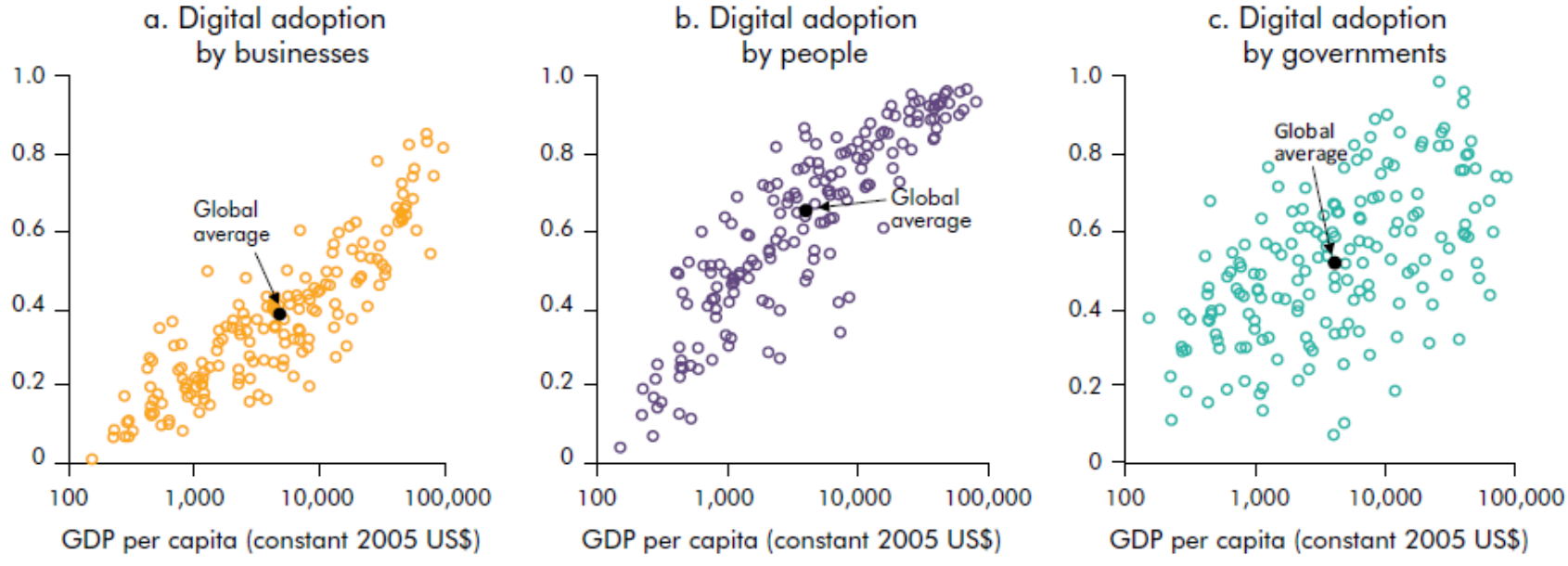
THE ROLE OF FINTECH IN DEVELOPMENT

Tavneet Suri

German Development Economics Conference

SPREAD OF DIGITAL TECHNOLOGY



Source: WDR 2016 team. Data at http://bit.do/WDR2016-Fig0_1.

Note: The figures show the diffusion of digital technologies across countries as measured by the Digital Adoption Index compiled for this Report and described in detail in chapter 5 of the full Report. GDP = gross domestic product.

FINTECH IN DEVELOPMENT

Mobile phones and digitalization are changing finance in the developing world: fintech

For example, mobile money in 96 countries (>310 deployments), >1.2b accounts, >$2b worth of transactions/day, >5.2m agent outlets

What do we know about the gains/possible gains?

For people, businesses, governments

What do we know about the downsides/possible downsides?

For people, businesses, governments

PEOPLE

MOBILE MONEY

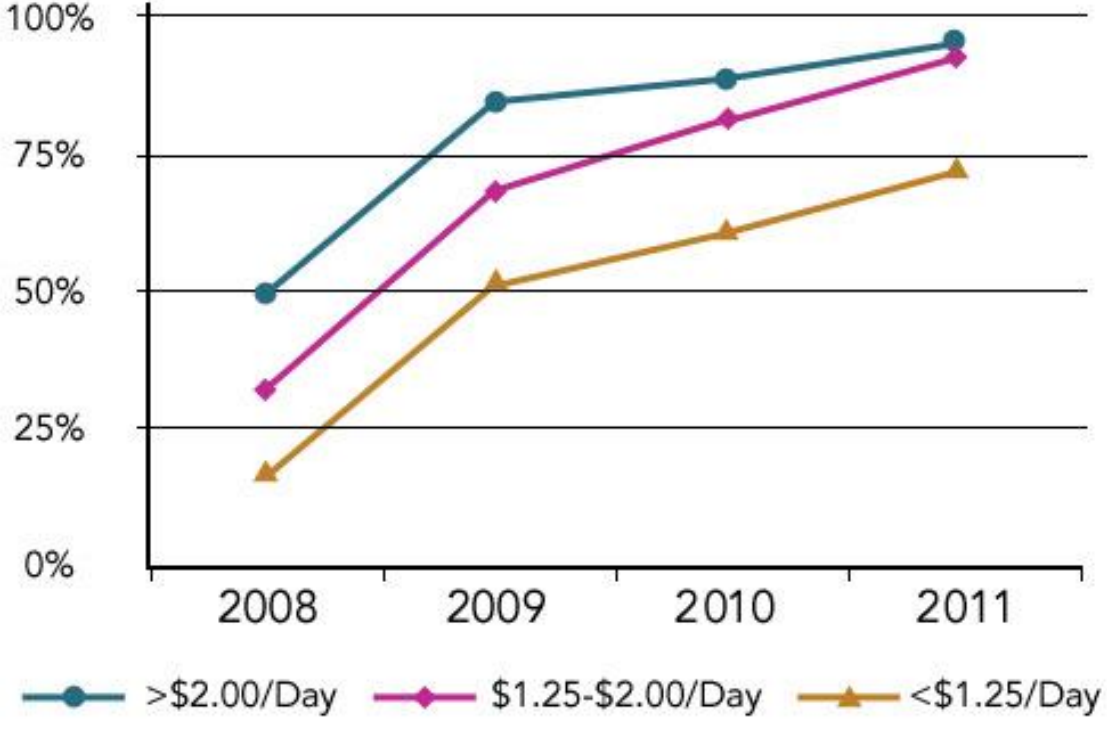
MOBILE MONEY IN SSA

M-PESA IN KENYA

with William Jack

OPERATIONS OF M-PESA

M-PESA ADOPTION BY POVERTY



FINANCIAL RESILIENCE

Core to financial wellbeing: **resilience**, i.e. the response to shocks

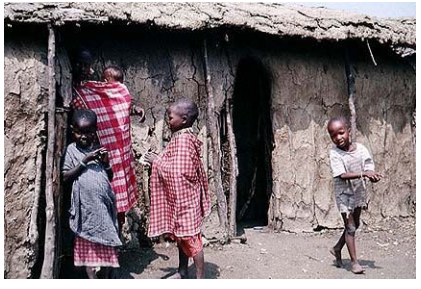
- Little private insurance and few public sector safety nets

Instead: social ties create an insurance network: efficient? Why not?

How about transaction costs?

- Transactions have to cross geographical space which has costs

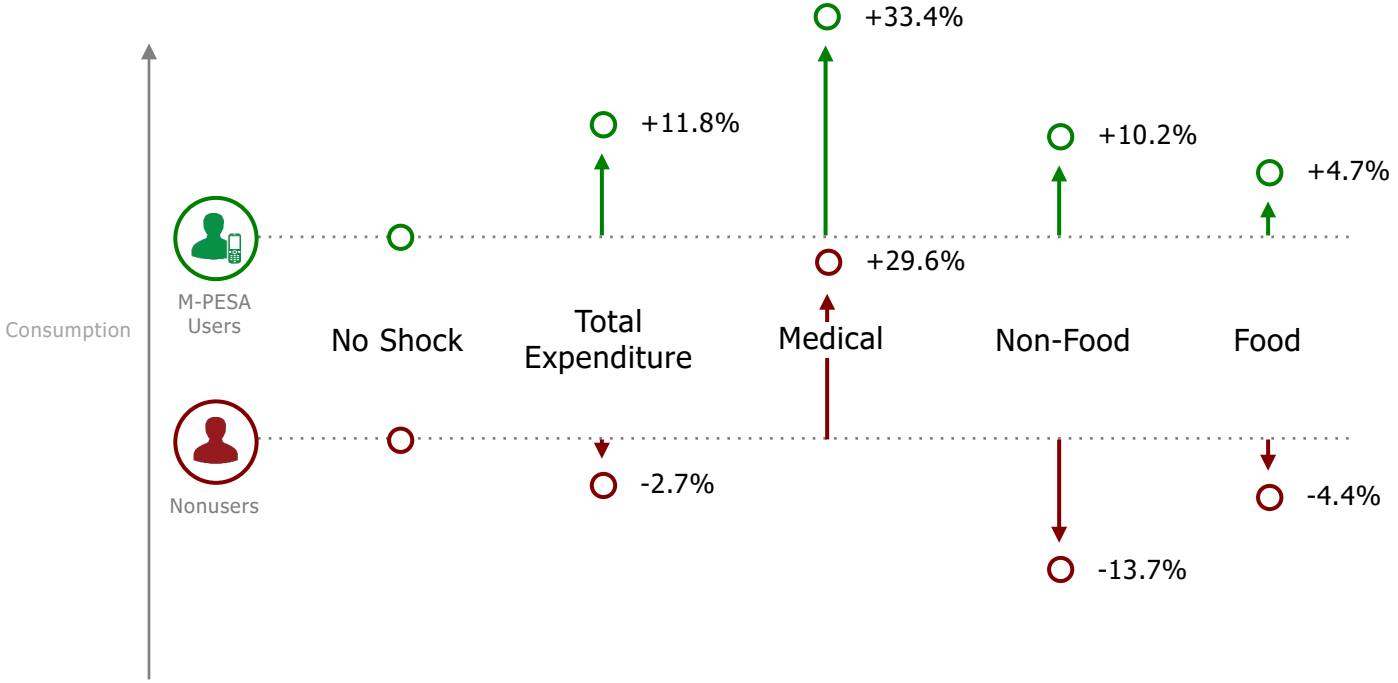
FINANCIAL INTERMEDIATION



ACCESS IN KENYA: 2007-2015

		Bank Branches	Bank Agents	Mobile Money Agents
2007	Distance	9.2 km	NA	4.9 km
	HHs within 1km	28%	NA	46%
	HHs >10km	32%		
2011	Distance	7.0 km	5.2 km	1.9 km
	HHs within 1km	33%	36%	57%
2015	Distance	6.0 km	1.9 km	1.4 km
	HHs within 1km	39%	56%	68%

RESILIENCE TO HEALTH EVENTS



JUST KENYA?

