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$$\frac{n}{n} \binom{n}{m} p^m (1-p)^{n-m} = p \sum_{\ell=0}^{m-1} \frac{\ell+1}{n} \frac{(n-1)!}{(n-1-\ell)! \ell!} p^\ell (1-p)^{n-1-\ell} = p \frac{n-1}{n} \sum_{\ell=0}^{n-1} \left[ \frac{\ell}{n-1} + \frac{1}{n-1} \right] \frac{(n-1)!}{(n-1-\ell)! \ell!} p^\ell (1-p)^{n-1-\ell} = p^2 \frac{n-1}{n} +$$
$$\frac{1}{(n-1)!} p^{m-1} (1-p)^{n-m} = p \sum_{\ell=0}^{m-1} \frac{\ell+1}{n} \frac{(n-1)!}{(n-1-\ell)! \ell!} p^\ell (1-p)^{n-1-\ell} = p \sum_{\ell=0}^{n-1} \frac{\ell+1}{n} \frac{(n-1)!}{(n-1-\ell)! \ell!} p^\ell (1-p)^{n-1-\ell} = p^2 \frac{n-1}{n} +$$

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# Do Rural Banks Matter That Much?

## Burgess and Pande (AER, 2005)

## Reconsidered

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### Abstract:

We replicate Burgess and Pande (2005), who analyze the effects of the state-led expansion of the banking sector on poverty in India from 1961 to 1990. They find that the bank branch expansion in the rural areas decreased poverty due to improved access to credit and saving facilities. However, Burgess and Pande (2005) do not consider other simultaneous policies affecting the financial sector and poverty, in particular, the Integrated Rural Development Program aiming at credit subsidizing for the poor. Therefore, using the methodology by Burgess and Pande (2005), we show that structural shifts in the rural bank branch expansion and rural poverty can be identified for almost any other year between 1970 and 1984. Our results imply that the experiment by Burgess and Pande (2005) does not prove a superior impact of the bank branch expansion on poverty reduction in India.

JEL: G21, G28, O15, O16

Keywords: Bank expansion, rural poverty, finance

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# 1 Introduction

Over the years, it has become widely accepted that easing of access to financial services can reduce poverty and boost overall economic growth. Several alternative policies have already been tried, including credit subsidies for the poor, microfinance, and bank branch expansion in previously unbanked areas. The importance of finance for growth has been confirmed by many, and even the 2010 edition of the Handbook of Development Economics contains a separate chapter surveying that time evidence ([Karlan and Morduch, 2010](#)). Moreover, Muhammad Yunus, the founder of the Grameen bank who pioneered the provision of microcredits in Bangladesh, was awarded by the Nobel Peace Prize in 2006. Although [Banerjee and Duflo \(2011\)](#) have questioned the transformative power of microfinance, the focus on access to finance has been incorporated in development strategies.

One of the most influential papers supporting the view that easier access to credit helps to decrease poverty is [Burgess and Pande \(2005\)](#). By the end of 2019, this paper collected more than 1150 Google Scholar citations, with 200 of them just in 2018 and 2019, indicating an ongoing interest in their research. Their paper has been acknowledged in several policy publications (i.e., [Claessens and Feijen, 2007](#); [Honohan and Beck, 2007](#); [Jahan and McDonald, 2011](#)) and mentioned in the Handbook of Development Economics ([Rodrik and Rosenzweig, 2010](#)).

The identification of the effect of access to finance on poverty reduction requires a careful treatment of potential endogeneity. As a measure of access to finance, [Burgess and Pande \(2005\)](#) employ the bank branch expansion. However, since banks expand in the areas with increasing business opportunities, the expansion is not necessarily exogenous to poverty. [Burgess and Pande \(2005\)](#) solve the problem of causal inference by instrumenting the bank branch expansion with imposition and removal of the 1977 bank branch licensing policy. This policy required every bank to open four branches in unbanked locations for each branch opened in a banked location. Therefore, [Burgess and Pande \(2005\)](#) test for the presence of a structural break in a trend of bank branch expansion in rural areas and whether the increase in the number of bank branches induces a decrease in rural poverty. In their exercise, the exogeneity of these trend reversals as instruments for the expansion of bank branches requires the bank licensing policy of 1977 to be the only policy aimed at poverty reduction.

Moreover, [Burgess and Pande \(2005\)](#) emphasize that the 1977 policy was new

and a one-time government intervention. However, [Panagariya \(2006\)](#) and [Kochar \(2011\)](#) point out that the bank branch expansion policy had already started in the 1960s and was amended multiple times, until its termination in 1990. Moreover, numerous other policies in the private and public sectors were running simultaneously with the bank licensing policy that also aimed at poverty reduction. Both [Panagariya \(2006\)](#) and [Kochar \(2011\)](#) argue that the identification validity of the bank expansion effects by [Burgess and Pande \(2005\)](#) depends on their assumption that there has not been another simultaneous policy that could affect poverty.

Thus, his paper provides a replication of the [Burgess and Pande \(2005\)](#). We successfully reiterate their empirical results; however, we find significant trend reversals for almost every other year between 1970 and 1984. These results, along with the historical evidence on policy changes in India, imply that [Burgess and Pande \(2005\)](#) overestimate the effect of the bank branch expansion on poverty. Unlike [Kochar \(2011\)](#), we obtain these results with the same data as used by [Burgess and Pande \(2005\)](#) in the original paper.<sup>1</sup>

These results have several policy implications. [Burgess and Pande \(2005\)](#) themselves express limitations to the efficiency of the bank branch expansion due to a high cost-benefit ratio.<sup>2</sup> Since our results indicate that they overestimate the benefits of the program, the doubts about the efficiency of the state-led bank expansion are even more considerable. Thus the Indian program might not be the first best option for development strategies.<sup>3</sup>

The remaining part of this paper is organized as follows. In the second section, we discuss the policies that took place in India from 1960 to 1990, under the direct influence of the Reserve Bank of India (RBI) and the Indian Government. In section three, we present the replication of [Burgess and Pande \(2005\)](#). First, we present the data and research design offered by the authors. Further, we discuss the results from reduced-form evidence and instrumental variables evidence, as shown in [Burgess and Pande \(2005\)](#). Finally, in section four, we present the empirical exercise to analyze the relevance and exogeneity of the instrument for the bank branch expansion and conclude with section five.

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<sup>1</sup>[Kochar \(2011\)](#) studies distributional effects on consumption over a ten years after 1983, based on district-level data. In contrast, [Burgess and Pande \(2005\)](#) study the impact of a bank expansion on poverty based on state-level data from 1961 to 2000.

<sup>2</sup>We refer the reader to the working paper version of their AER article ([Burgess and Pande, 2003](#)) for a more extensive discussion that has been tuned down for the journal publication.

<sup>3</sup>Note that a decrease of rural poverty in India accelerated in the 1990s, after the bank expansion policy was abandoned, see Figure 10 in Appendix.

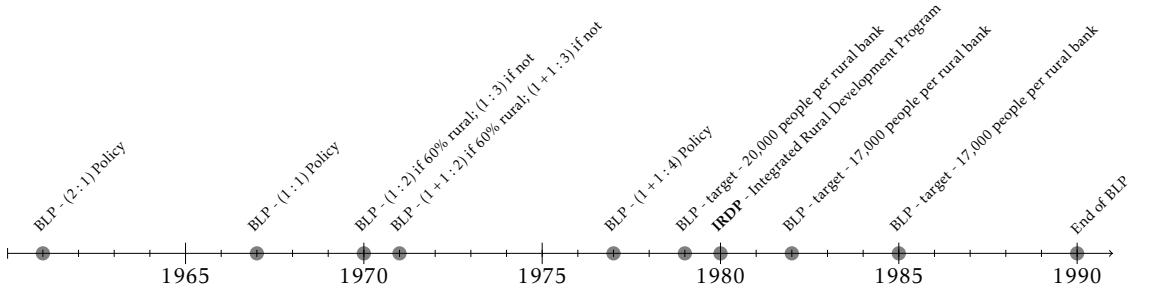
## 2 The Indian policies of the late 20<sup>th</sup> century

During the period 1949 to 1990, Indian commercial banks needed a license from the Reserve Bank of India (RBI) to open a new branch; thus the RBI could affect the density of bank networks in urban and rural areas. Following the Nationalization Act of 1969, the RBI took over the 14 largest commercial banks under its administration. This allowed the RBI to launch a massive branch expansion aimed at giving individuals across India equal access to financial services ([Banerjee et al., 2004](#); [Burgess and Pande, 2005](#); [Kochhar, 2011](#)).

According to [Burgess and Pande \(2005\)](#), the bank expansion policy was introduced in 1977, and required banks for each newly opened branch in banked location to open four additional branches in locations from the pre-selected list by the RBI (the 1:4 policy hereinafter). The list contained all unbanked locations, predominantly in rural areas with no existing financial institution, and with a ratio of the population size per bank over a certain threshold. Therefore, the list offered contained states with a lower initial financial development (stock of bank branches per capita). Every three years, the list was updated with a lower population threshold.

