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Evidence from  
urban India



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# Does Women's Banking Matter for Women? Evidence from urban India

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## Abstract

In many developing countries, women are prevented to take full advantage of the benefits of living in an urban area. In India, while one of every two men participates in the labor market, it is the case just for one of every six women. In this context, it is thought that access to microfinance is key to bridge the gap and to introduce women into the labor force. This is the first project to rigorously evaluate the long term impact of increasing access to microcredit on female labor force participation. In this study, we exploit quasi-experimental variation in women access to microfinance generated by a unique expansion strategy adopted by the oldest Women Bank in the world. From 1999 onward, the “Shri Mahil Self Employment Women Association Sahkari (SEWA) Bank” massively introduced the use of loan collection officers which dramatically reduced the transaction cost of getting a loan in Ahmedabad, urban India. Our findings support the hypothesis that access to microfinance integrate women into the labor force in the long run. Even more, our results suggest that this effect is driven by a greater participation of women in household business activity. It does not seem to be associated to a sustainable change in female empowerment. This increase in female labor force participation is accompanied by an increment in the share of household income produced by women. However, this effect fades out in time. Finally, our results also suggests that as a consequence of increasing participation in the labor force, a greater access to micro-finance reduce fertility in the long run.

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# 1 Introduction

Less than one of every three women of working age participates in the labor market in South Asia, North Africa and Middle East (ILO, 2013<sup>1</sup>). In the case of urban India, female labor force participation is 15.5% while the same index is equal to 56.3% for males (Chaudhary et al 2014)<sup>2</sup>. By providing incentive to actively participate in household business activity, by increasing their financial responsibilities and/or boosting female empowerment, a greater access to microfinance might play a key role to reduce women exclusion from labor markets. Previously literature has shown a causal relationship between women access to microcredit and labor force participation in the short run, specially self employment (Dufflo et al 2015). Nonetheless, literature has not evaluated the persistent of women microfinance on female labor force participation. More importantly, few has been done to understand the mechanisms behind those changes.

The objective of this project is precisely to causally evaluate the impact of a greater women access to microfinance on labor force participation in the medium and long run. Our study take place in Ahmedabad, urban, India. Even though it is the fifth most populous metropolitan area, the only microfinance institution in the city until 2007 was “Shri Mahil Self-Employment Women Association Sahkari (SEWA) Bank”. SEWA Bank adopted an ambitious expansion strategy in 1999/2000 through the implementation of doorstep banking. As it will be explained later, the expansion strategy generates quasi-random variation in access to microfinance services between 1999 and 2007.

Unlike previous literature, our research setting presents two advantages. First, we are able to study the impact on outcome variables measured in the medium and long run. We evaluate the impact of a quasi-random variation in access to micro-finance in the period 1999-2007 over socio-economic and demographic outcomes measured in 2009/2010 and 2014/2015 respectively. Our research design allows us to evaluate the persistence of the impact of microfinance on labor force participation and explore potential mechanisms. Even more, thanks to our research design we can explore the causal connection between access to microfinance and fertility. The second advantage is related to the nature of the microfinance service expansion we are analyzing. Doorstep banking has at least two key components. On the one hand, it reduces the transaction cost of commuting to bank branches. On the other hand, loan collection officers can be taken as role models by some of their clients. By taking caste information as proxy for social proximity, we will evaluate if the impact of access to microfinance on female labor force participation is greater when social proximity is higher. The latter is key to explore the mechanisms behind the impact of microfinance on the live of women.<sup>3</sup>

Our research method is based on the assumption that even though SEWA Bank chooses the areas where to locate more loan collection officers, within each small geographical unit the choice was as random. Therefore,

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<sup>1</sup>Global Employment Trends 2013, International Labor Organization - ILO.

<sup>2</sup>Indexes are calculated based on information from Indian National Sample Survey (NSS) 2011-2012.

<sup>3</sup>We are still processing the match of loan collection officers and clients according to caste. The current version of the project does not exploit the second advantage of our setting.

once we control for living within each specific geographical unit at baseline, we get quasi-random variation in the distance between the residence of each potential credit client and the closest loan collection officer. We use detailed GPS referenced residence history of all loan collection officers and the potential credit clients in our sample to construct an index of access to microfinance in the period 1999-2007. We show that this index strongly explains credit activity in the period 1999-2014 and it is uncorrelated with pre-determined characteristics. We use this index to evaluate the impact of a greater access to micro-finance on labor force participation and related socio-economic and demographic outcomes.

Results of this project show that a greater access to microfinance loans causes a persistent increase in female labor force participation. This effect is driven by self-employment and not by salaried jobs. Women increase their participation in household business activity. Even though women are more likely to have the last word regarding expenditures in household businesses, there is no conclusive evidence that there is an increase in female empowerment. Finally, our results suggest that the increase in female labor force participation is accompanied by a reduction in fertility in the long run.

The remaining of the paper is organized as follows: Section 2 will describe the background of our empirical research. In particular, it will describe the expansion strategy of SEWA Bank India that allows us to identify the long term impact of access to microfinance on labor force participation and related socio-economic and demographic outcomes. Section 3 will explain the source of data we used in this project. Section 4 will explain the empirical strategy that exploits small-scale variation in distance among clients and loan collection officers. Section 5 will describe the results. Finally, Section 6 concludes.

## 2 Background

### 2.1 Setting

Female labor force participation in India is not only low footnoteWhile female labor force participation was 52% on average in the world, it was just 27% in India (World Bank Development Indicators), but it has been decreasing over the last 25 years. According to Chaudhary et al (2014), female labor force participation has decreased 39.4% from 1990 to 2009-2010. Even more, female labor force participation is much lower in urban areas in comparison to rural areas: 15.5% versus 25.3%<sup>4</sup>. In this context, it is key to study whether access to microfinance loans might play a relevant role to integrate women into the labor force in the long run.

Our sampling area is limited to the city of Ahmedabad which is located in Western Indian state of Gujarat. Ahmedabad is India's fifth most populous city, with approximately 5.6 million inhabitants (Census of India, 2011)<sup>5</sup>. The incidence of poverty in Gujarat has generally been less than that of the country, both

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<sup>4</sup>While male labor force participation is almost at the same level: 56.3% in urban areas and 55.3% in rural areas

<sup>5</sup>The metropolitan Area of Ahmedabad, that includes adjacent cities, has a population of 6.3 millions and it is the seventh largest metropolitan area of India.

in rural and urban areas. An interesting fact is that the incidence of poverty has always been higher in urban than in rural areas (Bhatt, 2003). While the incidence of poverty was 15.6% in urban areas for the year 1999-2000, the incidence of poverty in rural areas was 13.2%. (Ahmedabad Municipal Corporation, 2006).

The city population is 85% Hindu and 11% Muslim (Indian Census 2001), and religion remains an important determinant of economic activity, particularly among the poor employed in the informal sector. Although Gujarat is one of the most economically developed states in India, it has until very recently had one of the highest fertility levels of all states in India. According to the Census Commission of India, the total fertility rate (TFR) for women age 15-49 in urban Gujarat in 2000 was 2.3, and it declined gradually to 2.0 by 2010. For rural Gujarat, the TFR goes from 3.2 to 2.7 in the same period. (SRS Report, 2012)<sup>6</sup>. In 2010, Gujarat was ranked 12th, out of 20 states in India, with respect to the smallest TFR.