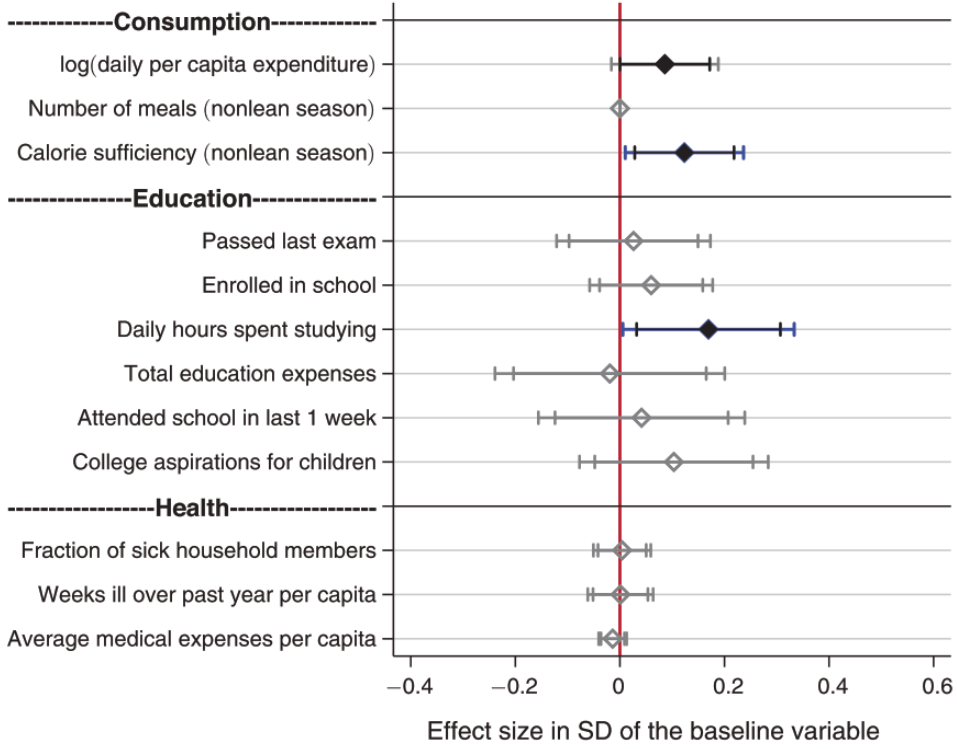
SIMILAR RESULTS IN…

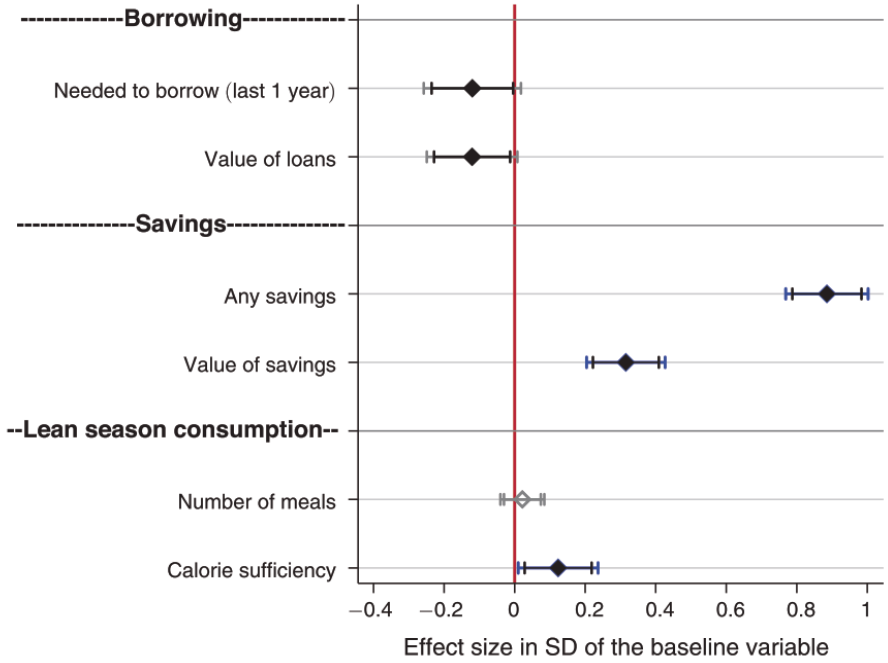
- **Tanzania:** Riley (2018); Abiona & Koppensteiner (2018) [poverty smoothing, human capital]
- **Mozambique:** Batista & Vicente (2022) [consumption smoothing, ag disinvestment, migration]
- **Uganda:** Wieser et al (2019) [food security]; Egami & Matsumoto (2020) [antenatal care]; Munyegera & Matsumoto (2014) [increased consumption]
- **Kenya:** Ahmed & Cowan (2021) [health care, informal loans]; Gürbüz (2017) [savings]; Kipchumba and Sulaiman (2021) [control over personal finances]
- **Afghanistan:** Blumenstock et al. (2022) [increase cash holdings, use less mobile money when exposed to violence]
- **Bangladesh:** Pople et al. (2021) [food security]
- **Large sample of developing economies:** Apeti (2023) [reduction in consumption volatility]

IS THERE A DOWNSIDE?

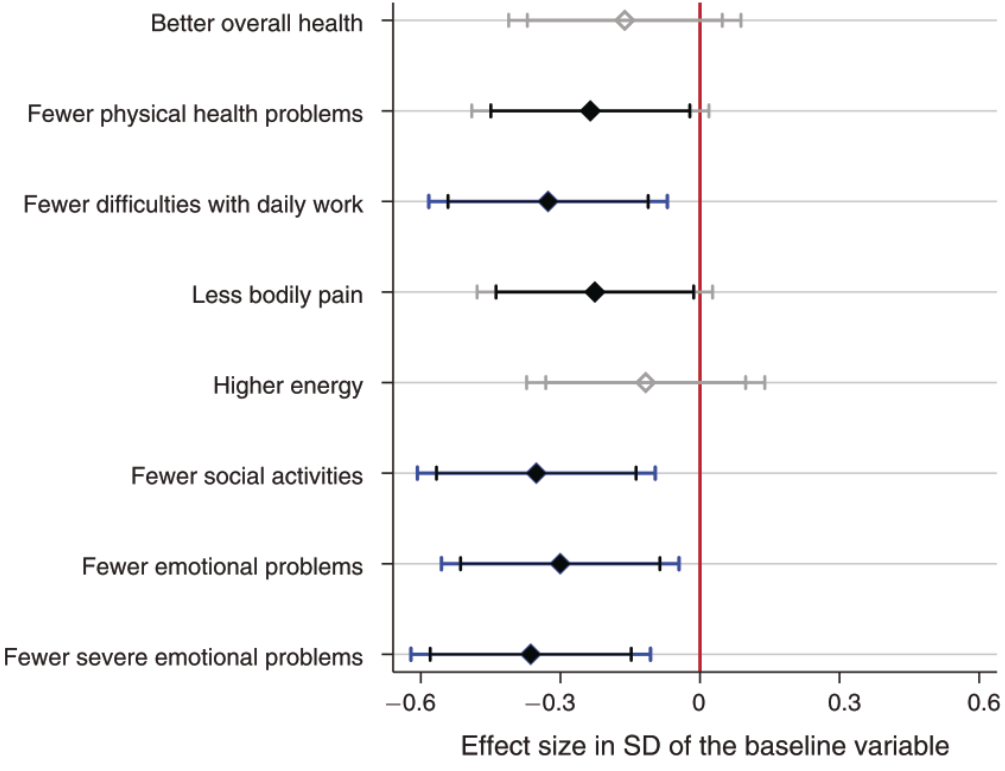
Lee et al, 2021

RESULTS: RURAL HOUSEHOLDS





RESULTS: MIGRANTS



LONGER TERM EFFECTS

with William Jack, 2018

LONGER TERM EFFECTS

A reduction in poverty of 2 percentage points, approx. 196,000 households move out of extreme poverty

Approx. 186,000 women switched their main occupation from farming to being in a business/retail

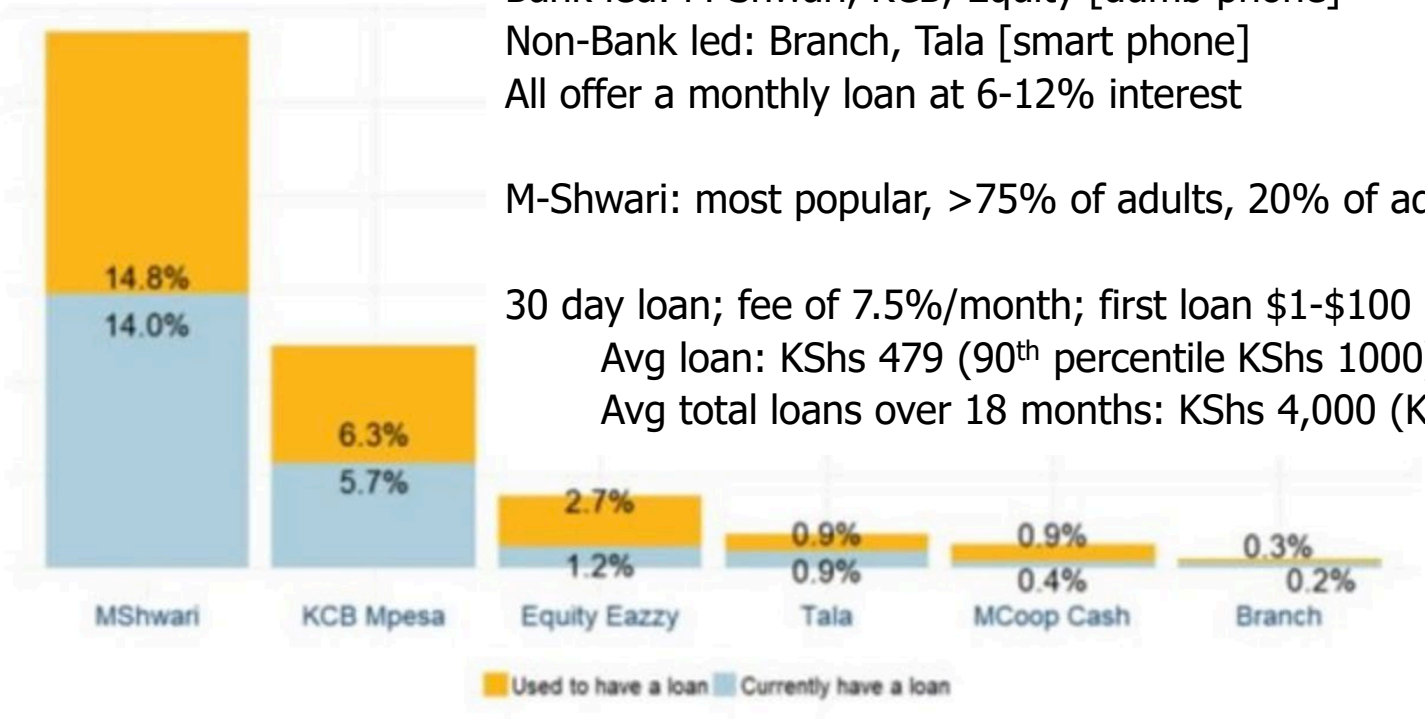
- A start to "structural transformation"?

