



# **Social service delivery and access to financial innovation**

**The impact of Oportunidades' electronic payment system in Mexico**

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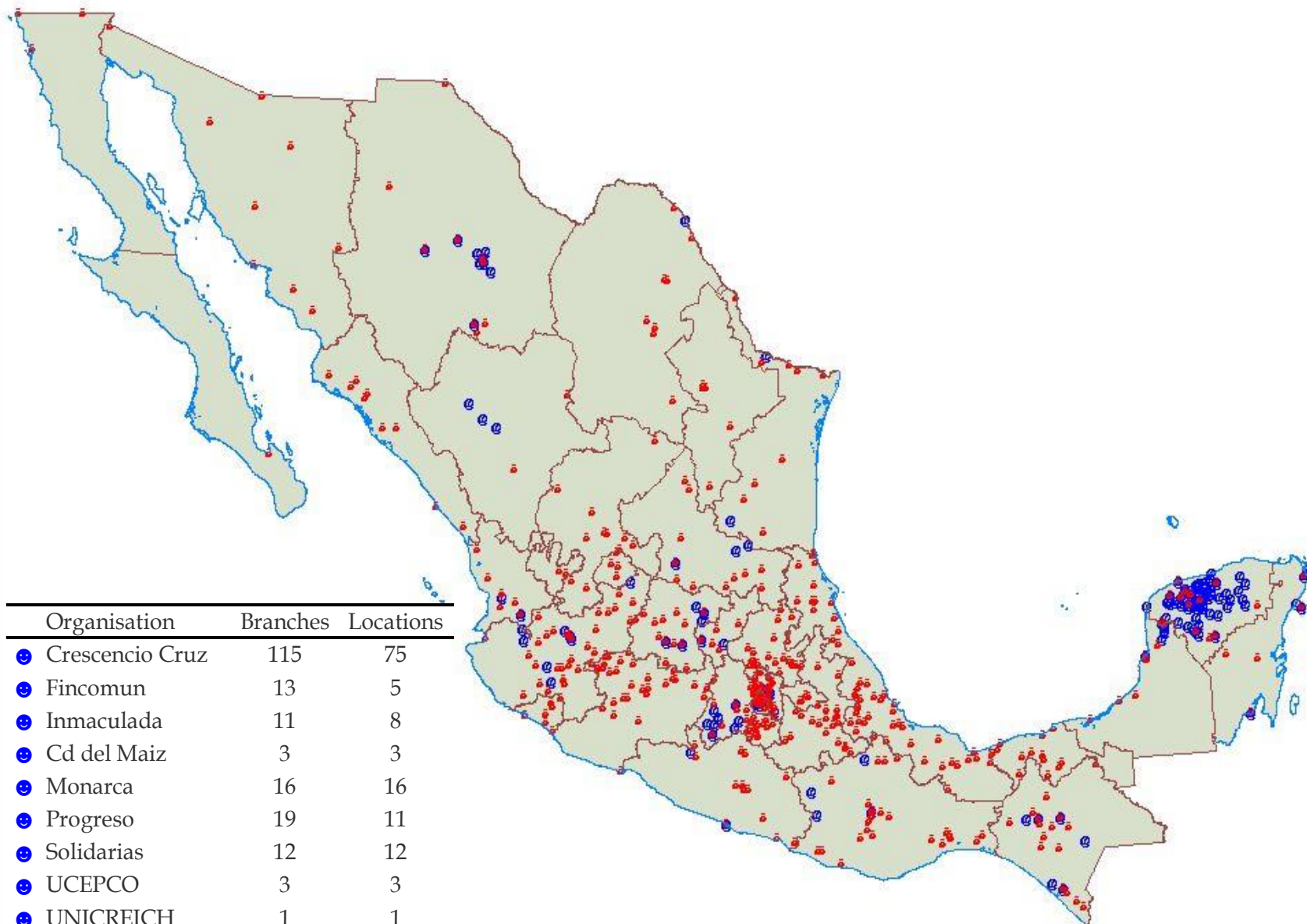
World Institute for Development  
Economics Research