## 2.2 Expansion of Microfinance in Ahmedabad

Our Microfinance Institution (MFI) partner, Shri Mahil Self Employed Women's Association Sahkari Bank (SEWA Bank), is the oldest Women Bank in the world as it was established in 1974 in Ahmedabad<sup>7</sup>. While many commercial banks operate in Ahmedabad, SEWA Bank is the only source of formal financial services for urban poor until 2007 (Chen and Snodgrass, 2001). It exclusively serves poor women working in the informal sector, and remained relatively small until a rapid expansion beginning in the late 1990s. During this period SEWA Bank has sought aggressively to expand its client base and, in particular, to increase the ratio of borrowers to savers. A major aspect of SEWA Banks expansion strategy is its emphasis on doorstep banking and its system of loan collection officers (called loan officers or Saathis).

In 1999/2000, SEWA Bank formalized a system of loan collection officers. They were chosen among previous members of SEWA community. In order to be a Saathi, a client should have at least 5 years of relationship with SEWA Bank, they should be literate and know basic math, and finally, they should be known in her close vicinity. Collection officers usually get a starting portfolio of clients living close to her residence and they were motivated to get new clients. Saathis receive a commission which is based in how much money they collect for each type of accounts. It is important to note that SEWA Bank incentives loan officers to move their clients quickly into borrowing. They receive the highest commission, 3%, for loan repayments, 1% for some illiquid savings products, and no commission for the most common savings accounts.

The number of loan collection officers increased from only 9 in 1999 to 95 in 2007 (Figure 1). This expansion was on both the intensive margin - more loan officers for a given area - (Figure 2) and on the extensive margin, with loan officers beginning to work in areas that previously had none (Figure 3). The

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<sup>6</sup>For the state as a whole, the TFR goes from 2.9 in 2000 to 2.5 in 2010.

<sup>7</sup>It is also the oldest MFI since Grameen Bank which is often referred to as the first MFI was started in the village of Jobra, Bangladesh, in 1976 (<http://www.mixmarket.org/mfi/sewa-bank> vs. <http://www.mixmarket.org/mfi/grameen-bank>).

variation in the proximity of loan officers to clients comes primarily from the introduction of new loan officers, the exit of loan officers, client residential mobility, and the occasional relocation of a loan officer. The main innovation with this expansion strategy is that the bank is closer to people. It does not only reduce the client's transportation cost to zero but it also reduces the burden of discussing your financial needs with people she does not know. It is easier to generate a trust relationship with the loan collection officer.

On average, each Saathis work with 550 clients and they are visit on a high frequent basis (once per day or once per week). In 2000, SEWA Bank also introduced daily loan and savings products. They are characterized because their installments should be paid on a daily basis. Daily loans and the Saathi expansion were complementary in that many clients were unable to travel to a bank branch at such high frequency to deposit their payments, but Saathis could collect and deposit their payments.

Loan officers - maximizing their own income - have an incentive to recruit clients close to their own residence. First, it reduces direct transportation cost and especially the opportunity cost of the travel time. It is important to recall that each loan collection officers started her operation with a portfolio of clients living close to her residence. Second, loan collection officers can use their social network to gather information on the reliability of new clients. In case a client fail to pay her installments, the salary of the loan collection officer decreases. Thus, all else equal, one would expect proximity to a loan officer to increase the likelihood of borrowing.

By 2005, SEWA Bank had 291,535 deposit accounts among female clients and the loans/deposits ratio was 0.23. As we can see in Table 1, the number of deposit accounts has steadily increase up to 361,639 in 2010. Even more, the loans/deposits ratio has also increased to 0.35. Those changes reflect the most important consequences of SEWA Bank expansion strategy. On the one hand, they expanded the number of clients and opened account. On the other hand, the number of loans increases more than the deposit accounts. According to SEWA Bank, by the year 2009, the bank had US \$9.9 million in outstanding loans (SEWA Bank Report, 2012).

### **3 Data**

Our research design will exploit the quasi-experimental variation in access to microfinance generated as a consequence of the adoption of doorstep banking by SEWA Bank in the period 1999-2007. We decided to work with a sample that we know had the same access to SEWA Bank services in 1999. Our targeted sample are all the population who share three characteristics. First, they had a saving account in SEWA Bank in 1999. Second, they had never gotten a loan from SEWA Bank before 1999. And finally, in 1999 they lived in the 5 areas of the city in which SEWA Bank has expanded the most (see Figure 4). Following this criteria, our targeted sample is composed by 3,676 respondents.

We have collected two rounds of household survey from our targeted sample. The first round was collected in 2009/2010. We tracked 92% of the sample (3,392). We completed 3098 surveys (84%). The other 294 tracked individuals were divided in three categories: 67 refusal, 128 clients were not interviewed due to death or physical incapability and 99 move out of Gujarat (2%, 4% and 3% of tracked sample respectively). Finally, out of the 3098 surveyed households, 93 (3%) were discarded in the cleaning data process. All in all, we have complete information for 2009 in the case of 3,005 respondents (82% of total population).

The first round survey collected socio-economic characteristic information for our respondents both in 2009 and 1999. Among others, we have collected information on clients residence, asset ownership and labor force participation in 1999 and 2009. Even more, in the case of credit activity we ask for a complete history of loans in the period 1999-2007. The surveyed households report an average per capita earning of less than a dollar a day (INR 39.2<sup>8</sup>) and they have in average 5.5 members. The majority of surveyed woman (SEWA's clients) are engaged in unskilled jobs (38%) while a big proportion of them do not participate in the labor force and do take care of the housework (28%).

A second round of the survey was collected in 2014/2015. Our targeted sample is a subset of the original targeted sample of 3,449 individuals<sup>9</sup>. In the second round we tracked 93% of the targeted population (3,220 clients). We completed 3,055 surveys. The other 165 tracked individuals are divided into two categories: 48 refusals and 177 clients who have died or moved out of Gujarat (1.5% and 3.6% of tracked sample respectively).

On the one hand, the second round of data collection guarantees to have an additional observation of each socio-economic variable collected in 2009/2010. On the other hand, we also complement the collected data with variables we do not include in the first round. It is important to highlight the following list of variables: Education attainment by the respondent and all their children, variables which proxy women decision making power within households and a complete fertility history module.

A subsample of 2,812 individuals has been interviewed in both rounds. All in all, we have at least one observation for 3,248 respondents, which is equivalent to 88% of the original targeted sample.

In addition to this primary data source, the study will use two complementary sources of information:

- Residence history and socio-economic information of all the individuals who have worked for SEWA bank as loan officers in the period 1999-2015. We have administered two surveys to each SEWA Saathis. The first one was collected in 2008 and the second one in 2016. Among other variables, we have collected GPS data for all Saathis' residence history, and we also know the religion and caste of each collection officer. The time-series of GPS data on client and loan officer locations of residence (1999-2007) allows us to construct a continuous time-serie proxy of SEWA client's access to financial services. The lower

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<sup>8</sup>In 2009, one dollar was equivalent to INR 47.

<sup>9</sup>We exclude those individuals who were reported death or living outside Gujarat in 2009/2010

distance between a client’s residence and the loan officer’s residence, the higher the access of this client to microfinance.

- Besides the survey information, we have secondary administrative data from SEWA, which includes savings and loan transaction records. Nonetheless, this data is clean for the period 2007-2013. We observe every transaction associated with any of the surveyed client’s accounts.