MOBILE MONEY AS RAILS

MOBILE MONEY AS RAILS

- **Afghanistan:** Blumenstock et al. (2015b) mobile salary payments
  - Significant cost reductions for operating agency, no significant impacts of mobile money use
- **Afghanistan:** Blumenstock et al. (2018) savings products (with defaults) on mobile money
- **Bangladesh:** Breza et al. (2020) move from cash to digital wage payments
  - Evidence of 'learning-by-doing'; agents in factories less likely to take advantage of women
- **Kenya:** Dizon et al. (2017): RCT on a mobile money account labelled for saving to women
  - Increased savings, reduced risk sharing, overall improvement in women's ability to manage shocks
- **Kenya:** Banerjee et al. (2023): a way to deliver a universal basic income
- **Mozambique:** Batista & Vicente (2020): incentivized savings between harvest & planting
  - Significantly higher savings, more likely to use fertilizer and other agricultural inputs

M-SHWARI: DIGITAL BANKING



Bank led: M-Shwari, KCB, Equity [dumb phone]
Non-Bank led: Branch, Tala [smart phone]
All offer a monthly loan at 6-12% interest

M-Shwari: most popular, >75% of adults, 20% of adults have an active loan

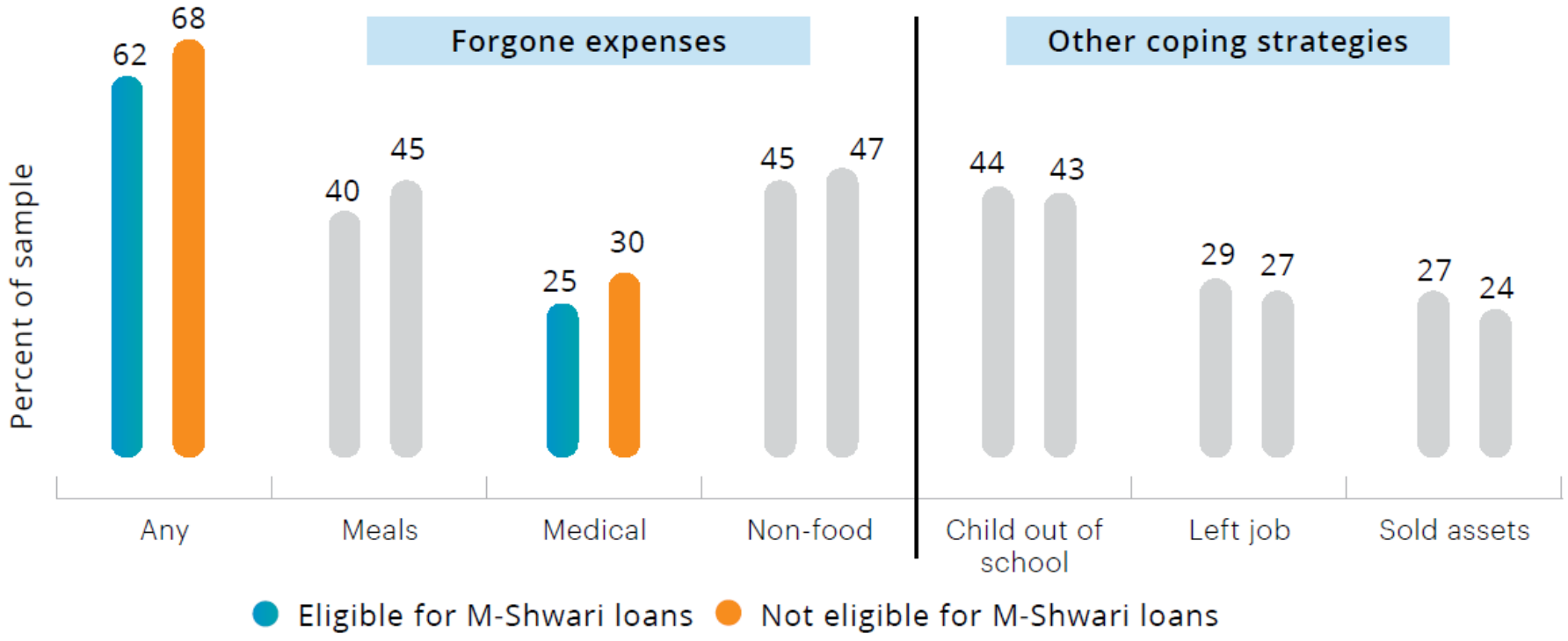
30 day loan; fee of 7.5%/month; first loan $1-$100
Avg loan: KShs 479 (90th percentile KShs 1000)
Avg total loans over 18 months: KShs 4,000 (KShs 9,900)

TRADITIONAL MICROFINANCE

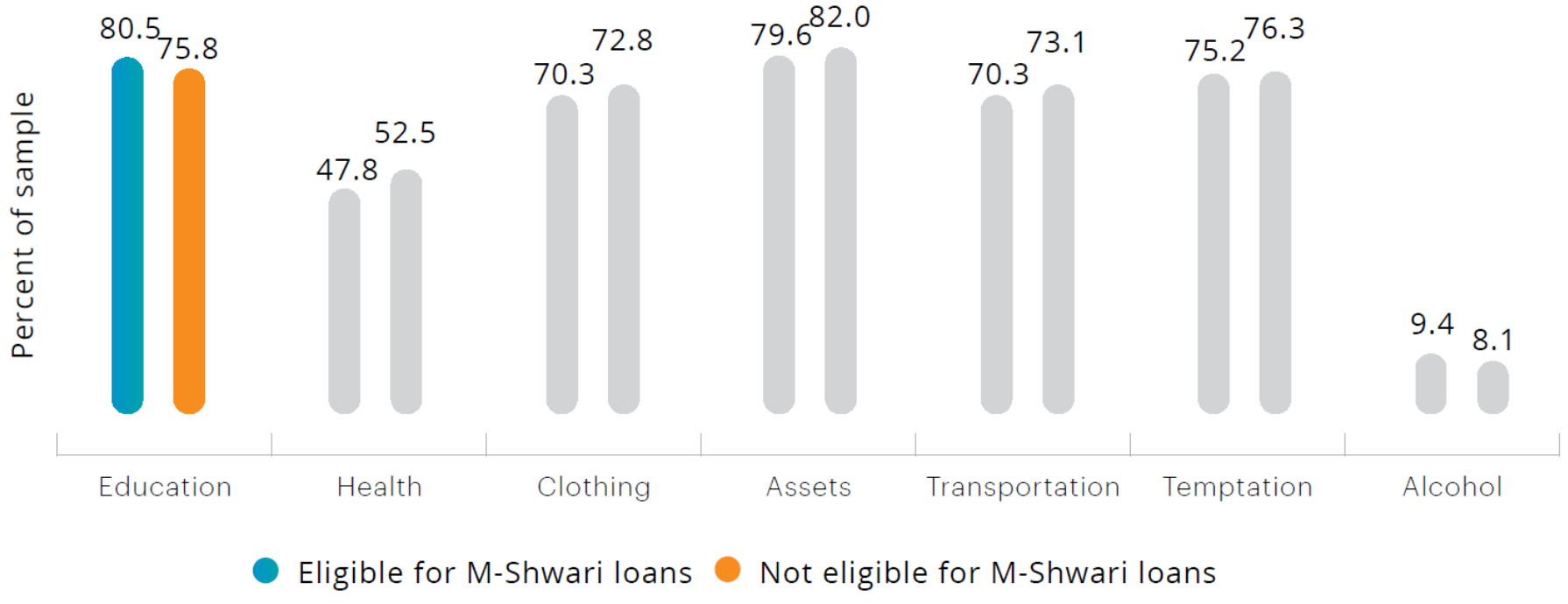
COUNTRY	FIELD PARTNER	TYPE OF PRODUCT	TAKE-UP RATE (%)	PRODUCT
MEXICO	Compartamos Banco	Credit	4	Existing
PERU	Arariwa	Credit	7.9	Existing
SOUTH AFRICA	Credit Indemnity	Credit	8.7	Existing
GHANA	Opportunity International	Credit	1.8	Existing

Karlan, Murdoch, and Mullainathan 2010

IMPACT OF M-SHWARI: RESILIENCE



IMPACT OF M-SHWARI: EXPENSES



RESULTS: SUMMARY

Large take up around the cutoff (34% of those eligible take it up)

Much higher than other forms of formal financial access (1-5%)

Does not substitute for other forms of formal/informal credit: true expansion

Improved resilience and higher propensity to spend on education

No effects on: overall consumption, assets, employment

DIGITAL BANKING/CREDIT

- **Tanzania:** Bastian et al. (2018): saving accounts on M-Pawa with/without business training
  - Save more in M-Pawa, save less elsewhere; obtain more micro-loans; increase in women's control
- **Kenya:** Habyarimana & Jack (2016): M-Shwari account vs commitment account in schools
  - Increase in savings and secondary school enrollments
- **Ghana:** Riley and Shonchoy (2022) on the adoption of mobile banking services using IVR
  - More bank transactions over mobile money, reduction in visits to bank branches
- **Nigeria:** Bjorkegren et al. (2022) use an RCT to study a digital loan product
  - Increases subjective well-being; larger loans (conditional on approval) do not have any impacts
- **Malawi:** Brailovskaya et al (2021) RDD and RCT on digital credit & financial literacy
  - Harms consumers' perceived well-being; financial literacy increased loan demand, but more default

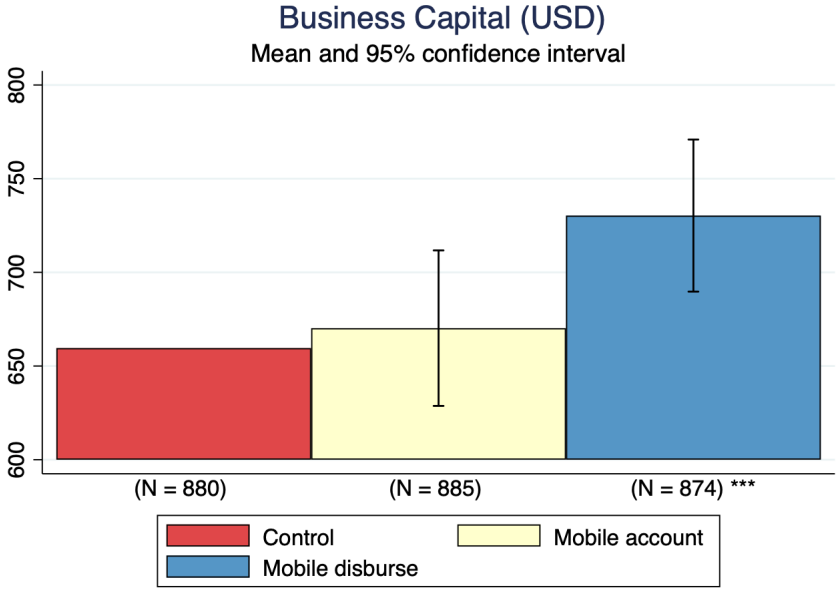

Tuma
PESA
kwa simu
NOKIA
Give Ksh2,000
cash to
Options
1000
1000
1000

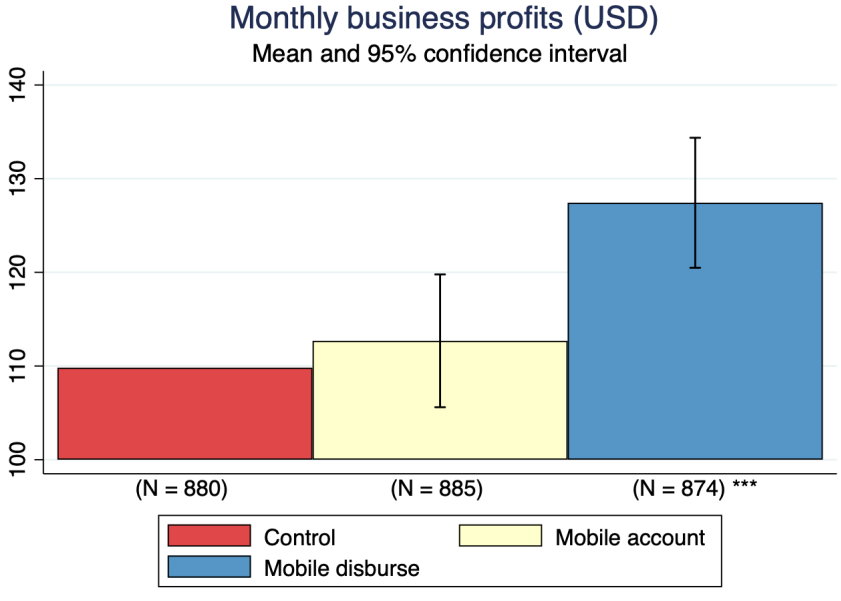
BUSINESSES

MICROENTERPRISES

Riley (2023)