However, [Panagariya \(2006\)](#) surveys the policies of the RBI in more detail and asserts that adoption of the 1:4 policy in 1977 was not entirely new. Rather, this policy followed other preceding policies linking rural and urban financial development in place since the 1960s. More precisely, [Panagariya \(2006\)](#) claims that starting from July 1962, the RBI introduced a 2:1 policy that obliged banks to open one branch in unbanked locations for every two branches opened in banked locations. Following the 1967 10-point program, adopted by the Indian National Congress, this policy was updated to a 1:1 banked to unbanked ratio. Another change in policy took place in the 1970s. The RBI adopted a 1:2 rule for the banks with the rural branches over 60% and a 1:3 for others. The rule was relaxed in 1971. The banks were allowed to open a branch in each - urban/banked and metropolitan areas for every three branches in rural areas (every two branches in the case of banks with over 60% of rural branches) ([Panagariya, 2006](#)); in other words, the policy was changed to a (1+1):3 and (1+1):2 rule. Finally, [Panagariya \(2006\)](#) claims that in 1977 the RBI updated to the (1+1):4 rule - for every four branches opened in rural areas, banks were allowed to open a branch in the urban and metropolitan areas - one in each. Therefore, [Panagariya \(2006\)](#) argues that the

Figure 1: Chronology of the Bank Licensing Policies



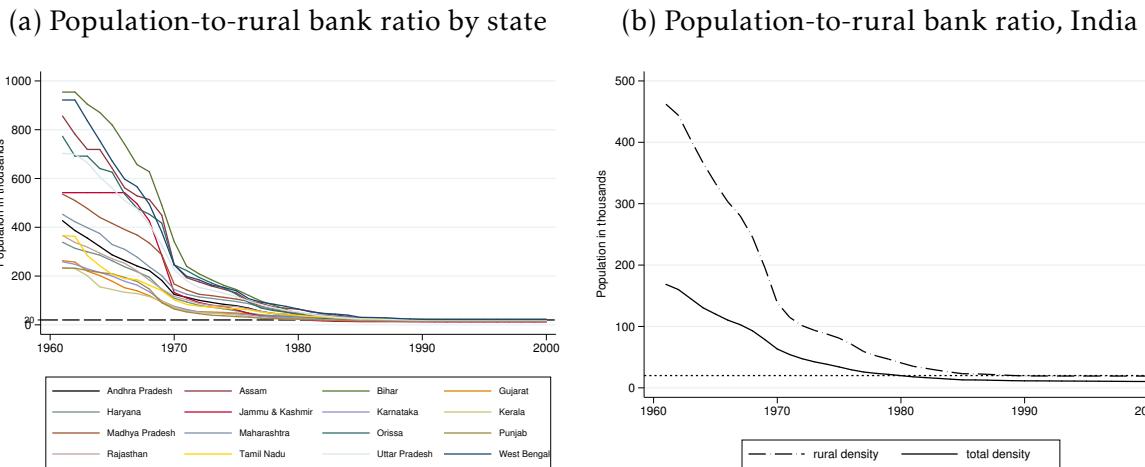
Note: The chronology of events is presented as described by [Kochar \(2011\)](#) and [Panagariya \(2006\)](#)

policy break that [Burgess and Pande \(2005\)](#) discusses as a new policy was neither new nor significantly different when considering the past policies. The sequence of events is presented in Figure 1.

According to [Kochar \(2011\)](#), bank expansion policies before 1979 were considered inefficient in reducing poverty. As a solution, the Government of India introduced the Integrated Rural Development Program (IRDP) in 1979 ([Copestake, 1996](#)), just two years after the 1:4 rule stressed by [Burgess and Pande \(2005\)](#). By October 1980, the IRDP was a significant program in fighting poverty ([Kochar, 2011](#)). [Copestake \(1996\)](#) asserts that the primary purpose of the IRDP was to increase the share of productive assets in rural locations by subsidizing credit. The author states that the main priority of the policy was to fulfill the credit needs of the various groups among the poor, thus providing a way out of poverty. However, the efficiency of both policies, namely of the IRDP, has been questioned frequently. [Pulley \(1989\)](#) recommends substantial adjustments to the rules upon which the credit was subsidized. Nonetheless, after reviewing dozens of studies on the effectiveness of the IRDP, [Paul \(2007\)](#) finds that although the number of families that crossed the poverty line was not significant, the level of poverty declined amongst three-fourths IRDP families.

Additionally, to give credit effectively to the disadvantaged groups, the government further adjusted the licensing policy. [Kochar \(2011\)](#) notes that before 1979 the banks were required to satisfy the ratio between the number of branches opened in unbanked versus banked locations. In contrast, after 1979, the government of India directly assigned the locations where new banks had to be opened. This change aimed to achieve a specific population-to-rural bank ratio to even out the distribution of banks throughout the country. The adjusted licensing policy

Figure 2: Population-to-rural bank ratio total for India and by state



took place in three consecutive stages – 1979 - 1981; 1982 - 1985; 1985 - 1990. The first stage targeted 20 000 individuals per bank in the district; the target decreased to 17 000 for the following two stages (calculated with the base population of 1981) ([Kochar, 2011](#)). Figure 2 shows that the population-to-rural bank ratio (by state and country average) significantly decreases after the 1960s and converges to around 20 000 people per bank, even in rural areas before 1990. The targets of the policy were fulfilled. Later, a Service Area Approach (SAA) policy was additionally introduced, to assign around 15 - 25 villages to each bank in 1989. This adjustment defined a target ratio of villages assigned to banks in addition to the target population to bank ratio. [Kochar \(2011\)](#) claims that unlike the previous BLP and SAA, the IRDP was not aimed at specific districts; on the contrary, it uniformly affected all parts of the country.

Figure 3 shows the development of a ratio of newly opened bank branches in unbanked and banked locations. Given the licensing rules, from 1962 the bank branch opening ratio between rural and urban locations should have been more than 0.5 (2:1 rule); from 1967 to 1970 the ratio should have been at least 1 (1:1 rule), between 2/3 and 1 (the (1+1):2 and (1+1):3 rule) before 1977, at least 2 after.<sup>4</sup> However, since the late 1970s, those ratios were consistently exceeded and more banks in rural locations were opened than prescribed by the licensing rules.

[Panagariya \(2006\)](#) gives two alternative explanations. First, opening branches

<sup>4</sup>Note that the 1:4 rule was rather (1+1):4 rule, as mentioned by [Panagariya \(2006\)](#). He also presents somewhat different ratios of rural to urban branches, but even with his data, the ratios prescribed by the licensing policy were achieved.

Figure 3: Bank branch opened in unbanked versus banked locations



Note: The table was generated based on data provided by [Burgess and Pande \(2005\)](#). The index is calculated by dividing the number of bank branches in rural locations opened in year  $t$  by the number of bank branches in urban locations opened in year  $t$ .

in rural locations was profitable; however, the ratio of new branches in rural areas decreases just after 1990 when the RBI ended the licensing policy. Consequently, the profitability might not be the driving force of branch expansion. The second reason is the existence of another simultaneous policy forcing the financial sector towards rural locations, i.e., the Integrated Rural Development Program (IRDP) [Panagariya \(2006\)](#). Therefore, the subsequent poverty reduction discussed by [Burgess and Pande \(2005\)](#) might not be caused solely by the licensing policy.

The series of massive and costly policies resulted in a balance-of-payments crisis in 1990. [Kochhar \(2011\)](#) claims that for India, this meant an end to the era of supply-driven policies. Licensing policy ended in 1990, as the RBI stopped interfering in the branch expansion decisions of the banks. Although closing an already open rural branch, if it was the only bank in the area, was not allowed ([Burgess and Pande, 2005](#)), the number of rural banks sharply decreased in the following decade ([Shah et al., 2007](#)).

### 3 Replication of the work

#### 3.1 The Data

To replicate the estimates of the effect of the bank branch expansion on rural poverty outcomes, we used the same dataset<sup>5</sup> as [Burgess and Pande \(2005\)](#). The dataset is from the Reserve Bank of India. It contains the information on bank branch opening dates, locations, and state characteristics (poverty, wages, expenditure, land reform, and population) from 1961 to 2000 in 16 Indian states. The authors categorize the branch openings into two classes - openings in a rural unbanked and banked area. The first classification refers to branches that opened in a previously unbanked rural location; the latter refers to the opening of a bank branch in a location with one or more banks.

The initial financial development is proxied by a number of bank branches per capita for each state in 1961, and the branch expansion by a sum of branches per capita in each state over time. Lastly, [Burgess and Pande \(2005\)](#) use a poverty headcount ratio from the national household expenditure surveys to estimate poverty. This ratio measures the share of the population below the official poverty line.

#### 3.2 Bank expansion and initial financial development

[Burgess and Pande \(2005\)](#) begin by evaluating the impact of the 1977 bank licensing policy on bank expansion in the previously unbanked areas. Without any constraints, banks are willing to expand and open new branches in wealthier states. In contrast, the RBI forced banks into opening bank branches in poorer states via their licensing policy. The authors expected that during the period 1977 to 1990, the bank expansion should have been more concentrated in previously less financially developed locations than in the other years without the 1:4 licensing policy. Therefore, they start by estimating bank branch expansion as a function of the initial financial development:

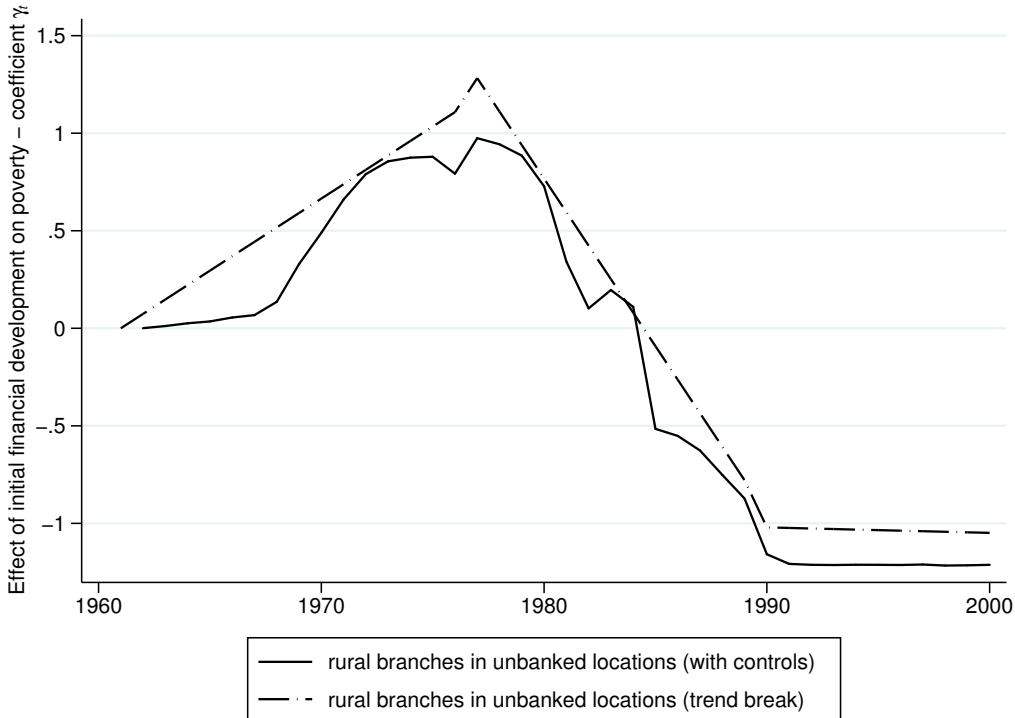
$$B_{it}^R = \alpha_i + \beta_t + \sum_{t=1961}^{2000} (B_{i1961} * D_k) \gamma_k + \sum_{t=1961}^{2000} (X_{i1961} * D_k) \delta_t + \varepsilon_{it} \quad (1)$$

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<sup>5</sup>The data were downloaded from the American Economic Association website: <https://www.aeaweb.org/articles?id=10.1257/0002828054201242>

where  $B_{i1961}$  is the measure of the 1961 financial development level in the state  $i$ . This variable enters the regression interacted with year dummies  $D_k$ ; thus,  $\gamma_t$  denotes for the year-specific effect of the initial financial development on bank branch openings.<sup>6</sup>  $X_{i1961}$  represents a vector of initial state conditions – log real state income per capita, population density, and the number of rural locations per capita, all measured in 1961. They enter the regression in interaction with year dummies as well, so that  $\delta_t$  is the year-specific coefficient.<sup>7</sup>

Figure 4: Initial Financial Development and Rural Branch Expansion



Note: The series "rural branches in unbanked locations (with controls)" shows the annual coefficients of the effect of initial financial development on branch expansion from the equation (1). The series "rural branches in unbanked locations (trend break)" graphs the trends obtained from equation (2), and correspond to the results reported in Table (1), column (1). This figure corresponds to Figure 1 in [Burgess and Pande \(2005\)](#), p.784. Burgess and Pande disregard the impact of pulse dummies in their Figure 1.

