Can Rural Banks Reduce Poverty? Evidence from the Indian Social Banking Experiment*

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Abstract

We exploit the introduction and removal of a nation-wide bank branch licensing rule which sought to increase and equalize bank branch presence across Indian states to estimate the effect of rural bank openings on poverty. Between 1977 and 1990, to qualify for a license to open a branch in a census location which already had one or more bank branches an Indian bank had to open four branches in locations with no bank branches. This policy caused banks to open relatively more rural branches in Indian states with lower initial financial development between 1977 and 1990. The reverse was true outside this period. We use these policy-induced trend reversals in the relationship between a state's initial financial development and rural branch expansion as instruments for rural branch expansion and find that rural branch expansion in India significantly reduced rural poverty.

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1 Introduction

The question of whether state-led expansion of credit and savings facilities can reduce poverty has long been of interest to economists and policy-makers. A large theoretical literature identifies different mechanisms through which access to such facilities can enable individuals to alter their production and employment choices and thereby exit poverty (Aghion and Bolton 1997, Banerjee and Newman 1993, Banerjee 2004). The belief that governments can use public policy to alleviate financing constraints and thereby engender development and reduce poverty led to the widespread implementation of state-led rural credit and savings schemes in low income countries in the post-colonial period. In most cases this was accomplished through government oversight of the banking sector, often aided by government ownership of banks.

Today, these schemes remain important in many developing countries (Besley 1995). However, many believe that formal subsidized credit was ineffective in reaching the poor, and may even have undermined rural development and increased rural poverty (Adams et al 1984, Braverman and Guasch 1986). Opponents argue that state control led to political considerations determining credit allocation and made the banking sector susceptible to elite capture (La Porta, Lopez-De-Silanes and Shleifer 2002, Sapienza 2004). Some claim that elite capture was associated with a concentration of formal subsidized credit in the hands of the powerful few and a worsening of terms in the informal markets on which the poor depend (Adams et al 1984, Braverman and Guasch 1986).

Credible evidence on whether state-led expansion of the banking sector can reduce poverty, however, remains limited. The central reason for this is the non-random nature of these programs. Specifically, banks favor opening branches in richer areas, while state-led bank branch expansion programs tend to target poorer areas. This makes identification of the causal impact of branch expansion on poverty outcomes problematic.[1] In this paper we evaluate the impact of a large state-led bank branch expansion program in India on rural poverty. The policy rules underlying the program provide us with a credible source of exogenous variation in rural branch expansion.

This program is the largest branch expansion program undertaken by any single country. After bank nationalization in 1969 the Indian government launched an ambitious social banking program which sought to improve the access of the rural poor to formal credit and saving opportunities. The program ended in 1990. Between 1969 and 1990 bank branches were opened in roughly 30,000 rural locations with no prior formal credit and savings institutions (unbanked locations).[2]

[1] Bank expansion and economic growth are positively correlated in cross country data (e.g. King and Levine, 1993). However, the fact that countries with greater growth potential attract more banks makes causal inference difficult.

[2] Throughout the paper locations refer to villages, towns and cities as defined by the Indian census. The census defines a location with a 10,000 or less person as rural. The same holds for rural and urban poverty definitions.

An integral element of this program was branch expansion into rural unbanked locations. The stated aim was to open bank branches in the most populous unbanked rural locations, and over time move down the population distribution of locations. India is a federation of states, and more of the targeted locations were situated in states with fewer bank branches per capita pre-program (financially less developed states). To further encourage rural branch expansion the Indian central bank announced a new branch licensing policy in 1977. It mandated that to obtain a license for a branch opening in a location with one or more branches (a banked location) a bank must open branches in four eligible unbanked locations. This policy remained in place until 1990.