BUSINESS OUTCOMES





MECHANISMS: SOCIAL PRESSURE

Heterogeneous treatment effects:

- Create an index of social pressure to share money
- Most of the effects are in the sample that have above median social pressure
- Private account lets them resist social pressure to share -> invest in business

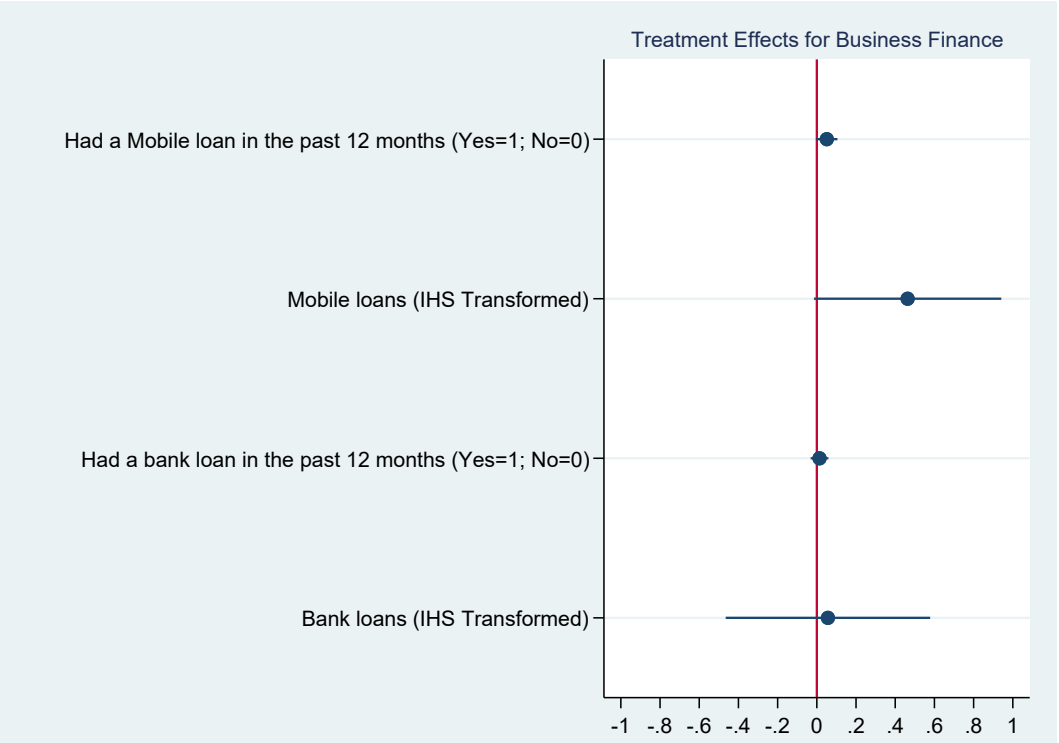
RETAIL PAYMENTS

Dalton et al 2022

LIPA NA MPESA

Adoption and impacts of an e-payment technology

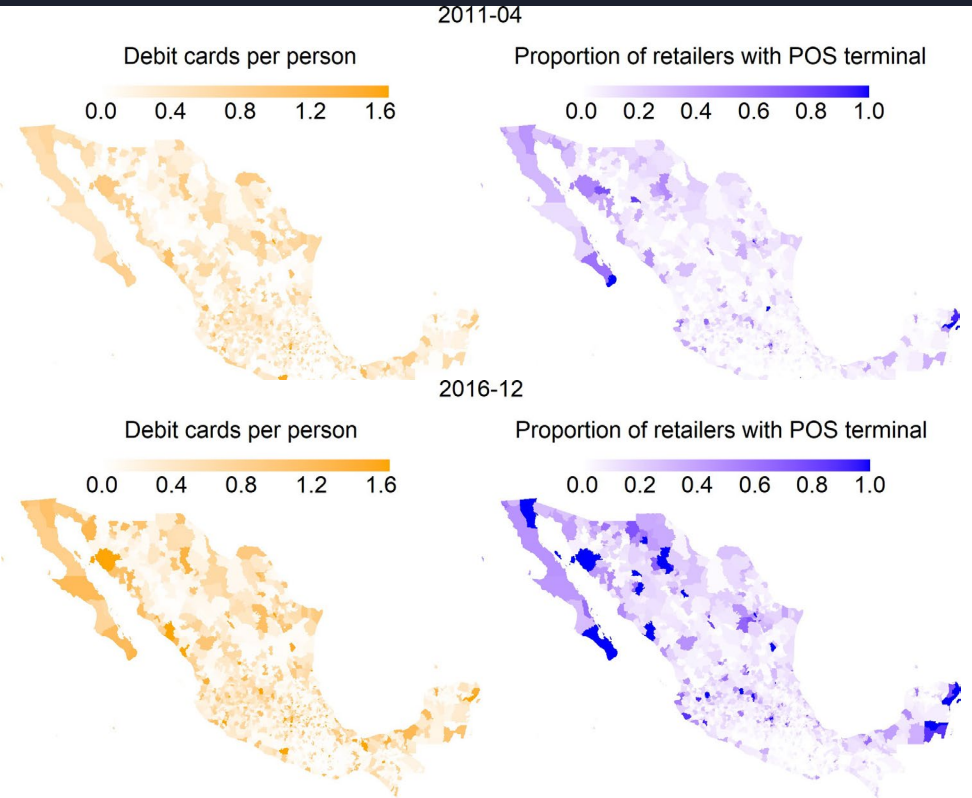
- Increases the access to digital credit by 50%
- Reduces the volatility in sales (more so for smaller firms)
- Does not change revenues or profits directly



BUSINESS FINTECH

Higgins (2022)

DEBIT CARD ROLLOUT (MEXICO)



Over 2009–2012, Prospera distributed ~1m debit cards

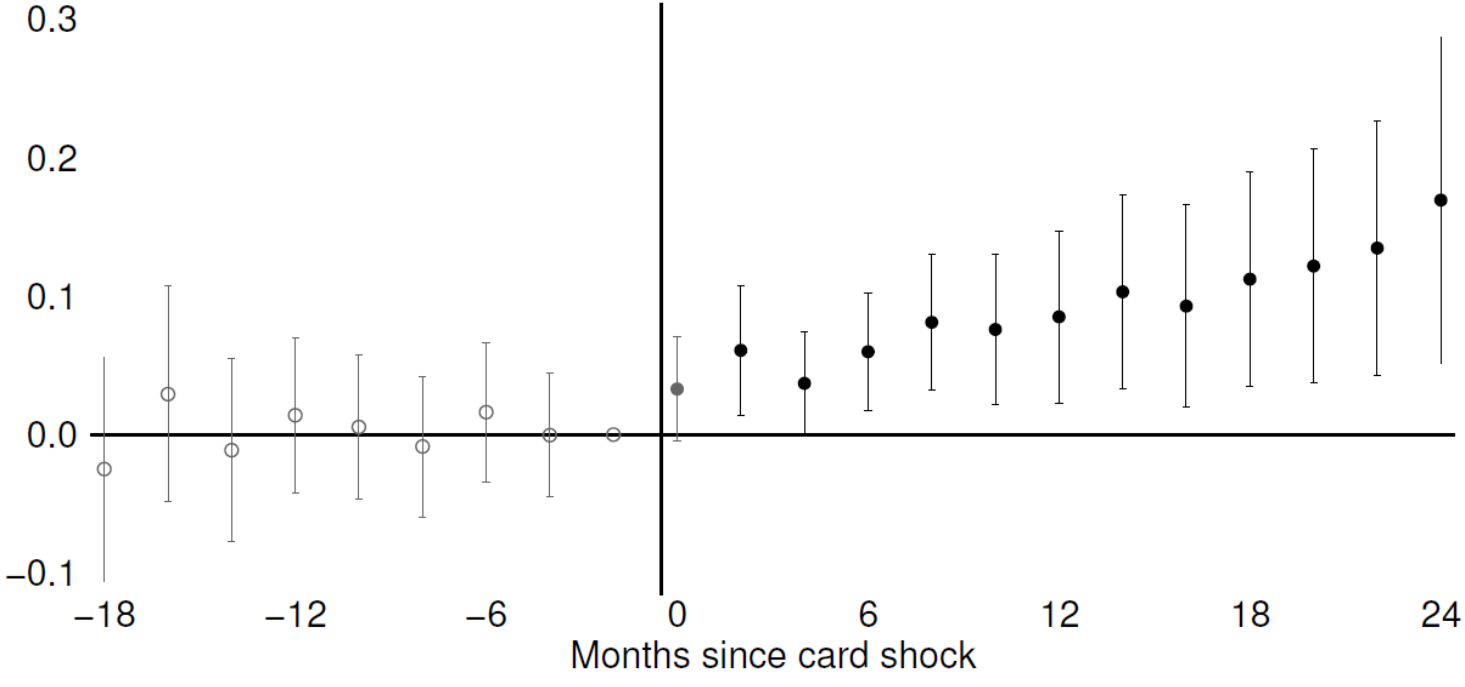
- In urban localities (population > 15,000)

