs. urban) households in the post-levy period (vs. pre-levy) in NPS wave 5 (vs. wave 4). We control for household-level covariates, including access to improved sanitation and water, access to electricity, household size, a female household-head indicator, recent healthcare use, completion of secondary education, remittances used for consumption, mobile-phone ownership, and incidence of shocks.

We run two specifications of the regression. First, we run a pooled regression, treating the two waves as repeated cross-sections. This allows us to use the complete wave 4 and 5 samples. Next, we run the regression with a balanced panel of households, i.e., the households that feature in both waves 4 and 5. The advantage of this specification is that we can use household fixed effects to account for time-invariant household characteristics such as preferences or risk tolerance. Some of the levy's impact could be due to observable differences that allow households to better smooth risk. To account for this, we check the robustness of results controlling for household characteristics for each specification.

4 Results

In this section, we present results from the empirical strategies described above. Columns 1 and 2 in Table 2 report results from our pooled cross-section specification on adult equivalent food consumption and households' worry about food. Adult equivalent food consumption was 9 percent lower in rural areas after July in the fifth round of NPS. This effect is not significantly different from zero, but it is in the expected direction. Controlling for household characteristics does not affect the point estimate, but it becomes marginally significant (Column 3), perhaps because the control variables absorb residual variance and increase precision.

Columns 2 and 4 show the impact of the levy on household's worry about food. Rural households interviewed in July or later in 2020/21 were 10 percentage points more likely to worry that the household would not have enough food to eat. There is minimal difference between regressions with and without controls, and the point estimates are statistically significant. The increased likelihood of worry is consistent with the decrease in food consumption.[6]

In Table 3, we show the results for other food security measures. The point estimates on the triple difference are all in the expected direction but they are not always statistically significant. Rural households in the second half of the year in wave 5 were 7 percentage points more likely to eat less preferred food or limit the variety of food. Focusing on reduced food intake, the likelihood was 8 percentage points higher, and this impact is statistically significant. At the other extreme of food insecurity, the levy did not lead to a severe food deficit, forcing households to borrow food, run out of food, or go a whole day without eating. Consistent with the previous table, we find little difference in the point estimates between specifications with and without controls.

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[6]In Table 2 and all subsequent tables, the sample size for the food consumption regressions is smaller because the food consumption variable specifically measures food consumed within the household. Households that only consume food outside the household are assigned a value of zero. Since food consumption is expressed in logarithmic form, households with a zero value are excluded from the regression analysis. The sample size for the regressions with controls is smaller because of missing control variables.

Table 2: Impact of Mobile Money Levy on Food Consumption and Food Security

	No Controls		With Controls	
	(1) Food Consumption	(2) Worried	(3) Food Consumption	(4) Worried
Post Period	0.04	-0.01	0.01	-0.01
	(0.038)	(0.027)	(0.035)	(0.026)
NPS Wave 5	-0.11***	-0.03	-0.18***	0.04**
	(0.028)	(0.021)	(0.026)	(0.021)
Post Period × NPS Wave 5	0.02	-0.03	0.05	-0.03
	(0.048)	(0.033)	(0.045)	(0.032)
Rural Tanzania	-0.24***	0.03	-0.02	-0.05**
	(0.026)	(0.022)	(0.025)	(0.022)
Post Period × Rural Tanzania	0.02	-0.05	0.02	-0.02
	(0.046)	(0.034)	(0.042)	(0.033)
NPS Wave 5 × Rural Tanzania	0.05	-0.02	0.10***	-0.05*
	(0.036)	(0.027)	(0.033)	(0.027)
Post Period × NPS Wave 5 × Rural Tanzania	-0.09	0.10**	-0.10*	0.08*
	(0.061)	(0.044)	(0.057)	(0.042)
Observations	7746	8061	7746	8052

Notes: Standard errors in parentheses. *Food Consumption* captures household food consumption based on Section J of the National Panel Survey (NPS), which records food consumption within the household over the past seven days. *Worried* represents the first food security measure, derived from Question 1 of Section H of the NPS, asking whether households worried about having enough food in the past seven days. The *Post Period* indicates the time after the levy was implemented (from July onwards). Controls include access to improved sanitation, access to improved water, access to electricity, household size, female household head, visited healthcare provider, completion of secondary education, remittances for consumption, and mobile phone ownership.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Impact of Mobile Money Levy on Food Consumption and Food Security