The coefficient  $\gamma_t$  is depicted as the solid line in Figure 4 (the reference year is 1961). [Burgess and Pande \(2005\)](#) explain that in the absence of the 1:4 license policy, the new branches were increasingly opened in already banked locations

<sup>6</sup>Note that the difference  $\gamma_{t+1} - \gamma_t$  indicates the change in rural branch growth between  $t + 1$  and  $t$  that is attributed to state  $i$ 's initial financial development.

<sup>7</sup>In this section, we opted for the presentation of the methodology that is in line with the Stata code accompanying the original paper by [Burgess and Pande \(2005\)](#). Hence, the equations are closer to the working paper version ([Burgess and Pande, 2003](#)) of the paper rather than to the journal version.

between 1961 and 1977. On the other hand, introducing the 1:4 license policy in 1977 reversed the trend, the coefficient  $\gamma_t$  decreases, and bank branches were opened with a higher rate in financially less developed states.

The authors summarize these trend reversals by a linear trend break model:<sup>8</sup>

$$\begin{aligned}
 B_{it}^R = & \alpha_i + \beta_t + \gamma_1(B_{i1961}^R[t - 1961]) \\
 & + \gamma_2(B_{i1961}^R[t - 1976]P_{1977}) \\
 & + \gamma_3(B_{i1961}^R[t - 1990]P_{1990}) \\
 & + \gamma_4(B_{i1961}^R P_{1977}) + \gamma_5(B_{i1961}^R P_{1990}) \\
 & + F(X_{i1961}) + \varepsilon_{it}
 \end{aligned} \tag{2}$$

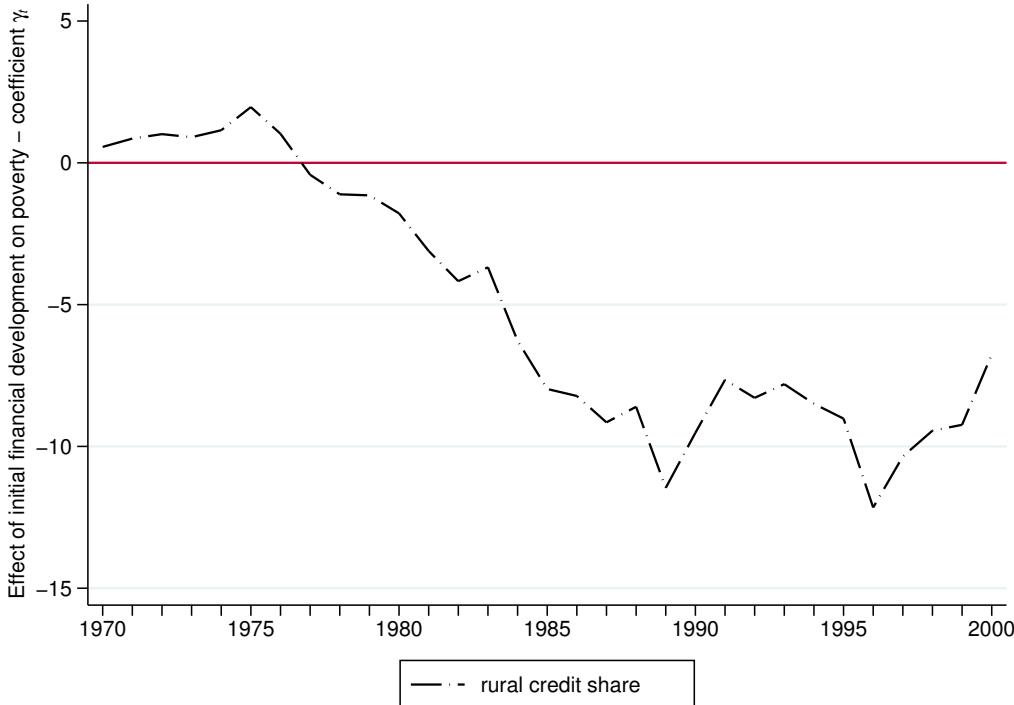
[Burgess and Pande \(2005\)](#) point out that besides the bank licensing policy, the branch expansion processes can also be affected by state and time-specific characteristics. Therefore the state and year fixed effects are included in the regression. The linear time trends,  $[t - 1961]$ ,  $[t - 1977]$ , and  $[t - 1990]$ , enter the regression interacted with the measure of the state's initial financial development,  $B_{i1961}$ .  $P_{1977}$  and  $P_{1990}$  are dummy variables, which equal one from 1977 and 1990 until 2000, respectively. The average trend relation between rural branch expansion and initial financial development in a state for the periods 1961-1977, 1977-1990, and 1990-2000 is measured by  $\gamma_1$ ,  $\gamma_2$ , and  $\gamma_3$  respectively. Moreover,  $\gamma_4$ , and  $\gamma_5$  measure the intercept changes in the trend relationship in 1977 and 1990, respectively. The additional variables  $X_{i1961}$  controlling for characteristics of the state  $i$  in 1961 enter the regression in a similar way as  $B_{i1961}$ . The inclusion of the set of additional controls,  $X_{i1961}$ , ensures that any observed trend reversal in  $B_{i1961}$  do not reflect trend breaks in a state's economic and demographic characteristics. Moreover, the authors cluster standard errors by state to account for possible serial correlation.

The coefficients estimates of equation (2) correspond to the results by [Burgess and Pande \(2005\)](#). The first column of Table 1 shows the relation between the initial financial development of the rural unbanked location and the bank branch

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<sup>8</sup>The equation (3) in the journal version does not contain the pulse dummies  $P_{77}$  and  $P_{90}$  in the interaction terms with the trends, although they are included in the authors' code. These dummies assure that the trends affect only the respective time periods - without them, the trends would be negative for preceding periods. Hence, we decided to include them in equation (2).

Figure 5: Initial Financial Development and Rural Bank Credit Share



Note: The series “rural credit share” reports the annual coefficients on initial financial development from a regression based on equation (2), but with rural bank credit share as the dependent variable. The results correspond to Table (1), column (2). This figure replicates Figure 2 in [Burgess and Pande \(2005\)](#), p.786.

opening in different periods. We observe a significant trend reversal in 1977, as confirmed by the F-test on restriction  $\gamma_1 + \gamma_2 = 0$ . In 1990, another structural break appeared, and the relation between bank expansion and initial financial development is no longer changing. Also, the null hypothesis of validity of the restriction  $\gamma_1 + \gamma_2 + \gamma_3 = 0$  is confirmed (F-test 2). The unrestricted model and linear trend break model give a very similar estimation of the  $\gamma_t$  coefficients, shown in Figure 4. Moreover, the F-test statistics reported in Table 1 show that the imposed restrictions do not damage the model fit.

Similar to [Burgess and Pande \(2005\)](#), we find trend reversals in credit and saving shares (Figure 5). Initially, credit shares are higher in financially more developed states; however, from 1977 to 1990, the pattern is reversed, and rural credit shares became higher in states with lower initial financial development. Columns 2 and 3 of Table 1 suggest that the rural bank expansion (namely the 1:4 policy) had a positive effect on savings mobilization and credit disbursement in rural India.

[Burgess and Pande \(2005\)](#) further check if the trends of the bank and state-level policies, that should not be affected by the 1:4 licensing policy, also exhibited trend reversals in 1977 and 1990. We corroborate their results in column 5 of Table 1, which shows the effect of a trend reversal on the fractions of bank credit going to priority sectors (small-scale industries, services, and agriculture). Since priority sector targets were binding for the banks, the portion of bank credit going to these sectors was independent of the bank's rural and urban branch distribution. Column 6 shows the fraction of total bank and cooperative credit that went to primary agricultural cooperatives. Trend reversals are not present in either case. Analogous to [Burgess and Pande \(2005\)](#), significant economic, political, and policy variables of the states, which influence rural poverty, do not exhibit a trend reversal similar to those seen in Figures 4 and 5.

### 3.3 Impact of bank branch expansion on poverty

Further, [Burgess and Pande \(2005\)](#) analyze the effect of the program on rural poverty in India. First they test whether the effect of the initial financial development measured by a number of bank branches per capita underwent similar trend reversals as the dynamics of the banking network in rural areas. Next, the authors estimate the effect of the policy-driven expansion of bank branches in rural locations on rural poverty in India with the help of an instrumental variable estimation.

