Financial Access and Gender Gap in Entrepreneurship and Employment:

Evidence from Rural India

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Abstract

Can expansion of bank branch network reduce gender-gap in economic activity at the village level? To explore this issue, we construct a novel village-level panel data where we observe the financial access of each unbanked village in India defined as its distance to the nearest village/town with bank branch from 1951-2019; and village-level enterprise data of four economic census rounds of 1990, 1998, 2005 and 2013. To account for endogeneity in placement of bank branches, we use a difference-in-difference methodology. We find that the presence of a bank branch within 5km of an un-banked village between 2005 and 2013 (Treatment Group) mitigated the gender gap in entrepreneurship, and employment. The increase in number of female enterprises and in the size of female employment occurs fully driven by non-agricultural sector, whereas a shift is observed in male entrepreneurship from agricultural to non-agricultural sector. We also find evidence that this transition may be a consequence of credit uptake by enterprises from non-institutional sources as proximity to a banked-center improves. Our results are robust to unobservable village and year effects, and presence of alternative village-level infrastructure.

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Keywords: Credit, Banking, Branch Expansion, Gender Gap, Entrepreneurship, Enterprise and Development

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1. Introduction

A vast literature has studied the constraints faced by women-owned businesses on their journey to survival and growth. Businesses led by women are typically found to be lesser in number; smaller in size of output, sales and employment; concentrated in less efficient and labor-intensive sectors; and have lower survival rates than male-owned businesses (Coleman 2002; Fairlie and Robb 2009, Bardasi, Sabarwal, and Terrel 2011). All of this results in a significant gender gap in entrepreneurship.

Several factors may explain the lower presence and growth of women-owned businesses (Fairlie and Robb 2009; and Langowitz and Minniti 2007). Among them, problem in acquiring financial resources is considered as one of the most important barriers to women entrepreneurship (Raghuvanshi, Agarwal and Ghosh 2017; Kairiza et al. 2017, and Panda 2018). Specifically, some studies show that the women-owned firms have lower probability of receiving a loan (Muravyev, Schafer and Talavera 2009; Chaudhuri, Sasidharan, and Raj 2020; Aristei and Gallo 2016; and Presbitero et al. 2014). On the other hand, counter-evidence suggests that inadequate access to finance may not be gender specific. Instead, characteristics of the firm or the owner such as size and age of the firm, industry type, foreign ownership, location etc., and factors outside financial markets such as level of literacy, occupation, age, education and wage discrimination, intra-household status etc., could also prevent women from accessing formal finance (Coleman 2002; Aterido, Beck and Iacovone 2013; Ghosh and Vinod 2017). This raises a pertinent question—whether improving access to financial services such as bank branches can improve entrepreneurship among women.

In this paper, we explore these issues in the Indian context. We start with measuring the gender gap in economic activity at the village level in India. Our metrics of economic activity are number of all, agricultural, and non-agricultural enterprises separated by gender-wise ownership; the size of male and female employment in these enterprises; their major source of finance classified into institutional and non-institutional credit. We find wide gender disparities in these indicators in rural India. Women, constituting nearly half of any society, remain excluded from several opportunities. This concern extends to financial inclusion as well and merit a study. Our main research question is

how do supply side interventions, in terms of improved proximity to financial services, enable economic activity of women vis-à-vis men.

We develop a novel village-bank branch matched dataset where we compute the distance of each unbanked village to its nearest banked center for each year from 1950 to 2019. We use this distance as our measure of financial access. An improvement in this indicator, or equivalently a decrease in this distance, over time would occur only when a branch opens in a previously unbanked area. Given this property of our measure, we attempt to estimate the impact of improved financial access in unbanked areas. Using the SHRUG data set prepared by Asher et al. (2019), we merge this data with village-level indicators of economic activity obtained from four rounds of Economic Census 1990, 1998, 2005 and 2013. This gives us a panel dataset of Indian villages where for each village in 1990, 1998, 2005 and 2013 we observe: 1) the distance to its nearest bank branch, 2) economic activity indicators as described above.

Starting from 2005, Reserve Bank of India (RBI) introduced several policies such as liberalized rules for opening bank branches, and removal of Service Area Approach (SAA). Following these policy changes since 2005, we observe a significant expansion in bank branch network in rural areas in particular (Figure 1) as well as a significant decline in closure/merger/conversion of bank branches in rural and urban areas (Figure 2). We exploit this expansion in bank branch network pre and post 2005 as a natural experiment for our study.

To identify the causal impact of proximity to bank branches on economic activity, we use the technique of Difference-in-Difference (D-I-D), where we divide all un-banked villages in our panel datasets into two groups – treated and control groups. The treated villages are those where the distance to the nearest banked village/town was greater than 5kms pre-2005 and declined to 5kms or less post-2005. Villages where the distance to the nearest branch remained above 5km up to 2013 serves as the control group. It is important to acknowledge that the choice of using 5km for classification is not a strict one. Our purpose is only to segregate villages which either become proximate (Treated) or remain distant (Control) to a bank branch after 2005. Using a separate threshold such as 3km do not alter our results significantly. In a recent policy proposal,

RBI has recommended that every village must have a bank branch within 5km (RBI, 2009). To the extent that we can provide insights to this policy proposal, we used 5km threshold.

Our results show that for overall female-owned enterprises in a village, the coefficient on D-I-D interaction term is 0.577 and significant at 1% level. Thus, for 2 treated villages, one additional female-owned enterprise gets generated due to an improved proximity to a bank branch within 5 kms. Further, most of this increase occurs in the non-agricultural sector, whereas the ATE for agricultural enterprises is only 0.015, insignificant with a standard error of 0.081. Thus, female-owned enterprises significantly expand in non-agricultural sector in treated villages. Male-owned enterprises show a positive but lower growth in agricultural sector in treated group as compared to the control group but a larger and significant increase in non-agricultural sector. Thus, bank branch proximity creates a shift in male-owned firms from agricultural to non-agricultural sector. The impact on female and male employment is positive and significant as well. Similar to the shift in entrepreneurship, we find that employment also exhibits a slower growth in agricultural enterprises and a larger increase in non-agricultural enterprises in the treated villages as compared to control villages.

Two simultaneous mechanisms can drive our results on economic activity in treated villages—availability of formal savings instruments (Burgess and Pande, 2005) or higher credit disbursement as soft information on potential borrowers improves (Peterson and Rajan, 1994). We are able to test for the latter mechanism in our study i.e. whether uptake of institutional credit improves in treated villages. We find that the uptake of credit from non-institutional sources such as informal lenders and Self-Help Groups (SHGs) increases significantly in treated villages. The uptake of institutional credit is not significantly different in treated and control villages. Our results remain statistically significant after holding constant the unobservable time-invariant village level factors and year fixed effects. In addition, we test our models for states where the SHG finance

is below average of this indicator. [4] Our results again show a positive increase in non-institutional credit in treated villages with the reduced sample as well. Thus, villages with an improved proximity to a bank branch see a rise in credit supply from intermediaries, such as moneylenders even where the role of SHGs is muted.

We conduct several additional checks to validate our identification strategy. First, we test for the parallel trends of the outcome variables between treated and control group prior to the treatment. Statistical tests reject divergence in pre-treatment trends between treated and control group for most of the above-mentioned outcome variables. For variables where pre-trends are not parallel, the bias runs in the opposite direction of our estimate providing a bound on the computed estimates. In other words, violation of parallel trends result, occurring in two cases, does not pose a concern for the implications of our results. Second, we test for alternative village level infrastructure that may have expanded concurrently with bank branches and could have also generated financial inclusion and economic activity. These include presence of roads which can grant access to markets; availability of other financial institutions such as agricultural credit society, cooperative banks, post office which can provide low cost credit; commercial power; size of population; proximity to towns; and literacy rates. First five of these factors do not diverge between treated and control villages pre- and post- treatment between 2001 and 2011. Although size of population, proximity to towns, and literacy levels were diverging across these two groups, most of our results survive after including the interaction of pre-treatment levels of these variables with time trends in our baseline specifications. Thus, these alternative confounding factors cannot explain our results on indicators of economic activity, which we attribute to proximity to a bank branch.

Next, we present literature review and a review of banking sector policies in India in sections 2 and 3 respectively. We explain the relevant datasets, methodology and descriptive statistics in sections 4, 5, and 6 respectively. The results are presented in section 7 followed by robustness checks in section 8. Section 9 concludes.

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[4] SHG as a source of finance for an enterprise was first recorded only in Economic Census 2013, and not in previous rounds. For our analysis, we have included SHG financing with non-institutional source.

2. Literature Review

The studies which are closest to ours are Bruhn & Love (2011) and Menon and Rodgers (2011). The former study shows that, in Mexican municipalities with a new Azteca bank branch, women's income increased by a higher margin (9%) compared to men's (4.8%); a higher proportion of women worked as wage earners; and a lower proportion of women self-reported as unemployed. Menon and Rodgers (2011) find evidence that improved credit access during social banking period in 1970s in India encouraged women's self-employment as own-account workers and employers, whereas, it discouraged men's self-employment as unpaid family members.

Other related papers have identified causal effects of bank branch establishment during India's social banking period of late 60's on poverty (Burgess and Pande, 2005) and of branch liberalization policy of 2005 on economic activity (Young, 2020) at the district level. A recent study by Chaudhuri, Sasidharan, and Raj (2020) has recorded lower credit uptake among women-owned MSMEs in India. Our paper provides several contributions toward the existing literature. First, we identify the causal impact of bank branch proximity at the village-level, which is the most granular administrative unit in India, whereas results in other papers are representative at the state or district-level. Secondly, our results indicate an attenuation of gender gap in economic activity, which could potentially improve social outcomes for women. Third, we show that the supply side interventions in the financial market encourage entry of women- and men-owned firms in the non-agricultural sector. Thus, consistent with Banerjee and Newman (1993), we find that the financial side of the economy can lead to structural change in the economy. Fourth, our paper addresses a critical point on financial inclusion. While policy makers attempt to expand financial services, some studies argue that low demand for formal finance may make such interventions ineffective (Kochar 1997; Kumar, Pal, and Pal 2019). Our results corresponds to these studies as we also find that the uptake of institutional credit does not increase as banks come closer to villages. However, intermediaries such as informal lenders and SHGs may play an important role.

In recent years, financial inclusion in India has received a major impetus due to *Pradhan Mantri Jan Dhan Yojana*, implemented in 2014, which ensure basic savings

bank deposit account to unbanked person. Nearly 77% of the population now has bank accounts in India (Demirguc-Kunt et. al., 2018). The experiment we study precedes *PMJDY* when no specific schemes were devised at a large scale such as that of *PMJDY* itself. Despite that, we find substantial impact on increased entrepreneurship of women due to bank branch proximity. Thus, our results bode well for proponents of these schemes and provide an insight into the potential impact of these new initiatives.