	No Controls			With Controls		
	(1) Negative Change	(2) Reduced Intake	(3) Severe Deficit	(4) Negative Change	(5) Reduced Intake	(6) Severe Deficit
Post Period	0.02	-0.01	-0.02	0.02	-0.00	-0.01
	(0.027)	(0.025)	(0.019)	(0.026)	(0.024)	(0.018)
NPS Wave 5	0.06***	0.03	-0.01	0.12***	0.08***	0.03*
	(0.021)	(0.020)	(0.015)	(0.021)	(0.020)	(0.015)
Post Period X NPS Wave 5	-0.08**	-0.09***	-0.00	-0.08**	-0.09***	-0.00
	(0.033)	(0.031)	(0.023)	(0.033)	(0.030)	(0.023)
Rural Tanzania	0.02	0.01	0.03*	-0.05***	-0.06***	-0.02
	(0.021)	(0.020)	(0.016)	(0.021)	(0.020)	(0.016)
Post Period X Rural Tanzania	-0.01	-0.02	-0.01	0.01	-0.00	0.01
	(0.034)	(0.031)	(0.024)	(0.033)	(0.031)	(0.024)
NPS Wave 5 X Rural Tanzania	-0.05**	-0.03	0.01	-0.09***	-0.06**	-0.00
	(0.027)	(0.026)	(0.020)	(0.027)	(0.026)	(0.020)
Post Period X NPS Wave 5 X Rural Tanzania	0.07*	0.09**	-0.02	0.06	0.09**	-0.02
	(0.044)	(0.040)	(0.031)	(0.043)	(0.040)	(0.031)
Observations	8061	8061	8061	8053	8053	8053

Notes: Standard errors in parentheses. This table presents the results of the impact of the mobile money levy on food consumption and food security. *Negative Change* is the second food security measure, generated from Questions 2a and 2b of Section H, which ask how many days households had to rely on less preferred foods or limit food variety. *Reduced Intake* reflects the third food security measure, based on Questions 2c, 2d, and 2e of Section H, concerning days when households had to limit portion sizes, reduce meal frequency, or restrict adult consumption for children. *Severe Deficit* is the fourth measure, derived from Questions 2f, 2g, and 2h of Section H, capturing days when households borrowed food, had no food at home, or went a whole day without eating. The *Post-Period* indicates the time after the levy was implemented, from July onwards. The control variables are access to improved sanitation, access to improved water, access to electricity, household size, female household head, visited healthcare provider, completion of secondary education, remittances for consumption, and mobile phone ownership.

Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The next two tables show the results from household fixed-effects regressions. As shown in Table 4, on the subset of panel households, we find a stronger impact of the levy on consumption. The adult equivalent consumption among rural households in the post-tariff period in the fifth NPS wave is about 18 percent lower (Table 4, Column 1). The estimates on households' worry about food is not statistically significant, but it is in the expected direction. Households are 5 percentage points more likely to worry about not having enough to eat (Table 4, Column 2). The addition of control variables does not meaningfully affect the point estimates.

Table 4: Impact of Mobile Money Levy on Food Consumption and Food Security

	No Controls		With Controls	
	(1) Food Consumption	(2) Worried	(3) Food Consumption	(4) Worried
Post Period	-0.05	0.02	-0.06	0.02
	(0.063)	(0.050)	(0.062)	(0.050)
NPS Wave 5	-0.21***	0.03	-0.18***	0.05*
	(0.031)	(0.026)	(0.032)	(0.027)
Post Period X NPS Wave 5	0.08	-0.02	0.09*	-0.00
	(0.053)	(0.043)	(0.052)	(0.044)
Rural Tanzania	0.01	0.08**	-0.01	0.08**
	(0.045)	(0.037)	(0.045)	(0.037)
Post Period X Rural Tanzania	0.05	-0.06	0.07	-0.06
	(0.068)	(0.055)	(0.067)	(0.055)
NPS Wave 5 X Rural Tanzania	0.15***	-0.09***	0.14***	-0.09***
	(0.040)	(0.033)	(0.040)	(0.033)
Post Period X NPS Wave 5 X Rural Tanzania	-0.18***	0.06	-0.17**	0.05
	(0.068)	(0.057)	(0.067)	(0.057)
Observations	5409	5602	5409	5594