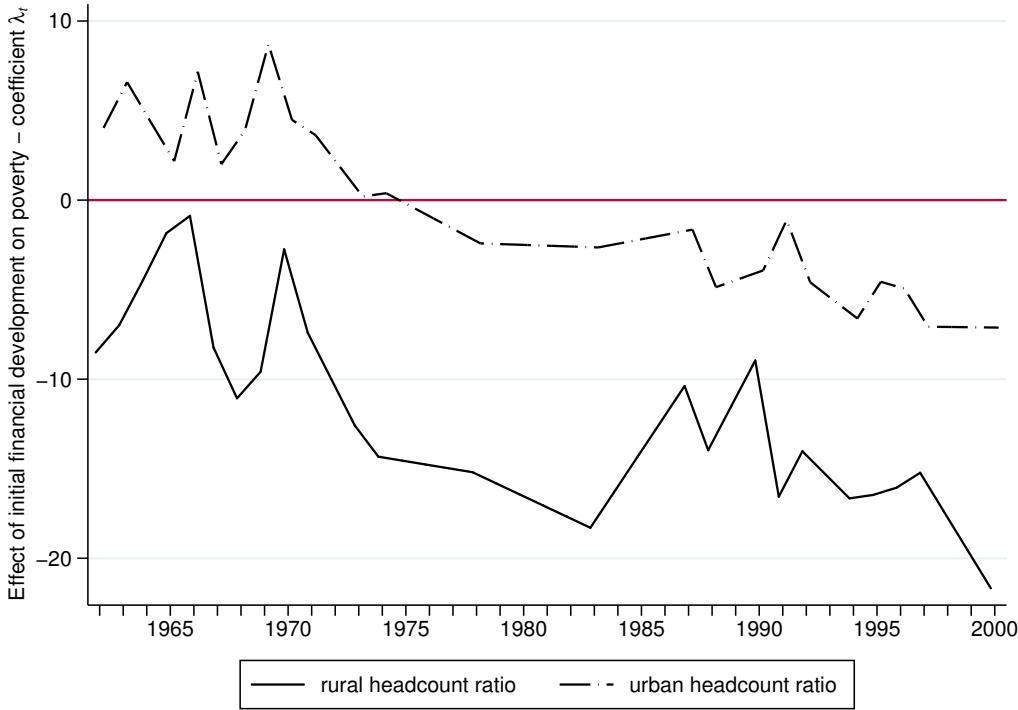
#### 3.3.1 Reduced-Form Evidence

[Burgess and Pande \(2005\)](#) start with a regression of the initial number of bank branches per capita on poverty in the  $i$  state:

$$y_{it} = \alpha_i + \beta_t + \lambda_t B_{i1961} + \delta_t X_{i1961} + \varepsilon_{it} \quad (3)$$

The coefficient of the initial financial development  $\lambda_t$ , from equation (3), is presented in Figure 6. Solid line depicts  $\lambda_t$  when  $y_{i,t}$  is the rural headcount ratio and dashed line when  $y_{i,t}$  is the urban headcount ratio. Based on these results, [Burgess and Pande \(2005\)](#) claim that between 1970 and 1978, and after 1990, financially more developed states were more efficient in the decrease of both rural and urban poverty. In contrast, between 1983 and 1990, in states with fewer bank

Figure 6: Initial Financial Development and Poverty



Note: Figure 6 graphs the annual coefficients on initial financial development  $\lambda_t$  from equation (3) for both rural and urban poverty. This figure replicates Figure 3 in [Burgess and Pande \(2005\)](#), p.787

branches per capita, the decrease in rural poverty was larger. Between 1978 and 1990, urban poverty and the state's initial financial development were uncorrelated. Therefore the graph of rural poverty (Figure 6) is an inverse of the branch expansion in rural locations (Figure 4).

To further analyze the relationship between poverty reduction and bank expansion in previously unbanked locations, the authors show that the coefficients  $\lambda_t$  and the coefficients  $\gamma_t$  from equation (2) exhibit a strong inverse relation.<sup>9</sup>

The authors estimate a linear trend break in the same fashion as in equation (2) to verify the trend reversals. The replication of their results is shown in columns 2 - 6 of Table 2. Indeed, we identify a significant trend reversal in the reduction of rural poverty from 1977 to 1990.

<sup>9</sup>This finding is supported by regressing the coefficient  $\lambda_t$  on  $\gamma_t$  as follows:

$$\lambda_t = a + b\gamma_t + C_1 P_{1977} + C_2 P_{1990} + \varepsilon_t \quad (4)$$

The coefficient  $b$  appears in the first column of Table 2.

### 3.3.2 Instrumental Variables Evidence

Burgess and Pande (2005) begin their analysis with a simple OLS estimation to see how an additional bank branch affects rural poverty. The results of the OLS regression are reported in column 1 of Table 3. This regression reveals a positive correlation between bank branches opened in rural unbanked locations and poverty. However, positive correlation merely reflects the fact that more branches were opened in poorer and previously less financially developed areas.<sup>10</sup> Also, the OLS regression cannot produce informative estimates of the causal effect of rural bank expansion on rural poverty, due to the nonrandom nature of branch openings.

Hence, Burgess and Pande (2005) propose to account for endogenous branch placement by using the deviations in trends between initial financial development and rural branch expansion estimated in equation (2). Thus, the authors consider trend reversals, between 1977 and 1990, and between 1990 and 2000 (relative to 1961 – 1977 trend), as instruments for rural branch openings. This idea resembles the difference in difference estimation, where only the interaction between initial financial development and treatment and control periods are considered. The policy is assumed as exogenous since the structural breaks are not observed in other political and policy variables. Moreover, there is one treatment period (1977-1989), and two control periods (1961-1976 and 1990-2000). The first stage regression coincides with equation (2) with the estimates provided in the first column of Table 1, and the second stage of the IV estimation is as follows:

$$y_{it} = \alpha_i + \beta_t + \phi B_{it}^R + \mu_1([t - 1961]B_{i1961}) + \mu_2(P_{1977}B_{i1961}) + \mu_3(P_{1990}B_{i1961}) + u_{it} \quad (5)$$

Table 3 (columns 3 to 5) present IV estimates for poverty outcomes, and again, the results are precisely the same as in Burgess and Pande (2005). A one-point increase in per capita bank branch opening in the unbanked location of rural India explains a 4.74-percent reduction in rural poverty (column 3). The authors claim that this result evaluated at the sample average implies that the state-led bank

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<sup>10</sup>Note that after including the interaction terms of a state's initial financial development and a time trend, and additional initial conditions as regressors, the relation between the number of branches and poverty becomes insignificant (column 2).

branch expansion in rural India explains a 17-percent reduction in the poverty headcount ratio. Moreover, this process did not affect urban poverty (column 4). Aggregate poverty in rural locations decreases by 4.10 percentage points, with every additional bank branch opening in a rural location per 100,000 persons (column 5). Column 6 to 8 exhibits the results of robustness checks. First, they exclude the pre-1977 and post-1990 periods (columns 7 and 6, respectively) to show how robust the results are from using a single instrument. Afterward, the sample is restricted to the years in which National Sample Surveys were carried out. Finally, it is found that additional bank branches increased the wage of agricultural workers.

The IV estimator was also used to estimate the effect of branch expansion on credit and savings. These results are provided in Table 4, and they indicate that rural poverty was reduced by increased rural credit and saving shares.

Lastly, in Table 5, we examine the robustness of IV results by controlling for time-varying political and policy variables. The negative and significant relationship between rural branch expansion and rural poverty persists even after controlling for events such as an increase in land reform and development spending, which is already known to reduce rural poverty ([Besley and Burgess, 2000](#)).

## 4 Sensitivity check: Different cut-years

In the previous section, we successfully replicate the results by [Burgess and Pande \(2005\)](#) and confirm the positive impact of the state-led bank branch expansion on poverty. However, the results and their policy implications are conditional on the assumption that the imposition and removal of the 1977 bank licensing policy provides a credible source of exogenous variation in rural bank branch expansion. In other words, there should have been no other policy interventions targeting rural poverty that affected the trend reversal in rural bank branch expansion.<sup>11</sup>

Nevertheless, [Panagariya \(2006\)](#), and [Kochhar \(2011\)](#) cover in-depth other poli-

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<sup>11</sup>[Burgess and Pande \(2005\)](#) use the imposition and removal of the 1977 bank branch licensing policy as an instrument for the cumulative branch expansions in the rural area. The requirements for IV validity are "no direct effect on poverty outcomes" and the significance of the trend reversal. These assumptions are carefully acknowledged by [Burgess and Pande \(2005\)](#) in the introduction of their paper. Note that we have analyzed trend reversals for different cut-years on credit flows to the priority and co-operative sectors, and we have not identified significant trend reversals either. These results are available upon request.

cies that coincided with the bank licensing program.<sup>12</sup> They assert that the effect of this program on poverty reduction cannot be evaluated without consideration of coexisting policies of credit subsidies, and different amendments of the bank licensing policies over the given period. In both cases, the exogeneity of the trend reversal in 1977 and thus their utilization as a valid instrument in estimation of the effect of bank branch expansion on poverty reduction might be questionable.<sup>13</sup>

To verify whether the trend reversal in bank branch expansion is a unique characteristic of 1977 or if similar trend reversals also appear in other years, we repeat the estimations of [Burgess and Pande \(2005\)](#) with different cut-years. Different cut-years would serve as evidence of other policies' success, i.e., the IRDP, which achieved a decrease in rural poverty and caused higher penetration of banks in rural areas ([Paul, 2007](#)). In this case, the exogeneity of the trend reversal in 1977, and thus its utilization as a valid instrument, might be questionable.

Broadly, we find that the trend reversals are significant for virtually all cut-years in the sample. Figure 7 presents the trend reversals for all years between 1970<sup>14</sup> and 1984. Moreover, the F-statistics of no-trend reversal tests is often maximized for cut-years different from 1977 (Figure 8). Therefore, our results support the claim of [Panagariya \(2006\)](#) and [Kochhar \(2011\)](#).

