The Impact of Mobile Money Levy on Household Welfare: Evidence from Tanzania

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Introduction

- Financial inclusion remains a significant challenge in developing countries, but substantial progress has been made in expanding access to financial services.
- The engine behind this progress is the growth in Mobile Money (MM) (a financial service that allows users to conduct transactions using a mobile phone)

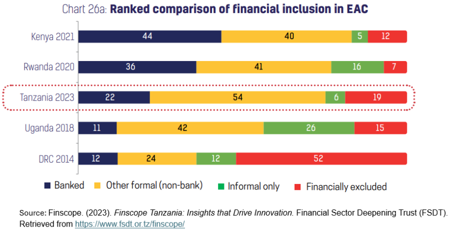


Figure 1: Financial Inclusion in East Africa.

Introduction

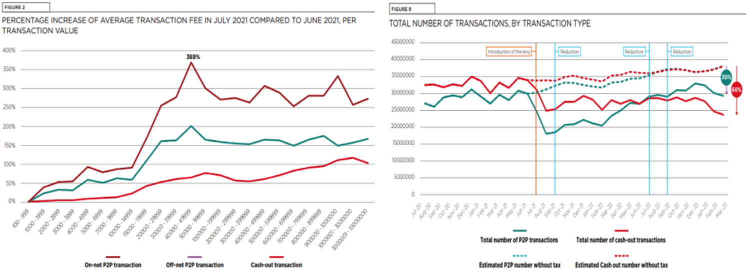
The MM revolution has brought with it several benefits for people in developing countries.

- Risk sharing (Jack & Suri, 2014; Munyegera & Matsumoto, 2016; Riley, 2018)
- Expanding financial access for rural and low-income households (Beck et al., 2008; Waweru & Kamau, 2017; Munyegera & Matsumoto, 2016; Batista & Vicente, 2013)
- Improved household welfare (Aker et al., 2016; Munyegera & Matsumoto, 2016; Qaim, 2017)

Introduction

Faced with significant fiscal challenges and limited domestic revenue, developing countries have begun taxing MM as a new source of public revenue (Uganda, 2018; Congo, 2018; Cote d'Ivoire, 2019; Malawai, 2019)

- Tanzania introduced a levy on mobile money transactions in July 2021



Source: GSMA. (2023). *Tanzania Mobile Money Levy Impact Assessment*. Retrieved from https://www.gsma.com/solutions-and-impact/connectivity-for-good/public-policy/gsma_resources/tanzania-mobile-money-levy-impact-assessment/

Figure 2: Mobile Money Levy - Tanzania

Introduction

- Several studies, including Holloway et al. (2017), Clifford (2020), GSMA (2021), UNCDF (2021), and CSBAG (2018), have examined the behavioral responses to these taxes, primarily on transaction volume and value.
- We contribute to this literature by analyzing the welfare implications of taxes on digital payment systems.

Data

- Three datasets are used for the analysis: the high-frequency phone survey and the 4th (2014-16) and 5th (2020-21) waves of the Tanzania National Panel Survey (NPS).
- The 5th wave of the NPS is well-timed for the analysis, spanning periods before and after the levy implementation. Data collection occurred from December 2020 to January 2022, with the levy introduced on July 1, 2021.
- We study the impact of the levy on adult equivalent food consumption and food security.

Estimation Strategy

- The triple difference (TD) estimator is used to assess the impact of the mobile money levy on household welfare.
- Per-capita food consumption and food security indicators are compared across rural and urban areas before and after July in the fourth and fifth rounds of the NPS.
- The levy is hypothesized to have a stronger impact in rural areas due to limited alternatives to mobile money. In 2021, 40% of households in urban areas had formal bank accounts, while only 13% had it in rural areas
- The identification strategy assumes no differential shocks for rural households in 2021 after July.

Estimation Strategy

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

$$
\begin{aligned}
y_{ilpw} = \alpha + \beta_1 X_{ilpw} + \beta_2 L_l + \beta_3 P_p + \beta_4 W_w + \beta_5 (L_l \cdot P_p) + \beta_6 (L_l \cdot W_w) \\
+ \beta_7 (P_p \cdot W_w) + \beta_8 (L_l \cdot P_p \cdot W_w) + \epsilon_{ilpw}
\end{aligned}
$$

where y_{ilpw} is the value of the dependent variable for household i in location L (urban or rural) in period P (before or after July) in NPS wave W (fourth or fifth).

- The main parameter of interest is the third level interaction β_8 which captures all the variation in outcomes specific to households in rural areas (relative to urban) in the post-levy period (relative to before) in NPS wave 5 (relative to wave 4).