Pre-intervention: Receive transfers ($150 every 2 months) in a bank account

Intervention: Visa debit cards attached to accounts: can use ATMs and at stores

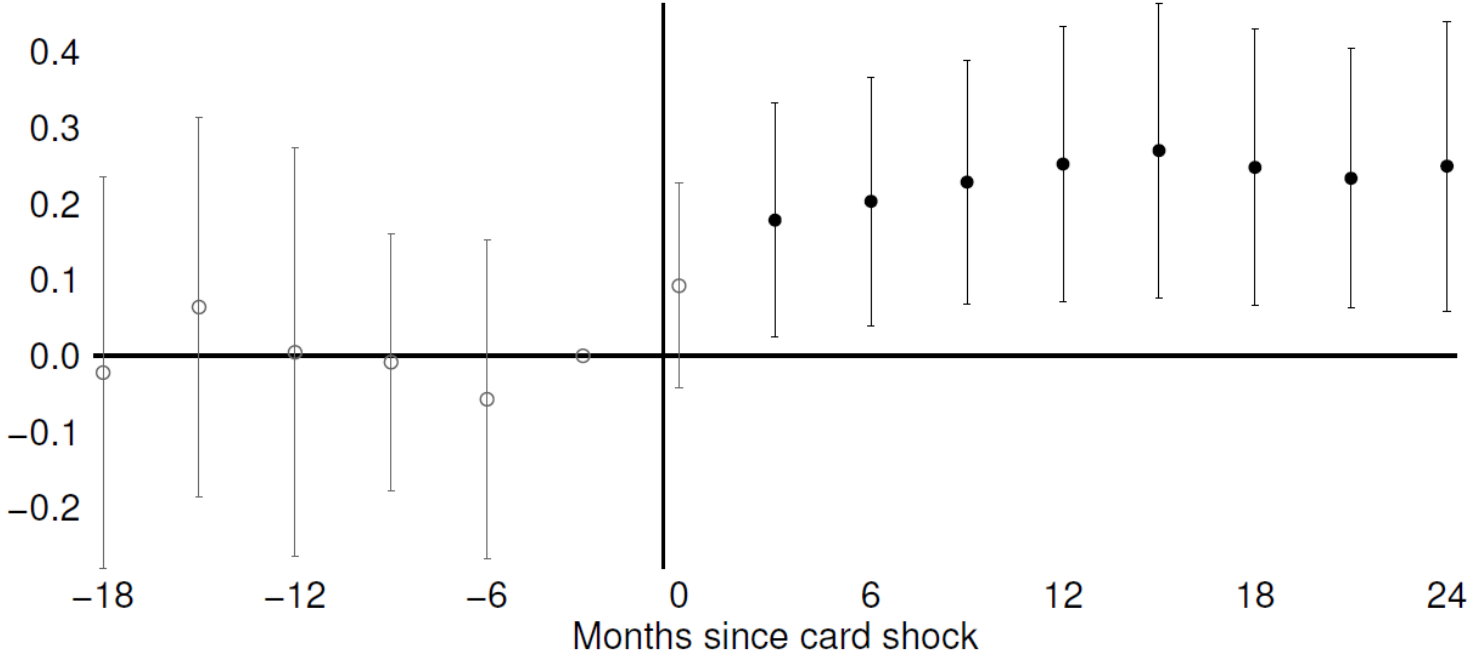
POS ADOPTION: CORNER STORES

$$\log \textit{Number of corner store POS}_{jt} = \xi_j + \delta_t + \sum_k \phi_k D^k_{jt} + \varepsilon_{jt}$$



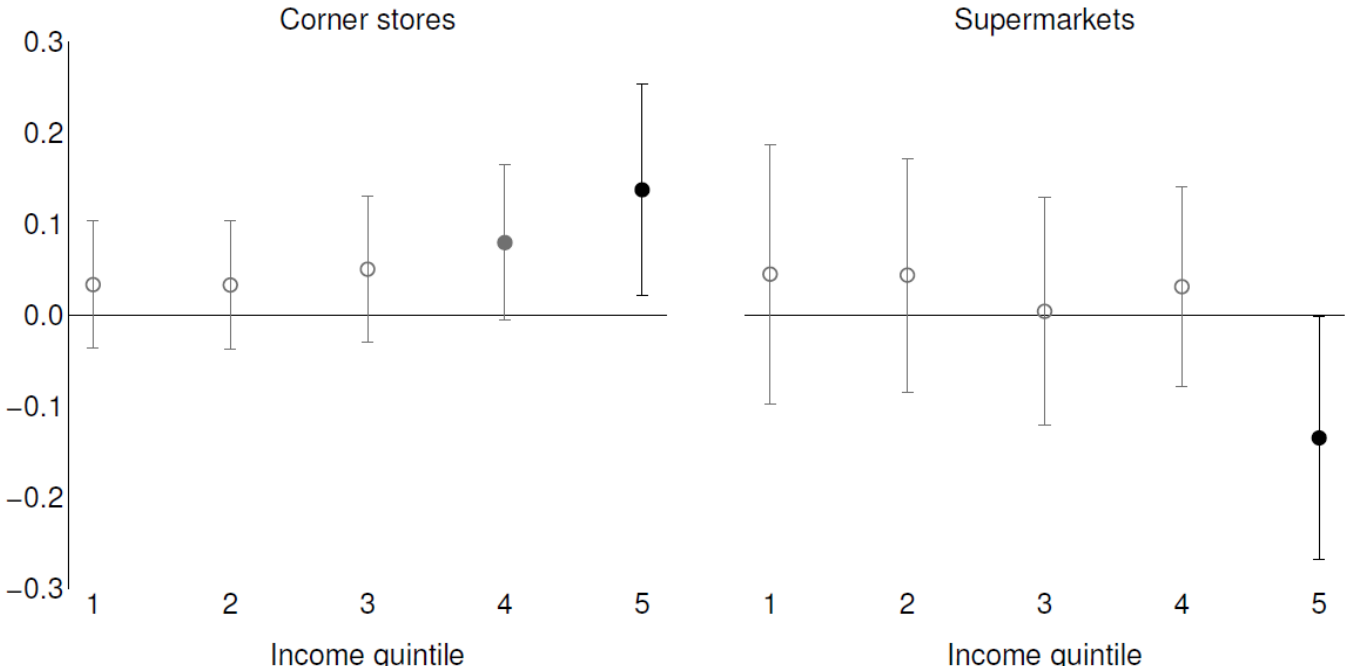
SPILLOVER TO OTHER CONSUMERS

$$\log \textit{Number of Debit Cards}_{jt} = \lambda_j + \delta_t + \sum_k \phi_k D^k_{jt} + \varepsilon_{jt}$$



WHERE DO CONSUMERS SPEND?

$$\log Spending^{s}_{it} = \lambda_{j(i)} + \theta_{q(i)t} + \gamma D_{j(i)t} + \sum_{q=2}^{5} \psi_q \mathbb{I}(quintile = q)_{it} \times D_{j(i)t} + \varepsilon_{it}$$



SALES, PROFITS AND WELFARE

Corner store: sales (↑ 6%) and profits increase (no cost increases)

Supermarkets: sales decrease (↓ 12%) as do inventory costs -> small reductions in profits

Estimate welfare gains: over half of total consumer gains are spillovers

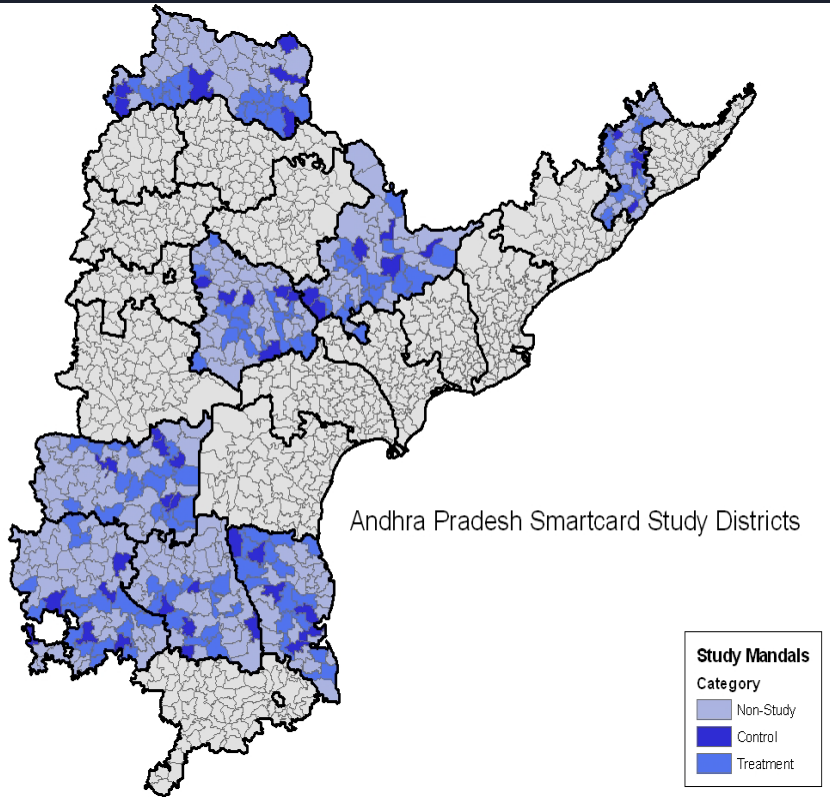
- Implies that indirect network externalities are large
- Consumer gains from spillovers exceed debit card rollout costs by 37x

GOVERNMENTS

AADHAAR

Muralidharan et al (2021)

8 DISTRICTS, 20M PEOPLE



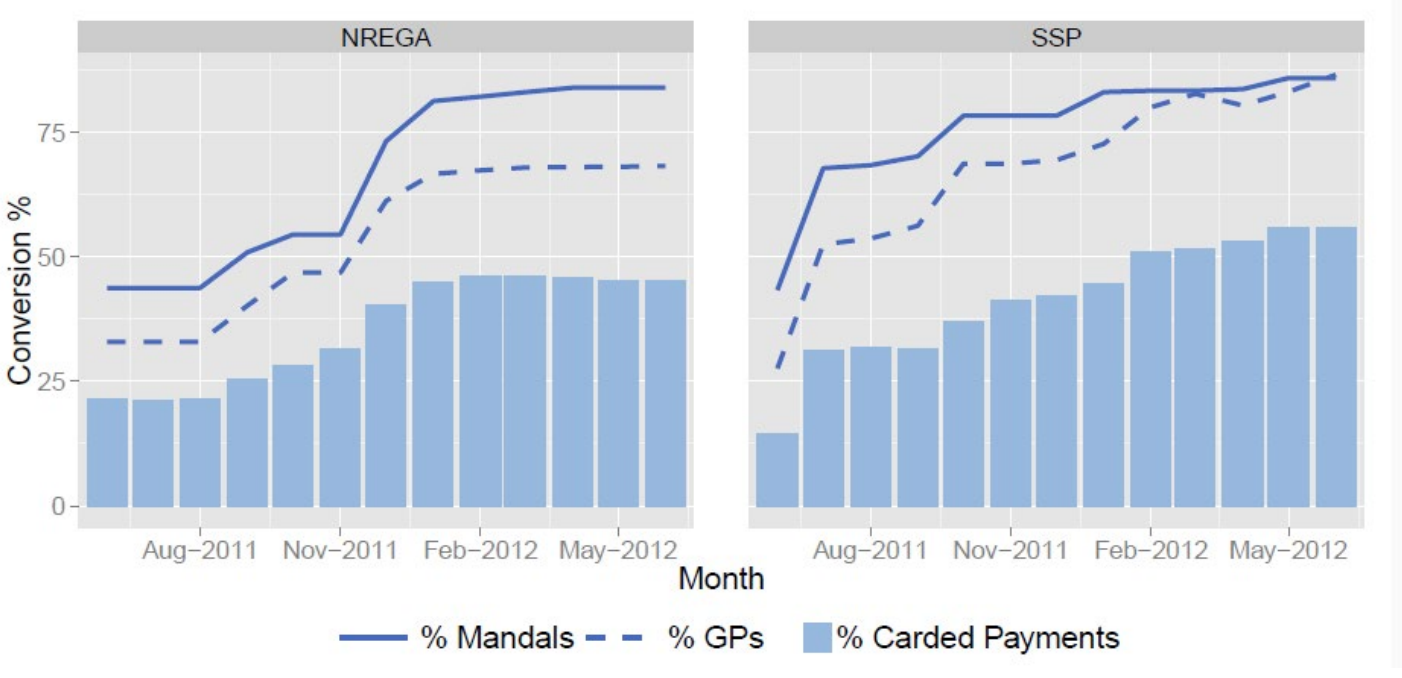
Improves state capacity

- Leapfrog literacy constraints to financial inclusion
- Reduce leakage

Challenges:

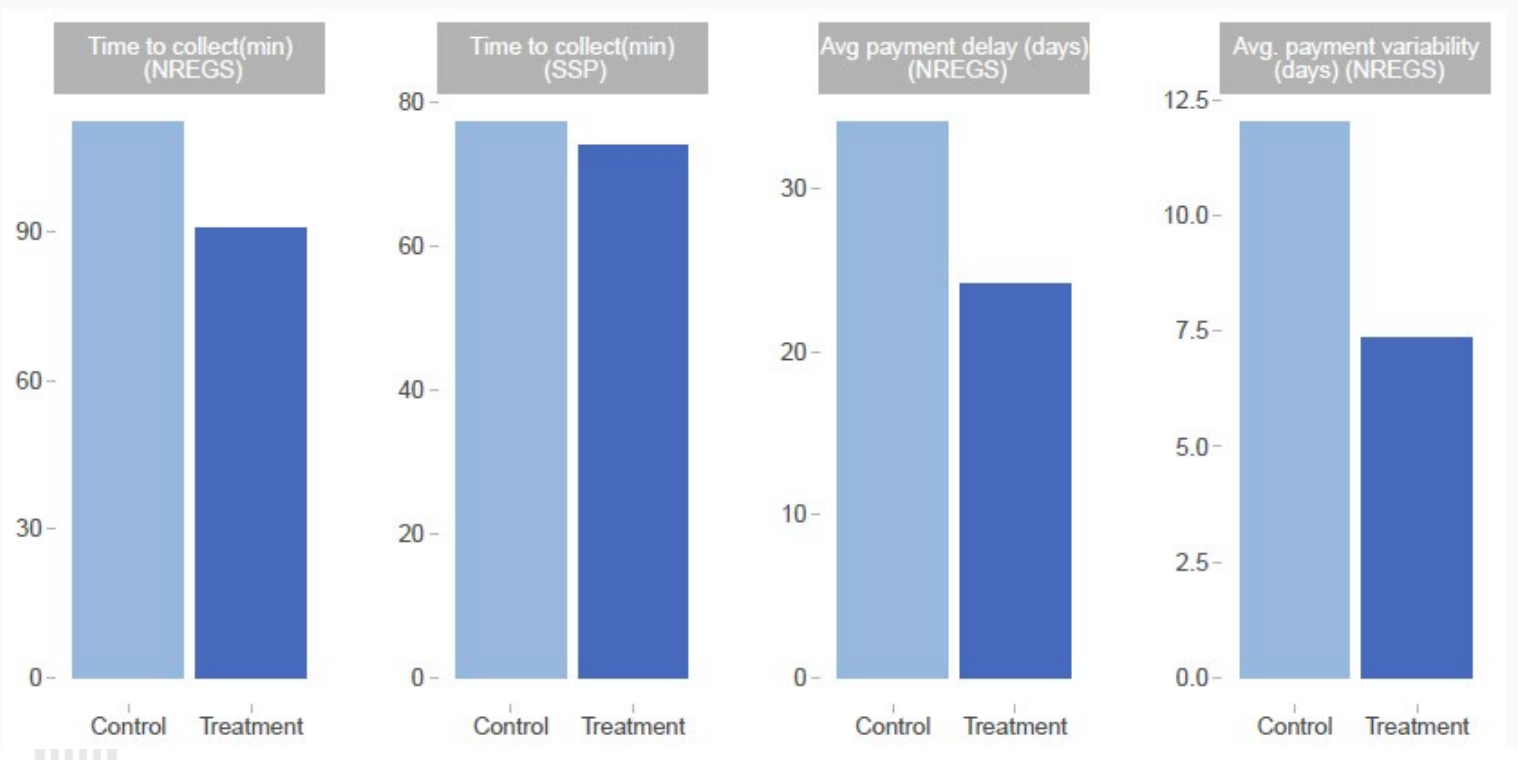
- Subversion by vested interests
- Exclusion errors
- Unproven cost-effectiveness

PAYMENT EXPERIENCE



Implementation was not complete with around 50% of payments carded after two years

PAYMENT EXPERIENCE

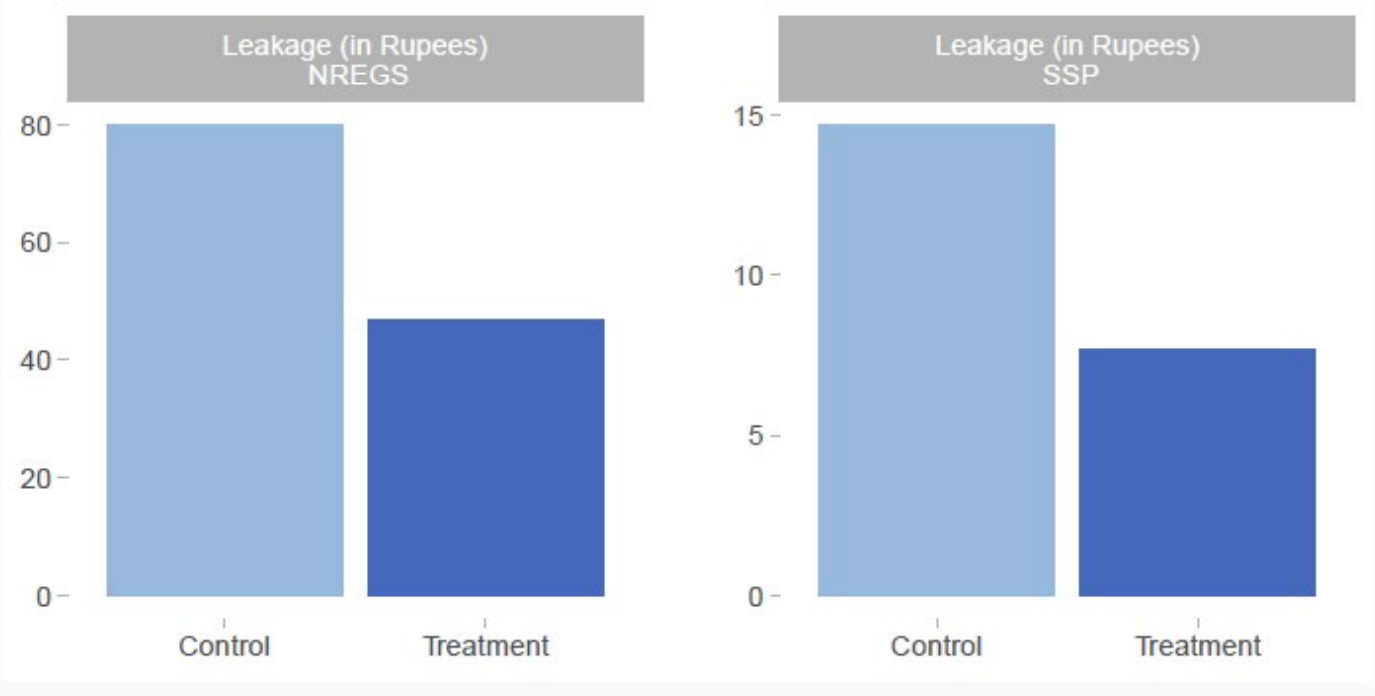


In T:

Payments disbursed faster, more timely

Payments more predictable

PROGRAM LEAKAGE



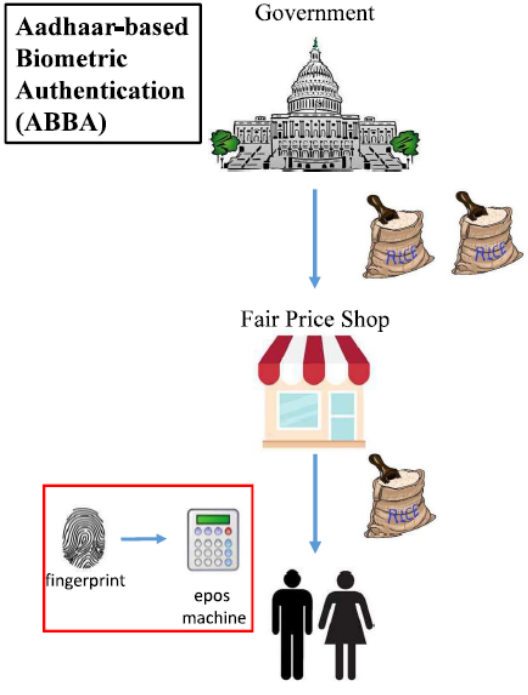
NREGS: 12.7 ppt reduction in leakage relative to fiscal outlays → 41% reduction relative to control

SSP: 2.8 ppt reduction in leakage relative to fiscal outlays → 47% reduction relative to control group

PDS WITH RECONCILIATION

Muralidharan et al (2022)

PDS AND AADHAAR



Phase 1 (Experiment)

Phase 2

Fixed monthly quantity of food grain at token prices

Largest component of safety net: ~1% of GDP

High rates of "leakage" (42% in 2012)

SUMMARY OF RESULTS

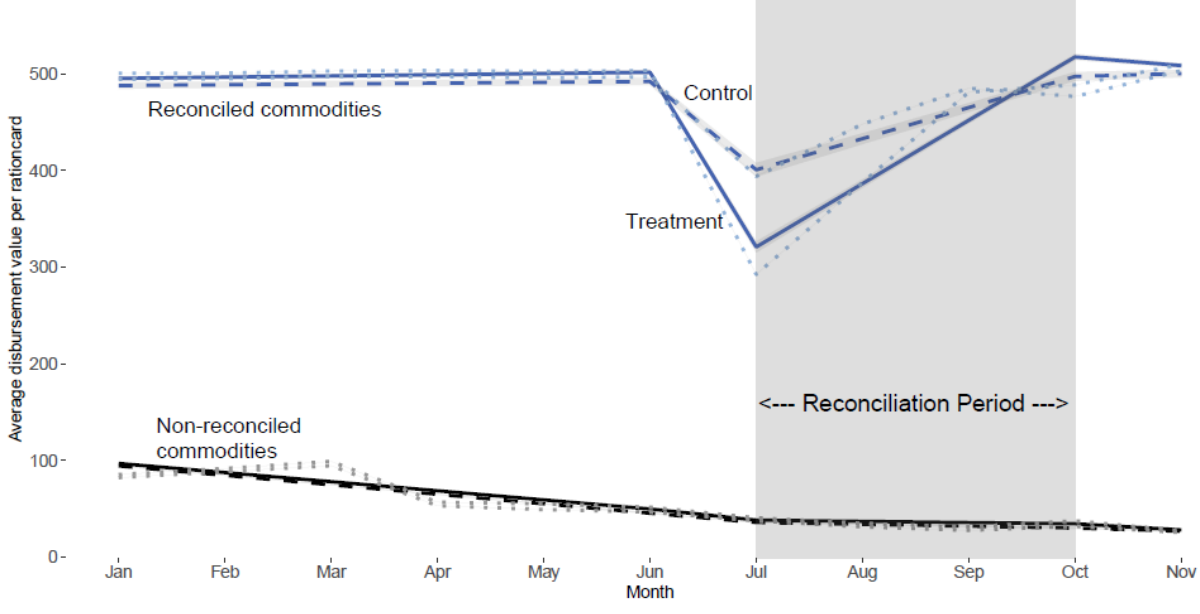
At first endline, control group leakage was 20%, but only 3% ghosts

ABBA by itself had no measurable impacts on average on value disbursed or received, leakage, quality of goods received, prices, ...