# Background

- **Social service delivery** for the poor remains a major challenge for development effectiveness
- **Public-private alliances** can represent a viable solution to improve the efficiency in the provision of social services
- This study contributes to the literature on conditional cash transfers and financial inclusion by examining the impact of a recently introduced electronic payment system by the Mexican government to distribute the Oportunidades programme
- **Oportunidades** (before known as **Progresa** and more recently renamed as **Prospera**) (**POP**) is Mexico's flagship antipoverty social assistance programme, which provides income support to poor families in exchange for regular school attendance of children and periodic health check-ups of household members

# Background

- POP was launched in August 1997 to cover 300,700 households in 6,344 rural municipalities. By the end of 2015, the programme supported 6.1 million households living in poverty (28.1 million people), which represents **25 per cent of Mexico's population**
- POP was initially paid in cash at distribution points located in towns. This usually entailed long travelling and queuing times for recipient households. The repercussions were also in terms of opportunity costs and personal safety
- **An electronic payment system for POP was introduced by the National Savings and Financial Services Bank (BANSEFI)**, a state-own development bank, in partnership with a network of non-banking institutions known as **L@ Red de la Gente** (People's Network). Non-banking institutions in Mexico usually target rural and peri-urban communities, many of which are poor and with limited or no access to banking services



Organisation	Branches	Locations
🇲🇽 Crescencio Cruz	115	75
🇲🇽 Fincomun	13	5
🇲🇽 Inmaculada	11	8
🇲🇽 Cd del Maiz	3	3
🇲🇽 Monarca	16	16
🇲🇽 Progreso	19	11
🇲🇽 Solidarias	12	12
🇲🇽 UCEPCO	3	3
🇲🇽 UNICREICH	1	1
🇲🇽 BANSEFI	554	423
<b>Total</b>	<b>747</b>	<b>513</b>

# Study objective

- The fact that **L@ Red de la Gente** targets communities where **POP** also **operates**, provided the opportunity to introduce a pilot project, in which a sub-sample of POP beneficiaries received their grant through **electronic transfers in savings accounts**. Most Oportunidades participants continued to receive payments in cash through distribution points located in the nearest town
- This study, examines the effect of the electronic payments system by taking advantage of the availability of a rich household-level dataset (BANSEFI-SAGARPA Panel Survey (2004-2007)), which **coincided with the phasing-in and roll-out process of the electronic payment programme**, to construct a quasi-experimental evaluation design
- We exploit as an **exogenous rule** the fact that the selection of participation in the electronic transfer programme was made by the managers of L@ Red de la Gente and POP, and not the households themselves. This allowed us to rule out **household self-selection**. However, since the selection into treatment was not random, and most likely influenced by the availability of local infrastructure, we exploit the variation in observables to compute average treatment effect on the treated (ATT) matching estimators

# Study contribution

- A scant literature has examined first- and second-order effects of electronic payments of a handful of cash transfer programmes (Duryea and Schargrodsky (2008), Wright, Tekin et al. (2014), Aker, Boumnijel et al. (2016), Muralidharan, Niehaus et al. (2016)).
- Our study contributes to the scant literature in two important respects:
  - First, it investigates the **four-year impact of the POP's electronic payment system on savings decisions, remittance reception and coping strategies against idiosyncratic risks**. This is particularly relevant in the context of Mexico, where financial inclusion among the poor remains very limited and where **one in every fifth poor and vulnerable household has a migrant worker**.
  - Second, our **analysis captures the medium-term effects of the electronic payment system**, and identify possible underlying mechanisms through which better access to financial services can have add-on effects on beneficiaries of CCTs

# Results in a nutshell

- Households that received their cash transfer in a savings account:
  - **decreased** their participation in **informal saving** arrangements
  - faced **less constraints on remittance reception**, and as a result,
  - were **less likely to reduce consumption or contract loans** to cope with idiosyncratic shocks.
- We find a degree of **outcome heterogeneity**, which seems to be contingent upon the environments that characterize rural and urban areas in Mexico
- Our analysis suggests that the **nature of financial institutions** implementing the reforms, together with the **certainty that regular income transfers from POP provided to the poor**, and the **incentive mechanisms** that the intervention generated, played an important role