3. Expansion of bank branch network in India

Banking sector has expanded in urban as well as in rural areas of India. Figure 1 plots the number of new branches opened from 1950 to 2019. The pace of its expansion varied under different policy regimes of bank branch expansion. Before Social Banking Period (Pre-1969), RBI adopted a demand-led model to guide entry of bank branches. Consequently, licenses were provided to branches in areas with adequate demand for financial services and with a goal of reaching 10,000 people per branch. In the social banking period (1969-1990), RBI devised mandatory location-based quotas for each bank for establishing new branches in rural areas. Consequently, there was a sudden jump in the rate of branch establishment in rural areas. Over time, RBI started relaxing the constraints on opening of bank branches.

Social banking period ended in 1990 with the beginning of liberalization in India. While the quota-based restrictions on branch entry were withdrawn, RBI decided to approve establishment of a new branch depending on certain criterion, such as management, the adequacy of its capital structure and earning prospect (RBI, 2005). The branch entry regime reversed to demand-following approach, with most entry in urban areas, as opposed to what was observed in the social banking period. To ensure continuous progress of the rural and semi-urban regions of the country, the RBI had adopted a Service Area Approach in 1989 in which all existing branches were designated a cluster of 15-25 villages based on contiguity and proximity between villages and banks (RBI 2004a). This designated branch, known as the Service Area Branch, was responsible for meeting the credit needs of the assigned villages. If a non-service area branch had to lend to a borrower from a particular cluster, it required a no dues certificate for the

potential borrower from the service area branch. This feature of the service area approach limited the scope for banking operations.

Taking cognizance of low entry of branches, large closure/merger/conversion of branches and lop-sided growth, RBI devised new rules to influence branch entry 2005 onwards. First, RBI withdrew the restrictive measures under SAA (RBI 2004b). Now borrowers were allowed to seek credit from any branch outside their defined service area. As a result, a non-service area branch did not need to seek 'no dues' certificate from a service area branch before lending. This increased the market size of existing branches and provided more flexibility to people to access branch of their choice. Second, RBI also introduced the BC model to expand the financial access of people in rural areas. Third, RBI provided incentives for opening rural branches and predictability in approval process. Banks were now supposed to submit annual plans for branch expansion. Further, to speed up the process of entry, RBI committed to evaluating the plan and responding to banks in 4 weeks. This was in stark contrast to the period from 1990 to 2005 when each application was approved on a case-by-case basis. Thus, a more predictable environment was created for banks to expand[5]. Following these measures, two main outcomes were observed. First, it reduced the size of branches getting closed/merged/converted. Second, it expanded the new branches in the country where expansion was faster in rural areas.

4. Data

Outcome variable: Gender-wise ownership, Employment, and Credit Uptake

We obtain our outcome variables from the Economic Census (EC) of India which enumerates all non-farm enterprises in the country[6]. It collects indicators such as gender and caste of the owner, NIC code, size and the gender composition of employment, and their major source of finance among others.

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[5]See Young (2020)
[6]The sectors not covered in EC are the following. In case of agricultural activity, establishments classified under 011 and 012 of Section A of NIC 2008; in case of non-agricultural activity, establishments engaged in Section O of NIC 2008 (public administration, defence, compulsory social security), Section T of NIC 2008 (territorial organization and bodies) and Section R of NIC 2008 (illegal gambling and betting activities)

We include the following as outcome indicators at the village level. First we consider the total number of female and male owned enterprises to observe the trends in the overall gender gap in ownership. Data provides NIC code upto 3 digits for each enterprise through which we identify whether the reported enterprise belongs to agricultural or non-agricultural sector. We use this classification to understand the sector-wise gender gap. Further, the census documents the 'major source of finance' of each enterprise, where the response is one of the following: Institutions, Non-institutions, self-financed and government aid. The EC 2013 has one more category of SHGs as major source of finance. It is not recorded explicitly in the previous rounds, although, it could be part of other recorded categories such as institutional or non-institutional credit. SHGs are not a formal source like a bank and also not informal source like a moneylender. We compute two main sources of finance – (i) Institutional finance which records banks as major source of finance; and (ii) Non-institutional finance where we club enterprises which report either money lenders or SHGs as major source of finance. However, a concern still remains as SHGs lending could also be recorded in institutional credit in previous EC rounds. Therefore, to mitigate this concern, we analyse those states as robustness check where presence of SHGs is below average. This allows us to measure the impact of bank proximity on the credit uptake from banks or money-lenders where the inclusion of SHGs is smaller.[7] Using this information, we study the gender gap in uptake of credit from different sources.

Six ECs have been conducted so far in the years 1977, 1980, 1990, 1998, 2005 and 2013. However, gender-wise ownership of enterprises was recorded only in the last three rounds (1998, 2005, and 2013). To create a panel of villages from these rounds, we use the Socioeconomic High-resolution Rural-Urban Geographic Dataset on India (SHRUG) created by Asher et al. (2019), which provides village-level identifiers compatible with Economic Censuses (1990, 1998, 2005 and 2013) and Population Census (1991, 2001, 2011) of India. The rich diversity of information present in the Economic Census combined using SHRUG IDs makes it possible to observe the trends in economic activity in a village over time.

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[7] It is important to mention that credit uptake from SHGs because it is not uniformly measured in the previous rounds of the EC. Otherwise, it would have been an interesting outcome indicator of our analysis.

Explanatory variables: Access to finance

The population census 2001 and 2011 record whether a village has a bank or not, and if not, the distance to the nearest branch is also recorded. However, the distance is measured in coarse intervals of 5 km such as 0-5km, 5-10km, and so on. We use a more refined measure of village level financial access than the one used in other studies so far or available in these two rounds of population census. We define financial access as the distance of each un-banked village to its nearest banked village/town (banked-center). Using three datasets—RBI Commercial Bank Directory[8] that provides exhaustive list of branches of commercial banks in the country, Population Census[9] 2011 and GIS-shape files[10] for boundary of Indian villages—we compute this metric from 1951 to 2019 as follows.

First, we matched RBI commercial Bank Directory with Population Census to uniquely identify the villages/towns where each bank branch is present. We could match 1,51,104 out of 154,505 bank branches with 45,911 unique villages and towns, which gives us a match rate of 97.4% between RBI directory and Population Census. The villages which remain un-merged with RBI data are termed as un-banked villages. There were nearly 6,03,084 unbanked villages as on October 31, 2019. Merging RBI data with PC 2011 also allows us to incorporate spatial data (centroid of each village) in it. This process gives us the GIS location of banked and unbanked village/towns.

Next, we computed the straight line distance between centroid of un-banked villages to the centroid of the banked villages using the user-written command *geonear* in STATA which identifies the nearest neighbour using geodetic distances (Picard, 2010). Further, as the RBI directory specifies the date of opening of each bank branch, we are able to compute the distance for each year from 1951-2019. The complete detail of construction

[8] The RBI Commercial Bank Directory is obtained as on October 31, 2019. It provides the details of each commercial bank branch in the country with the name of the state, district and rural center (roughly equivalent to a village) where the branch is situated. It also provides the year in which each bank branch got established among many other indicators.
[9] Population Census is a decennial count of the population and its various characteristics. It is conducted by Ministry of Home Affairs, Govt. of India. It provides demographic and socioeconomic composition of the population, local amenities in rural and urban areas, among other indicators.
[10] The spatial data we use is the GIS shape files which provides us the location of each village in terms of latitude and longitudes of the boundary of each village. This data is obtained from the research team at the World Bank. These GIS shape files are compatible with Population Census 2011 (henceforth, PC 2011).

of our measure of financial access is explained in Garg and Gupta (2020) along with its limitations. We observe a significant improvement in bank access in rural areas over the past decades, as the average distance of unbanked village to the nearest village/town with bank branch has declined from 43.5 km in 1951 to 5kms in 2013 and further declined to 4.2 km in 2019. The prime concern still remains whether and how much a straight line distance deviates from the actual travel distance on ground. Several studies have found high degree of correlation between the two measures of proximity to the nearest public good such as health centers in Yemen (Al-Taiar et al., 2010) hospitals in US census tracts (Boscoe, Henry and Zdeb, 2012) and health service providers in Montreal (Apparacio et al., 2008). Few exceptions were found in difficult geographic terrain such as a shoreline, mountainous regions and other physical barriers (Leyshon et al, 2018). To mitigate this concern further, we also computed the travel distance between banked and unbanked villages for the state of Maharashtra, Punjab and Haryana for the year of 2021.[11] We find the mean and median travel distance to be 5.64kms and 4.79kms respectively for un-banked villages with a straight line distance between 0 and 5kms. While for villages with a straight line distance above 5km, the mean and median travel distance was observed to be 14.8kms and 10.84kms respectively. Therefore, what we consider more proximate to a banked center using straight line distance is also proximate by travel distance.

Other variables

We obtain other indicators which could potentially influence economic activity in rural areas. One such important factor is the availability of paved roads. Few recent papers have estimated the impact of village roads on several aspects of human development such as easier access to various types of government services e.g. health and education services, labour market, goods market. Asher and Novosad (2020) show that the new paved roads in rural India lead to reallocation of labour from agriculture to non-farm work outside the village. Thus, road availability in rural areas cannot be ignored as a

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[11] The travel distance is calculated using *georoute* directory in STATA. It uses the background map API information from the website of https://developer.here.com. Given that this code uses real time map service, it is not possible to compute the travel distance for the past years. Therefore, we compute it on real time basis in August 2021.

confounding factor in this study. Therefore, we include the data on paved road availability at the village level from the population census of 2001 and 2011.

A close substitute of a commercial bank branch could also influence uptake of credit and economic activity in rural areas. To account for such substitutes, we obtain the village level availability of cooperative bank branch, agricultural credit society and post office from the population census of 2001 and 2011. Other control variables we use at the village level are literacy rate, population size, availability of electricity for commercial purpose, distance to town and these are also obtained from the two rounds of PC-2001 and 2011.

5. Methodology

Identifying the impact of bank branches on rural economic activity in India is challenging. First, as explained above, RBI introduced several policy changes which may have collectively led to a significant expansion of bank branches. Importantly, unlike during social banking period, banks had more control in branch placement after 2005. Thus, endogeneity of bank branch location with unobservable village factors poses a concern. Further, Indian rural economy experienced substantial changes in the period between 2005 and 2013, such as an employment guarantee program and rural road construction. Thus, unobservable macro factors may also confound with economic activity.

To address unobservable village and macro factors, we propose a difference-in-difference research design for our study. First, we construct a panel of villages using Economic Censuses 1990, 1998, 2005, and 2013, and merge it with our measure of village-level financial access. From this, we construct the following treatment and control groups:

1. Control Group: This group consists of those unbanked villages which did not have a bank branch within 5km in 1998, 2005, and 2013. There are 187,814 such villages.

2. Treatment Group: These unbanked villages did not have a bank branch within 5km in 1998 and 2005, but a new branch was opened within a 5km of these villages between 2006 and 2013. This group comprises of 74,444 villages.

Apart from these two groups, there is a third group of 274,009 villages which had a bank branch within 5km even before 2005. We do not include these villages in our analysis.