The significance of trend reversals implies that any trend reversals from the period 1970 - 1981 are relevant instruments, which is a necessary but not sufficient condition for instrument validity. Interestingly, the F-test 1 is maximized for 1980 when the Integrated Rural Development Program was finally implemented, and not in 1977 when the bank licensing policy was strengthened.<sup>15</sup> Hence, our analysis points not only to the importance of the 1:4 ratio of the Bank Licensing Policy

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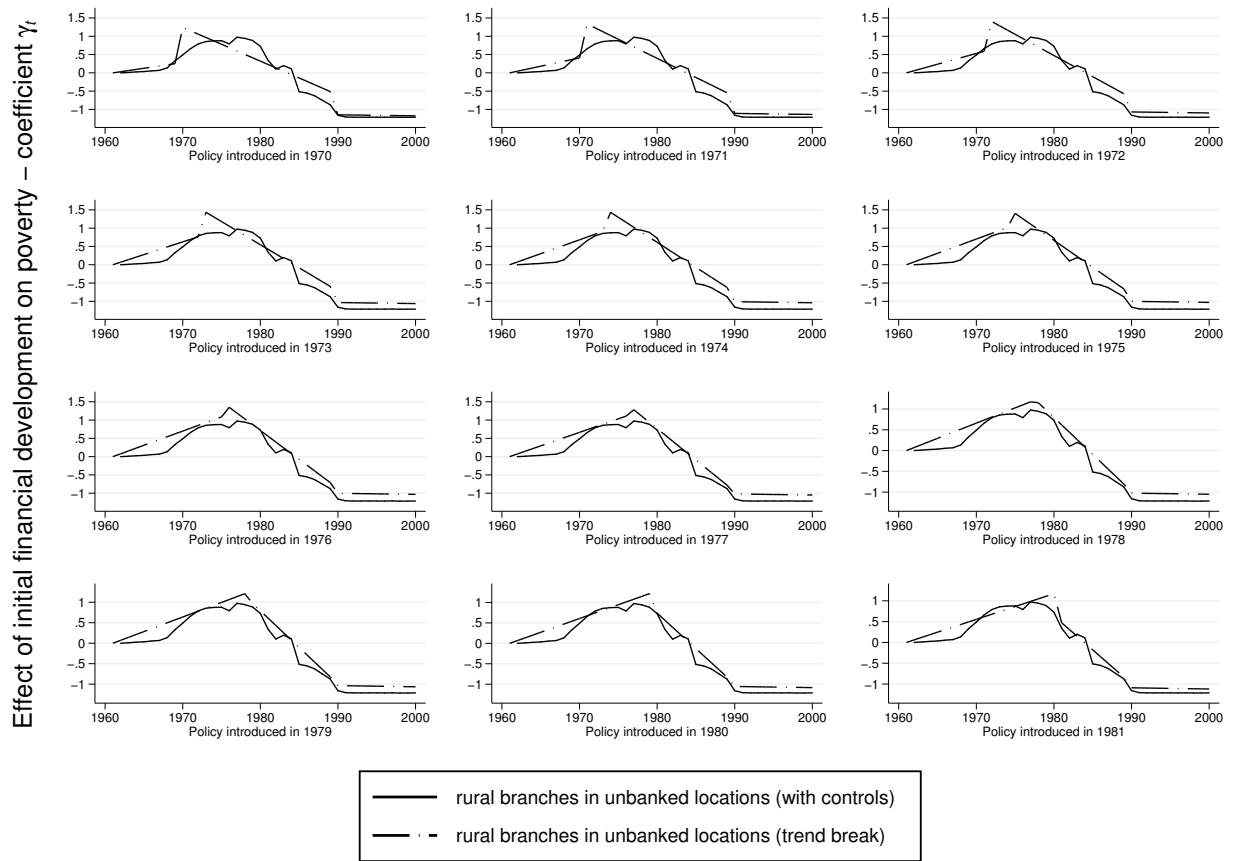
<sup>12</sup>Brief summary is provided in Section 3 of this paper.

<sup>13</sup>The exact year and the reason for the trend reversal are arguable. The Government of India was fighting against rural poverty through many different policies. According to the All India Rural Credit Survey (RBI, 1947), more than 90 percent of rural credit needs were satisfied by informal lenders, and the share of bank lending in rural household credit was only 1 percent. Till the 1990s, the share of bank lending in total rural credit increased to 29 percent, mainly due to the increasing number of co-operatives ([Basu and Srivastava \(2005\)](#), and the working paper [Burgess and Pande \(2003\)](#)). According to [Madan \(2007\)](#), the Government of India promoted the increase of co-operatives from the mid-1960s. The author asserts that, in 1975, the Government of India was especially concerned about providing institutional credit to rural farmers. Consequently, they introduced a 20-point program which aimed at the elimination of rural indebtedness by providing refinancing means. Hence, the 1977 bank licensing policy cannot be the sole reason for the trend reversal in credit and saving opportunities of the rural regions.

<sup>14</sup>The year after Nationalization Act of 1969, which allowed the RBI to take over the 14 largest commercial banks under its administration.

<sup>15</sup>Note that the F-test 1 tests the restriction of no-trend reversal in the dynamics of bank branch openings in initially less financially developed rural areas.

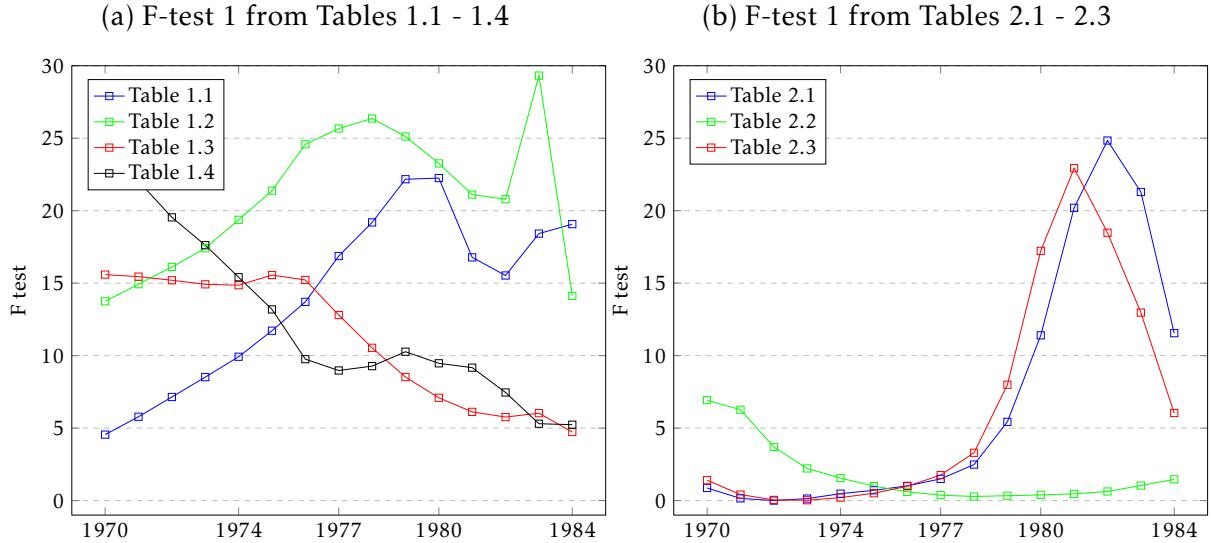
Figure 7: 1961 Initial Financial Development and Rural Branch Expansion with Different Cut-years



on poverty reduction but also to its connection with the other credit subsidizing programs. At the same time, it casts doubts on the validity of identification of the effects of bank branch expansion on poverty using the trend reversal in 1977. The other cut-years reveal the importance of different policies targeting poverty reduction while expanding the banking network. Even though these trend-reversals are not exogenous to the poverty rate, they still lead to virtually the same results as the estimates based on the cut-year in 1977. Therefore, the identification of the effect of bank expansion on poverty reduction, exploiting the trend reversal in 1977, is debatable due to the instrument's potential endogeneity.

Next, in Tables 1.2 and 1.3, we report the results for the rural bank credit and saving shares repeated for various cut-years. In both tables, the 8<sup>th</sup> column represents the results from the original regression and is the benchmark for the comparison. For Rural credit share (Table 1.2), we can see similar results to those

Figure 8: F-test 1 from Tables 1.1 - 1.4 and Tables 2.1 - 2.3



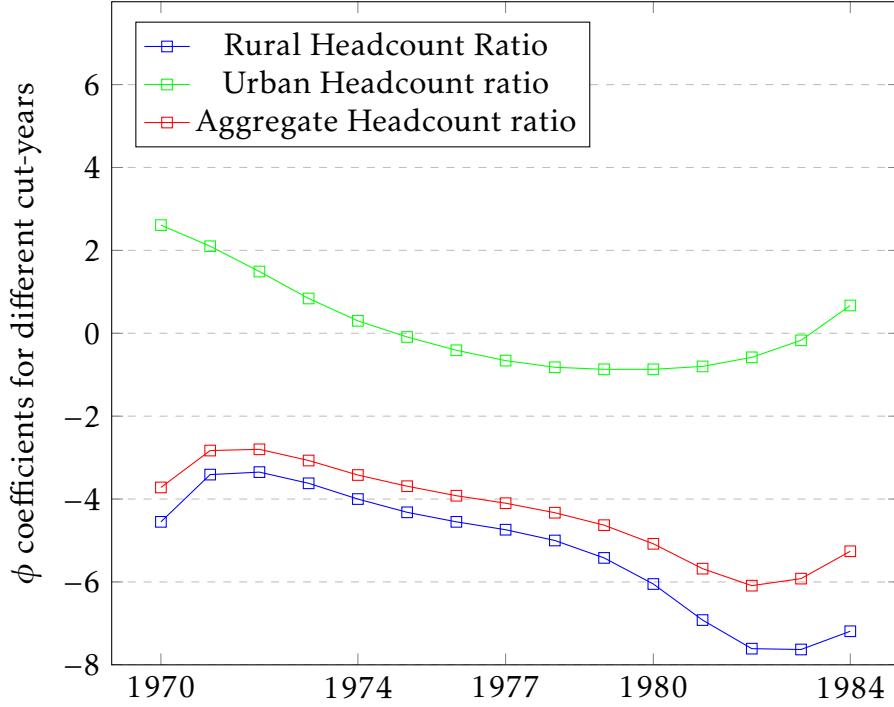
Note: The figures show F-statistics of a linear restriction test of no trend reversal (F-test 1) in any of the years in the sample. **Figure 8.a.** Series Table 1.1 shows the F-statistics of Table 1.1, i.e., trend reversals in branches opened in rural regions. Series Table 1.2 and 1.3 report trend reversals in rural bank credit and savings shares. Series Table 1.4 shows tests of trend reversals in branches opened in already banked regions. **Figure 8.b.** Series Table 2.1 shows the F-statistics of Table 2.1, i.e., trend reversals in Rural Headcount Ratio. 2.3 report trend reversals in Aggregate Headcount Ratio. The trend reversals in Urban Headcount Ratio (Table 2.2) are insignificant.

of [Burgess and Pande \(2005\)](#) from 1971 up until 1979. For Rural saving share (Table 1.3), results are similar to the original paper for almost all cut-years.