## 4 Empirical Strategy

### 4.1 Predicting borrowing with physical proximity to provider

The empirical strategy exploits the characteristics of the ambitious service expansion strategy executed by SEWA Bank from 1999 onwards. As indicated before, the main characteristic of this expansion was the multiplication of loan officers. Consequently, access to new financial services (mainly credit) for SEWA clients differs based on small-scale variation in their physical distance to loan officers. In our setting, we measure this distance precisely with detailed GPS data on the location of all clients and loan officers over the decade, which varied over time and across the city. The idea is that SEWA clients that lived “close enough” to a loan officer had complete financial access, while the rest of the clients had restricted access.

Since the locations of the loan officers were not exogenously determined, we use spatial fixed effects. We divided the map of Ahmedabad into homogeneous square geographical units within which we argue that the access to microfinance - physical proximity among loan officers and SEWA clients - is exogenously assigned. In order to jointly determine the size of the geographical units ( $R \times R$  square meters) and the restricted access’s threshold distance, we performed an identification search process. We consider a SEWA bank client to have high access to credit services in some specific year if she lived within a distance of at most  $r$  meters from a loan officer for that year. We performed a joint search exercise to find  $R$  and  $r$ <sup>10</sup>. This exercise had two objectives: (1) To guarantee that this measure of access to microfinance has strong predictive power on having an active credit history (Strong first stage), and (2) to eliminate the endogeneity between the treatment (financial access in the period 1999-2007) and baseline controls characteristics. We performed an endogeneity test to show that the access to microfinance in the period 1999-2007 was orthogonal to the baseline characteristics. The identifying assumption is that, while the MFI may have targeted specific areas of Ahmedabad during its expansion, the location of a clients home relative to a collection officer’s home within a geographic unit was uncorrelated with credit demand, credit-worthiness, or other related factors.

The identification search process is organized in two complimentary steps: A strong first stage and a successful endogeneity test. The objective of this process is to set a threshold for the distance under which a

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<sup>10</sup>Figure 5 present a graphical representation of  $R$  and  $r$ .

SEWA client have complete access to microfinance (radius  $r$ ) and a specific size for the square rasters ( $R \times R$ ). In order to find a strong first stage, we perform the following regression:

$$B_{jR} = X_{jR}\beta + \mu_R + Z_{jR}\pi + \varepsilon_{jR} \quad (1)$$

where  $B_{jR}$  is an indicator that client  $j$  in raster  $\mu_R$  had active credit activity between 1999 and 2007, and  $Z_{jR}$  represents the number of years during the period 1999-2007 that a loan officer has lived within a radius  $r$  of the clients residence. Let be  $X_{jR}$  a vector of individual characteristics. In  $X_{jR}$  we control for the remaining individual-level pre-existing differences between treated and non-treated clients that have not been eliminated by the utilization of the spatial raster fixed effects. Along the paper,  $X_{jR}$  includes only one variable: client's religion measured as a dummy variable that takes value 1 in case the respondent is muslim. The fixed effects  $\mu_R$  absorb any mean differences in unobservables within rasters. Thus we use only within area variation.

Our empirical specification considers several variables that reflect that a SEWA Bank client has an active credit history, including the total number of years with credit, the total amount of borrowing that took place over the decade, and whether or not a client ever took out a loan. Just to recall, all the subjects in our sample are female SEWA Bank clients that had a deposit (saving) account in 1999 but who had not asked for a loan from this bank before 1999.

Complimentarily to the strong first stage, we perform an endogeneity test that guarantee that, within rasters  $\mu_R$ , the variable  $Z_{jR}$  is orthogonal to the characteristics of the client in the pre-treatment period (1999 or before). Among those characteristics we include age, caste, ownership of different assets, category of job, educational attainment, marital status among others.

## 4.2 The impact of exogeneous access to microfinance

Once we show that within rasters ( $\mu_R$ ), our measure of access to microfinance ( $Z_{jR}$ ) is orthogonal to pre-existing characteristics, we can use the same equation to estimate the impact that a greater access to microfinance have on different socio-economic/demographic outcomes ( $Y_{jR}$ ) either in 2009/2010 or in 2014/2015.

Let  $Y_{jR}$  represents a socio-economic/outcome variable of client  $j$  in area  $R$ , and let  $Z_{jR}$  be the number of years during the period 1999-2007 that a loan officer has lived within a radius  $r$  of the clients residence. Then, we can find the impact of access to microfinance ( $Z_{jR}$ ) on  $Y_{jR}$  using the following specification:

$$Y_{jR} = X_{jR}\beta + \mu_R + Z_{jR}\pi + \varepsilon_{jR} \quad (2)$$

## 5 Results

### 5.1 First Stage and Endogeneity Test

The resulting specification in this project sets  $800 \times 800m$  squares as rasters ( $R = 800$ ) and considers a client to have complete access to microfinance whenever there is a loan officer living within a radius of at most  $350m$  ( $r = 350$ ). We proxy access to microfinance over the period 1999-2007 as the number of years any Saathi has lived within a 350 meter radius of the client's residence. Hereafter, we will refer to the instrument ( $Z$ ) simply as *Years - Commission Saathi (350)*. The results from the first stage are shown in Tables 2, 3 and 4, while the results of endogeneity test are shown in Table 5.

Before explaining the first stage results, two relevant comments are in order. First, on average *Years - Commission Saathi (350)* takes a value of 3.53. Therefore, the magnitude of the impact of SEWA Bank expansion strategy on a specific dependent variable is equal to 3.53 times the estimated coefficient of interest. Second, SEWA Bank was the only source of microfinance loans for our targeted population. Nonetheless, SEWA Bank expansion strategy might have caused informal sources of credit (as money-lenders) to re-adjust the characteristics of their products in order to make them more attractive. Therefore, in the first stage regressions we look to the impact of a greater access to SEWA microfinance services on both just SEWA Bank and overall credit activity.

Table 2 shows that *Years - Commission Saathi (350)* is associated with an increase in credit activity in the period 1999-2009/2010. As a consequence of SEWA Bank expansion strategy, the probability of getting a credit increase in 3.53 percentage points. On average, one of every three person that are exposed to 9 years of living close to a Saathis have gotten an additional loan. Similar results are shown in table 3 for the overall credit activity in the period 1999-2014. Additionally, table 4 show that a greater access to micro-finance is also associated with an active SEWA Bank credit activity. SEWA Bank financial expansion is associated with an increase of 2.8 percentage points in the probability of getting a loan from SEWA Bank in the period 2007-2013, which represents 14% of the mean value for this variable.

Table 5 shows the results of the endogeneity test<sup>11</sup>. First, notice that *Years - Commission Saathi (350)* is negative and significant correlated with being muslim within each raster. It might be due to the fact while 23% of our sample is muslim, just 9.6% of SEWA Saathis are from the same religion. This is why we have presented the endogeneity test results controlling and without controlling for being muslim. All in all, given our research design, our proxy of access to microfinance is uncorrelated with age, asset ownership, caste, employment category, marital status and education. Even though, *Years - Commission Saathi (350)* is correlated with the number of children in 1999, this correlation becomes not significant once we restrict the

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<sup>11</sup>Recall that information on educational attainment was collected only in 2014/2015. Therefore, the sample size associated to this variable is smaller.

sample to women that are more likely to continue having kids (with 45 years or less, 82% of the sample<sup>12</sup>). Given these results, we can safely conclude that we pass the endogeneity test.