We use the following difference-in-difference specification:

$$y_{vt} = \alpha.Treated_v + \beta.Post-Treatment_t + \gamma.Treated_v * Post-Treatment_t + \varepsilon_{vt}$$

where, $Treated_v$ takes value 1 for villages which received treatment and 0 otherwise, $Post-Treatment_t$ is 1 for year 2013 and 0 prior to that. The coefficient, γ, on the interaction term measures the impact on y_{vt} after bank branch becomes proximate.

With this specification, we can control for unobservable village-level and year-level factors. The latter controls for confounding macro-economic changes in rural economy, while the former addresses time-constant village-level factors which could influence endogenous placement of bank branches.

Concerns for Identification

Admittedly, placement of bank branches is not entirely exogenous. While our specification can control for unobservable village-level fixed effects, time-varying village-level factors may bias our results if such factors were correlated with endogenous placement of bank branches. For example, banks may have established branches in areas which were already growing faster. Alternatively, bank branch location could be endogenous to concurrent village-level infrastructure, such as road, and other financial access points, such as cooperative banks, which may increase economic activity as well. In such cases, our specification γ may become biased upward. To address these, we will conduct several robustness checks, such as testing for parallel pre-trends and testing for concurrent factors.

6. Descriptive Statistics

As our objective in this paper is to study the link between financial access and gender gap in economic activity at the village level, we start by analyzing the level and trends of our dependent variables.

Table 1 provides descriptive statistics for treated and control villages for all three rounds of EC (1998, 2005, and 2013). The left (right) panel describes indicators for female- (male-) owned enterprises. We observe a sharp gender gap in ownership of enterprises in all years of our study. The average number of male-owned enterprises (per village) is roughly 5 times higher than the number of female-owned enterprises in 2013. The growth in number of enterprises has been uneven. While both indicators show an increase over the years, a higher increase can be observed from 2005 to 2013.

Across agricultural and non-agricultural sectors, a persistent gender gap exists. Growth of male as well as female ownership has been higher in agricultural sector. For females, agriculture and non-agriculture enterprises have become similar in number over time ranging between 3-4 enterprises per village on average.

We analyze credit uptake across different sources. These enterprises have low dependence on finance. First, institutional finance (as major source of finance) has higher prevalence than non-institutional finance for male owned enterprises. This scenario reverses for female-owned enterprises where non-institutional finance has grown at much higher rate exceeding institutional finance. This finding may partly be driven by inclusion of SHGs in the indicator of non-institutional finance. The growth of SHGs has been significant in rural parts of the country which, subsequently, may have led to a rise in financial access among female-owned enterprises.

Secondly, while we observe sharp gender gap in both type of financing sources, it is higher for institutional finance in 2013. The average value at 0.60 indicates that more than one male-owned enterprise for every two villages receives institutional credit. This ratio deteriorates to one enterprises for every 15 villages for female-owned enterprises.

A declining, yet significant, gender gap is visible in average employment numbers (Table 2). Female employment increases from 13.99 persons per village in 1990 to 36.88

persons in 2013. On the contrary, male employment fluctuates. It first increased marginally from 58.28 in 1990 to 59.12 in 2013 but experienced a drastic decline in 1998 and 2005. Therefore, a positive growth in female employment and a stagnant growth in male employment numbers attenuated the gender gap in employment in all enterprises.

Size of employment in non-agricultural enterprises is higher than that of agricultural enterprises in all the years of study. Further, the growth of female and male employment has been positive in agricultural enterprises in all the years of study. On the contrary, in non-agricultural enterprises, only female employment shows a positive growth and the male employment has declined over the years. Male employment in agricultural sector has cushioned a fall in average male employment of all enterprises.

In Table 3, we present the mean distance of banked centers to these villages in 1998, 2005 and 2013. The average distance to nearest banked center for treated and control villages in 1998 were 8.45 km and 9.81 km, respectively. These distances remain nearly unchanged in 2005. In 2013, the average distance for treated villages declines significantly to 3.25 km. However, for control group, this distance reduces only slightly to 8.43 km. Thus, by 2013, we observe a substantial improvement in proximity to banked centers for treated villages whereas control group villages still remain distant.

These summary statistics provide interesting stylized facts. Women entrepreneurs have lower presence in credit, and institutional credit in particular, in agricultural and non-agricultural sectors. In the next section, we show how improved proximity to bank branch impacts patterns on economic activity.

7. Results
a) Total number of Enterprises: Gender-wise Ownership

The expansion of banking services is likely to create multiplier effect on economic activity. For example, access to institutional credit or saving instruments may increase local purchasing power creating demand for goods and services, and thus, spurring economic activity. For our first measure of economic activity, we use number of female- and male-owned enterprises as an outcome of economic activity.

Results for female-owned (male-owned) enterprises are presented in columns 1 to 3 (4 to 6) of Table 4A. The ATE shown by interaction term in column 1 is 0.562 with a standard error of 0.121. On adding village fixed effects in column 2, and village and year fixed effects in column 3, ATE rises to 0.592 and remains significant at 1% level. This impact is nearly 25.7% (0.592/2.3) of the mean of this indicator. Thus, the number of female-owned enterprises increases significantly as access to bank branches improves.

The corresponding ATE for male-owned enterprises is positive but not significant (columns 4-6). The coefficient on interaction term is 0.132 with a standard error of 0.422 in column 4. On using village and year fixed effects in columns 6, we find the coefficient reduces to 0.068 and remains insignificant. Thus, improved proximity to bank branch does not seem to affect the number of male-owned enterprises in a village.

Figures 3A and 3B visually depict the trends in female-owned and male-owned enterprises, respectively, in treatment and control villages. The trends for female-owned enterprises coincide and run parallel prior to the treatment. Although post-2005, observed a high growth in female ownership in both groups of villages, proximity to bank branch provided an additional impetus to this growth in the treated group. For male-owned enterprises, we observe a notable difference across the two types of villages. After 2005, there is a substantial increase in the level for this variable; however, the increase in treated group runs parallel to the control group and remains insignificant.

b) Total number of Enterprises in Agricultural Sector: Gender-wise Ownership

We decompose the effect on gender-wise ownership of enterprises into agricultural and non-agricultural sectors. Results are shown in Table 4B.

Results show that bank proximity does not influence female enterprises in agricultural sector. In column 1, the coefficient on the interaction term is 0.002 with a standard error of 0.081. The results remain statistically insignificant with village fixed effects (Column 2) and village and year fixed effects (Column 3). Figure 3C shows an increase in this indicator post-treatment in both treated and control groups, but the level and time trend of this variable across two groups are indistinguishable. Thus, proximity to a

bank branch appears to not have altered the female-ownership of agricultural enterprises.

On the contrary, we observe a slower growth for male-owned agricultural enterprises in treated villages after the treatment. The coefficient on the interaction term is -0.986 with a standard error of 0.251 (Column 6), which is significant at 1% level. Figure 3D shows that male-owned enterprises in agricultural sector increase in both treated and control group. However, the increase in former is lesser. Therefore the negative coefficient portrays slower growth in the treated group. As a proportion of the average number of male-owned agricultural enterprises, this growth is slower by 17.7% (-0.986/5.55).

c) <u>Total number of Enterprises in Non-Agricultural Sector: Gender-wise Ownership</u>

Agricultural enterprises may decline in treated villages due to a shift in economic activity toward non-agricultural sector. To test this hypothesis, we present treatment effect for the number of female and male-owned enterprises in non-agriculture sector in Table 4C.

For female-owned enterprises, the coefficient on interaction term in column 1 is 0.560 which is significant at 1% level. After controlling for village and year fixed effects, this coefficient declines slightly to 0.539 but remains significant at 1% level. This shows a substantial increase of nearly 42.4% (0.539/1.27) as a share of the average. Figure 3E shows a distinct divergence in female-owned non-agricultural enterprises between treated and control villages after treatment. The indicator rises steeply in treated villages after treatment.

We find a similar increase for male owned non-agricultural enterprises. The ATE is 1.054 after controlling for village and time fixed effects (Column 6, Table 4C). The effect is significant at 1% level. As compared to the average, this impact is nearly 6%-- much smaller compared to the impact for female-owned entrepreneurship in non-agricultural sector. These results are robust to inclusion of village fixed effects (columns 2 and 5) and village and year fixed effects (columns 3 and 6). As seen in Figure 3F, the curve for

treated villages become slightly steeper post-treatment indicating an impact of proximity to a bank branch.

Thus, upon improved access to a bank branch, the number of female-owned enterprises increases which is driven almost fully by non-agricultural sector. We do not observe an increase in the overall number of male enterprises in treated villages, however, their activity slows down in agricultural sector and increases in non-agricultural sector. Therefore, improved bank branch proximity shifts economic activity from agricultural to non-agricultural sector.

d) <u>Gender-wise Employment in all, agricultural and non-agricultural enterprises</u>

Next, we study the impact of improved proximity to a bank branch on female and male employment in all, agricultural and non-agricultural enterprises. It is important to note that Economic Census includes non-farm enterprises and thus our analysis excludes employment in farms.

Results in Table 5A show that both female and male employment increases in villages after improved access to a bank branch. The impact on female employment is 0.894, significant at 1% level. After controlling for village and year fixed effects, the coefficient increases to 1.012 and remains significant at 1%. Therefore, a village experiences an increase of 1 female worker after it receives a bank branch within 5 km. This impact is equivalent to nearly 6.9% (1.012/14.5) of the mean of this indicator. The impact can be observed in Figure 4A where the size of female labour has increased in both groups of villages post-treatment, but the increase is much steeper in treated villages.

The coefficient for male employment is 1.457 after controlling for village and year fixed effects which is significant at 1% level. With the mean value of this indicator at 48.8, the impact is equivalent to 2.98% (1.457/48.8) of the mean. Figure 4B shows parallel trends for male employment pre-treatment which diverge slightly after treatment as treated villages trend steeper.

We further disaggregate the impact on overall employment into agricultural and non-agricultural labour markets. The proximity to a bank branch slows down the increase in

both female and male employment in agricultural enterprises (Table 5B). The interaction terms -1.096 and -1.211 for female and male employment, respectively, both of which are significant at 1%. Figure 4C and 4D show that the employment size in agricultural enterprises has increased over the years for both the genders. While their levels are indistinguishable in pre-treatment period between treated and control group, a sharp divergence occurs post-treatment. Both indicators grow slowly in treated villages as compared to the control villages. This result also corresponds with the number of agricultural enterprises which grew at lower pace in treated villages after the treatment (Table 3B).

Therefore, not only agricultural enterprises increase at slower rate when a bank branch becomes accessible but also the labour force employed therein shows a lesser increase as compared to the control group of villages.

On the contrary, we observe a sizeable increase in the female and male labour force in non-agricultural enterprises (Table 5C). While female employment increases by 5.577, male labour increases by 4.38 in a treated village post treatment. The impact is significant at 1% level of significance after controlling for village and time fixed effects. As compared to the average levels of these indicators, the impact is equivalent to 53.8% and 10.5% for female and male labour force in non-agricultural sector, respectively. Therefore, not only the marginal impact, the relative impact as share of the average is also much higher for female employment in non-agricultural sector. We observe this graphically also in Figure 4E. Female labour diverges sharply post-treatment with a higher increases in treated villages. Male employment in non-agricultural sector shows a similar trend.