Notes: Standard errors in parentheses. This table presents the results of the impact of the mobile money levy on food consumption and food security. *Food Consumption* captures household food consumption based on Section J of the National Panel Survey (NPS), which records food consumption within the household over the past seven days. *Worried* represents the first food security measure, derived from Question 1 of Section H of the NPS, asking whether households worried about having enough food in the past seven days. The *Post-Period* indicates the time after the levy was implemented, from July onwards. The control variables are access to improved sanitation, access to improved water, access to electricity, household size, female household head, visited healthcare provider, completion of secondary education, remittances for consumption, and mobile phone ownership.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5 reports the food insecurity measures from the panel regressions. The coefficients are muted comparable to cross-sectional regression and they are not statistically significant. However, all the point estimates are in the expected direction.

Table 5: Impact of Mobile Money Levy on Food Consumption and Food Security

	No Controls			With Controls		
	(1) Negative Change	(2) Reduced Intake	(3) Severe Deficit	(4) Negative Change	(5) Reduced Intake	(6) Severe Deficit
Post Period	0.04	0.01	0.01	0.05	0.02	0.01
	(0.051)	(0.047)	(0.038)	(0.051)	(0.047)	(0.038)
NPS Wave 5	0.14***	0.10***	0.01	0.13***	0.11***	0.03
	(0.026)	(0.024)	(0.019)	(0.027)	(0.025)	(0.020)
Post Period X NPS Wave 5	-0.07*	-0.10**	-0.02	-0.07	-0.09**	-0.02
	(0.044)	(0.041)	(0.033)	(0.044)	(0.041)	(0.033)
Rural Tanzania	0.10***	0.07**	0.04	0.09**	0.07**	0.04
	(0.038)	(0.035)	(0.028)	(0.038)	(0.035)	(0.028)
Post Period X Rural Tanzania	-0.08	-0.07	-0.02	-0.08	-0.07	-0.02
	(0.056)	(0.051)	(0.041)	(0.056)	(0.052)	(0.041)
NPS Wave 5 X Rural Tanzania	-0.15***	-0.11***	-0.02	-0.14***	-0.10***	-0.01
	(0.034)	(0.031)	(0.025)	(0.034)	(0.032)	(0.025)
Post Period X NPS Wave 5 X Rural Tanzania	0.05	0.08	0.02	0.04	0.08	0.02
	(0.058)	(0.053)	(0.043)	(0.058)	(0.054)	(0.043)
Observations	5602	5602	5602	5595	5595	5595

Notes: Standard errors in parentheses. This table presents the results of the impact of the mobile money levy on food consumption and food security. Negative Change is the second food security measure, generated from Questions 2a and 2b of Section H, which ask how many days households had to rely on less preferred foods or limit food variety. Reduced Intake reflects the third food security measure, based on Questions 2c, 2d, and 2e of Section H, concerning days when households had to limit portion sizes, reduce meal frequency, or restrict adult consumption for children. Severe Deficit is the fourth measure, derived from Questions 2f, 2g, and 2h of Section H, capturing days when households borrowed food, had no food at home, or went a whole day without eating. The Post-Period indicates the time after the levy was implemented, from July onwards. The control variables are access to improved sanitation, access to improved water, access to electrcity, household size, female household head, visited healthcare provider, completion of secondary education, remittances for conusmption, mobile phone ownership.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.1 Robustness checks

We exploit the variation in penetration of bank accounts across the survey domains to check the robustness of the results. The NPS is representative of four domains: Dar es Salaam, Mainland Other Urban, Mainland Rural, and Zanzibar. We estimate the impact of the levy on the three domains relative to Dar es Salaam, i.e., we run three separate regressions, each time comparing a domain with Dar es Salaam. If our hypothesis is correct, we should see the strongest effect of the levy in the domain with the lowest rate of bank account ownership. We use Dar es Salaam as the reference domain because it has the highest bank account ownership rate. In the NPS wave 5, the bank account ownership rate in the four domains was as follows: 43.2 percent in Dar es Salaam, 34.5 percent in Mainland Other Urban, 24.4 percent in Zanzibar, and 13.4 percent in Mainland Rural. Therefore, the strongest effect of the levy should be in Mainland Rural, followed by Zanzibar and, finally, Mainland Other Urban.