The successful endogeneity test and the robust first-stage results provide confidence in our research design. Thus, once we control by raster fixed effects, we can use *Years - Commission Saathi (350)* as an instrument to evaluate the impact of greater access to microfinance on labor force participation and related socio-economic outcomes.

## 5.2 The impact of financial access on female labor force participation

Table 6 and 7 show that a greater access to microfinance is associated with a greater labor force participation. On average, thanks to SEWA expansion strategy, participation of women in the labor market has increased in 7% and 3.2% in 2009/2010 and 2014/2015 respectively. Thus, the first point to notice is that this effect persist on time. Even though access to microfinance loans is measured for the period 1999-2007, we still find a significant effect on female labor force participation in 2014. Results show that most of this effect is due to the impact of a greater access to microfinance on household business activity. By 2014/2015, the effect of *Years - Commission Saathi (350)* on labor force participation is completely explained by its impact on the probability of working in a household business as main activity. The average effect is equivalent to 30% of the proportion of women being mainly employed by a household business in 2014/2015.

From table 8 to table 11, we further analyze the impact of a greater access to microfinance on household business activity. All in all, those table show that the positive impact of a greater access to microfinance loans on household business activity is due to its effect on those businesses that our female respondents actively operates and/or manages (hereafter referred as respondent hh business)<sup>13</sup>. The average impact of *Years - Commission Saathi (350)* on the number of respondent hh business is equivalent to 93% and 77% of the impact of this variable in the overall number of household businesses in the years 2009 and 2014 respectively. SEWA Bank expansion has increased the average number of respondent hh business in 25% and 19% relative to the mean in years 2009 and 2014 respectively.

Next, we evaluate whether or not the sustainable effect in labor force participation is also associated with an increase in female empowerment. Table 15 and 16 show explores the impact of *Years - Commission Saathi (350)* on two indexes that are intend to capture women household decision making power<sup>14</sup>. Both indexes are equal to the sum of the z-scores of its component variables. While the first index captures independence at the moment of managing financial resources, the second one captures whether or not women has the major word with respect to relevant household expenditure decisions. Results show that *Years - Commission*

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<sup>12</sup>Once we restrict the sample to women with 45 years or less, the correlation between *Years - Commission Saathi (350)* and the pre-determined variables show in Table 5 remain similar in magnitude and significance level.

<sup>13</sup>Even though, it is not necessarily the main job of our respondents.

<sup>14</sup>For this specifications, we restrict our sample to married women in 2014/2015.

*Saathi (350)* does not change significantly any of those indexes. Nonetheless, it is interesting to notice that a greater access to microfinance is associated with an increase in the probability of having separated savings with respect to husband, it also increases the probability of being able to lend Rs.1k without consulting with husband, and finally, it also increases the likelihood that the respondent has the major word with respect to investment on household businesses but it decreases she has the major word with respect to big household expenditures. From these results, we cannot conclude that a greater access to microcredit is associated to a sustainable change in women empowerment.

From this section, we conclude that access to microfinance caused a sustainable impact on female labor force participation. This effect is mainly driven by a more active participation of women on household business activity. Finally, we do not find strong evidence that the long term impact on labor force participation is also related to a change in female empowerment.

### 5.3 Further Results

We start by analyzing if the impact on female labor force participation is also associated to an increase on respondent's income and her household welfare. As we can see in Table 12, living close to a *Saathi* an extra year is associated with an increase on respondent's income of 9% by 2009/2010. Consequently, SEWA Bank expansion strategy is associated with a greater income generated by women within households, at least in the medium run. Results in Table 13 show that the effect on women income fades out in time and it become not significant by 2014/2015. In the case of household welfare, we do not find evidence that a greater access to microfinance causes a significant change on household income per capita neither in 2009/2010 or 2014/2015.

Finally, we evaluate the impact that a greater access to microfinance might have on the number of children. In particular, we evaluate if *Years - Commission Saathi (350)* is associated with having less kids after 1999. The hypothesis is that by either increasing female labor force participation, women empowerment or the income generated by women within their households, a greater access to microfinance can affect the decision of having a kid or having more kids. Our research design has the advantage that we can look to the medium and long term impact. As we can see in Table 14, as a consequence of SEWA Bak expansion strategy, women in our sample have reduced the number of childbearings after 1999. As expected, this impact is concentrated among women that are more likely to continue having kids after 1999. We refer to those women who were 45 years old or younger in 1999. The fact that the results are persistent in both samples 2009/2010 and 2014/2015 suggests that there is an impact the total number of children and not just on birth spacing. All in all, results in the project indicate that the impact on the number of children is associated with a greater female labor force participation.

## 6 Conclusion

A greater women access to microfinance has the potential of reducing the gap in labor market participation across genders in developing countries. In this project, we have exploited the quasi-random variation in women access to microcredit generated by a unique expansion strategy adopted by SEWA Bank in Ahmedabad. The strategy was based on the formalization and expansion of loan collection officers between 1999 and 2007. Since SEWA Bank was the only microfinance institution in the city until 2007 and it exclusively serves women, it generates quasi-random variation in women access to microfinance.

We take advantage of this setting to evaluate the medium and long term impact that a greater women access to microfinance loans might have on female labor force participation and related socio-economic and demographic variables. In this project we have found that access to microfinance has the potential of persistently increasing female labor force participation. According to our results, the long-term impact on labor force participation is driven by a greater activity of women on household businesses. Our analysis is not conclusive regarding the impact of microfinance on female empowerment. As part of the future extensions, we will analyze whether or not a greater access to microfinance increases the investment in children education, especially female children.

Our results also show that a greater access to microfinance is associated with an increase of the share of income household produced by women. Nonetheless, this effect fades out in the long run. All in all, access to microfinance do not have an impact on household welfare measured as income per capita. Interestingly, we exploit the fact that we can look to long term effects to conclude that a greater access to microcredit might have a persistent negative impact on fertility.

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# Appendices

## A SEWA Summary Statistics

Table 1: Number of Clients and Accounts - SEWA BANK

Fiscal Year	No. Accounts	No. Loans Accounts	No. Deposit Accounts	Loans/Deposit Ratio	Gross Loan Portfolio to total assets
2004		64,326	276,684	0.23	
2005	309,212	76,857	291,535	0.26	0.30
2006	326,141	91,096	304,933	0.30	0.33
2007	329,384	91,096	307,558	0.30	0.32
2008	340,143	103,679	318,594	0.33	0.35
2009	349,356	115,944	328,363	0.35	0.33
2010	391,932	126,510	361,639	0.35	0.32
2011	394,470		371,108	6344	0.35