7.1   Mechanisms: Impact on credit uptake

Proximity to a financial service point such as banks can create economic impact through two main channels. Firstly, availability of venue for formal savings for excluded population may alleviate poverty (Burgess and Pande, 2005). Secondly, proximity

between banks and borrowers reduces information asymmetry and, thus, increases lending (Rajan and Peterson, 1994).

We cannot test the deposit channel in our paper as our data does not tell us household saving behavior. However, given the major source of finance of each enterprise, we are able to test the second channel. As mention earlier, we consider finance from SHGs under non-institutional sources of finance.

a) Borrowing from Institutional Sources

Table 6A presents the ATE for number of female and male-owned enterprises that report institutional finance as major source of finance. We do not find any significant impact for either female or male enterprises in treated villages. The results hold when we control for village and time fixed effects.

In figures 5A and 5B, we graphically illustrate the time trends for this outcome variable in control and treated villages. Prior to 2005, the trends and level of this indicator for female-owned enterprises appear to be different. Post-treatment, it increases more in treated villages, however, the increase is not significantly different from that in control villages. Figure 5B shows peculiar results for the male-owned enterprises. While the indicator was increasing pre-treatment and the trends between treated and control villages also appear parallel, it declines after the treatment. A closer look at the figure shows that the decline is slightly lower in treated group, however not statistically different from the control group. Therefore, the interaction term has a positive coefficient of small magnitude but insignificant.

b) Borrowing from Non-Institutional Sources

Credit uptake from institutional sources remains muted in the treated village. What about other sources of credit such as informal moneylenders? Rural India has a higher reliance on non-institutional sources of credit. Ghosh and Vinod (2017) report that female headed households are less inclined to access formal finance and more inclined towards informal finance. With pooled data of 4 rounds of NSSO (1983, 1987-88, 1993-94, and 1999-2000) for 16 states, Menon and Rodgers (2011) find that the indebted households are three times as likely to have obtained their loan from an informal source

as from a formal source. To test the impact of the treatment on borrowing from non-institutional sources, we use the number of female- and male-led enterprises availing loans from money lenders and SHGs as outcome variables. Table 6B provides the results.

The coefficient on the interaction term is positive and significant for both female and male enterprises. Column 1 shows that proximity to a bank branch increases the number of female-owned enterprises with non-institutional finance (major source) by 0.055 in a treated village. The effect increases slightly to 0.062 after controlling for village and year fixed effects (Columns 2 and 3). Figure 5C indicates that the pre-trends between treated and control villages for this variable were slightly diverging but the effect is stronger in the treated villages post-treatment.

From columns 4-6, we see that the impact is higher for male-owned enterprises. The coefficient on the interaction term increases from 0.074 (Column 4) to 0.081 (Column 5 and 6) upon including village and year fixed effects and remains significant at 1% level. As compared to the mean level of same indicator, this impact is observed to be nearly 25% (0.081/0.33). Figure 5D shows that trend of this indicator appear parallel between treated and control group pre-treatment. They diverge post-treatment and portray an increasing trend where a higher increase is observed in the treated villages. This shows that the presence of male enterprises with non-institutional credit increases over the years in general and in treated villages, in particular.

Why do we observe an increase in non-institutional credit after improved proximity of a bank branch but not institutional credit even though the latter arises out of commercial banking sector? Evidence on the role of informal lenders as intermediaries between formal sources and borrowers may provide an explanation. Bell (1990) documents how wealthy suppliers in rural India borrow from banks and lend to their. Moneylenders may have certain advantages over institutional sources such as banks. They possess relatively more accurate information about the creditworthiness of the local people. Moreover, money-lenders, compared to an individual borrowers, are expected to have larger borrowing requirements and therefore, may turn out to be viable customers of a bank. Recently, Surendra (2020) recorded high dependence of money lenders on banks

which increases following high demand of credit from households during weather-induced shocks. Therefore, lending by informal channels may increase after presence of a bank branch in the vicinity, as the wealthier individuals borrow from banks in exchange of collateral, and offer to poorer households in the village at a higher rate.

7.2   *Aggregate Average Treatment Effect of a Banked Center*

The difference-in-difference coefficients in tables 4-6 are the treatment effects on one un-banked village due to establishment of a bank branch within 5km of that village. However, one bank can serve multiple villages. Table 7 shows the coverage of a banked center i.e. the number of un-banked villages within 5km of a banked center between 2005 and 2013. On average, there are 9.04 villages within 5km of a banked center, and the median value is 6. In other words, in order to cover 9.04 unbanked villages with a bank within 5 km, we need 1 banked center on an average. The maximum value is 75 indicating that areas where the size of villages is small, one banked center can cover as many as 75 un-banked villages. A bank, thus, can impact several villages at the same time. Using the average, we compute the aggregate average treatment effect in a neighborhood of 5km of a banked center in Table 8 as follows:

Aggregate average treatment effect = γ* average coverage of a banked center[12].

One banked center leads to 9.52 new male-owned enterprises in non-agricultural sector but rises slowly nearly by 8.91 units in the agricultural sector. Given the higher output and employment multipliers of non-agricultural sector in India, this is likely to be a net gain. Similarly, 4.87 more female-owned non-agricultural enterprises are established due to a bank branch entry. Although small in absolute value, the relative impact is much higher due to the lower average value of this indicator (Table 2). Further, female-ownership will also create substantial social impact.

The female and male employment show a slower increase in agricultural sector where the aggregate ATE is of similar magnitude at -9.908 and -10.93 respectively. However, the gain in non-agriculture sector employment are much larger at 50.35 and 39.59

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[12] We provide Aggregate Average Treatment Effect for all our dependant variables except for number of female enterprises with informal finance since the pre-trends for the treatment and control group were not parallel for this variable, and the ATE is, thus, biased.

persons for females and males respectively. This shows that financial development brings transformation in the labour market and in its gender-wise composition as well.

8. Robustness Checks

In this section, we provide various tests which address unobserved time-varying village factors. We also conduct some additional robustness checks.

a) Parallel Pre-Trends

Identification in D-I-D method requires the control group to serve as a counterfactual for the trend in treated group without the treatment. While this assumption remains untested, we conduct a parallel pre-trend test—whether the treated and control group villages moved parallel before the treatment. An absence of parallel pre-trends (or more importantly, diverging trends) would suggest that some pre-treatment unobservable factors were already affecting the outcome indicators of treated and control groups, weakening the argument for the effect of treatment.

Figures 3-5 illustrate the pre-trends visually. To test it empirically, we use the following empirical model on pre-treatment observations:

$$y_{vt} = \varphi_v + \sum \varphi_t + \sum \rho_t \cdot \varphi_t \cdot (Treated_v) + \varepsilon_{vt}$$

where, φ_v are village fixed effects. φ_t takes value 1 for each pre-treatment period and 0 otherwise. ρ_t measures the change in trend between the two groups of villages in year t compared to the base year[13]. An insignificant coefficient of the interaction term would indicate that the trends were not significantly different before the treatment between treated and control villages.

Table 9 shows the results of the above test for overall female and male owned enterprises (columns 1 and 2), in agricultural sector (columns 3 and 4) and in non-agricultural sector (columns 5 and 6). Except for male-owned enterprises in agricultural

[13] It should be noted that for employment variables, we have three pre-treatment periods (EC 1990, EC 1998 and EC 2005) but for the remaining variables pre-treatment observations are from EC 1998 and EC 2005.

sector, all other outcome variables exhibit parallel pre-trends. Noticeably, the male-owned agricultural enterprises in treated villages were on a steeper trajectory prior to the treatment, which decelerates post-treatment. Thus, our estimate of average treatment effect for this variable is an upper bound; bank branch proximity may have led to an even slower growth in number of male-owned agricultural enterprises than what we have estimated in Table 3.

Table 10 shows the results for employment indicators. The results confirm parallel pre-trends for male and female employment in non-agricultural enterprises as the interaction coefficient is insignificant. Employment in agricultural sector appears to diverge pre-treatment. However, the bias introduced due to diverging trend runs counter to our estimated treatment effect in Table 5B. Hence, the ATEs measured in columns 3 and 6 in Table 5B serve an upper bound, whereas the true treatment effect may be further lower indicating that the contribution of proximity to banks in industrial shift away from agricultural may be stronger.

Finally, Table 11 shows results for credit indicators. The parallel pre-trend assumption is met for institutional finance for both male and female-owned enterprises. For non-institutional finance, while the male-owned enterprises exhibit parallel pre-trend, we observe weak divergence (significant at 10%) for female-owned enterprises. It indicates that our result of post-treatment increase for the latter is biased upwards as the demand for non-institutional finance was increasing at higher rate in the pre-treatment period itself.

It is notable that finding evidence of parallel pre-trends does not rule out the mechanism of savings that may occur after a bank is established. Lack of available data does not allow us to test this channel.

b) <u>Potential Concurrent Factors</u>

Kahn-Lang and Lang (2018) argue that the failure to reject diverging trends is neither sufficient nor necessary to establish treatment effects. For example, alternative village-year effects which are correlated with presence of bank branches may also improve

economic activity or credit uptake. In such a case, the treatment effect could be biased upwards.

To address these concerns, we compare our treated and control villages across key variables before and after treatment, which may impact economic activity in the village. We include infrastructure variables (presence of paved roads, power for commercial use), other financial agencies (post offices, cooperative banks, and agricultural credit societies) and socio-economic variables (population, literacy and distance to towns). If our treated and control villages are diverging on these variables, then our treatment effect may be biased.[14]

Figure 6A-E plot the proportion of infrastructural indicators and other financial agencies in our treated and control group between 2001 and 2011. For none of these factors, the trend for treated villages is diverging from control villages. Moreover, the differences on presence of roads and agricultural credit society have converged between 2001 and 2011. We test this more rigorously using the following specification:

$$I_{vt} = \alpha.Treated_v + \beta.Post-Treatment_t + \gamma.Treated_v * Post-Treatment_t + \varepsilon_{vt}$$

where, I_{vt} is an indicator which takes value 1 if village v had an infrastructure in year t, where t is either 2001 or 2011, and 0, otherwise. Table 12 shows the results. The interaction term in any of the columns is either insignificantly different from zero or significantly negative. The latter indicates that the respective village amenity is converging between two sets of villages over studied points of time. Thus, our treatment effect is not biased by these variables which are key in generating economic activity or financial inclusion.