# Context and intervention

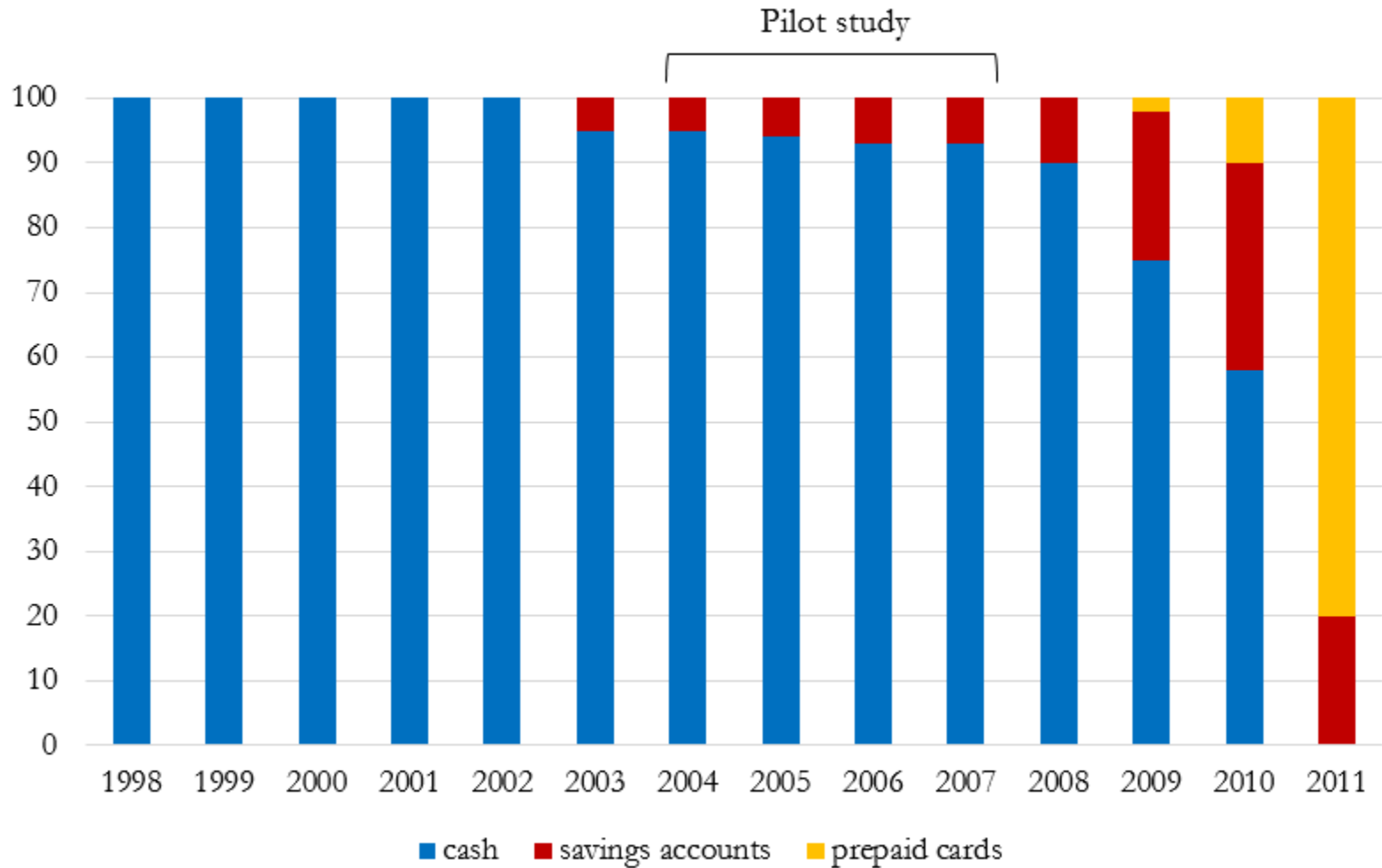
- **POP is the largest national-wide antipoverty policy in Mexico**, reaching 28.1 million people (25% Mexico's population)
- Program eligible is based on a rigorous targeting method in two steps:
  - First, it identifies poor localities using a census-based marginality or 'social gap' index
  - Second, it relies on categorical criteria and a proxy means test (sistema unico de puntaje or SUP) that identifies the poor using survey and census data
- POP's income support is distributed every two months and is primarily given to women
- **The monthly average transfer size is about 130 USD** –or 20 per cent of household income among the targeted population–, which can vary depending on household composition



