

# Mobile phone access, Agriculture Productivity and Labour market transitions in Tanzania

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# Presentation Outline

Motivation

Objectives

Scope of Analysis

Results

Conclusion

# Motivation

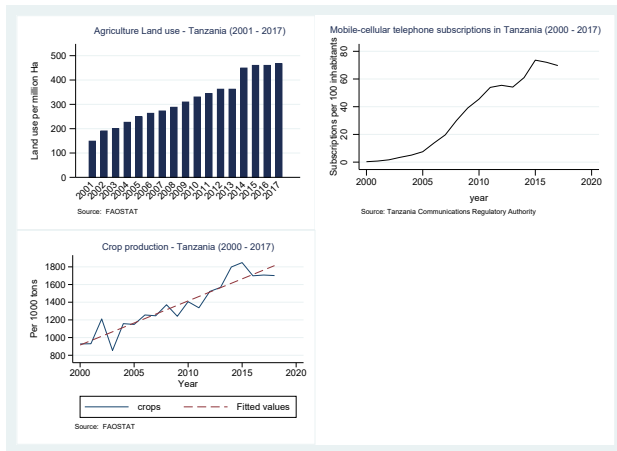
- ▶ Mobile phones shown to be important method in improving agriculture productivity for developing countries.
- ▶ Reduces informational, search and transactions costs to farmers → increase efficiencies within the agriculture sector.
- ▶ Mobile phones allowed for sufficient market information by grain traders to engage in optimal arbitrage, and assuring symmetric information, reduced agricultural price distortions (Aker, 2010).

## Motivation

- ▶ Relevant for SSA: Low agricultural production levels, livelihood of more than 60 % of households reliant on agriculture (FAO, 2019).
- ▶ SSA experienced a considerable surge in mobile phone access (MPA) over the last two decades - use of handsets as high as 45 percent in 2018, smart phone around 36 percent (GSMA, 2019).
- ▶ Labour market structural transformation and agriculture productivity:
  - ▶ Muto (2012): mobile phone ownership increases probability of migration for work and the effect is larger for those in minority ethnics group in Uganda.
  - ▶ Klonner and Nolen (2010): mobile coverage expansion in rural South Africa increases women wages while agricultural employment decreases, especially for men.

# Mobile Phone Trends in Tanzania

Figure 1: Trends in Agriculture production and Mobile Cellular Telephone Subscriptions in Tanzania (2000 - 2017)



# Objective

1. To estimate the effect of mobile phone ownership on farm agricultural productivity in Tanzania.
2. To examine how MPA affects labor supply decisions within farm households in Tanzania.
3. Provide mechanisms through which increased agriculture productivity, induced by mobile phone use, leads to non-agriculture employment opportunities

# Data

- ▶ Construct a household panel dataset using three rounds (2008/09, 2010/11 and 2012/13) from the Tanzanian NPS.
- ▶ Implemented by the Tanzanian National Bureau of Statistics (NBS), with support provided by the World Bank under the Living Standard Measurement Study-Integrated Surveys Agriculture (LSMS-ISA) program.

# Estimation Strategy - OLS

$$y_{hVRT} = \alpha + \alpha_1 D_{hVRT} + \phi_V + \delta_r + \lambda_t + \gamma_{r*t} + \epsilon_{hVRT} \quad (1)$$

- ▶  $y_{hVRT}$ : vector of outcomes -log of total annual farm output, log of number of days worked on the farm by household members, log of number of farm working days by hired workers and the log of wages paid to hired farm workers.
- ▶  $D_{hVRT}$ : indicator variable for whether a household has access to mobile phone or not by time  $t$ .
- ▶  $\phi_V$  and  $\delta_r$ : community and regional fixed effects
- ▶  $\lambda_t$ : survey year fixed effect
- ▶  $\gamma_{r*t}$ : absorbs common shocks within a particular region in given year of survey.
- ▶  $\epsilon_{hVRT}$ : idiosyncratic error term.