On the contrary, the level and growth of socio-economic indicators - literacy rate, size of population, and distance to town were significantly different between treated and control villages over 2001 and 2011. To be specific, treated villlages have higher literacy rate, population and lower distance to towns. These variables, indicating higher economic potential, could bias our results. As an additional robustness check, we re-

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[14] Ideally, such variables should be included as controls in our main specification. However, we obtain these variables from Population Census 2001 and 2011 which are temporally not aligned with our Economic Censuses conducted in 1990, 1998, 2005 and 2013.

estimate our results by including interactions of pre-treatment levels of these variables with time trends.[15] These indicators proxy for the pre-treatment economic potential of a village. If the significance of ATE survives after inclusion of differential time trends, then the treatment effect is less likely to be biased by pre-treatment trajectory of economic potential of the village (Wing et. al. 2018). We use the following model:

$$y_{vt} = \gamma.Treated_v * Post - Treatment_t + Z_{v2001} * TT + \varphi_v + \varphi_t + \varepsilon_{vt}$$

where, Z_{v2001} is a set of village characteristics from 2001, which include population of the village, literacy rate and distance to the nearest town. We test if γ, coefficient on the interaction term, remains significant after inclusion of these time trends. Table 13-15 report the coefficient on the interaction term and our results remain consistent with our baseline specifications from corresponding tables 4-6. Results on institutional and non-institutional credit also follow a similar pattern as observed in the baseline model. Thus, our average treatment effects are not solely driven by a differential trajectory of villages with higher pre-treatment levels of economic potential; an improved proximity to a bank branch provided an impetus.

c) <u>Addressing lending by SHGs</u>

As previously discussed, SHGs were not recorded explicitly as a source of credit in Economic Census rounds prior to 2013 even though SHG lending has been prevalent since early 1990s. For our analysis on credit uptake, we have clubbed SHGs with non-institutional source of finance in EC 2013. However, counting SHGs as non-institutional source in 2013 may be incorrect if interviewers recorded SHGs as an institutional source in previous rounds. This concern is pertinent since SHGs themselves rely on commercial banks for credit.

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[15] Ideally, we would have wanted to include these variables as controls in our estimation equation. However, these data are available only for 2001 and 2011 population census rounds, making it difficult to use as controls for variables which are available for 1998, 2005 and 2013.

To address this issue, we test our results on credit uptake after excluding states with an above average share of SHG lending as per EC 2013. [16] Table 16 provide the results for the remaining states. We still observe a positive impact on both female and male onwed-enterprises with non-institutional finance. The ATE for the former is 0.0715 with a standard error of 0.026, significant at 1% and the corresponding coefficient is 0.101 with a standard error of 0.054 for the latter. For instititional finance, we find negative and insignificant coefficients on both female and male-owned enterprises.

9. Conclusion

Engagement of women in productive avenues of the economy is vital for holistic development. However, in India, workforce participation of women remains abysmally low. While several reasons may explain low participation of women in economic activities, in this paper, we explore how financial access transforms entrpreneurship and employment of men and women in rural India. RBI's policy of branch expansion and liberalising the use of non-service area branch led to penetration of branches in all areas in general, and in semi-urban and rural areas in particular. It also reduced the extent of closures/mergers/conversions over time. Therefore, a bank branch was more likely to survive even in rural areas. These initiative, in turn led to a remarkable improvement in financial access of unbanked-areas. We examine what impact these policies have had on economic activity in those areas subsequently.

We construct a novel panel dataset of village-level economic enterprises in India with their distance to the nearest banked center. Our results shows that improved proximity to financial access point attenuates the gender gap in entrepreneurship and labour markets. Number of women entreprenuers increases with most of this increase occuring in non-agricultural sector. Men also enter non-agricultural sector as entrprenuers but net male entreprenuership remains unchanged as a corresponding decline occurs in agricultural sector. Labour market transformation is even starker—employment in

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[16] On average, 12% of enterprises across states receive majority of their finances from SHGs. States with below average share, and thus included in table 13, are Assam, Bihar, Chattisgarh, Dadra & Nagar Haveli, Daman & Diu, Goa, Gujarat, Jammu & Kashmir, Lakshadweep, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and West Bengal.

agriculural enteprises declines with a more-than-compensating increase in non-agricultural labour force for both the genders. Increase in women employment is observed to be higher. We find evidence that this transition is a consequence of higher credit uptake by enterprises from non-institutional sources.

Several interesting policy-relevant insights arise from our work. First, proximity to financial services improves women's presence in relatively more productive sectors of the economy. Supply-side restrictions due to mobility constraints, and not only social aversion to working, may exclude women from accessing financial services. Some recent evidence also suggests that restrictions on women's mobility leads to their financial exclusions (The Power of Jan Dhan, 2021). Facilitating these services may then stem the downward decline in female employment. Second, financial infrastructure aids transition in villages from agricultural to non-agricultural sector, a hypothesis ideated by Banerjee and Newman (1993). To the best of our knowledge, our paper is the first to estimate causal impact of bank branches on village-level structural transformation in India. Finally, even though government agencies strive to remove informal intermediaries between banks and borrowers, they play an important role in connecting the real side of the economy to the financial markets. This may possibly happen due their information advantages.

Our paper also suggests new areas of research. We do not observe amount of credit provided, interest rate charged, collateral offered, etc. As noted previously, these can be potential areas where gender discrimination is exercised. Understanding disparity in scale and cost of credit faced by women and men will be an interesting area to explore. Additionally, higher economic well-being is a means to achieve the end of social well-being. What has been the impact of higher female entrepreneurship on intra-household bargaining, poverty rates, vulnerability to exogenous shocks, and social ills? Given that our village-bank matched panel data ranges from 1950 onwards, our estimation technique can be extended to other appropriately measured village-level outcomes. We leave this for future work.

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Figures

Figure 1: Number of New Branches Opened Each Year in Rural and Urban Areas: 1950-2019
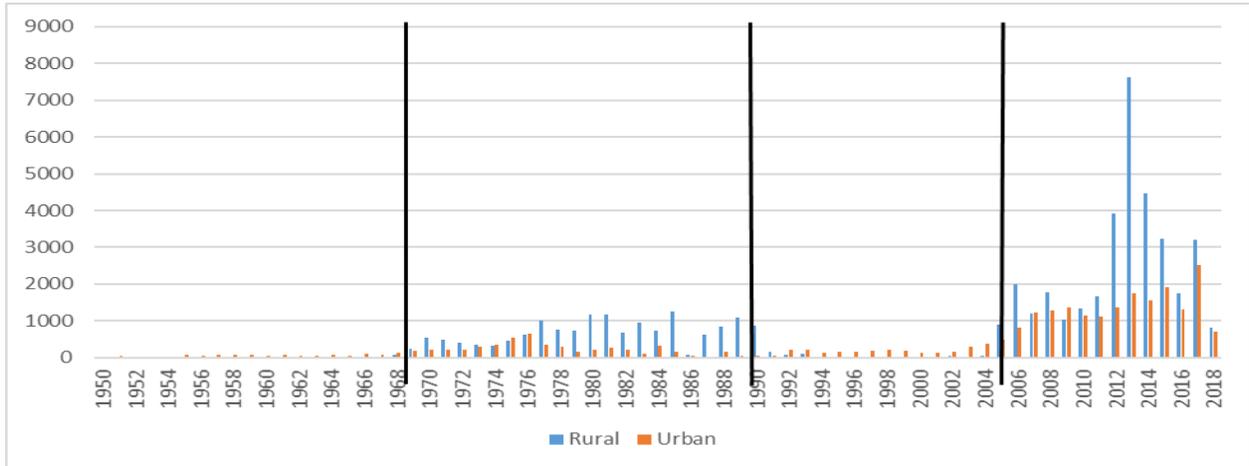
Data Source: RBI Commercial Bank Directory as on October 2019.

Figure 2: The Size of Branch Closure/Merger/Conversion: All India Level
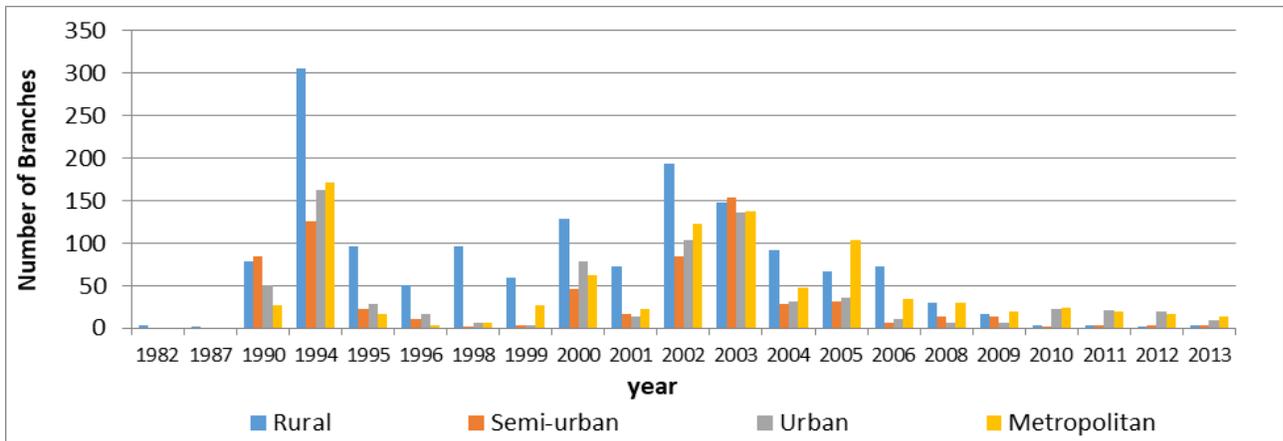
Data Source: Data obtained from RBI Branch Banking Statistics of various years.

Figure 3: Impact on Number of Enterprises: by Gender-wise Ownership
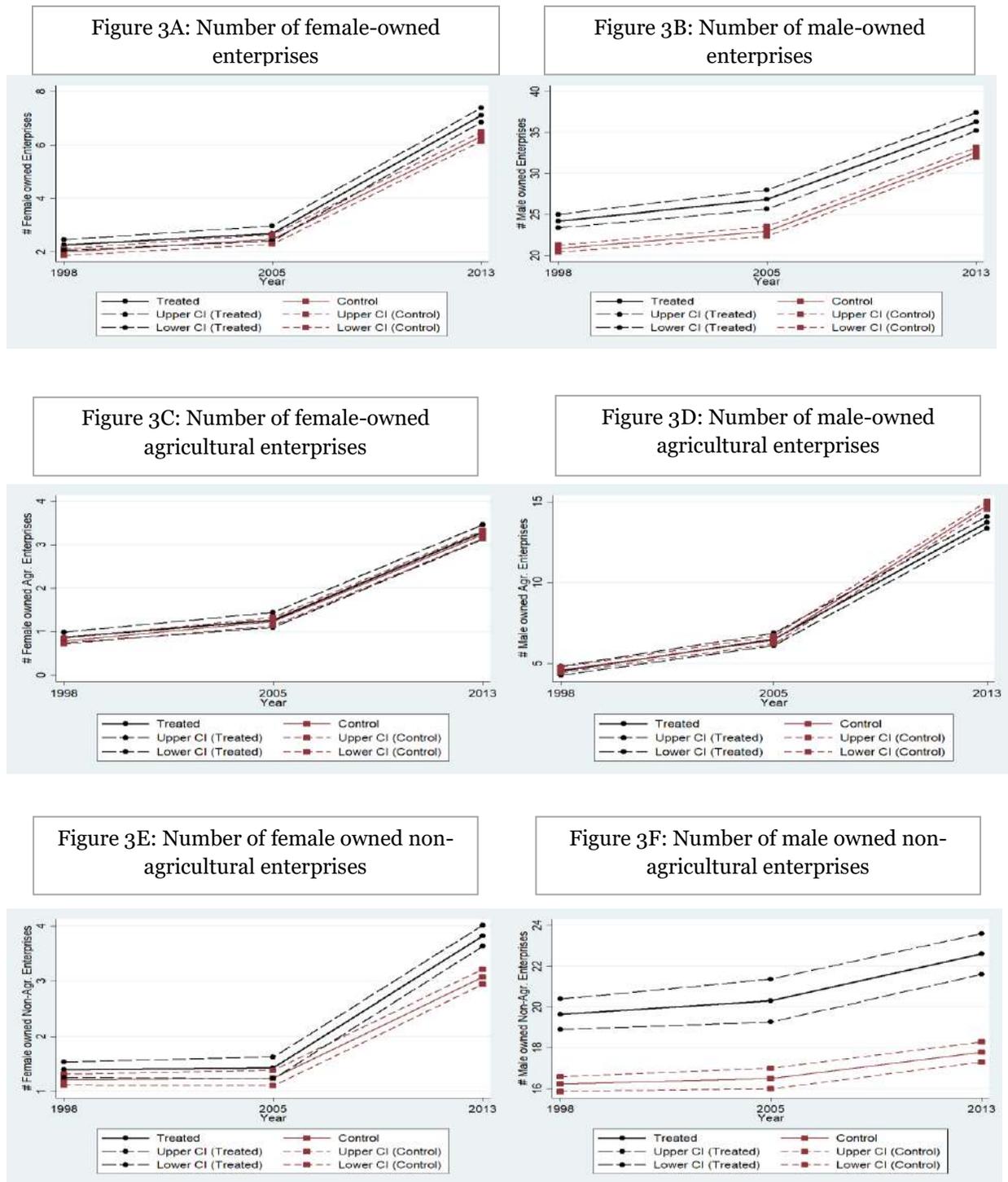
Figure 3A: Number of female-owned enterprises