# Context and intervention

- The pilot of the electronic payment system analysed in this paper is the result of a joint effort that began in 2003 by SEDESOL, POP's National Co-ordination Unit, BANSEFI and L@ Red de la Gente
- The pilot involved opening savings accounts for POP's beneficiaries in nearby BANSEFI branches and non-banking institutions part of L@ Red de la Gente
- **POP's accounts were free of opening and maintenance fees.** Seira (2010) reports that, as the result of the policy, rural households' opportunity and financial costs associated with the collection of POP decreased by 77% and 98.5%, respectively.
- The inclusion of BANSEFI branches and affiliates to L@ Red de la Gente into the pilot depended on the institutional quality of financial intermediaries, and the availability of financial infrastructure
- During the pilot phase, more than 90% of POP's beneficiaries continued to receive the grant in cash. The transition from cash to electronic payments was completed in 2011

# Context and intervention



Source: Authors' with data from Oportunidades (2012)

# Data and identification strategy

- In 2004, BANSEFI and SAGARPA began the collection of a household panel survey in 25 of Mexico's 32 federal states, which coincided with the pilot phase of POP electronic payment system.
- The sampling frame was designed to be **representative at three regions**: north, centre and south, from which a **sample of non-banking institutions was randomly drawn with a probability proportional to their number of clients**
- For each selected branch, 20-30 households were randomly selected from a listing of clients (treatment group=T). An equal number of households with no recorded use of formal financial services was also included (control group=C)
- The survey was then repeated for another three rounds, in 2005, 2006, and 2007, for a **total of 17,680 observations**
- For the purpose of this study, **we retain a subsample of 2997 households that between 2004 and 2007 were POP beneficiaries and which were always compliers**, i.e. received Oportunidades in either **cash** or in a **bank account** over the four year period

# Data and identification strategy

- For the identification strategy, we exploit as a strictly exogenous rule the fact that **the selection of households into the electronic transfer programme was made by the managers of POP and BANSEFI**, and not the households themselves.
- Selection into treatment was based on the proximity of the household to a BANSEFI branch, or the nearest affiliate of L@ Red de la Gente, generally within a radius of 10 kilometres. This criterion was adopted to reduce the travelling and opportunity costs to the recipient households
- **We can rule out potential endogeneity problem from household self-selection.** However, **we cannot rule out the presence of endogeneity if systematic heterogeneity exists** in terms of available infrastructure and services *within* the locations, and *between* the areas where the treatment and control groups reside
- **The covariate distribution between the two groups suggests that there may be sources of upward or downward bias**, with the direction of the bias depending on the outcome analysed

# Data and identification strategy

Variable	Mean (C)	St. Dev. (C)	Mean (T)	St. Dev. (T)	P val. T=C	Obs. Total
<b>Outcomes</b>						
Tandas	0.112	0.315	0.108	0.311	0.772	2997
HomeSavings	0.307	0.461	0.306	0.46	0.923	2995
Remittances	0.748	2.817	0.592	2.618	0.119	2997
ShockCoping	0.152	0.36	0.14	0.348	0.936	629
<b>Covariates</b>						
LocalType	0.286	0.452	0.408	0.491	0.000***	2997
LocalSize	0.103	0.304	0.06	0.238	0.000***	2637
North_Mexico	0.115	0.319	0.227	0.419	0.000***	2997
South_Mexico	0.644	0.478	0.58	0.493	0.000***	2997
Centr_Mexico	0.239	0.427	0.191	0.393	0.002***	2997
HouseProperty	0.814	0.388	0.8	0.399	0.355	2996
HouseFloor	0.724	0.446	0.818	0.385	0.000***	2997
PipedWater	0.79	0.407	0.857	0.349	0.000***	2997
DepRatio	1.167	0.954	1.067	0.886	0.005***	2810
Age	47.86	14.7	48.97	15.54	0.05**	2994
Sex	0.118	0.389	0.119	0.401	0.394	2997
Education	1.18	0.385	1.206	0.404	0.082*	2988
MaritalStatus	0.814	0.388	0.798	0.401	0.279	2995
Indigenous	0.262	0.44	0.44	0.496	0.000***	2982
IdioShock	0.25	0.427	0.193	0.394	0.002***	2996