Results

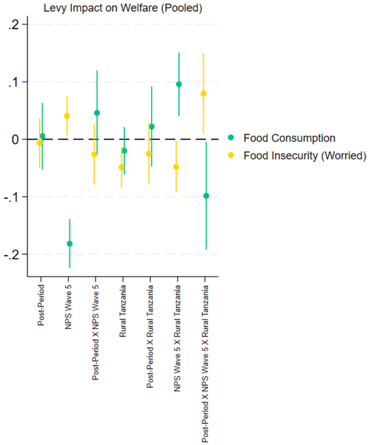


Figure 3: Impact of the Levy on Welfare

Robustness Tests

- We check the robustness of the result by comparing each NPS domain with Dar es Salaam. We should see the largest impact of the levy on the domains with the lowest penetration of formal financial services.

Table 8: 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	-0.03	0.03	-0.03	-0.01	0.07
	(0.057)	(0.039)	(0.024)	(0.020)	(0.103)	(0.076)
NPS Wave 5	-0.11**	-0.00	-0.08***	-0.01	-0.27***	0.09**
	(0.045)	(0.033)	(0.022)	(0.017)	(0.046)	(0.044)
Post Period X NPS Wave 5	0.02	0.03	-0.06*	0.05*	0.04	-0.07
	(0.070)	(0.047)	(0.035)	(0.027)	(0.113)	(0.083)
Post Period X NPS Wave 5 X Dar es Salaam	0.04	-0.09				
	(0.103)	(0.074)				
Post Period X NPS Wave 5 X Dar es Salaam			0.12*	-0.11**		
			(0.067)	(0.053)		
Post Period X NPS Wave 5 X Dar es Salaam					0.04	0.03
					(0.127)	(0.095)
Observations	2665	2788	6127	6374	2139	2256

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 electrcity, household size, female household head, visited healthcare provider, completion of secondary education, remittances for conusmption, mobile phone ownership. Dar es salaam is the business capital of Tanzania. Urban is other urban areas outside of Dar es salaam.

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

Figure 4: Impact of Mobile Money Levy (by NPS domain)

Robustness Tests

- NPS lacks information on shocks occurring at the same time as the intervention. The recall period is "last 2 years."
- HFPS data offers information on shocks. However, we only have shocks modules in rounds 3 (June/July 2021) and 8 (August/September 2023), referencing events "since January 2021."
- Without a comparable information on shocks in NPS 4, we cannot apply triple difference and therefore rely on double difference as the best available method.
- To do this, we merge the NPS wave 5 with HFPS, using consumption and food security variables from the NPS and shocks from the HFPS.

Robustness Tests

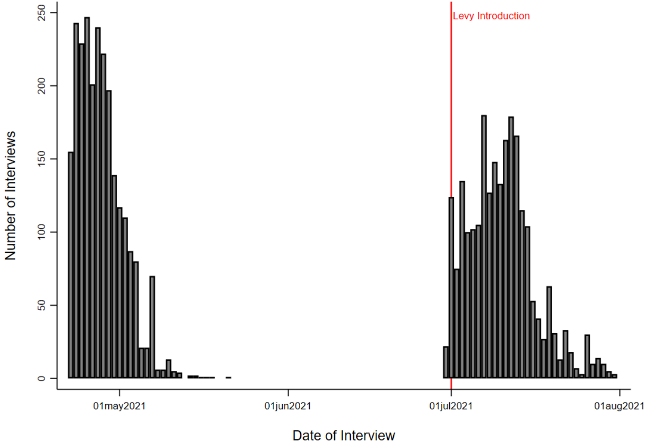


Figure 5: HFPS Date of Interview - Rounds 2 and 3

Robustness Tests

These coefficients are from the double-difference regressions that use consumption and food security variables from the NPS and shocks from the HF surveys.

Table 7: 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 X 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

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. 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 controls come from the third round of High Frequency Welfare Monitoring Phone Survey. They are: gender of respondent, age of respondent, employment status, employment in wage work, employment in family business and employment in agriculture, the final control is shocks incidence from hfwmps.

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

Figure 6: Double-difference estimates of the impact of levy (controlling for shocks from the HF survey)

Policy Implications

- **Domestic Revenue Mobilization (DRM):** Taxing mobile money transfers has become a strategy for boosting tax revenues in low-income countries with low tax-to-GDP ratios.
- **Unintended consequences:** There is evidence that mobile money levies reduce transaction numbers and volumes, counteracting the revenue generation goal and threatening the progress on financial inclusion.
- **Equity concerns:** Our analysis shows that these taxes may affect household welfare, most likely by limiting their ability to share risks, raising equity issues.