Figure 3B: Number of male-owned enterprises

Figure 3C: Number of female-owned agricultural enterprises

Figure 3D: Number of male-owned agricultural enterprises

Figure 3E: Number of female owned non-agricultural enterprises

Figure 3F: Number of male owned non-agricultural enterprises

Notes: (i) Based on authors' calculations. (ii) This figure plots the comparison of economic activity indicators defined as number of female and male owned total, agricultural and non-agricultural enterprises between treated and control villages. (iii) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (iv) Data Source: Enterprise level data is obtained from three rounds of Economic census - 1998, 2005, and 2013, and combined in to a panel using SHURG Ids; data on financial access is derived using spatial data, PC 2011 and RBI commercial bank directory.

Figure 4: Impact on Gender-wise Employment

Figure 4A: Number of female workers in all Enterprises
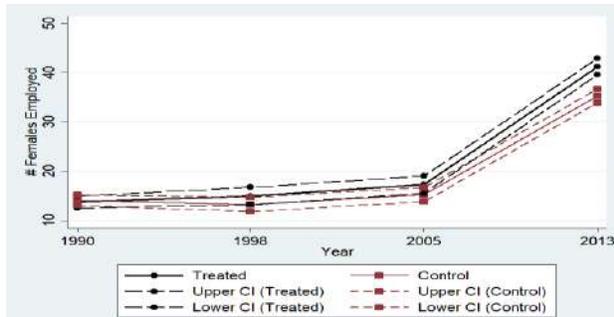
Figure 4B: Number of male workers in all Enterprises
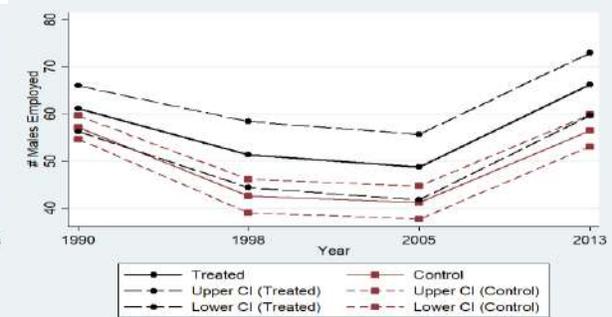
Figure 4C: Number of female workers in Agricultural Enterprises
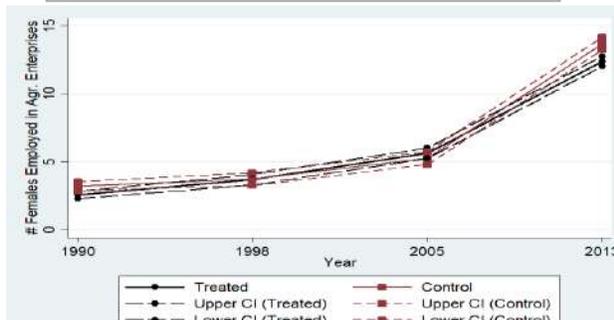
Figure 4D: Number of male workers in Agricultural Enterprises
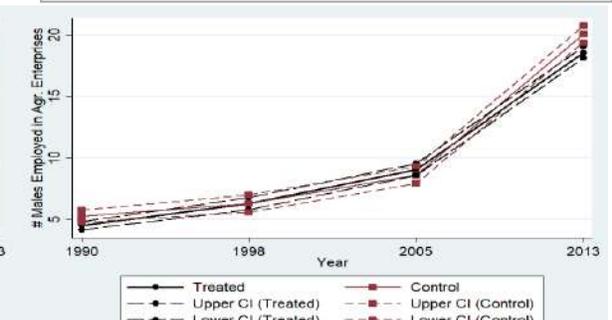
Figure 4E: Number of female workers in Non-Agricultural Enterprises
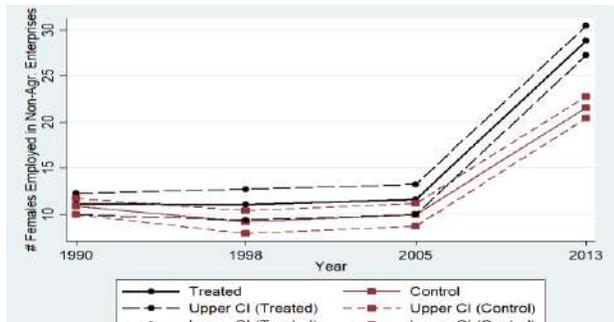
Figure 4F: Number of male workers in Non-Agricultural Enterprises
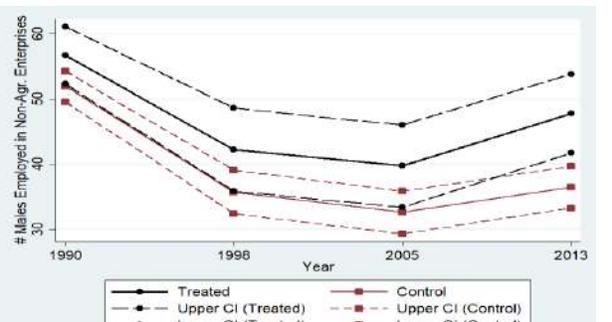
Notes: (i) Based on authors' calculations. (ii) This figure plots the comparison of economic activity indicators defined as number of female and male employed in all, agricultural and non-agricultural enterprises between treated and control villages. (iii) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (iv) Data Source: Enterprise level data is obtained from three rounds of Economic census – 1990, 1998, 2005, and 2013, and combined in to a panel using SHURG Ids; data on financial access is derived using spatial data, PC 2011 and RBI commercial bank directory.

Figure 5: Impact on Uptake of credit (Major Source of Finance)

Figure 5A: Number of female owned enterprises with institutional finance	Figure 5B: Number of male owned enterprises with institutional finance
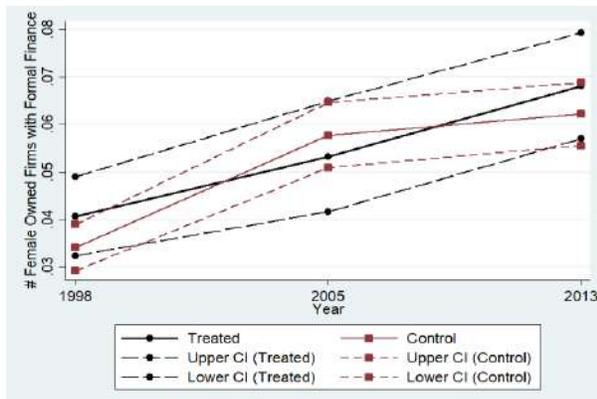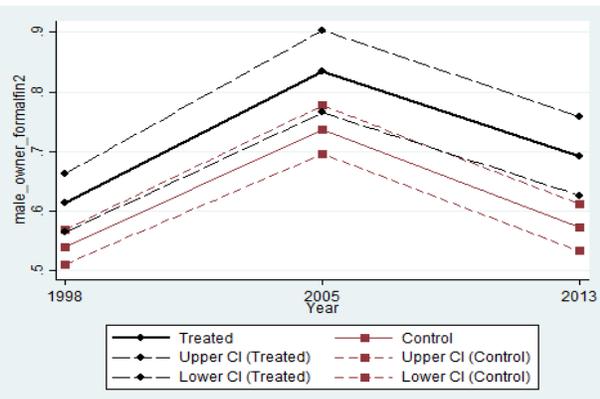
Figure 5C: Number of female owned enterprises with non-institutional finance	Figure 5D: Number of male owned enterprises with non-institutional finance
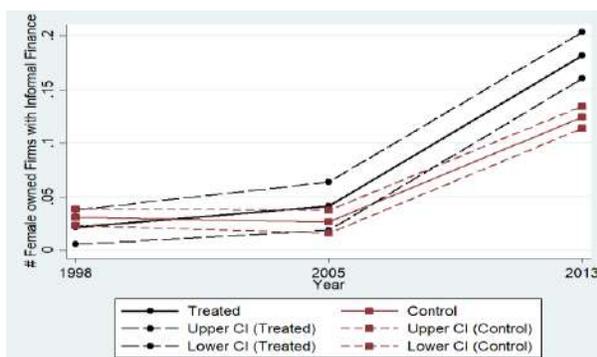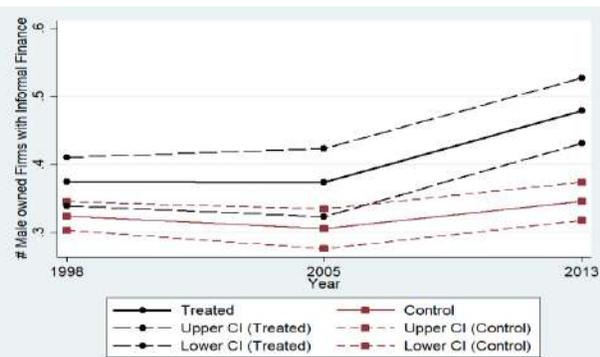
Notes: (i) Based on authors' calculations. (ii) This figure plots the comparison of number of female and male enterprises with their major source of finance between treated and control villages. (iii) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (iv) Data Source: Enterprise level data is obtained from three rounds of Economic census – 1990, 1998, 2005, and 2013, and combined in to a panel using SHURG Ids; data on financial access is derived using spatial data, PC 2011 and RBI commercial bank directory.