# Methodology

To begin the exposition, we consider the following simple linear model:

$$y_i = \alpha + D_i\beta + X_i\gamma + \varepsilon_i$$

Where  $D_i$  is a dummy variable taking the value one for households receiving Oportunidades via electronic payments and zero for households receiving the grant in cash.  $X_i$  is a vector of household- and locality-level characteristics,  $\beta$  is the parameter of interest whereas  $\gamma$  and  $\varepsilon$  are the parameter of  $X$  and the error term, respectively

A linear specification that compares average outcomes between treatment and control groups is likely to be biased due to the effect of observed (and unobserved) heterogeneity affecting the outcomes of interest

# Methodology

We address these concerns, we adopt two approaches:

**1) A fully interacted linear model (FILM)**, which relaxes the homogeneity assumption and allows for the inclusion of interactions of all control variables with the treatment status

$$y_i = \alpha + D_i\beta + X_i\gamma + (X_i * D_i)\delta + \varepsilon_i$$

**If interaction terms are found to be statistically significant, impact heterogeneity is an issue.** In such a case, only comparable individuals should be considered for treatment effects

**Matching estimators based on the propensity score or other distance metrics can also be used to construct a synthetic quasi-experimental counterfactual**

# Model

2) We adopt a Mahalanobis distance metric matching estimator that minimizes the distance between treated unit  $i$  and control unit  $j$  by **assigning weights to each co-ordinate of  $X$  in inverse proportion to the variance of that co-ordinate** as follows:

$$d(i, j)_M = (X_{ik} - X_{jk})' D^{-1} (X_{ik} - X_{jk})$$

where  $X$  identifies  $k$  matching covariates and  $D^{-1}$  is the variance covariance matrix of  $X$ .

By applying the Mahalanobis distance metric, **the control unit with the minimum distance  $d(i, j)_M$  is chosen as a match for each treated unit**



# Model

The **average treatment effect on the treated (ATT)** corresponds to:

$$ATT = E[y_1 | T = 1, d(i, j)_M] - E[y_0 | T = 0, d(i, j)_M]$$

or

$$ATT = E[y_1 - y_0 | d(i, j)_M]$$

As sensitivity test, we computed three different matching algorithms:

- 1) **Nearest neighbour matching estimation** in which treated observations are only matched to the closest untreated neighbour
- 2) **Weighted smoothed kernel-based matching**, where the counterfactual estimation is based on the data distribution on which a weighting structure is imposed
- 3) **Nearest neighbour bias-adjusted estimator (Abadie and Imbens 2011)**, which allows to overcome the finite sample bias deriving from non-exact matching

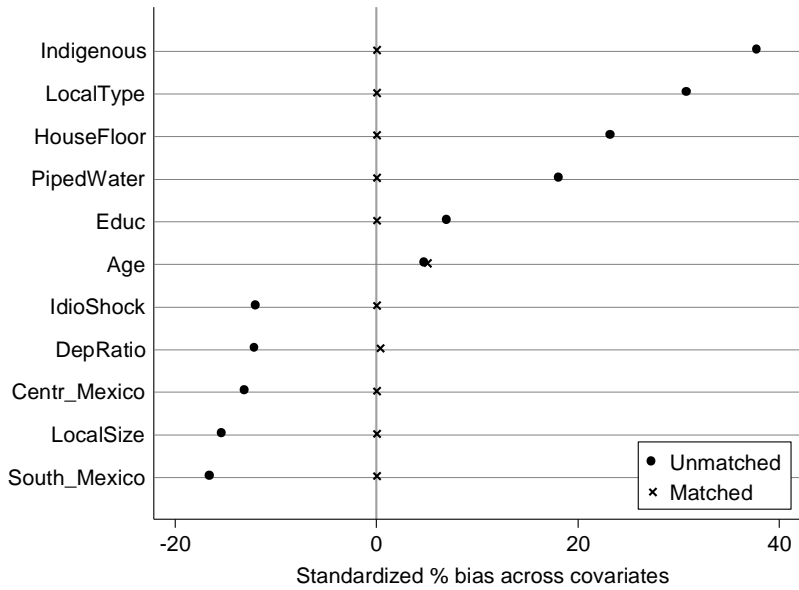
# Model

Although the violation of the **Conditional Independence Assumption (CIA)** due to household self-selection is ruled out, local-level heterogeneity remains an issue