Table 6 presents the results of the robustness analysis. For parsimony, we only report the findings from the pooled cross-sectional specification with controls. Columns 1 and 2 compare Mainland Other Urban areas and Dar es Salaam, while columns 3 and 4, and 5 and 6 do the same for Mainland Rural and Zanzibar, respectively. As expected, the strongest effect of the increase in levy is in Mainland Rural. The triple-difference coefficient on adult equivalent household consumption is 12 percent lower in Mainland Rural households than in Dar es Salaam, and worry about food is 11 percentage points higher. This is followed by Zanzibar and Other Mainland Urban, although the coefficients are not statistically significant. This pattern is qualitatively robust to the cross-sectional regression without controls.

Table 6: Impact of Mobile Money Levy on Food Consumption and Food Security

	Dar - Urban		Dar - Rural		Dar - Zanzibar	
	(1) Food Consumption	(2) Worried	(3) Food Consumption	(4) Worried	(5) Food Consumption	(6) Worried
Post Period	0.02 (0.057)	-0.03 (0.039)	0.03 (0.024)	-0.03 (0.020)	-0.01 (0.103)	0.07 (0.076)
NPS Wave 5	-0.11** (0.045)	-0.00 (0.033)	-0.08*** (0.022)	-0.01 (0.017)	-0.27*** (0.046)	0.09** (0.044)
Post Period X NPS Wave 5	0.02 (0.070)	0.03 (0.047)	-0.06* (0.035)	0.05* (0.027)	0.04 (0.113)	-0.07 (0.083)
Post Period X NPS Wave 5 X Dar es Salaam	0.04 (0.103)	-0.09 (0.074)				
Post Period X NPS Wave 5 X Dar es Salaam			0.12* (0.067)	-0.11** (0.053)		
Post Period X NPS Wave 5 X Dar es Salaam					0.04 (0.127)	0.03 (0.095)
Observations	2665	2788	6127	6374	2139	2256

Notes: Standard errors in parentheses. *Food Consumption* captures household food consumption based on Section J of the National Panel Survey (NPS), which records food consumption within the household over the past seven days. *Worried* represents the first food security measure, derived from Question 1 of Section H of the NPS, asking whether households worried about having enough food in the past seven days. The *Post-Period* indicates the time after the levy was implemented (from July onwards). Controls include access to improved sanitation, access to improved water, access to electricity, household size, female household head, visited healthcare provider, completion of secondary education, remittances for consumption, and mobile phone ownership. "Dar" denotes Dar es Salaam; "Urban" refers to other Mainland urban areas outside Dar es Salaam.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We also use the variation in the size of the levy to analyze the differential impact on household consumption. Since the levy was the highest in July and August, its impact on household food consumption should also be higher when the high rates were in effect. Specifically, we would expect a larger drop in food consumption for households that receive remittances through mobile money during the third quarter (July–September), when the levy was highest. Conversely, in the fourth quarter (October–December), when the levy was

reduced, we should observe a smaller—or no—impact on food consumption.

We find that food consumption in rural areas was about 8 percent lower in the third quarter compared to the first half of the year in wave 5 of the NPS, relative to wave 4. The effect is muted in the fourth quarter, where consumption is 3 percent lower. Although both point estimates are statistically insignificant, the relative magnitudes are consistent with our expectation.

Table 7: Impact of Mobile Money Levy on Food Consumption

	(1) Food Consumption
Second Quarter	0.00
	(0.035)
Third Quarter	0.01
	(0.048)
Rural Tanzania	-0.02
	(0.027)
NPS Wave 5	-0.18***
	(0.027)
Second Quarter × Rural Tanzania × NPS Wave 5	-0.08
	(0.064)
Third Quarter × Rural Tanzania × NPS Wave 5	-0.02
	(0.082)
Observations	7539

Notes: Standard errors in parentheses. *Food Consumption* is based on Section J of the National Panel Survey (NPS), which records household food consumption over the past seven days.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

While the results in Tables 2, 3, and 6 suggest a negative causal impact of the levy on household welfare, the triple difference estimate may be biased if rural households interviewed after July in NPS wave 5 experienced a distinct shock. If the shocks also negatively affected household welfare, our estimates will be confounded by omitted variable bias. Our cross-sectional regressions do control for shocks, so the triple-difference estimates are conditional on the realization of shocks. However, the shock variable in the NPS records the shock experienced in the "past two years," which does not adequately control for the contemporaneous shocks experienced since the introduction of the levy.