Information has been taken from SEWA Bank Annual Report 2012 ad MixMarket.org

# B SEWA Bank - Adoption of doorstep banking

Figure 1: Number of Saathis by year

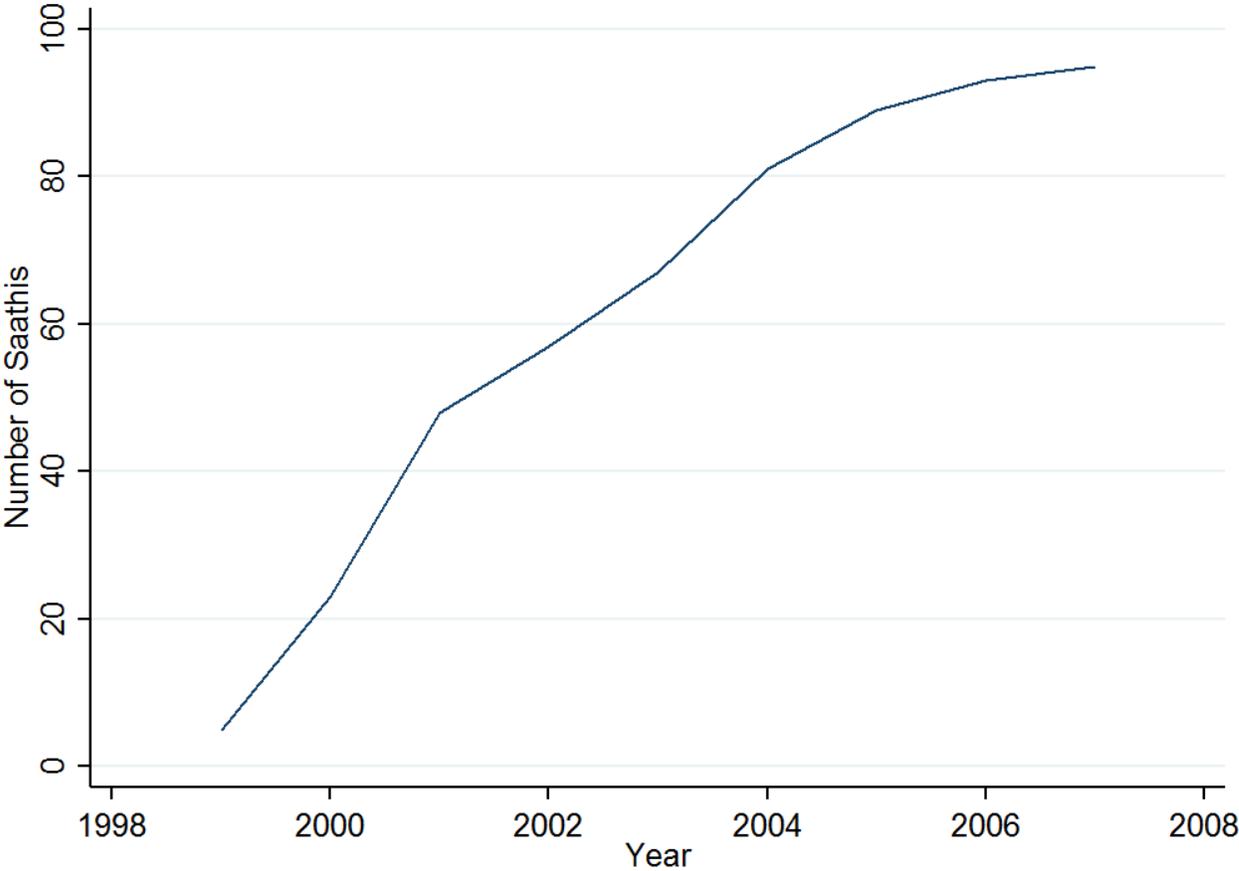


Figure 2: Intensive Margin: Average number of Saathis living close to a Saathis