To support the claim that the change was policy-driven, [Burgess and Pande \(2005\)](#), in Table 1, column 4 shows the results of initial financial development on the openings in banked locations. In column 4, they show that banks were drawn to more financially developed states within the sample period. They further claim that the bank openings in banked locations decrease as a result of the licensing policy. While the change in bank branch opening behavior most possibly was the result of the vast number of various policies of the time, the magnitude of the influence by each policy is impossible to disentangle in the scope of given analyses. In Table 1.4, we present results from similar analyses and show that the outcomes for other cut-years starting from 1975 are very similar to that of the original paper. Before hypothetical cut-year T and after 1990, the initial financial development in each state has a significant and positive effect on the branch openings in the banked location. In contrast, in between those years, the rate of bank branch openings decreases in the banked locations.

There is similar uncertainty regarding the appropriate timing of the trend re-

Figure 9: Impact of bank branch expansion on headcount poverty (IV regression)



Note: The figure shows the coefficient  $\phi$  from equation (5) for different cut-years.

versal when we repeat the exercise for the effects of initial financial development on rural (Table 2.1) and aggregate (Table 2.3) headcount ratios. The F-test 1 statistics are maximized for years 1982 for rural poverty and 1981 for aggregate poverty (Figure 8). The urban headcount ratio (Table 2.2), similarly to the original paper, remains uncorrelated with the initial financial development.

Burgess and Pande (2005) report the results from the instrumental variable regression on the headcount ratio in Table 3 (Columns 3 - 8). Tables 3.1, 3.2, and 3.3 correspond to columns 3 - 5 of Table 3. The effect of branch openings in rural unbanked locations on rural poverty (Table 3.1) is significant for all hypothetical cut-years starting from 1974. Again, the effect is similar to the result from analysis with 1977 cut-year. On the other hand, the urban poverty headcount ratio was unaffected by branch openings in rural unbanked locations for all hypothetical cut-years. Similar to Table 3.2, in Table 3.3, we can see that the effect of branch openings in rural locations had a significant adverse effect on the aggregate headcount ratio starting from the hypothetical 1974 cut-year. Figure 9 depicts the estimated coefficients of rural bank branch openings,  $\phi$ , from the regression of the form equation (5) for different cut-years. It displays the dependence of the magnitude of branch openings' impact on poverty. Finally, Tables 3.4 - 3.6 correspond

to Table 3, columns 6 - 8, and present significant similarities to the original results with trend reversals in 1977.

Interestingly, the rural credit share's contribution to a decrease in rural poverty is the highest for a trend breaks in 1982 and 1983 rather than in 1977, as demonstrated in Table 4.1. The same results hold when other policy variables are explicitly included within the IV estimation (Tables 5.1 and 5.2).

## 5 Conclusion

The discussion of the impact of the bank licensing policy on rural poverty, provided by [Burgess and Pande \(2005\)](#), [Kochar \(2011\)](#), and [Panagariya \(2006\)](#), gives two different perspectives. [Burgess and Pande \(2005\)](#) consider the BLP as a new policy introduced in 1977, while [Kochar \(2011\)](#), and [Panagariya \(2006\)](#) claim that the BLP policy was first introduced at the beginning of 1960 and amended multiple times until 1990 when the policy was terminated.

Moreover, [Burgess and Pande \(2005\)](#) conclude that the bank branch expansion, instrumented by the imposition and removal of the 1977 bank licensing policy, significantly decreased rural poverty. However, [Kochar \(2011\)](#), and [Panagariya \(2006\)](#) point to positive impacts of other simultaneous policies, and they raise doubts about the validity of the identification used by [Burgess and Pande \(2005\)](#).

First, we replicate the results obtained by [Burgess and Pande \(2005\)](#) successfully. We identify significant trend reversals in bank branch expansion and the effect of new branches openings on poverty using the 1977 cut-year when the bank licensing policy was supposed to be adopted according to authors. Second, if the policy implementation of 1977 caused the trend reversal, this should have been the unique characteristic of the mentioned year. On the other hand, if other policies were also effective in mitigating poverty, the results of the analysis with the 1977 cut-year should not have differed significantly from the surrounding years. Hence, we repeat [Burgess and Pande \(2005\)](#) exercise with other hypothetical policy introduction years (i.e. cut-years) from 1970 - 1984. Our results suggest that any cut-year from 1974 to 1981 yield very similar results to the year 1977, which implies that the negative correlation between bank branch expansion and poverty rates could be driven by other policies rather than by the bank expansion itself.

Thus, the main result in [Burgess and Pande \(2005\)](#) that rural banks matter for

poverty reduction is driven by the choice of the methodology used. The central challenge of [Burgess and Pande \(2005\)](#) question is disentangling the effect of the BLP and the IRDP policies, as well as other policies that encouraged the use of financial services in the rural locations (e.g., programs promoting co-operatives, 20-point program in 1975 providing refinancing stressed by [Madan \(2007\)](#), etc.). The significance of the 1980 threshold, identified in our analysis by using the same approach as [Burgess and Pande \(2005\)](#), implies the prominence of the IRDP over the BLP in decreasing rural poverty. Consequently, it can be doubtful that putting banks physically in unbanked locations without further subsidizing of credit would yield the results discussed by [Burgess and Pande \(2005\)](#).

The main challenge of [Burgess and Pande \(2005\)](#) is disentangling the effect of the BLP and the IRDP. The aggregate state-level data offered by [Burgess and Pande \(2005\)](#) does not show within state variations, and therefore does not allow for such analysis. Whereas, using a household level and district-level banking data, [Kochar \(2011\)](#) provides relevant analysis. To separate the IRDP from the BLP effect, [Kochar \(2011\)](#) includes proxies for the IRDP credit and expenditure in the district. The author concludes that bank branch expansion increased poverty as it affected mostly the non-poor households, rather than the poor ones.

From a policy perspective, our results indicate that [Burgess and Pande \(2005\)](#) overestimate the effects of bank expansion on elimination of rural poverty . These findings further amplify the doubts about the efficiency of the mentioned policy given its costs, compared to potential alternatives. Such doubts are expressed by [Burgess and Pande \(2005\)](#), regarding the default rates at 40% during the 1980s. Moreover, the effects of bank expansion on poverty without additional credit subsidies and other programs are not apparent. Therefore, in development strategies, more efficient policies to mitigate poverty and ease access to finance should be preferred, and the critical lessons from the Indian experience should not be overlooked, no matter how tempting the reliance on bank branch expansion might be.

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# Appendix

Figure 10: Poverty measures for India

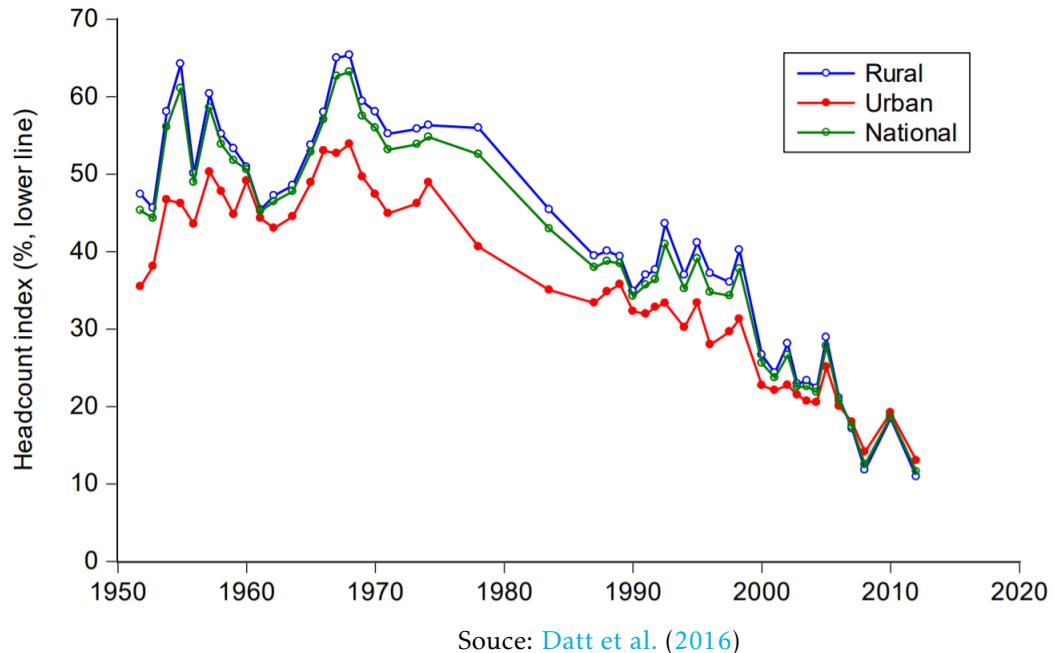


Table 1. Banking as a function of initial financial development

	Branches in rural unbanked locations (1)	Rural bank		Branches in banked locations (4)	Credit share	
		Credit share (2)	Savings share (3)		Priority sector (5)	Cooperative (6)
Number of bank branches per capita in 1961*(1961–2000) trend	0.07** (0.028)	0.18 (0.209)	-0.03 (0.235)	0.14*** (0.012)	-0.08 (0.626)	0.42 (0.337)
Number of bank branches per capita in 1961*(1977–2000) trend	-0.25*** (0.030)	-1.09** (0.434)	-0.82*** (0.252)	-0.07*** (0.020)	0.08 (0.865)	0.02 (0.416)
Number of bank branches per capita in 1961*(1990–2000) trend	0.17*** (0.042)	0.87*** (0.263)	0.43* (0.229)	0.10** (0.041)	-0.18 (0.333)	-0.18 (1.013)
Number of bank branches per capita in 1961*Post-1976 dummy <sup>†</sup>	0.34 (0.251)	-0.30 (1.495)	-0.17 (0.777)	0.53** (0.187)	-3.37 (2.402)	-3.80 (2.237)
Number of bank branches per capita in 1961*Post-1989 dummy <sup>†</sup>	-0.24 (0.152)	1.95 (1.490)	0.44 (0.533)	-0.40*** (0.103)	-0.05 (1.858)	-3.32 (2.803)
State and year dummies	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.963	0.879	0.870	0.981	0.863	0.806
F-test 1	16.87 [0.001]	12.80 [0.003]	25.67 [0.000]	8.975 [0.009]	0.000 [0.988]	5.484 [0.033]
F-test 2	0.491 [0.494]	0.099 [0.757]	9.000 [0.009]	27.22 [0.000]	1.785 [0.201]	0.060 [0.810]
Observations	636	512	512	636	512	494