Figure 6: Potential Concurrent Factors: Villages with rest of the amenities (Proportion of all villages)

Figure 6A: Villages with a Road

Figure 6B: Villages with Post Office

Figure 6C: Villages with Agricultural Credit Society

Figure 6D: Villages with Commercial Power

Figure 6E: Villages with Cooperative Bank
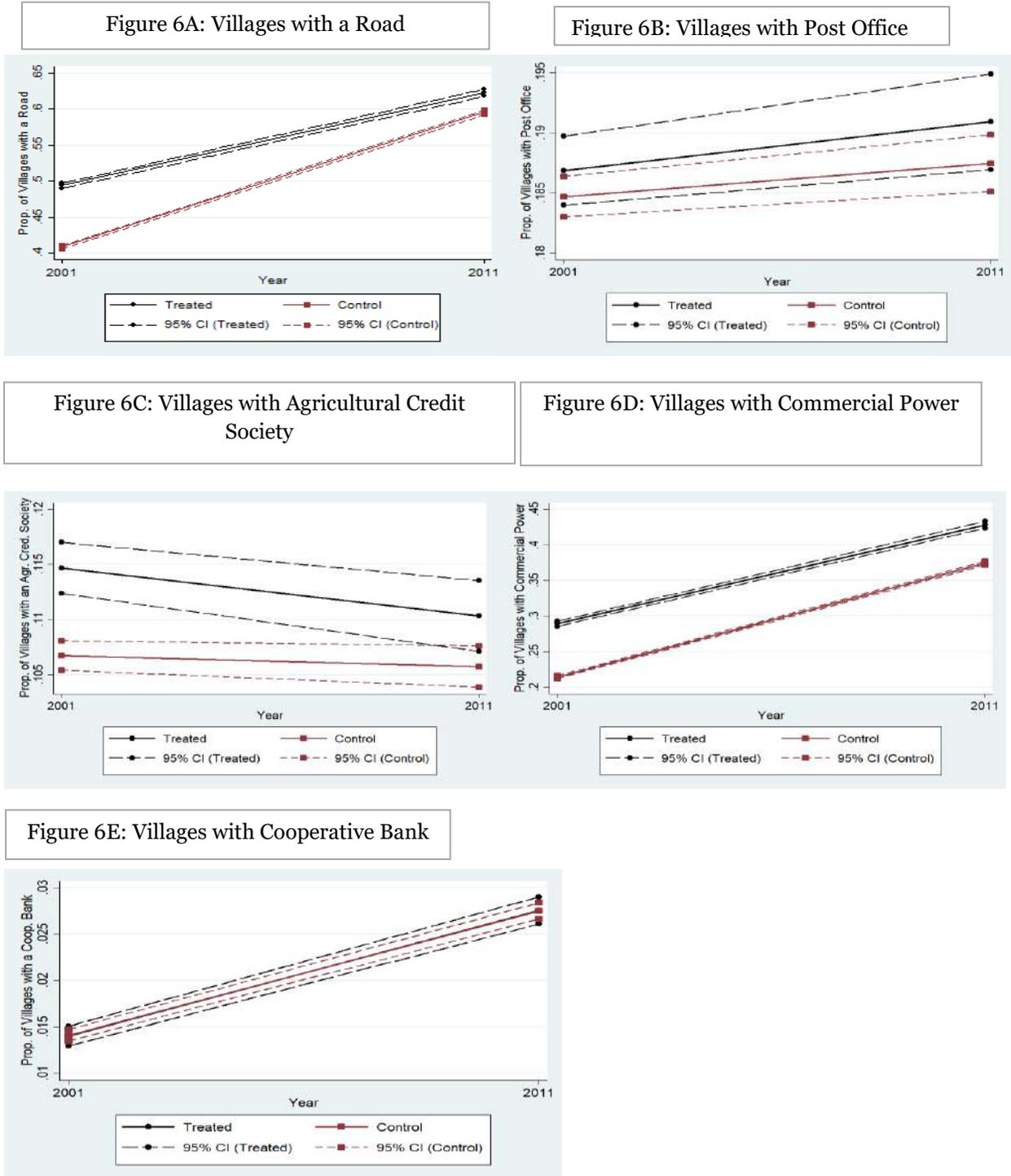
Notes: (i) Based on authors' calculations. (ii) All indicators are captured as dummy (Yes – 1, No-0). The dependent variable in these graphs is computed as proportion of villages with respective public good. (iii) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (iv) The pre- and post-treatment period refers to the population census data of 2001 and 2011 respectively.

Tables

Table 1: Summary Statistics

	1998	2005	2013	1998	2005	2013
	Female-owned enterprises			Male-owned enterprises		
	Number of Enterprises					
All	2.06	2.53	6.53	21.71	23.97	33.59
Treated	2.26	2.7	7.12	24.19	26.81	36.33
Control	1.99	2.47	6.31	20.8	22.9	32.58
	Number of Agricultural Enterprises					
All	0.80	1.24	3.25	4.59	6.47	14.51
Treated	0.86	1.27	3.29	4.55	6.49	13.73
Control	0.78	1.23	3.23	4.6	6.45	14.79
	Number of Non-agricultural Enterprises					
All	1.25	1.29	3.28	17.12	17.50	19.08
Treated	1.39	1.42	3.82	19.64	20.31	22.59
Control	1.21	1.24	3.08	16.22	16.49	17.79
	Institutional Finance as major source of credit					
All	0.035	0.056	0.063	0.559	0.762	0.604
Treated	0.04	0.053	0.068	0.614	0.834	0.692
Control	0.034	0.057	0.062	0.54	0.736	0.572
	Non-institutional Finance as major source of credit					
All	0.02	0.03	0.139	0.337	0.32	0.38
Treated	0.021	0.041	0.181	0.375	0.373	0.479
Control	0.03	0.026	0.123	0.324	0.305	0.346

Notes: (i) Based on authors' calculations. (ii) Data Source: Data is obtained from Economic census rounds of 1998, 2005, and 2013.

Table 2: Summary Statistics: Employment Indicators

	1990	1998	2005	2013	1990	1998	2005	2013
	Female Employment				Male Employment			
	All Enterprises							
All	13.99	13.69	15.79	36.88	58.28	44.91	43.2	59.12
Treated	13.71	14.96	17.27	41.25	61.16	51.4	48.75	66.29
Control	14.09	13.24	15.27	35.28	57.19	42.6	41.22	56.49
	Agricultural Enterprises							
All	3.03	3.72	5.38	13.34	5.07	6.31	8.74	19.65
Treated	2.57	3.69	5.65	12.38	4.5	6.3	9.07	18.57
Control	3.21	3.73	5.29	13.69	5.28	6.31	8.63	20.05
	Non-agricultural Enterprises							
All	10.95	9.68	10.41	23.5	53.21	37.4	34.45	39.4
Treated	11.14	11.08	11.62	28.86	56.65	42.21	39.68	47.72
Control	10.88	9.18	9.98	21.59	51.9	35.71	32.59	36.44

Notes: (i) Based on authors' calculations. (ii) Data Source: Data is obtained from Economic census rounds of 1990, 1998, 2005, and 2013.

Table-3: Mean Distance of un-banked villages to the Nearest Banked Center (kms)

	1998	2005	2013
Treated	8.45	8.3	3.23
Control	9.81	9.84	8.42

Notes: (i) Based on authors' calculations. (ii) Data Source: The financial access is derived using spatial data, PC 2011 and RBI commercial bank directory.

Table 4A: Impact on All Enterprises: Gender-wise Ownership

	Number of Female-owned Enterprises			Number of Male-owned Enterprises		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.244***			3.613***		
	(0.091)			(0.398)		
Post-2005 dummy	4.075***	4.552***		10.669***	13.427***	
	(0.065)	(0.086)		(0.195)	(0.256)	
Treated*Post-2005	0.562***	0.593***	0.592***	0.132	0.070	0.068
	(0.121)	(0.161)	(0.161)	(0.422)	(0.549)	(0.549)
Mean	2.3			22.8		
Observations	6,85,575			6,85,575		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Table 4B: Impact on Agricultural Enterprises: Gender-wise Ownership

	Number of Female-owned Ent. in Ag Sector			Number of Male-owned Ent. in Ag. Sector		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.059			-0.011		
	(0.051)			(0.103)		
Post-2005 dummy	2.222***	2.459***		9.237***	10.752***	
	(0.041)	(0.055)		(0.097)	(0.141)	
Treated*Post-2005	0.002	0.054	0.053	-1.047***	-0.984***	-0.986***
	(0.081)	(0.110)	(0.110)	(0.172)	(0.251)	(0.251)
Mean	1.03			5.55		
Observations	6,85,575			6,85,575		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Table 4C: Impact on Non-Agricultural Enterprises: Gender-wise Ownership

	Number of Female-owned Ent. in Non-ag Sector			Number of Male-owned Ent. in Non-ag Sector		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.185***			3.624***		
	(0.070)			(0.368)		
Post-2005 dummy	1.853***	2.094***		1.432***	2.676***	
	(0.047)	(0.062)		(0.160)	(0.204)	
Treated*Post-2005	0.560***	0.539***	0.539***	1.179***	1.055**	1.054**
	(0.082)	(0.108)	(0.108)	(0.370)	(0.469)	(0.469)
Mean	1.27			17.3		
Observations	6,85,575			6,85,575		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Notes: (i) Based on authors' calculations. (ii) The outcome variable is the number of female- and male-owned all, agricultural and non-agricultural enterprises. (iii) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (iv) Following Bertrand et al (2004), standard errors are corrected for heteroscedasticity within villages. (v) Standard errors are provided in parenthesis. (vi) */**/*** denote significance at 10/5/1% levels respectively. (vii) Data Source: Enterprise level data is obtained from three rounds of Economic census - 1998, 2005, and 2013, and combined in to a panel using SHURG Ids; data on financial access is derived using spatial data, PC 2011 and RBI commercial bank directory.