But increased transactions costs for beneficiaries to collect benefits (17%)

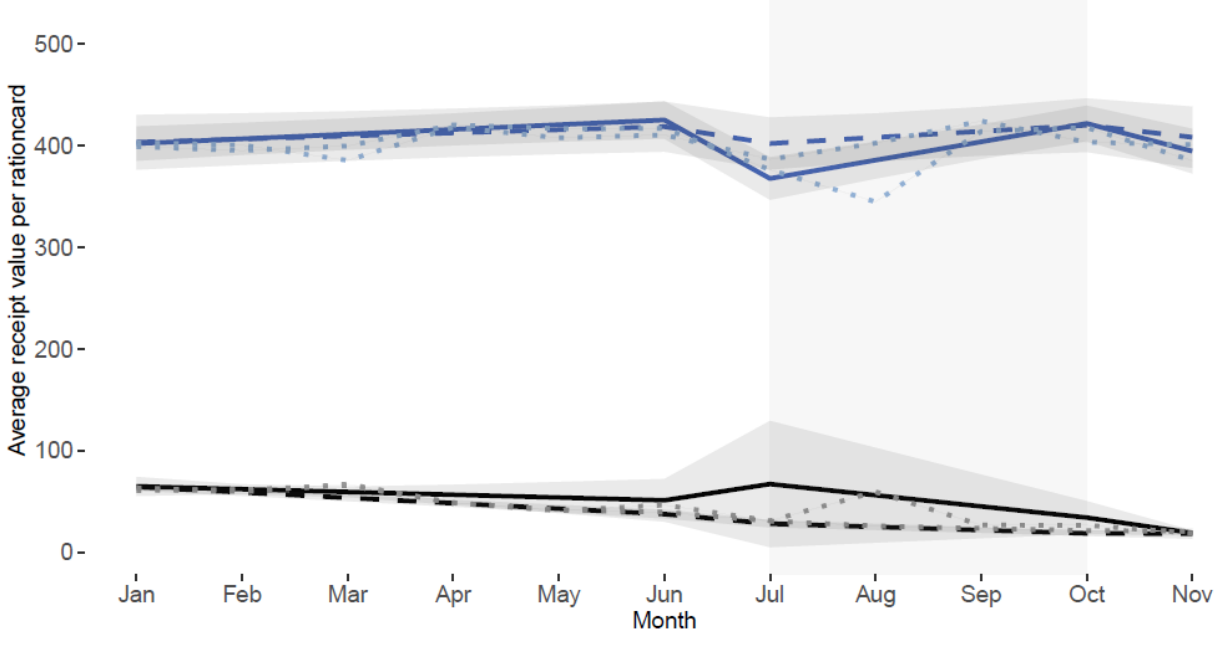
And increased probability of not getting any benefits by 2.4pp; 300,000 lost benefits

ABBA+: DISBURSALS DROP



This figure plots the evolution of the average value of commodities disbursed by treatment status from January to November of 2017. The unit is the ration card-month. The shaded bands represent 95% confidence intervals for the fitted values. The shaded region from July to November indicates the period of reconciliation.

ABBA+: VALUE RECEIVED DROPS



This figure plots the evolution of the average value of commodities received by treatment status from January to November of 2017. The unit is the ration card-month. The shaded bands represent 95% confidence intervals for the fitted values. The shaded region from July to November indicates the period of reconciliation.

“CLEAN SLATE” EXERCISE

Sharp 37% ↓ in disbursements in T: 66% of this is ↓ in leakage, 34% ↓ in receipts

Better in C: 19% ↓ in disbursed value, of which 78% is a drop in leakage

Use experiment to extrapolate to clean slate: small ↓ in leakage + (insig) ↑ in receipts

The way transition managed responsible for the pain, i.e. holding dealers responsible for past stock: costs of “gradualism” vs “shock therapy” (compare speed to AP)

Risk of exclusion while attempting to reduce leakage is real

Impact of technology depends less on “context” than on policy choices & program design

NREGS

Field et al (2021)

NREGS & FINANCIAL INCLUSION

Field et al (2021): NREGS wages for women in their own bank accounts

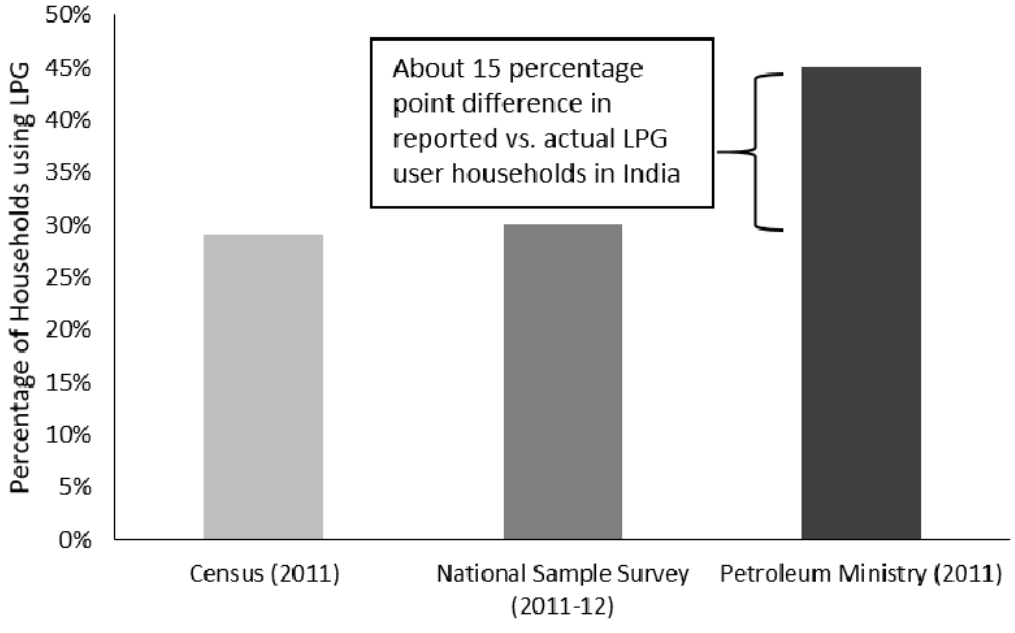
Find:

- Boosts financial inclusion and financial autonomy for women
- Raises female labor supply in the private sector
- No effects on empowerment but improvements in actual norms (for women) and perceived norms (for both men and women)
- Not due to savings constraints, general equilibrium wage effects or other fixed costs

DIRECT BENEFIT TRANSFERS

Barnwal (2023)

LPG LEAKAGE: 40m HOUSEHOLDS



Two extreme prices

Diverted subsidized fuel -> commercial users

Audits reveal millions of "ghost" beneficiaries

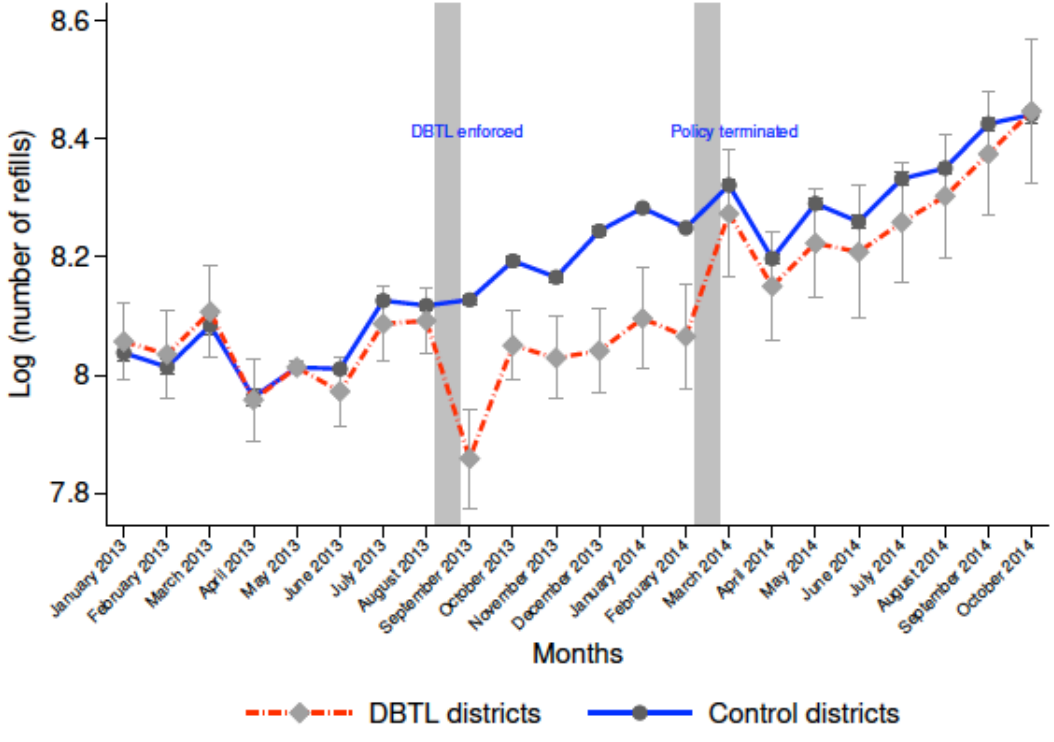
Transact subsidized fuel in black markets

DBT (Aug 2013):

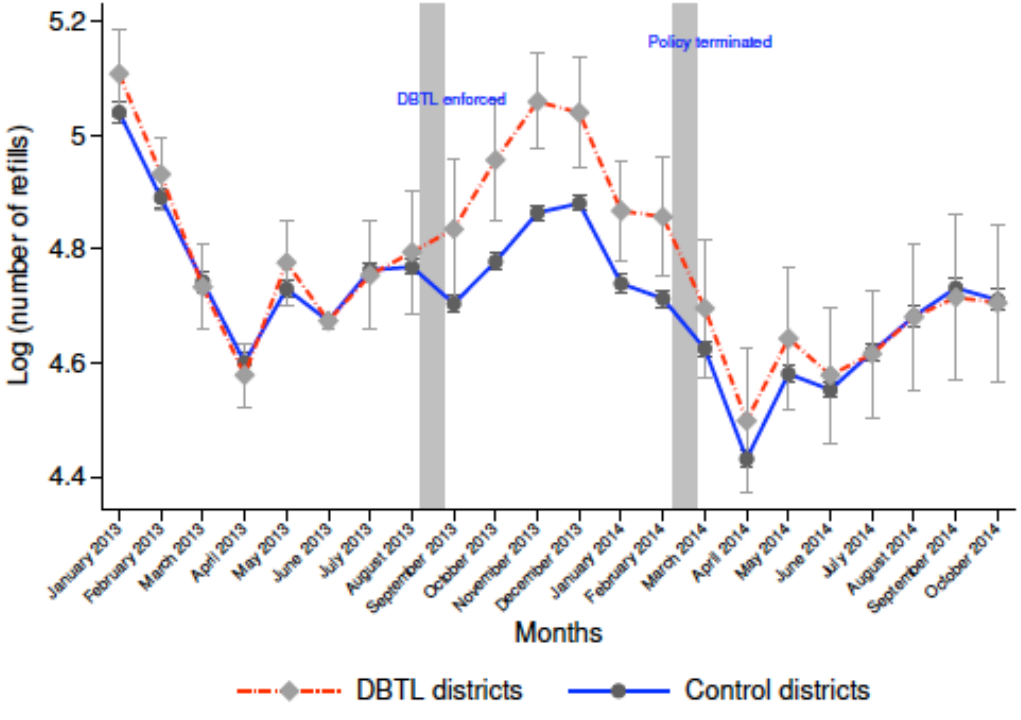
- Fuel sold OTC at the market price
- Subsidy -> bank a/c, verified w/ Aadhaar
- No subsidy to non-compliant beneficiaries