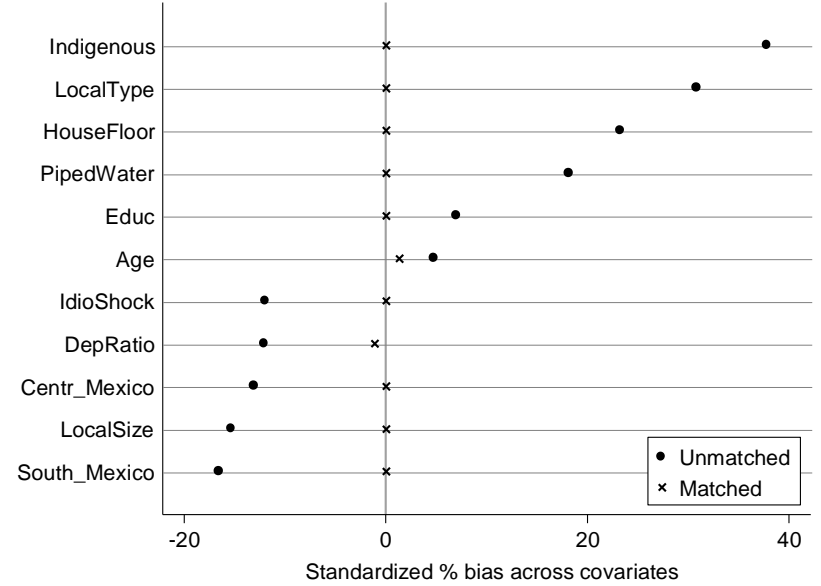
To address this shortcoming, we will follow two strategies

1. We include in the **set of matching covariates** those for which a statistically significant difference between treatment and control groups exists
2. We separate rural from urban localities and re-estimate the model by matching only households within each area. This is the **matching analogy to the fixed effects (FE) estimator**, which removes location-related unobservable variation

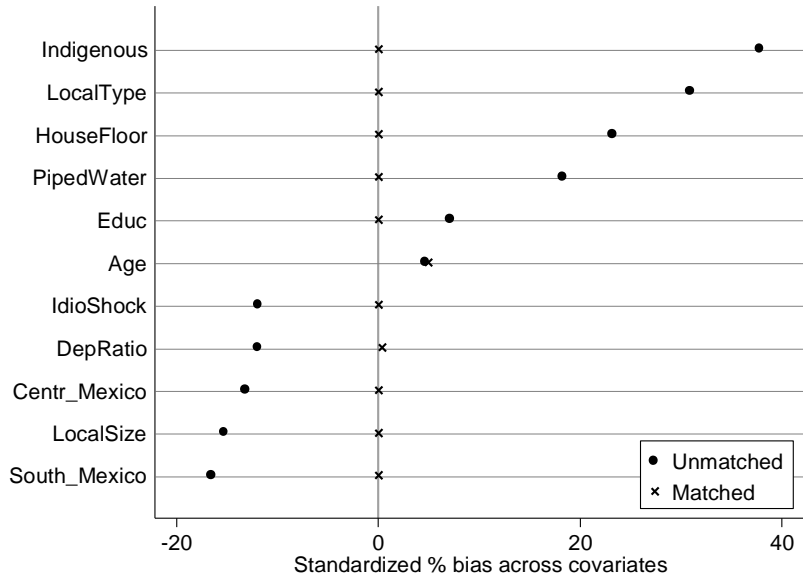
ROSCAs participation: nearest neighbour matching – bias reduction