Table 5A. Impact on Gender-wise Employment in All Enterprises

	Number of Females Employed in all Enterprises			Number of Males Employed in all Enterprises		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.670***			1.274***		
	(0.143)			(0.209)		
Post-2005 dummy	9.604***	10.269***		13.300***	14.506***	
	(0.160)	(0.201)		(0.214)	(0.265)	
Treated*Post-2005	0.894***	1.030***	1.012***	1.197***	1.485***	1.457***
	(0.255)	(0.321)	(0.322)	(0.317)	(0.401)	(0.404)
Mean	14.5			48.8		
Observations	927226			927226		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Table 5B. Impact on Gender-wise Employment in Agricultural Enterprises

	Number of Females Employed in Agricultural Enterprises			Number of Males Employed in Agricultural Enterprises		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	-0.134			-0.155		
	(0.136)			(0.197)		
Post-2005 dummy	9.604***	10.269***		13.300***	14.506***	
	(0.160)	(0.202)		(0.214)	(0.265)	
Treated*Post-2005	-1.173***	-1.081***	-1.096***	-1.321***	-1.187***	-1.211***
	(0.227)	(0.289)	(0.291)	(0.290)	(0.369)	(0.372)
Mean	4.05			6.71		
Observations	905720			905720		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Table 5C. Impact on Gender-wise Employment in Non-agricultural Enterprises

	Number of Females Employed in Non-agricultural Enterprises			Number of Males Employed in Non-agricultural Enterprises		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	1.260***			6.330***		
	(0.475)			(1.766)		
Post-2005 dummy	11.571***	12.390***		-3.640***	-1.241	
	(0.365)	(0.448)		(0.835)	(0.968)	
Treated*Post-2005	6.014***	5.537***	5.577***	4.951***	4.043*	4.385**
	(0.692)	(0.883)	(0.886)	(1.817)	(2.214)	(2.209)
Mean	10.35			41.7		
Observations	905720			905720		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Notes: (i) Based on authors' calculations. (ii) The outcome variable is the number of females and males employed (includes both hired and non-hired categories) in all, agricultural, and non-agricultural enterprises. (iii) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (iv) Following Bertrand et al (2004), standard errors are corrected for heteroscedasticity within villages. (v) Standard errors are provided in parenthesis. (vi) */**/*** denote significance at 10/5/1% levels respectively. (vii) Data Source: Enterprise level data is obtained from three rounds of Economic census – 1990, 1998, 2005, and 2013, and combined in to a panel using SHURG Ids; data on financial access is derived using spatial data, PC 2011 and RBI commercial bank directory.

Table 6A: Impact on Number of Enterprises with Institutional Credit as Major Source of Finance

	Female Enterprises			Male Enterprises		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.001			0.086***		
	(0.004)			(0.024)		
Post-2005 dummy	0.016***	0.019***		-0.068***	-0.034*	
	(0.003)	(0.004)		(0.015)	(0.020)	
Treated*Post-2005	0.005	0.005	0.005	0.034	0.020	0.020
	(0.006)	(0.008)	(0.008)	(0.029)	(0.038)	(0.038)
Mean	0.052			0.641		
Observations	6,85,575			6,85,575		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Table 6B: Impact on Number of Enterprises with Non-institutional Credit (Money lenders + SHGs) as Major Source of Finance

	Female Enterprises			Male Enterprises		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.003			0.059***		
	(0.004)			(0.014)		
Post-2005 dummy	0.096***	0.109***		0.031***	0.055***	
	(0.005)	(0.008)		(0.011)	(0.016)	
Treated*Post-2005	0.055***	0.062***	0.062***	0.074***	0.081**	0.081**
	(0.012)	(0.018)	(0.018)	(0.024)	(0.033)	(0.033)
Mean	0.029			0.33		
Observations	6,85,575			6,85,575		
Fixed Effects	No	Village FE	Village and Year FE	No	Village FE	Village and Year FE

Notes: (i) Based on authors' calculations. (ii) In panel 1, the outcome variable is the number of female- and male-owned enterprises which reported formal finance as their major source of finance. (iii) In panel 2, the outcome variable is the number of female- and male-owned enterprises which reported non-institutional source (moneylenders and SHGs) as their major source of finance. (iv) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (v) Standard errors are provided in parenthesis. (vi) */**/*** denote significance at 10/5/1% levels respectively. (vii) Data Source: Enterprise level data is obtained from three rounds of Economic census - 1998, 2005, and 2013, and combined in to a panel using SHURG Ids; data on financial access is derived using spatial data, PC2011 and RBI commercial bank directory.

Table-7: Coverage of a bank branch: Number of Un-banked Villages Within 5km of a Banked Center in 2013

	Min	25th Percentile	Median	75th Percentile	Mean	Max
Number of villages within 5km of a banked center	1	3	6	12	9.04	75

Note: Computed by authors using the financial access indicator for each unbanked village in 2013.

Table-8: Aggregate Average Treatment Effect

	Enterprises in agricultural sector		Enterprises in non-agricultural sector		Employment in agricultural enterprises		Employment in non-agricultural enterprises	
	#Female-owned	#Male-owned	#Female-owned	#Male-owned	Females	Males	Females	Males
γ ^	0.053	-0.98***	0.53***	1.054***	-1.096**	-1.21**	5.57***	4.38**
Aggregate Average Treatment Effect within 5km of a bank branch*	0.47912	-8.91344	4.87256	9.52816	-9.90784	-10.9384	50.3528	39.5952

Notes: (i) Computed by authors. (ii) ^- Average Treatment Effect obtained from Tables 3 – 4. (iii) * is defined as multiplication of mean coverage (9.04) by γ .

Table-9: Pre-Trends for Number of Enterprises: Gender-wise Ownership

	Total Enterprises		Agricultural Enterprises		Non-agricultural Enterprises	
	#Female-owned	#Male-owned	#Female-owned	#Male-owned	#Female-owned	#Male-owned
	(1)	(2)	(3)	(4)	(5)	(6)
Treated*(Year=2005)	0.011	1.33	-0.0231	0.359*	0.034	0.978
	(0.259)	(1.305)	(0.122)	(0.212)	(0.218)	(1.26)
Observations	4,29,720	4,29,720	4,29,720	4,29,720	4,29,720	4,29,720

Notes: (i) Based on authors' calculations. (ii) The outcome variable is the number of aggregate, agricultural, and non-agricultural enterprises. (iii) Standard errors are provided in parenthesis. (iv) */**/*** denote significance at 10/5/1% levels respectively.

Table-10: Pre-Trends for Gender-wise Employment

	Employment in all Enterprises		Employment in Agricultural Enterprises		Employment in Non-agricultural Enterprises	
	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Treated*(Year=1998)	2.19	3.82	0.706	0.848	1.655	0.33
	(2.08)	(8.29)	(0.485)	(0.753)	(1.88)	(7.49)
Treated*(Year=2005)	2.55	2.78	1.262***	1.523***	1.30	1.251
	(1.98)	(7.12)	(0.497)	(0.741)	(1.867)	(7.000)
Observations	6,49,865	6,49,865	6,49,865	6,49,865	6,49,865	6,49,865

Notes: (i) Based on authors' calculations. (ii) The outcome variable is the size of female and male employment in all, agricultural, and non-agricultural enterprises. (iii) Standard errors are provided in parenthesis. (iv) */**/*** denote significance at 10/5/1% levels respectively. (v) Data Source: Enterprise level data is obtained from three rounds of Economic census – 1990, 1998, 2005, and 2013, and combined in to a panel using SHURG Ids; data on financial access is derived using spatial data, PC2011 and RBI commercial bank directory.

Table-11: Pre-Trends for Credit Uptake of the Enterprises

	Non-Institutional Finance (Major Source)		Institutional Finance (Major Source)	
	Female	Male	Female	Male
	(1)	(2)	(3)	(4)
Treated*(Year=2005)	0.0279*	0.0464	-0.0031	0.0973
	(0.0156)	(0.0497)	(0.0117)	(0.0754)
Observations	4,29,720	4,29,720	4,29,720	4,29,720

Notes: (i) Based on authors' calculations. (ii) The outcome variable is the number of all, female and male enterprises, separated by their major source of finance. (iii) Standard errors are provided in parenthesis. (iv) */**/*** denote significance at 10/5/1% levels respectively.

Table-12: Significance of Potential Concurrent Factors: Village Amenities

	Roads	Cooperative Banks	Agricultural Credit Society	Post Office	Commercial Power
Treated	0.085***	-0.000	0.008***	0.075***	0.002
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Post-Treatment	0.187***	0.013***	-0.001	0.160***	0.003***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Treated*Post-Treatment	-0.058***	0.000	-0.003***	-0.021***	0.001
	(0.003)	(0.001)	(0.001)	(0.003)	(0.001)
Observations	5,67,660	5,67,660	5,67,660	5,67,660	5,67,660

Notes: (i) Based on authors' calculations. (ii) The outcome variable is the village level availability of paved road, Cooperative bank, Agricultural credit Society, Post Office, and Power for commercial use. All indicators are captured as dummy (Yes – 1, No-0) (iii) The treated villages are those un-banked villages which received a bank branch within 5 km between 2005 and 2013. (iv) The pre- and post-treatment period refers to the population census data of 2001 and 2011 respectively. (v) Following Bertrand et al (2004), standard errors are corrected for heteroscedasticity within villages. (vi) Standard errors are provided in parenthesis. (vii) */**/*** denote significance at 10/5/1% levels respectively. (vii) Data Source: Data on village amenities is obtained from two rounds of Population census of 2001 and 2011; data on financial access is derived using spatial data and RBI commercial directory.

Table-13: Impact on Entrepreneurship after Including Differential Time-trends

	Female-owned Enterprises			Male-owned Enterprises		
	Total	Agricultural	Non-agricultural	Total	Agricultural	Non-agricultural
	(1)	(2)	(3)	(4)	(5)	(6)
Treated*Post-2005	0.044	-0.19*	0.233**	-1.49***	-2.02***	0.53
	(0.167)	(0.11)	(0.19)	(0.55)	(0.256)	(0.249)
Observations	654,217			654,217		

Note: Each model includes village-fixed effects, year-fixed effects and time-trend interacted with population of village, literacy rates of villages and distance to nearest town as per Population Census 2001.

Table-14: Impact on Employment after Including Differential Time-trends

	Female Employment		Male Employment	
	Agricultural Enterprises	Non-agricultural Enterprise	Agricultural Enterprises	Non-agricultural Enterprises
	(1)	(2)	(3)	(4)
Treated*Post-2005	-2.24***	3.12***	-2.94***	3.65**
	(0.303)	(0.83)	(0.366)	(1.49)
Observations	654,217		654,217	

Note: Each model includes village-fixed effects, year-fixed effects and time-trend interacted with population of village, literacy rates of villages and distance to nearest town as per Population Census 2001.

Table-15: Impact on Credit Uptake after Including Differential Time-trends

	Female Owned		Male Owned	
	Non-Institutional	Institutional	Non-Institutional	Institutional
	(1)	(2)	(3)	(4)
Treated*Post-2005	0.049***	0.003	0.072**	0.022
	(0.018)	(0.008)	(0.03)	(0.04)
Observations	654,217		654,217	

Note: Each model includes village-fixed effects, year-fixed effects and time-trend interacted with population of village, literacy rates of villages and distance to nearest town as per Population Census 2011.

Table-16: Impact on Uptake of Credit in States with Below-average Share of SHGs Finance (Major Source of Finance)

	Female Owned Enterprises		Male Owned Enterprises	
	Non-Institutional Finance	Institutional Finance	Non-Institutional Finance	Institutional Finance
	(1)	(2)	(3)	(4)
Treated*Post-2005	0.071***	-0.011	0.101*	-0.026
	(0.026)	(0.013)	(0.054)	(0.059)
Observations	226,214		226,214	

Note: (i) Based on authors' computations. (ii) Each model run for states which have share of SHG finance (as major source) below-average. SHG share is used from EC 2013 data. (iii) Each model includes village-fixed effects, year-fixed effects. (iv) Standard errors are provided in parenthesis. (v) */**/*** denote significance at 10/5/1% levels respectively.

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