Our best alternative source of information on shocks is the high-frequency phone survey.

Round 3 of the survey, conducted between June 30 and July 31, 2021, included a module on shocks and coping mechanisms. The survey asked the respondents if they had been affected by a shock "since January 2021." Although this reference period still covers the period before the introduction of the levy, it is the best information we have on contemporaneous shocks. We merge the consumption and food security variables from the NPS Wave 5 with high-frequency survey round 3 and run the regressions controlling for shocks. Since we do not have similar information on shocks for the NPS Wave 4 sample, we cannot use the triple-difference framework. Instead, we follow the difference-in-difference approach using the NPS Wave 5 cross-sectional sample.

Table 8 reports the difference-in-difference estimates of the impact of mobile money level on food consumption and food security. Controlling for shocks, adult equivalent food consumption among rural households was 17 percent lower after the levy was instituted. Although the coefficients on food security measures are not always in the expected direction, they are also statistically insignificant. This bolsters our confidence in the main results.

Table 8: Impact of Mobile Money Levy on Food Consumption and Food Security — Double Difference Estimates Using High-Frequency Survey

	(1) Food Consumption	(2) Worried	(3) Negative Change	(4) Reduced Intake	(5) Severe Deficit
Post Period	0.15**	-0.02	0.00	-0.11***	-0.01
	(0.065)	(0.043)	(0.047)	(0.042)	(0.029)
Rural Tanzania	-0.07	0.01	0.03	-0.00	0.00
	(0.061)	(0.040)	(0.043)	(0.041)	(0.029)
Post Period × Rural Tanzania	-0.17*	-0.01	-0.09	0.02	-0.04
	(0.097)	(0.066)	(0.070)	(0.064)	(0.042)
Observations	827	864	864	864	864

Notes: Standard errors in parentheses. *Food Consumption* is based on Section J of the National Panel Survey (NPS), which records household food consumption over the past seven days. *Worried* is the first food-security measure (Section H, Question 1). *Negative Change* (Section H, Q2a–Q2b) counts days relying on less-preferred foods or limiting variety. *Reduced Intake* (Q2c–Q2e) covers limiting portions, cutting meals, or restricting adults' intake. *Severe Deficit* (Q2f–Q2h) includes borrowing food, no food at home, or going a whole day without eating. Controls are from the Round 3 High-Frequency Welfare Monitoring Phone Survey: respondent gender and age; employment status; indicators for wage work, family business, and agriculture; and an incidence-of-shocks indicator.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.2   Mechanism

Several studies have examined the impact of mobile money on household welfare (Jack and Suri, 2014; Kikulwe et al., 2014; Kirui et al., 2013; Munyegera and Matsumoto, 2016; Murendo and Wollni, 2016). These studies consistently find that mobile money adoption enhances household income, smooths consumption, and strengthens food security. This is largely attributed to improved access to remittances, reduced transaction costs, and greater financial resilience. Industry data indicates that over half of Tanzania's population—approximately 55 percent—engages in remittance transfers, with 44 percent of the population receiving remittances. Notably, mobile money facilitates nearly 90 percent of these transactions, underscoring its dominance as the primary remittance transfer channel (FinScope, 2023). Among households receiving remittances, data from the fifth wave of the NPS reveals that approximately 87 percent use them for consumption.

Industry data further shows that the introduction of the mobile money levy led to a 30 percent decline in peer-to-peer transactions and a 60 percent reduction in cash withdrawals. Withdrawals are particularly critical for rural households, where limited mobile payment infrastructure forces most market transactions to be conducted in cash. A decline in cash withdrawals, therefore, likely constrained liquidity for rural households, reducing their ability to engage in consumption and economic activities. The evidence from the industry data aligns with the observed drop in household welfare following the levy. The combination of increased transaction costs and liquidity constraints likely led some households to cut back on essential expenditures or resort to alternative coping mechanisms.

While the direct causal pathways warrant further investigation, the magnitude and direction of industry trends reinforce the empirical evidence that the levy negatively impacted household welfare. As researchers have found, one of the primary channels through which mobile money affects welfare is remittances. Greater remittance inflows from relatives and friends directly increase household income, while indirect effects arise from remittances acting as a form of financial insurance (Jack and Suri, 2014; Munyegera and Matsumoto, 2016).