Source: This table is a replication of Table 1 in [Burgess and Pande \(2005\)](#), page 785. For replication I used data and methodology provided by the authors. <sup>†</sup> Original paper contains Post-1976 dummy\*(1977–2000) trend and Post-1989 dummy\*(1990–2000) trend instead, which is not consistent with the text and the stata code. Therefore, we have changed the variable names accordingly. Note: p-values of tests in brackets. Coefficient estimates from regressions in the form of equation (2). Other controls include state population density, log state income per capita, log rural locations per capita, all measured in 1961. F-test 1 and F-test 2 test the joint significance of coefficients in the first two rows and three rows, respectively. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2. Bank branch expansion and poverty: reduced form evidence

	Annual coef. rural head- count ratio (1)	Headcount ratio			Wage	
		Rural (2)	Urban (3)	Aggregate (4)	Agricultural (5)	Factory (6)
Annual coefficients for branches in rural unbanked locations	-4.71*** (1.01)					
Number of bank branches per capita in 1961*(1961–2000) trend		-0.77*** (0.235)	-0.27 (0.237)	-0.71*** (0.225)	-0.00 (0.006)	0.01 (0.019)
Number of bank branches per capita in 1961*(1977–2000) trend		1.15** (0.424)	0.15 (0.257)	0.99*** (0.332)	-0.01 (0.008)	-0.01 (0.019)
Number of bank branches per capita in 1961*(1990–2000) trend		-1.15*** (0.342)	-0.31 (0.378)	-1.04*** (0.310)	0.05* (0.023)	-0.02 (0.010)
Number of bank branches per capita in 1961*Post-1976 dummy <sup>†</sup>		-3.77* (1.940)	-2.76 (2.286)	-3.53* (1.706)	0.09* (0.049)	0.04 (0.047)
Number of bank branches per capita in 1961*Post-1989 dummy <sup>†</sup>		1.20 (2.387)	0.50 (0.964)	0.62 (1.819)	-0.03 (0.054)	0.01 (0.022)
State and year dummies	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.835	0.913	0.875	0.901	0.701	
F-test 1	1.497 (0.240)	0.373 (0.551)	1.760 (0.205)	23.95 (0.000)	0.234 (0.636)	
F-test 2	2.973 (0.105)	3.948 (0.066)	4.148 (0.059)	1.884 (0.191)	6.066 (0.026)	
Observations	39	627	627	627	545	553

Source: This table is a replication of Table 2 in [Burgess and Pande \(2005\)](#), page 788. For replication I used data and methodology provided by the authors. <sup>†</sup> Original paper contains Post-1976 dummy\*(1977–2000) trend and Post-1989 dummy\*(1990–2000) trend instead, which is not consistent with the text and the stata code. Therefore, we have changed the variable names accordingly. Note: p-values of tests in brackets. The first column reports the regression of the annual coefficients at the rural headcount ratio ( $\gamma_t$ , equation (1)) on the annual coefficients on initial financial development ( $\lambda_t$ , equation (3)). The other columns show estimated coefficients from regressions similar to equation (2) but with the respective headcount ratios as dependent variables. For the definition of other control variables and F-tests see Table 1. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3. Bank branch expansion and poverty: instrumental variables evidence

	Headcount ratio										Wage																	
	Rural					Urban			Aggregate		Rural		Agricultural															
	OLS		IV		(1)	IV		(2)	(3)		(4)	IV		(5)	IV		(6)	IV		(7)	IV		(8)	IV		(9)	IV	
Number branches opened in rural unbanked locations per capita	2.09** (0.785)	1.16 (1.024)	-4.74** (1.790)	-0.66 (1.066)	-4.10** (1.464)	-4.70** (1.821)	-4.70** (1.821)	-4.70** (1.821)	-4.10** (1.464)	-0.66 (1.066)	-4.10** (1.464)	-4.70** (1.821)	-6.84** (2.805)	-4.21* (2.263)	-4.21* (2.263)	-0.08* (0.042)	0.05 (0.083)											
Number of bank branches per capita 1961*(1961–2000) trend	-0.43** (0.165)	-0.48* (0.269)	-0.26* (0.134)	-0.46* (0.226)	-0.46* (0.226)	-0.46* (0.226)	-0.43 (0.264)	-0.43 (0.264)	-0.46* (0.226)	-0.46* (0.226)	-0.46* (0.226)	-0.46* (0.226)	-0.80* (0.447)	-0.46 (0.281)	-0.46 (0.281)	-0.01 (0.004)	0.01 (0.013)											
Number of bank branches per capita in 1961*Post-1976 dummy <sup>†</sup>	-0.31 (1.229)	-1.42 (2.297)	-2.06 (1.654)	-1.39 (2.034)	-1.39 (2.034)	-1.39 (2.034)	-2.13 (2.587)	-2.13 (2.587)	-2.13 (2.587)	-2.13 (2.587)	-2.13 (2.587)	-2.13 (2.587)	-1.31 (3.322)	-1.31 (3.322)	-1.31 (3.322)	0.04 (0.059)	0.03 (0.065)											
Number of bank branches per capita in 1961*Post-1989 dummy <sup>†</sup>	5.38** (2.468)	-1.08 (2.334)	-0.47 (1.015)	-1.55 (1.759)	-1.55 (1.759)	-1.55 (1.759)	-0.45 (2.903)	-0.45 (2.903)	-0.45 (2.903)	-0.45 (2.903)	-0.45 (2.903)	-0.45 (2.903)	-0.45 (2.903)	-0.79 (2.614)	-0.79 (2.614)	-0.79 (2.614)	0.11 (0.068)	-0.05 (0.047)										
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES									
Other controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES									
Overidentification test																												
Adjusted R-squared	0.807	0.834	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[1]	[1]	[0.98]	[0.98]	[0.98]	[0.99]									
Observations	627	627	627	627	627	627	627	627	627	627	627	627	627	375	375	375	375	375	554									

Source: This table is a replication of Table 3 in [Burgess and Pande \(2005\)](#), page 789. For replication I used data and methodology provided by the authors. <sup>†</sup> Original paper contains Post-1976 dummy\*(1977–2000) trend and Post-1989 dummy\*(1990–2000) trend instead, which is not consistent with the text and the stata code. Therefore, we have changed the variable names accordingly. Note: The IV estimates correspond to equation 4 for different dependent variables. For the definition of other controls see Table 1. The over-identification is tested using the conventional Sargan test. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4. Rural credit and savings and poverty: instrumental variables evidence

	Headcount Ratio					
	Rural		Urban		Aggregate	
	(1)	(2)	(3)	(4)	(5)	(6)
Rural bank credit share	-1.52** (0.694)		-0.67 (0.466)		-1.37** (0.586)	
Rural bank savings share		-2.22** (0.781)		-1.05 (0.675)		-2.01*** (0.647)
Number bank branches per capita in 1961*(1961–2000) trend	-1.01* (0.496)	-1.51** (0.538)	-0.70** (0.253)	-0.96** (0.343)	-0.96** (0.406)	-1.42*** (0.437)
Number bank branches per capita in 1961*Post-1976 dummy <sup>†</sup>	-2.89 (1.681)	-2.05 (2.340)	-1.59 (1.975)	-1.23 (2.554)	-2.60 (1.677)	-1.84 (2.518)
Number bank branches per capita in 1961*Post-1989 dummy <sup>†</sup>	4.40 (2.644)	2.13 (2.653)	2.87 (2.345)	1.88 (1.310)	3.53 (2.352)	1.47 (1.975)
State and year dummies	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES
Overidentification test	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]
Adjusted R-squared	0.686	0.602	0.903	0.879	0.746	0.669
Observations	503	503	503	503	503	503

Source: This table is a replication of Table 4 in [Burgess and Pande \(2005\)](#), page 791. For replication I used data and methodology provided by the authors. <sup>†</sup> Original paper contains Post-1976 dummy\*(1977–2000) trend and Post-1989 dummy\*(1990–2000) trend instead, which is not consistent with the text and the stata code. Therefore, we have changed the variable names accordingly. Note: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5. Bank branch expansion and poverty reduction: robustness checks

	Rural Headcount Ratio		Urban Headcount Ratio	
	(1)	(2)	(3)	(4)
Number branches opened in rural	-4.12** (1.544)	-3.77** (1.544)	-1.05 (1.061)	-0.81 (0.908)
unbanked locations per capita				
Cumulative land reform	-1.75** (0.696)	-1.87** (0.678)	0.41 (0.286)	0.27 (0.302)
Health and education spending	-10.97 (30.908)	-3.31 (28.402)	23.52 (14.531)	23.74 (14.796)
Other development spending	-40.84*** (12.394)	-37.32** (13.365)	6.31 (12.083)	5.73 (11.890)
<b>Fraction legislators from:</b>				
Congress parties		-13.07 (8.904)		0.22 (3.138)
Janata parties		-11.62 (6.899)		1.62 (3.184)
Hindu parties		6.15 (12.905)		9.61 (8.361)
Hard Left parties		-14.81 (9.074)		1.76 (3.718)
Regional parties		-15.11 (12.911)		-2.34 (4.596)
State and year dummies	YES	YES	YES	YES
Other controls	YES	YES	YES	YES
Overidentification test	[0.99]	[0.99]	[0.99]	[0.99]
Adjusted R-squared	0.802	0.816	0.915	0.916
Observations	605	603	605	603

Source: This table is a replication of Table 5 in [Burgess and Pande \(2005\)](#), page 792. For replication I used data and methodology provided by the authors. Note: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 1.1 -- Branched in Rural Unbanked locations**