Policy manipulation: DBT terminated Feb 2014

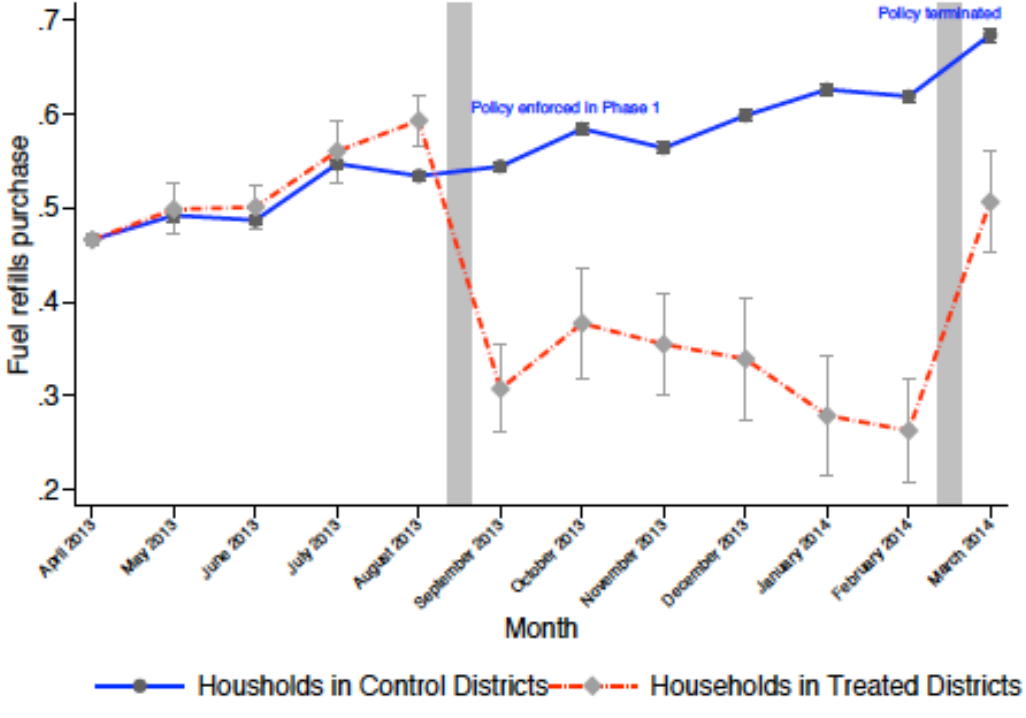
IMPACT ON DOMESTIC FUEL SALES



IMPACT ON COMMERCIAL SALES



FUEL PURCHASE: NON DBT

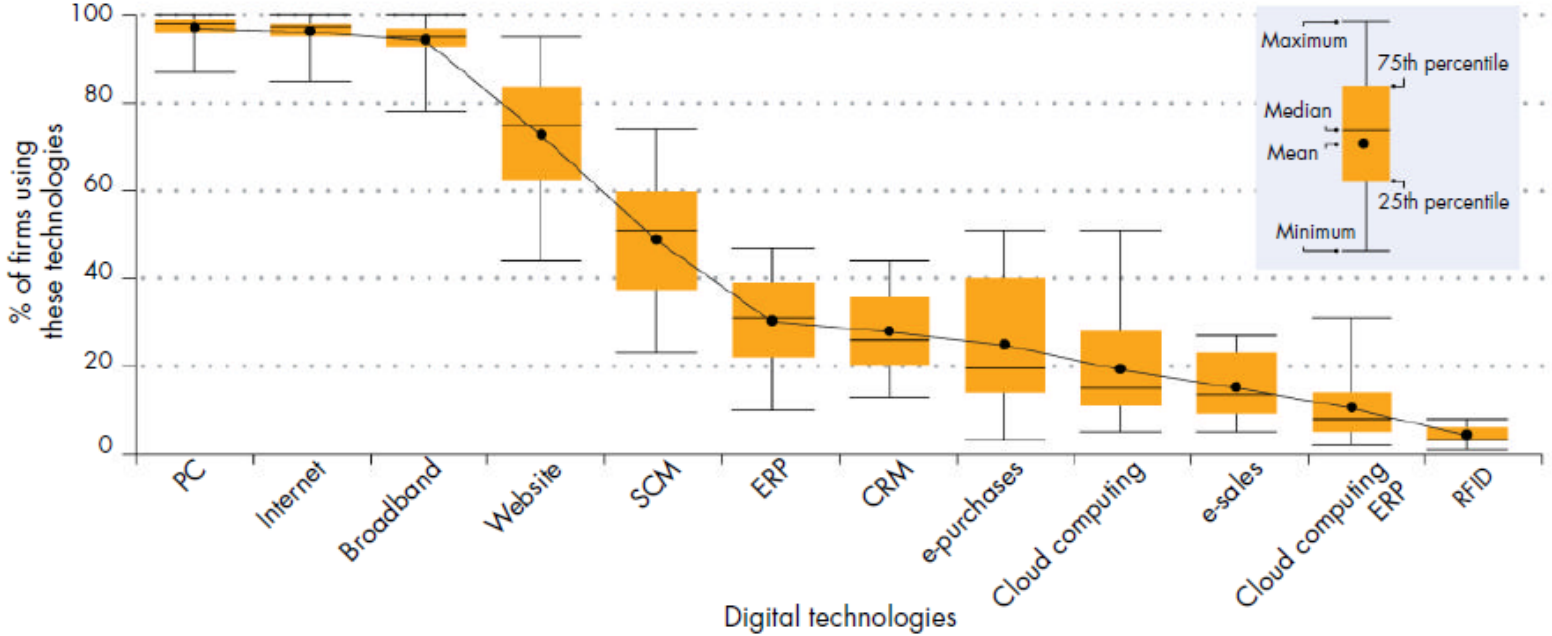


WHEN ALL IS SAID AND DONE

- Enforcement of subsidy rules with DBT policy
  - 17-18% reduction in the purchase of subsidized household fuel
  - Supply shock in the black market
  - Higher prices in the black market increase formal commercial fuel sales
- Little evidence on large displacement in fraud; increase in commercial fuel purchase suggests sustained effects over time
- Service quality to households does not decrease significantly
- Politics can prevent the adoption of governance improving tech

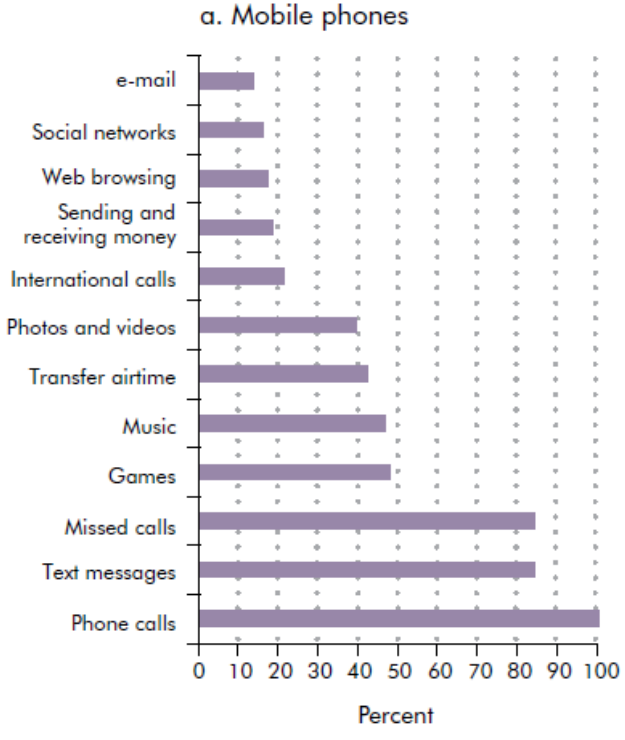
TAKING STOCK

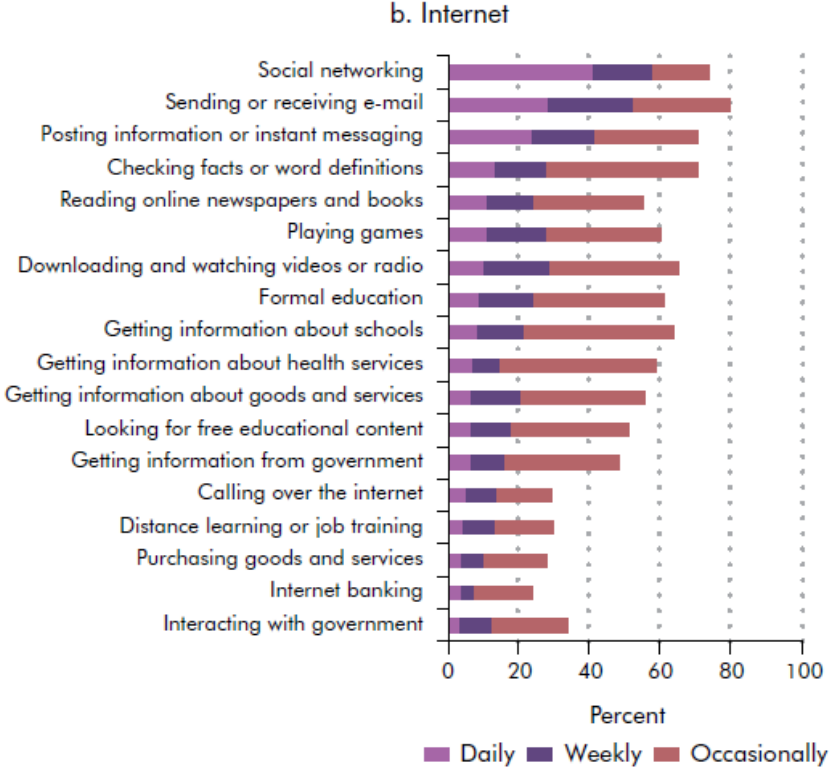
STILL A LONG WAY TO GO…



Source: Eurostat, circa 2014 (EC, various years). Data at http://bit.do/WDR2016-Fig1_3.

Note: For each technology, the chart shows the distribution across 32 high-income countries of the share of firms (with at least 10 employees) that use that technology. Data are for 2014 or the last available year. CRM = customer relationship management software; ERP = economic resource planning software; PC = personal computer; RFID = radio frequency identification technologies; SCM = supply chain management software.


a. Mobile phones
e-mail
Social networks
Web browsing
Sending and receiving money
International calls
Photos and videos
Transfer airtime
Music
Games
Missed calls
Text messages
Phone calls
0 10 20 30 40 50 60 70 80 90 100
Percent


b. Internet
Social networking
Sending or receiving e-mail
Posting information or instant messaging
Checking facts or word definitions
Reading online newspapers and books
Playing games
Downloading and watching videos or radio
Formal education
Getting information about schools
Getting information about health services
Getting information about goods and services
Looking for free educational content
Getting information from government
Calling over the internet
Distance learning or job training
Purchasing goods and services
Internet banking
Interacting with government
0 20 40 60 80 100
Percent
Daily
Weekly
Occasionally

… A LONG LONG WAY…

“First we thought the PC was a calculator. Then we found out how to turn numbers into letters with ASCII — and we thought it was a typewriter. Then we discovered graphics, and we thought it was a television. With the World Wide Web, we've realized it's a brochure.” - Douglas Adams