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If remittances serve as both a direct income source and a financial buffer, then households that receive remittances via mobile money should be more vulnerable to disruptions caused by the levy. In contrast, households that only use mobile money for transactions or receive transfers through other channels may experience relatively smaller reductions in welfare. Thus, if this mechanism holds, we expect to see a more pronounced decline in welfare among households that depend on mobile money for remittance inflows compared to those that merely use mobile money for other purposes or receive remittances without relying on mobile transfers.

To pursue this line of inquiry, it is critical to first rule out the possibility that households self-selected into or out of mobile money usage in response to the levy. If households began or ceased using mobile money as a reaction to the policy, any observed changes in welfare could be biased due to this behavioral shift rather than due to the causal impact of the levy.

The framing of the mobile money usage question in the survey alleviates this concern. Specifically, the survey asks whether individuals used mobile money at any point in the past twelve months, capturing behavior that largely or mostly predates the levy. Furthermore, users of mobile money use it frequently, so if a household reports having used (not used) mobile money in the last twelve months, it was likely a user (non-user) since before the introduction of the levy. Prior studies and mobile money usage statistics in Tanzania support this hypothesis. Approximately 63 percent of Tanzanians use mobile money at least twice a month, and the proportion rises when considering more infrequent use (World Bank, 2023). It is thus reasonable to argue that households not using mobile money over the past year are unlikely to have been users in the first place, with their behavior not shaped by the levy's introduction.

The results align with these hypotheses. Using a difference-in-differences estimator, we analyze the impact of the levy on mobile money users, mobile money receivers (transactions only), and receivers of remittances through mobile money. The findings indicate that food consumption specifically among households receiving remittances through mobile money fell by about 10 percent (Table 9). In contrast, we do not observe a statistically significant drop

in food consumption among households that use mobile money or receive mobile money transfers without remittances.

Table 9: Impact of Mobile Money Levy on Food Consumption

	(1) Food Consumption	(2) Food Consumption	(3) Food Consumption
Post Period	0.03	0.03	0.03
	(0.038)	(0.032)	(0.021)
Use Mobile Money (MM)	0.12***		
	(0.026)		
Post Period × Use MM	-0.02		
	(0.044)		
Received Mobile Money (MM)		0.11***	
		(0.024)	
Post Period × Received MM		-0.03	
		(0.040)	
Remittances via Mobile Money (MM)			0.06
			(0.038)
Post Period × Remittances MM			-0.10*
			(0.058)
Observations	4457	4457	4457

Notes: Standard errors in parentheses. *Food Consumption* is based on Section J of the National Panel Survey (NPS), which records household food consumption over the past seven days. "Use MM" indicates any mobile money use; "Received MM" indicates having received mobile money transfers; "Remittances via MM" indicates receiving remittances via mobile money. *Post Period* denotes the period after the levy was implemented (from July onwards).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

To strengthen the validity of these results, we implement a matching procedure as an additional robustness check. While double difference controls for time-invariant unobservable differences between treated and control households under the parallel trends assumption, it does not guarantee balance on observable pre-treatment characteristics. If mobile money users and non-users differ systematically on variables that also affect outcomes, this could bias the difference-in-difference estimates.

To address this concern, we use propensity score matching (PSM) to improve comparability between treated and control groups. The matching procedure is based on a set of pre-treatment covariates including household, economic activities, education levels, housing quality, access to basic services, financial inclusion and experience of shocks. Matching is implemented using radius matching with a caliper of 0.01.

Matching was conducted on the full sample, including households interviewed both before

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and after the policy shock. Although standard practice typically recommends restricting matching to pre-treatment observations to avoid post-treatment bias, this concern is less relevant here. The analysis at this stage is restricted to wave 5 of the survey, and the data is cross-sectional, with each household interviewed only once. Additionally, as we argue above, treatment status (mobile money use) as captured in the data is unlikely to be affected by the price shock. Moreover, the household characteristics used for matching — such as housing materials, education, and financial access — are relatively stable over time, further reducing concerns about post-treatment bias.

Table 10 presents the results. Consistent with the main findings, we observe a negative impact of the levy on household welfare, with the effect size similar in both direction and magnitude to the triple-difference estimates reported in Table 2. However, while the estimates in Table 10 remain consistent, they are not statistically significant. It is worth noting that the p-values are sensitive to the choice of matching caliper adopted during the matching procedure.