**Table 1.2 -- Rural Bank Saving Share**

**Table 1.3 -- Rural Bank Credit share**

**Table 1.4 -- Branches in banked locations**

**Table 2.1 -- Rural Headcount Ratio**

Year	1970	1971	1972	1973	1974	1975	1976	1977	Rural Headcount Ratio	1978	1979	1980	1981	1982	1983	1984
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Number of Bank Branches per capita in 1961 * (1961 - 2000) trend	-0.75	-0.38	-0.37	-0.46	-0.58	-0.69**	-0.75***	-0.77***	-0.78***	-0.78***	-0.77***	-0.77***	-0.76***	-0.75***	-0.75***	
	(0.773)	(0.629)	(0.552)	(0.464)	(0.379)	(0.293)	(0.251)	(0.235)	(0.234)	(0.243)	(0.244)	(0.240)	(0.234)	(0.228)	(0.224)	
Number of Bank Branches per capita in 1961 * (T - 2000) trend	0.49	0.27	0.38	0.56	0.75	0.92**	1.04**	1.15**	1.26**	1.38***	1.52***	1.66***	1.77***	1.80***	1.53***	
	(0.778)	(0.659)	(0.594)	(0.524)	(0.465)	(0.419)	(0.413)	(0.424)	(0.429)	(0.402)	(0.365)	(0.330)	(0.313)	(0.314)	(0.297)	
Number of Bank Branches per capita in 1961 * (1990 - 2000) trend	-0.52*	-0.67**	-0.78**	-0.88***	-0.95***	-1.01***	-1.07***	-1.15***	-1.25***	-1.38***	-1.52***	-1.67***	-1.79***	-1.82***	-1.56***	
	(0.264)	(0.266)	(0.282)	(0.296)	(0.303)	(0.312)	(0.326)	(0.342)	(0.351)	(0.346)	(0.355)	(0.380)	(0.420)	(0.463)	(0.476)	
Number of Bank Branches per capita in 1961 * Post-T dummy	-2.13	-5.86*	-7.01**	-7.16**	-6.42**	-5.23**	-4.37*	-3.77*	-3.37*	-3.14*	-2.82	-2.3	-1.43	0.1	2.92	
	(3.078)	(2.910)	(3.111)	(3.084)	(2.893)	(2.411)	(2.161)	(1.940)	(1.682)	(1.666)	(2.009)	(2.369)	(2.590)	(2.566)	(2.180)	
Number of Bank Branches per capita in 1961 * Post-1989 dummy	4.47*	3.59	2.95	2.42	2.05	1.81	1.52	1.2	0.84	0.41	-0.01	-0.4	-0.69	-0.75	-0.32	
	(2.308)	(2.356)	(2.407)	(2.437)	(2.427)	(2.420)	(2.414)	(2.387)	(2.311)	(2.153)	(1.995)	(1.845)	(1.713)	(1.615)	(1.593)	
Observations	627	627	627	627	627	627	627	627	627	627	627	627	627	627	627	
Adjusted R-squared	0.835	0.837	0.84	0.841	0.841	0.838	0.836	0.835	0.835	0.835	0.835	0.836	0.836	0.835	0.834	
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Other controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
F-test 1	0.87	0.152	0.000	0.138	0.477	0.709	1.015	1.497	2.483	5.433	11.4	20.2	24.84	21.29	11.55	
P1	0.366	0.702	0.993	0.715	0.5	0.413	0.33	0.24	0.136	0.0341	0.00415	0.000428	0.000163	0.000337	0.00397	
F-test 2	2.972	2.972	2.973	2.973	2.973	2.973	2.973	2.973	2.973	2.973	2.973	2.973	2.973	2.973	2.973	
P2	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2.2 -- Urban Headcount Ratio**

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
	Urban Headcount Ratio														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Number of Bank Branches per capita in 1961 * (1961 - 2000) trend	0.47	0.35	0.23	0.08	-0.06	-0.15	-0.21	-0.27	-0.32	-0.36*	-0.38**	-0.39**	-0.40**	-0.40**	-0.39**
	(0.364)	(0.343)	(0.334)	(0.323)	(0.312)	(0.287)	(0.262)	(0.237)	(0.212)	(0.190)	(0.173)	(0.160)	(0.150)	(0.144)	(0.141)
Number of Bank Branches per capita in 1961 * (T - 2000) trend	-0.81**	-0.65*	-0.48	-0.3	-0.14	-0.03	0.07	0.15	0.21	0.23	0.23	0.2	0.15	0.05	-0.12
	(0.346)	(0.354)	(0.341)	(0.325)	(0.307)	(0.287)	(0.268)	(0.257)	(0.254)	(0.261)	(0.282)	(0.316)	(0.352)	(0.376)	(0.433)
Number of Bank Branches per capita in 1961 * (1990 - 2000) trend	-0.09	-0.13	-0.18	-0.22	-0.23	-0.26	-0.29	-0.31	-0.32	-0.3	-0.28	-0.24	-0.18	-0.09	0.08
	(0.246)	(0.250)	(0.260)	(0.279)	(0.309)	(0.332)	(0.356)	(0.378)	(0.396)	(0.404)	(0.420)	(0.441)	(0.460)	(0.467)	(0.508)
Number of Bank Branches per capita in 1961 * Post-T dummy	-3.85*	-4.47**	-4.87**	-4.67*	-3.9	-3.59	-3.22	-2.76	-2.16	-1.35	-0.65	-0.02	0.57	1.17	1.88
	(2.121)	(1.842)	(2.001)	(2.255)	(2.555)	(2.427)	(2.364)	(2.286)	(2.162)	(2.026)	(1.960)	(1.843)	(1.570)	(1.083)	(1.267)
Number of Bank Branches per capita in 1961 * Post-1989 dummy	1.64	1.38	1.1	0.91	0.85	0.7	0.58	0.5	0.46	0.52	0.6	0.7	0.84	1.02	1.3
	(1.633)	(1.522)	(1.411)	(1.294)	(1.166)	(1.069)	(0.997)	(0.964)	(0.988)	(1.093)	(1.206)	(1.308)	(1.371)	(1.352)	(1.228)
Observations	627	627	627	627	627	627	627	627	627	627	627	627	627	627	627
Adjusted R-squared	0.912	0.913	0.914	0.914	0.914	0.914	0.913	0.913	0.913	0.912	0.912	0.911	0.911	0.911	0.912
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F-test 1	6.926	6.268	3.698	2.215	1.555	1.001	0.605	0.373	0.282	0.338	0.39	0.465	0.629	1.037	1.466
P1	0.0189	0.0243	0.0737	0.157	0.232	0.333	0.449	0.551	0.603	0.57	0.542	0.506	0.44	0.325	0.245
F-test 2	3.947	3.948	3.948	3.948	3.948	3.948	3.948	3.948	3.948	3.948	3.948	3.948	3.948	3.948	3.948
P2	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655	0.0655

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2.3 -- Aggregate Headcount Ratio**

Year	1970	1971	1972	1973	1974	1975	1976	1977	Aggregate Headcount Ratio	1978	1979	1980	1981	1982	1983	1984
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Number of Bank Branches per capita in 1961 * (1961 - 2000) trend	-0.59	-0.32	-0.33	-0.42	-0.54	-0.63**	-0.68**	-0.71***	-0.72***	-0.73***	-0.73***	-0.72***	-0.72***	-0.71***	-0.70***	
	(0.669)	(0.539)	(0.477)	(0.410)	(0.348)	(0.278)	(0.242)	(0.225)	(0.220)	(0.223)	(0.221)	(0.216)	(0.211)	(0.207)	(0.204)	
Number of Bank Branches per capita in 1961 * (T - 2000) trend	0.32	0.17	0.28	0.45	0.63	0.77**	0.89**	0.99***	1.09***	1.18***	1.28***	1.37***	1.43***	1.41***	1.14***	
	(0.650)	(0.547)	(0.496)	(0.443)	(0.394)	(0.349)	(0.334)	(0.332)	(0.327)	(0.301)	(0.274)	(0.261)	(0.271)	(0.286)	(0.253)	
Number of Bank Branches per capita in 1961 * (1990 - 2000) trend	-0.49**	-0.61**	-0.71***	-0.79***	-0.85***	-0.90***	-0.97***	-1.04***	-1.12***	-1.21***	-1.31***	-1.40***	-1.47***	-1.46***	-1.20**	
	(0.224)	(0.227)	(0.238)	(0.252)	(0.271)	(0.281)	(0.295)	(0.310)	(0.323)	(0.334)	(0.357)	(0.391)	(0.432)	(0.458)	(0.425)	
Number of Bank Branches per capita in 1961 * Post-T dummy	-2.43	-5.40**	-6.39**	-6.41**	-5.54**	-4.72**	-4.07**	-3.53*	-3.05*	-2.58	-2.08	-1.45	-0.58	0.78	3.14*	
	(2.687)	(2.363)	(2.406)	(2.417)	(2.425)	(2.055)	(1.851)	(1.706)	(1.617)	(1.765)	(2.051)	(2.279)	(2.343)	(2.138)	(1.543)	
Number of Bank Branches per capita in 1961 * Post-1989 dummy	3.47*	2.73	2.17	1.72	1.44	1.18	0.91	0.62	0.32	0.02	-0.26	-0.51	-0.68	-0.65	-0.23	
	(1.860)	(1.888)	(1.951)	(1.970)	(1.926)	(1.902)	(1.871)	(1.819)	(1.725)	(1.562)	(1.404)	(1.260)	(1.147)	(1.089)	(1.150)	
Observations	627	627	627	627	627	627	627	627	627	627	627	627	627	627	627	
Adjusted R-squared	0.875	0.877	0.879	0.88	0.88	0.878	0.876	0.875	0.875	0.875	0.875	0.875	0.875	0.875	0.874	
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Other controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
F-test 1	1.406	0.415	0.047	0.0241	0.205	0.509	0.987	1.76	3.299	7.993	17.23	22.93	18.48	12.97	6.043	
P1	0.254	0.529	0.832	0.879	0.657	0.487	0.336	0.205	0.0893	0.0127	0.000854	0.000239	0.000633	0.00262	0.0266	
F-test 2	4.147	4.147	4.147	4.147	4.147	4.147	4.147	4.148	4.148	4.148	4.148	4.148	4.148	4.148	4.148	
P2	0.0598	0.0598	0.0598	0.0598	0.0598	0.0598	0.0597	0.0597	0.0597	0.0597	0.0597	0.0597	0.0597	0.0597	0.0597	

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3.1 -- Rural Headcount Ratio - IV**

**Table 3.2 -- Urban Headcount ratio - IV**

**Table 3.3 -- Aggregate Headcount ratio - IV**

**Table 3.4 -- Rural Headcount ratio -- 1961 - 1989 -- IV**

**Table 3.5 -- Rural Headcount ratio -- T-2000 -- IV**

**Table 3.6 -- Rural Headcount ratio -- Survey years -- IV**

**Table 4.1 -- Rural Headcount Ratio - effect of rural Credit and Saving Share**

**Table 4.2 -- Urban Headcount Ratio - effect of rural Credit and Saving Share**

**Table 4.3 -- Aggregate Headcount Ratio - effect of rural Credit and Saving Share**

**Table 5.1 -- Rural Headcount Ratio -- Robustness Checks**

**Table 5.2 -- Urban Headcount Ratio -- Robustness Checks**

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