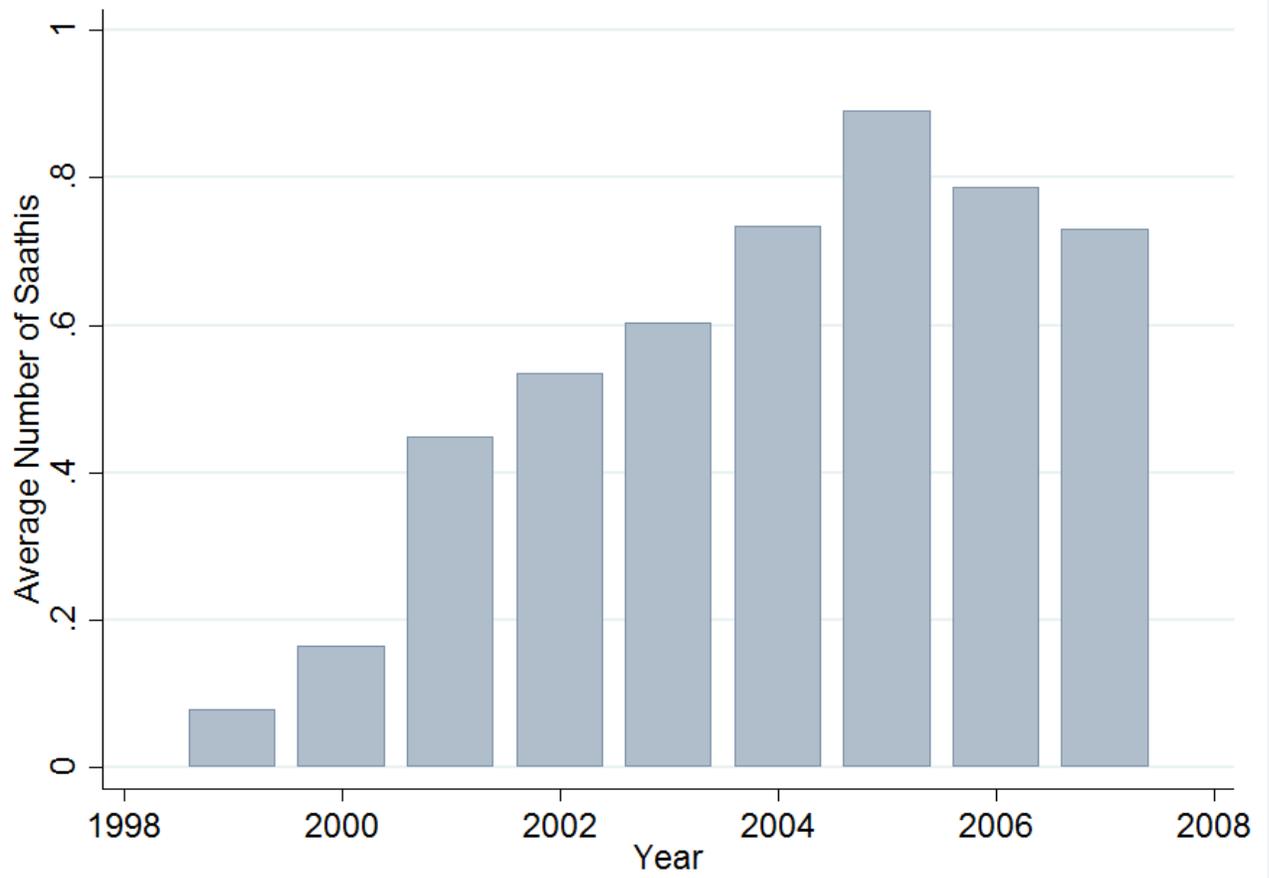
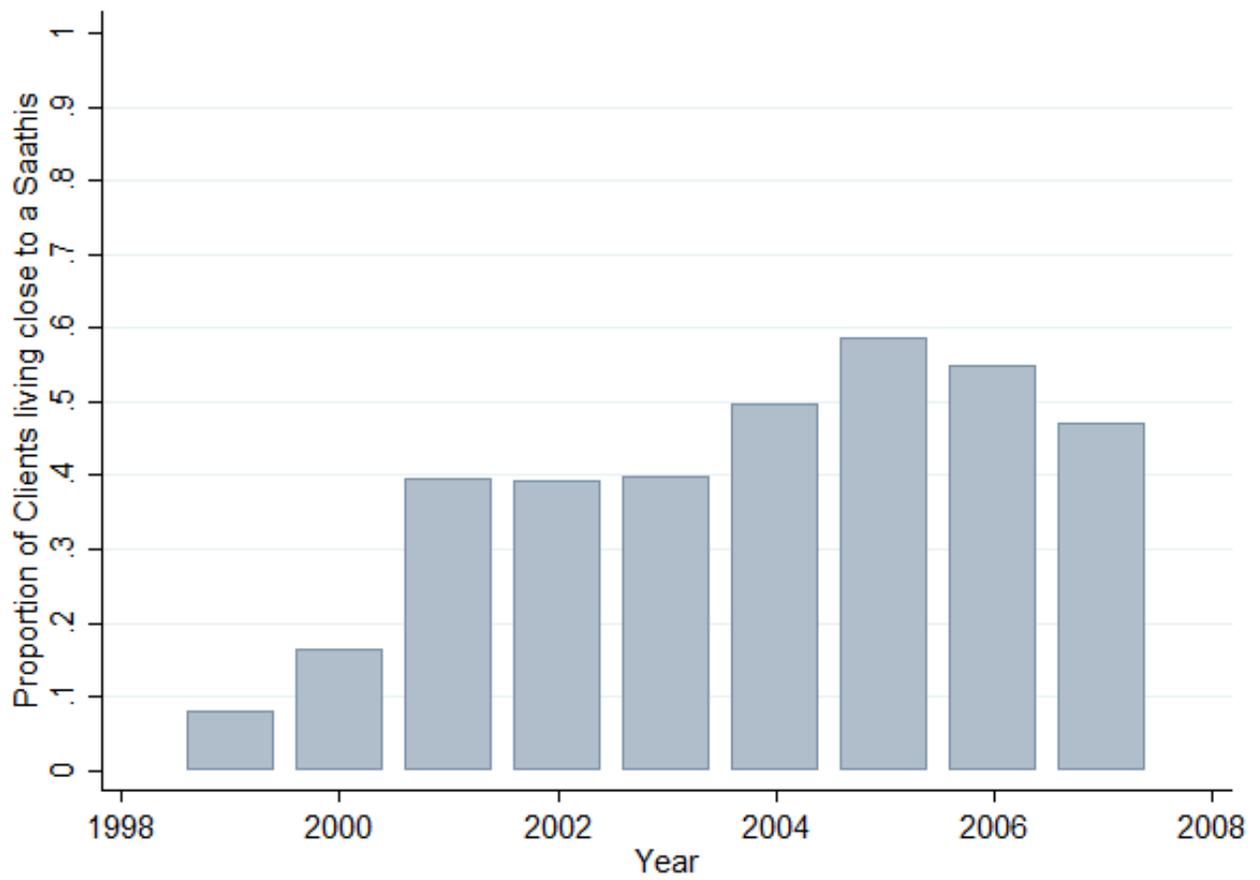
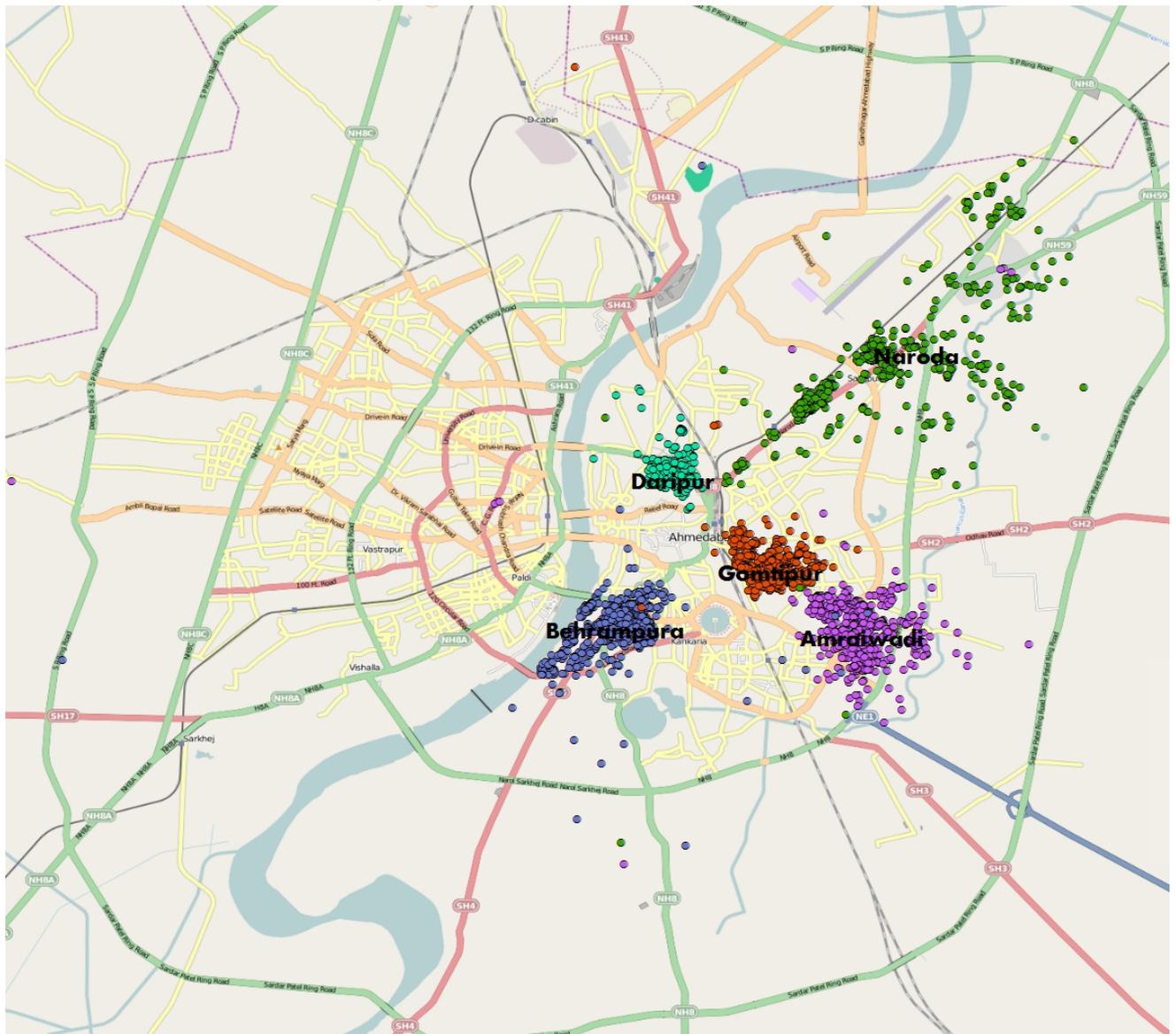


Figure 3: Extensive Margin: Probability of having a Saathis living in a distance of 350m or less