Table 10: Impact of Mobile Money Levy on Food Consumption

	(1) Food Consumption
Post Period	0.02
	(0.027)
Remittances via Mobile Money (MM)	0.05
	(0.038)
Post Period × Remittances MM	-0.10
	(0.059)
Observations	4455

Notes: Standard errors in parentheses. *Food Consumption* captures household food consumption based on Section J of the National Panel Survey (NPS), which records food consumption within the household over the past seven days.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5   Conclusion

This paper investigates the impact of a mobile money transfer levy on household welfare in Tanzania. We use a credible identification strategy based on two waves of the National Panel Survey to show that, after the introduction of the levy, households in rural areas with fewer alternatives to mobile money experienced a 10 percent decline in household consumption and a 9 percentage point increase in food insecurity.

Although we use a triple-difference estimator, we cannot rule out the possibility of omitted variable bias, i.e., unique shocks experienced by rural households in NPS wave 5 interviewed after July 2021 may be driving our results. We cannot test for it directly, or control for it in the regression because of missing data. We also cannot test for the possible pathways of impact due to the lack of data.

Many low-income countries have low tax collection, which limits their access to capital for much-needed investment. Domestic revenue mobilization is a priority for the countries. As a result, many countries are taxing the digital economy such as mobile money transfers to raise domestic revenues. Such taxes can widen the tax base and improve the efficiency of revenue collection.

However, the benefits must be balanced against the unintended consequences of the tax. Previous research has shown that mobile money transfer levies may reduce the number of transactions and volume of transfers. This may undermine the tax collection objective and slow or reverse financial inclusion.

This paper contributes to this debate by exploring the household welfare implications of the levy. Making mobile money transfers more expensive may make households worse off by limiting their ability to share risk. Thus, policymakers must balance the imperative of domestic revenue mobilization with the protection of household welfare, especially given that the use of mobile money is becoming increasingly common in low-income countries.

References

[1] Aker, J. C., Boumnijel, R., McClelland, A., & Tierney, N. (2016). Payment mechanisms and antipoverty programs: Evidence from a mobile money cash transfer experiment in Niger. *The World Bank Economic Review, 30*, 1–27.

[2] Anyidoho, N. A., Gallien, M., Rogan, M., & van den Boogaard, V. (2022). Mobile money taxation and informal workers: Evidence from Ghana's E-Levy. *ICTD Working Paper, 146.* https://doi.org/10.19088/ICTD.2022.012

[3] Amankwah, Akuffo, et al. (2023). The welfare effects of structural change and internal migration in Tanzania. *World Bank Policy Research Working Paper, 10530.*

[4] Aron, J. (2018). Mobile money and the economy: A review of the evidence. *The World Bank Research Observer, 33*(2), 135–188. https://doi.org/10.1093/wbro/lky001

[5] Batista, C., & Vicente, P. C. (2013). Introducing mobile money in rural Mozambique: Evidence from a field experiment. *NOVA School of Business and Economics Working Paper Series.*

[6] Beck, T., Demirgüç-Kunt, A., & Honohan, P. (2008). Access to financial services: Measurement, impact, and policies. *World Bank Research Observer, 24*(1), 119–145. https://doi.org/10.1093/wbro/lkn008

[7] Clifford, K. (2020). The causes and consequences of mobile money taxation: An examination of mobile money transaction taxes in sub-Saharan Africa. *GSMA Report.*

[8] Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2022). *The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19.* Washington, DC: World Bank. https://doi.org/10.1596/978-1-4648-1897-4

[9] Finscope. (2017). *Finscope Tanzania: Insights that Drive Innovation.* Dar es Salaam: Financial Sector Deepening Trust (FSDT).

[10] Finscope. (2023). *Finscope Tanzania: Insights that Drive Innovation.* Dar es Salaam: Financial Sector Deepening Trust (FSDT).

[11] GSMA. (2021). Tanzania mobile money levy impact analysis. *GSMA Policy Report.*

[12] GSMA. (2023). Tanzania mobile money levy impact assessment. *GSMA Policy Report.*

[13] Holloway, K., Rouse, R., & Cook, W. (2017). Women's economic empowerment through financial inclusion: A review of existing evidence and remaining knowledge gaps. *Innovations for Poverty Action Report.*

[14] IMF. (2019). Uganda: 2019 Article IV Consultation—Press Release; Staff Report; and Statement by the Executive Director for Uganda. *International Monetary Fund Country Report.*

[15] Jack, W., & Suri, T. (2014). Risk sharing and transactions costs: Evidence from Kenya's mobile money revolution. *American Economic Review, 104*(1), 183–223. https://doi.org/10.1257/aer.104.1.183

[16] Katusiime, L. (2021). Mobile money use: The impact of macroeconomic policy and regulation. *Economies, 9*(2), Article 51, 1–19.