## Estimation Strategy - IV

- ▶ Other factors could affect the distribution of mobile phone network (including intensity of Antenna and tower placements) across the regions in Tanzania.
- ▶ Non-random distributions of mobile phone networks induces extra biases when examining the effect of mobile phone use on the outcomes.
- ▶ To deal with such challenges, we instrument for MPA using the intensity of average mobile phones in the community

## Results - OLS and IV models

- ▶ Ownership of a mobile phone has a statistically significant and positive effect on the value of agriculture output, almost 40 percent increase compared to those without phones, and the effect is higher in male headed households.
- ▶ Associated with a decrease in number of days worked on the plot - reduction of 22 percent in the number of days worked on the plot.
- ▶ Hire workers for 30 percent more days than those without phones, spending up-to 37 percent more on wages for their agriculture labourers.
- ▶ Hire 15 percent more men and 32 percent more women than households with no mobile phones.

## Results: IV results - labour reallocation

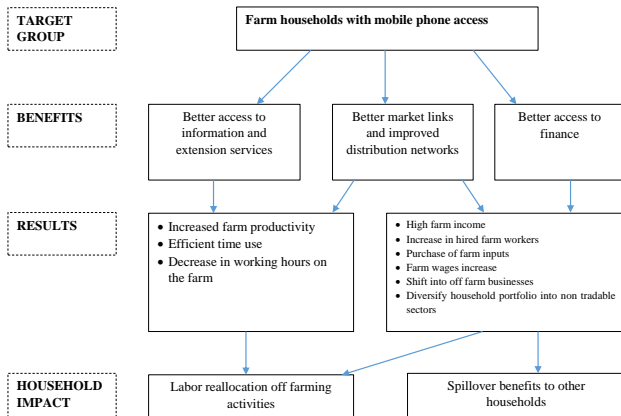
Table 1: Mobile phone use and Number of days worked on farm by household members

	Farm employment		Non-farm employment	
	(1)	(2)	(3)	(4)
	Agriculture	Public	Private	Other family jobs
Average # of Mobile phone /PSU	-0.081*** (0.012)	0.012*** (0.004)	0.044*** (0.008)	0.025 *** (0.005)
Share of Active members [15-30]	-0.059 (0.038)	0.012 (0.010)	0.086*** (0.026)	-0.039* (0.023)
Share of Active members [30-45]	-0.104** (0.049)	0.015 (0.015)	0.141*** (0.036)	-0.051* (0.027)
Share of Active members [45-65]	-0.056 (0.039)	0.027*** (0.010)	0.038 (0.029)	-0.009 (0.021)
Household Controls	Yes	Yes	Yes	Yes
Farm Controls	Yes	Yes	Yes	Yes
Region by survey year FE	Yes	Yes	Yes	Yes
Mean value of outcome	0.814	0.018	0.077	0.092
Observations	8193	8193	8193	8193
R-Squared	0.114	0.053	0.071	0.074

Robust standard errors in parenthesis; \* p<0.1, \*\* p<0.05, \*\*\*p<0.01

# Theory of Change

Figure 2 : Channels linking mobile phone ownership to household labour decisions



## Conclusion

- ▶ MPA increases agricultural productivity, reduces the number of days spent on agriculture activities by household members, increases the likelihood of hiring more casual women on the intensive margin.
- ▶ Economically active household members of less than 45 years are more likely to move in private sector jobs, while the public sector is significantly more likely to absorb individuals aged between 45-65 years old.
- ▶ The decomposed analysis, however, indicates that off-agriculture family jobs are marginally and significantly less likely to absorb workers when public and private jobs options are still possible.
- ▶ MPA stimulates agricultural developments which then improve marginal productivity of labour in the agriculture sector and, hence, induce a surge in non-agriculture employment opportunities.
- ▶ MPA important factor in understanding African landscape and Labour markets.

# Thank you

## List of References I

- Aker, J. C. (2010), 'Information from markets near and far: Mobile phones and agricultural markets in niger', *American Economic Journal: Applied Economics* **2**(3), 46–59.
- FAO (2019), 'Commodities by region'. Data retrieved from Food and Agriculture Organization of the United Nations statistical database, <http://www.fao.org/faostat/en/#compare>.
- GSMA (2019), 'The mobile economy 2019'. Data retrieved from GSMA, <https://www.gsma.com/r/mobileeconomy/>.
- Klonner, S. and Nolen, P. J. (2010), 'Cell phones and rural labor markets: Evidence from south africa'.
- Muto, M. (2012), 'The impacts of mobile phones and personal networks on rural-to-urban migration: Evidence from Uganda', *Journal of African Economies* **21**(5), 787–807.