## C Geographical distribution of clients and loan collection officers

Figure 4: Client Sample in 1999 by area



# D Identification Strategy

Figure 5: Graphical representation of  $R$  and  $r$

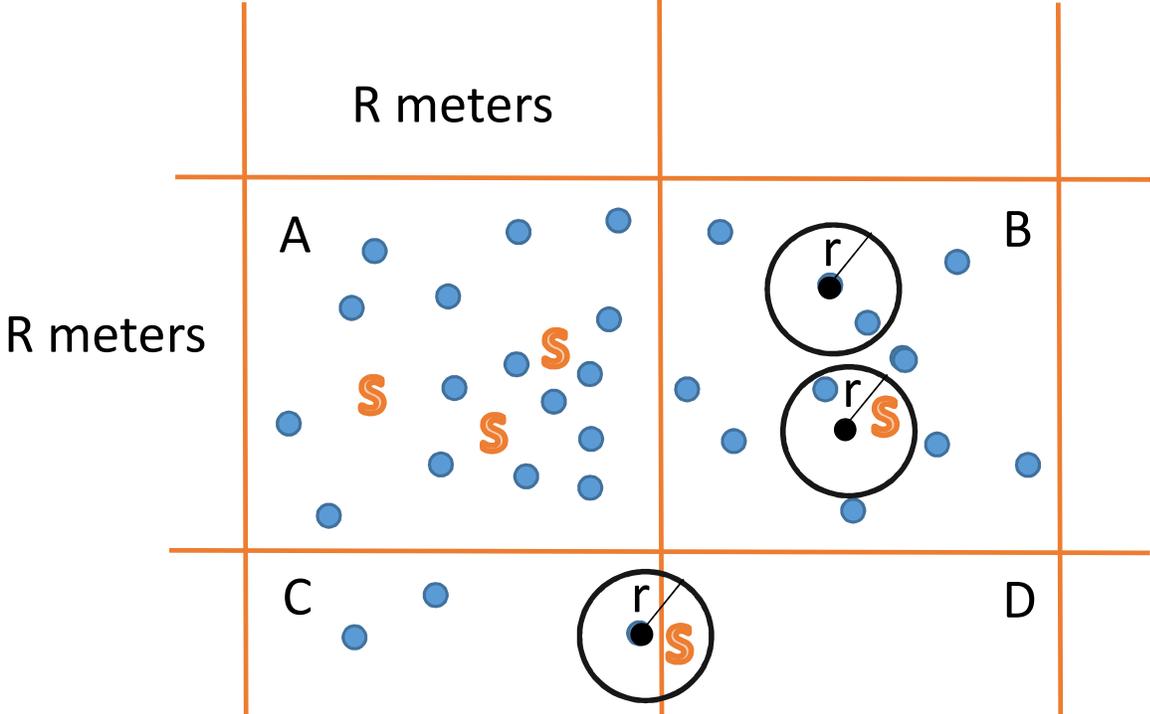
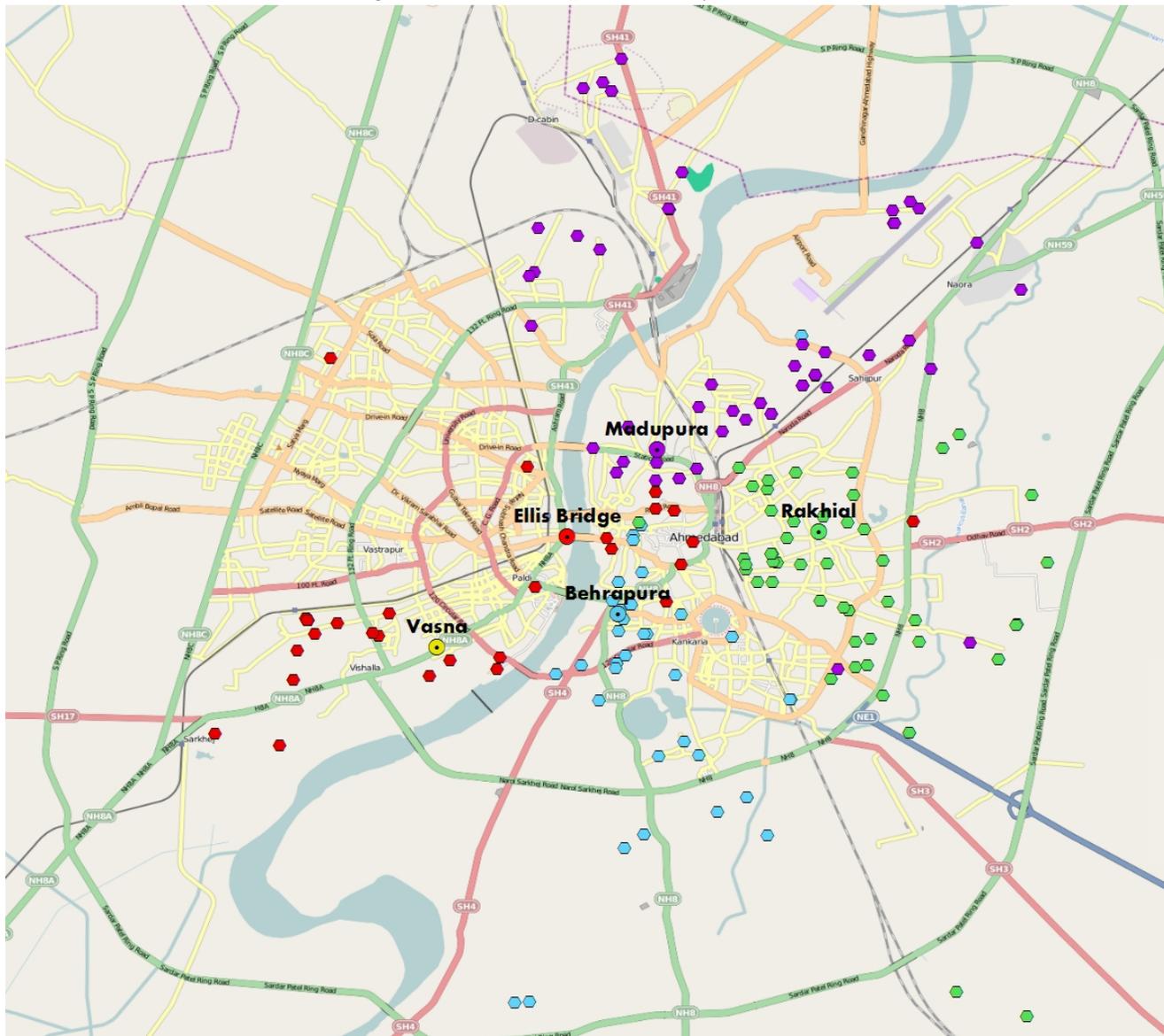


Figure 6: Saathi Sample in 2007 by area



## E First Stage - Credit Activity

Table 2: First Stage - Credit History 1999-2009/2010

	Total Loan amount(ln)	Loan dummy	Total loan count	Years since first loan
Years - Commission Saathi (350)	0.323*** (0.1120)	0.010** (0.0042)	0.035** (0.0140)	0.056** (0.0251)
Observations	3247	3247	3247	3247
Mean	11.423	0.587	1.414	2.516

SE in parenthesis. Every specification controls for muslim religion and raster FE.

Table 3: First Stage - Credit History 1999-2014

	Total Loan amount(ln)	Loan dummy	Total loan count	Years since first loan
Years - Commission Saathi (350)	0.108** (0.0443)	0.010** (0.0041)	0.051** (0.0232)	0.085** (0.0347)
Observations	3054	3054	3054	3054
Mean	7.849	0.731	2.592	4.644

SE in parenthesis. Every specification controls for muslim religion and raster FE.

Table 4: First Stage - SEWA Bank Records 2007-2013

	Total Loan amount(ln)	Loan dummy	Total loan count
Years - Commission Saathi (350)	0.079* (0.0427)	0.008** (0.0040)	0.009 (0.0097)
Observations	2532	2532	2532
Mean	2.181	0.205	0.420

SE in parenthesis. Every specification controls for muslim religion and raster FE.