[17] Matheson, T., & Petit, P. (2021). Taxing telecommunications in developing countries. *International Tax and Public Finance, 28*(1), 248–280.

[18] Munyegera, G. K., & Matsumoto, T. (2018). ICT for financial access: Mobile money and the financial behavior of rural households in Uganda. *Review of Development Economics, 22*(1), 45–66.

[19] Muralidharan, K., & Prakash, N. (2017). Cycling to school: Increasing secondary school enrollment for girls in India. *American Economic Journal: Applied Economics*, *9*(3), 321–350. https://doi.org/10.1257/app.20160004

[20] Riley, E. (2018). Mobile money and risk sharing against village shocks. *Journal of Development Economics*, *135*, 43–58.

[21] Sekabira, H., & Qaim, M. (2017). Mobile money, agricultural marketing, and off-farm income in Uganda. *Agricultural Economics*, *48*(5), 597–611. https://doi.org/10.1111/agec.12360

[22] UNCDF. (2021). The impact of mobile money taxation in Uganda. *United Nations Capital Development Fund Report*.

[23] Waweru, K. M., & Kamau, J. W. (2017). The effect of mobile money on saving and money transfer practices for low-income earners in Kenya. *Journal of Business Studies Quarterly*, *8*(3), 52–64.

Annex

Table 11: Summary Statistics - Attrited vs. Tracked Households

Variable	Attrited Households			Tracked Households		
	Urban	Rural	Total	Urban	Rural	Total
Consumption (TZS)						
Per capita	186,612	97,551	140,880	139,561	76,432	96,430
Food	68,922	56,023	62,298	61,303	48,959	52,869
Consumption (2015 prices)						
Per capita	237,118	123,953	179,009	177,332	97,118	122,529
Food	87,575	71,185	79,159	77,894	62,210	67,178
Food Security						
Worried	0.28	0.33	0.31	0.34	0.36	0.36
Negative change	0.32	0.35	0.33	0.32	0.34	0.33
Reduced intake	0.23	0.28	0.25	0.27	0.27	0.27
Severe deficit	0.10	0.18	0.14	0.13	0.15	0.15
Household Characteristics						
Female head	0.27	0.25	0.26	0.33	0.28	0.30
Household size	3.43	4.45	3.95	4.23	5.21	4.90
Employment						
Wage work	0.44	0.11	0.27	0.39	0.05	0.16
Nonfarm work	0.39	0.09	0.23	0.41	0.04	0.16
Agriculture work	0.13	0.58	0.36	0.22	0.61	0.49
Education						
Primary	0.59	0.78	0.68	0.75	0.81	0.79
Secondary	0.41	0.16	0.28	0.40	0.16	0.24
Tertiary	0.09	0.01	0.05	0.04	0.01	0.02
Housing Quality						
Mud wall	0.16	0.63	0.40	0.25	0.64	0.52
Grass roof	0.03	0.32	0.18	0.05	0.35	0.26
Earth floor	0.09	0.70	0.40	0.21	0.76	0.58
Utilities						
Improved water	0.86	0.61	0.73	0.86	0.60	0.68
Improved sanitation	0.28	0.10	0.19	0.27	0.09	0.14
Electricity	0.67	0.13	0.39	0.51	0.06	0.20
Financial Inclusion						
Mobile money use	0.89	0.44	0.66	0.80	0.40	0.52
Bank account	0.46	0.10	0.27	0.37	0.09	0.18
Savings group	0.16	0.03	0.09	0.07	0.04	0.05
Shocks & Transfers						
Shock incidence	0.69	0.75	0.72	0.75	0.78	0.77
Received remittances	0.44	0.43	0.43	0.36	0.33	0.34
Remittances/Food (%)	20.0	17.4	18.6	16.2	12.2	13.6
Technology						
Mobile phone ownership	0.93	0.67	0.80	0.93	0.69	0.77
Observations (N)	283	267	550	971	1,823	2,794