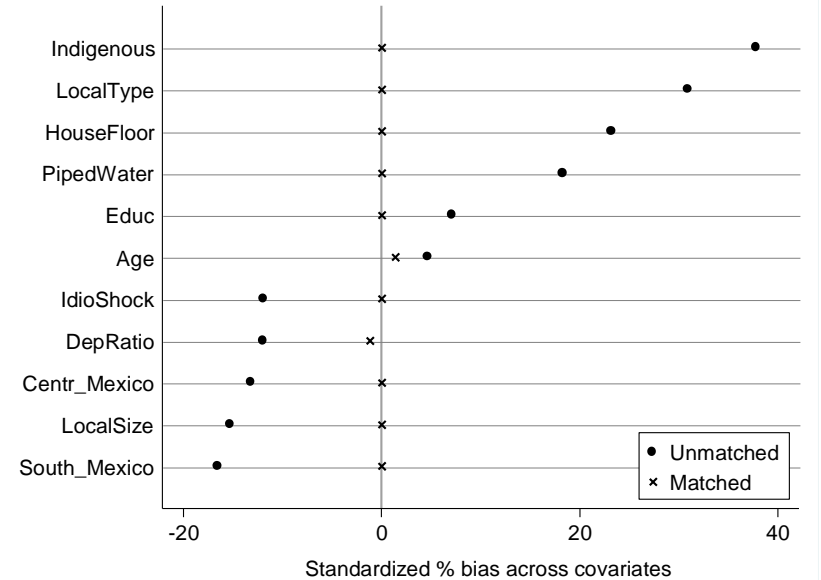
ROSCAs participation: kernel matching – bias reduction



Home saving: nearest neighbour matching – bias reduction



Home saving: kernel matching – bias reduction



# Results

- Matching on the whole sample indicates that **electronic transfers of POP decreased the propensity to participate in ROSCAs** by between 3.3 per cent and 4.8 per cent, depending on the estimator
- **Opportunity and transaction costs** associated with informal saving arrangements, both in terms of time allocation to peer-monitoring of savings groups, and the implicit risk of losing the funds, **seem to play a key role here**
- Interestingly **the propensity to save at home**, the second outcome of interest, **is not affected by the provision of a bank account**

# Results

- **Households who receive POP in a bank account were 6-8% more likely to use their savings to cope with shocks.** The increased reliance on savings implies that resorting to contracting loans or reducing consumption became less frequent
- These are desirable results, as POP beneficiaries live near the subsistence level, and for them **any reduction in consumption can drastically impact their health status, schooling decisions, work productivity, and future consumption and income levels**

# Results

- The impact of electronic transfers on the frequency of remittance reception was positive but concentrated in rural areas, where **their reception increased by 90%. Reduction in transaction and opportunity costs are the likely mechanism behind the increase**
- Rural households that received POP in a bank account were 8-10% more likely to **use their own savings as a coping mechanism against idiosyncratic shocks**
- In the context of rural Mexico where internal and international migration is significant, it is plausible to argue that **better conditions, and more frequent access to remittances**, together with the certainty that **regular, predictable and reliable transfers from POP** bring to the poor, **are the underlying incentive mechanisms that permitted the poor to save and better cope with shocks**

# Impact heterogeneity

- Older POP beneficiaries, with a lower educational background, displayed a higher propensity to substitute savings in ROSCAs for savings in BANSEFI accounts
- **The impact of the electronic payment was more pronounced among those with higher dependency ratios.** This is not surprising. Families with children, and thus with more liquidity constraints, are likely to be in more pressing need to receive remittances from adult family members living abroad.
- **Age of the household head also appears to influence the frequency of remittance reception**, as a result of treatment, until the age of 55; point after which no further impact is observed. **This could be linked to the life cycle of economic migration**
- Moreover, **the more educated beneficiaries were also more likely to receive remittances more frequently.** It is reasonable to assume that for the illiterate and poorly educated, it is harder to take full advantage of the financial products made available to them through the BANSEFI savings account, including remittances. Thus, they may simply stick to the usual method of receiving remittances.

# Conclusions

- The electronic payment of POP produced positive effects, although with a degree of impact heterogeneity between rural and urban areas
- **Transaction costs are the most likely underlying mechanism explaining the substitution effect between formal and informal savings**, although we cannot rule out the possibility of intra-household dynamics also influencing savings decisions
- **Our results highlight the contribution of remittances in smoothing consumption and mitigating the catastrophic effects of income shocks.** The fact that treated households were more likely to resort to their own savings to cope with shocks is in itself a desirable outcome of the intervention
- Our study underscores the potential welfare benefits from public-private alliances. CCTs in addition to their intended social impacts, can contribute to improve financial inclusion among the poor.
- The challenge for CCTs to become an effective policy device for financial inclusion is not constrained to just improving access to finance, but to provide incentives to get people use a broader spectrum of financial services