## F Endogeneity Test

Table 5: Endogeneity Test

	Years Saathi in 350m radius			
	(1)	Mean	N	
	b/se	b/se	mean	N
Age 1999	0.143 (0.093)	0.139 (0.093)	32.11	3248
Muslim	-0.025*** (0.003)		0.23	3248
House owner upon joining SEWA	-0.002 (0.004)	-0.002 (0.004)	0.75	3248
TV color 1999	0.005 (0.003)	0.003 (0.004)	0.25	3248
Two-wheeler 1999	-0.004 (0.002)	-0.004 (0.002)	0.08	3248
OBC government caste classification	-0.002 (0.002)	-0.002 (0.002)	0.03	3247
SC/ST government caste classification	0.016*** (0.004)	-0.002 (0.003)	0.53	3247
Job 1999: Skilled	0.003 (0.003)	0.006** (0.003)	0.14	3248
Job 1999: Unskilled	0.001 (0.004)	0.000 (0.004)	0.30	3248
Married 1999	-0.002 (0.003)	-0.003 (0.003)	0.82	3248
Primary Complete	-0.001 (0.004)	-0.001 (0.004)	0.67	3055
Middle School Complete	-0.004 (0.004)	-0.006 (0.004)	0.50	3055
Secondary School Complete	-0.002 (0.003)	-0.004 (0.003)	0.19	3055
Number of children 1999	0.032* (0.017)	0.039** (0.018)	2.86	3248
Number of children 1999, 45 years or less 1999	0.025 (0.018)	0.028 (0.018)	2.71	2679
Fixed Effects	800	800		
Controls	no	yes		

Standard errors in parentheses with \* indicating significance at 10%, \*\* at 5%, and \*\*\* at 1%. All reported standard error use the sandwich estimator of variance.

## G Core Results

### G.1 Labor Participation

Table 6: Labor Participation 2009/2010

	Respondent in labor force	In household business	Skilled labor	Unskilled labor
Years - Commission Saathi (350)	0.020*** (0.0039)	0.006** (0.0028)	0.007** (0.0031)	0.002 (0.0041)
Observations	3247	3247	3247	3247
Mean	0.701	0.129	0.182	0.373

SE in parenthesis. Every specification controls for muslim religion and raster FE.

Table 7: Labor Participation 2014/2015

	Respondent in labor force	In household business	Skilled labor	Unskilled labor
Years - Commission Saathi (350)	0.009** (0.0043)	0.009*** (0.0028)	-0.000 (0.0030)	-0.002 (0.0039)
Observations	3054	3054	3054	3054
Mean	0.558	0.108	0.144	0.289

SE in parenthesis. Every specification controls for muslim religion and raster FE.

## G.2 Participation in Household Business

Table 8: Household (Hh) Business Activity in 2009

	Prob of hh having a business 2009	Number of hh business 2009	Number of years with a hh. business 1999-2009
Years - Commission Saathi (350)	0.009** (0.0043)	0.014** (0.0055)	0.142*** (0.0402)
Observations	3053	3053	3053
Mean	0.357	0.417	3.444

SE in parenthesis. Every specification considers religion and raster FE as controls.

Table 9: Respondent being part of Hh Business Activity in 2009

	Prob of respondent working in hh business 2009	Number of respondent hh business 2009	Number of years a resp. business 1999-2009
Years - Commission Saathi (350)	0.013*** (0.0034)	0.013*** (0.0040)	0.131*** (0.0324)
Observations	3053	3053	3053
Mean	0.175	0.182	1.795

SE in parenthesis. Every specification considers religion and raster FE as controls.

Table 10: Household (Hh) Business Activity in 2014

	Prob of hh having a business 2014	Number of hh business 2014	Number of years with a hh. business 1999-2014
Years - Commission Saathi (350)	0.010** (0.0043)	0.013** (0.0059)	0.192*** (0.0569)
Observations	3053	3053	3053
Mean	0.395	0.476	5.352

SE in parenthesis. Every specification considers religion and raster FE as controls.

Table 11: Respondent being part of Hh Business Activity in 2014

	Prob of respondent working in hh business 2014	Number of respondent hh business 2014	Number of years a resp. business 1999-2014
Years - Commission Saathi (350)	0.010*** (0.0034)	0.010** (0.0039)	0.190*** (0.0460)
Observations	3053	3053	3053
Mean	0.171	0.180	2.666

SE in parenthesis. Every specification considers religion and raster FE as controls.

### G.3 Female Income at household

Table 12: Female Income at Household 2009/2010

	Respondent income(ln)	Female income(ln)	Household income(ln)	Household income per capita(ln)
Years - Commission Saathi (350)	0.090*** (0.0319)	0.069** (0.0325)	0.009 (0.0109)	0.010 (0.0092)
Observations	3005	3005	3005	3005
Mean	3.826	4.467	8.434	6.816

SE in parenthesis. Every specification controls for muslim religion and raster FE.

Table 13: Female Income at Household 2014/2015

	Respondent income(ln)	Female income(ln)	Household income(ln)	Household income per capita(ln)
Years - Commission Saathi (350)	0.053 (0.0348)	0.044 (0.0345)	-0.005 (0.0112)	-0.009 (0.0094)
Observations	3054	3054	3054	3054
Mean	4.336	5.143	9.233	7.645

SE in parenthesis. Every specification controls for muslim religion and raster FE.

## G.4 Number of children after 1999

Table 14: Fertility Cross-Section

	N. children under 10 (2009 data)	N. children under 10 (2009 data)	N. children under 15 (2014 data)	N. children under 15 (2014 data)
Years - Commission Saathi (350)	-0.017** (0.0072)	0.001 (0.0074)	-0.017** (0.0088)	-0.004 (0.0078)
D45 (45 years or less in 1999)		0.532*** (0.0359)		0.603*** (0.0401)
D45*Y. Saathi		-0.019** (0.0081)		-0.015* (0.0084)
Observations	3247	3247	3053	3053
Mean	0.460	0.460	0.515	0.515
Mean (D45=1)	0.511	0.511	0.566	0.566

SE in parenthesis. Every specification controls for muslim religion and raster FE.

## H Other Results

### H.1 Decision Making 2014/2015

Table 15: Decision Making - Management of financial resources

	Have separated savings	Pool income with husband	Argue about money	Exc. control over some money	Amount of controlled money	Able to lend Rs. 1000	Z-Score DM1
Years - Commission Saathi (350)	0.013*** (0.0047)	-0.002 (0.0038)	-0.001 (0.0037)	-0.001 (0.0040)	-0.011 (0.0320)	0.007* (0.0043)	0.031 (0.0279)
Observations	2365	2365	2365	2365	2364	2365	2365
Mean	0.406	0.789	0.167	0.759	5.816	0.263	0.000

SE in parenthesis. Every specification considers religion and raster FE as controls.

Table 16: Decision Making - Respondent has major word on household decisions

	Food eaten at home	Children health	Big household expenditure	Investment on hh. business	Land purchase	Z-Score DM2
Years - Commission Saathi (350)	-0.002 (0.0039)	-0.002 (0.0048)	-0.009** (0.0044)	0.008** (0.0036)	-0.001 (0.0035)	-0.009 (0.0334)
Observations	2365	2365	2365	2365	2365	2365
Mean	0.765	0.430	0.250	0.136	0.145	-0.000

SE in parenthesis. Every specification considers religion and raster FE as controls.

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