Our research design exploits the policy-driven nature of branch expansion across Indian states. We show that between 1977 and 1990 rural branch expansion was relatively higher in financially less developed states. The reverse was true before 1977 and after 1990. The timing and nature of these trend reversals point to their being caused by the introduction and removal of the 1:4 branch licensing policy. By using the deviations, between 1977-1990 and post-1990, from the pre-program linear trend relationship between a state's initial financial development and rural branch expansion as instruments we are able to identify the policy-driven element of rural branch expansion. This allows us to address the problem of non-random branch placement. Our research design assumes that other state-specific economic and policy variables which affect poverty outcomes did not exhibit similarly timed trend reversals. We show that potentially confounding variables, such as states' economic performance, poverty alleviation policies and other credit programs, did not show similar patterns.

This paper's main finding is that branch expansion into rural unbanked locations in India significantly reduced rural poverty. We show that this effect was, at least partially, mediated through increased deposit mobilization and credit disbursement by banks in rural areas. In contrast, the rural branch expansion program left urban poverty outcomes unaffected.

The paper is organized as follows. Section 2 describes the Indian rural branch expansion program and the data we use. Section 3 describes our research design, Section 4 presents the results and Section 5 concludes.

2 The Program

Nationalization in 1969 brought the fourteen largest commercial banks under the direct control of the Indian central bank. Following this, the central bank launched an ambitious branch expansion program which sought to both expand the rural bank branch network and equalize individual access to banks across Indian states.

This program encouraged branch openings in rural unbanked locations. Banks were restricted to selecting unbanked locations for branch expansion from a list cir-

culated by the central bank. This list identified all unbanked locations with a population above a certain number, and was updated (with a lower population cut-off) every three years. The same population cut-off was used across India, and therefore the list featured relatively more locations from states with a lower initial stock of bank branches per capita. Having a common criteria for identifying unbanked locations also implied that, within a state, more locations were targeted in districts with fewer bank branches per capita pre-program.[3]

The 1949 Banking Regulation Act requires banks to obtain a license from the Indian central bank before opening a new branch. As a means of ensuring that targeted rural unbanked locations received bank branches the central bank in 1977 introduced a new branch licensing policy. It mandated that a bank can obtain a license to open a branch in an already banked location only if it opened branches in four unbanked locations. This 1:4 licensing policy was aimed at forcing banks wishing to expand in already banked locations to open branches in unbanked locations. The 1:4 licensing policy was discontinued in 1990. Since then central bank policy has been that branch expansion should reflect "need, business potential and financial viability of the location" (Government of India 1991). However, banks cannot close a rural branch if it is the only one serving a given location.

To ensure that rural branch expansion translated into increased credit and savings opportunities for the rural population the central bank regulated banks' deposit-taking and lending policies. Between 1969 and 1990 rural lending rates were kept below urban lending rates, with the opposite true of saving rates. After bank nationalization the central bank also mandated that banks' lending portfolio meet lending targets with respect to 'priority' sectors. These included loans to small scale industries and entrepreneurs and to agriculture. At nationalization 33 percent of all bank loans had to be made to priority sectors and this increased to 40 percent from 1985 onwards. Finally, to ensure that banks did not concentrate their lending in urban areas the central bank required that every bank branch maintain a credit-deposit ratio of 60 percent within its geographical area of operation.

Our focus is on examining the impact of the branch expansion program on rural poverty. To measure the extent of rural branch expansion we use a branch level data set provided by the Indian central bank (Reserve Bank of India 2000).[4] This data set identifies the opening date and location of every Indian bank branch and also whether it is in a rural location. We classify the first branch opening in a rural location as an opening in a rural unbanked location. Branch opening in a census

[3]In each Indian district one commercial bank was selected by the central bank to be the Lead Bank which was responsible for coordinating branch expansion activities in that district. This was to ensure that targeted unbanked locations within districts were filled and to guard against branch openings being concentrated in affluent areas of states.

[4]Each branch in the data set is a distinct physical entity (typically a concrete building) which undertakes deposit-taking and lending activities. It is usually staffed by an officer, two clerks, one of whom is the cashier, and a security guard.

location which already has one or more bank branches is classified as an opening in a banked location.

We aggregate these branch data to construct an annual state-level panel for the sixteen main Indian states, 1961-2000.[5] We identify a state's initial financial development by the number of bank branches per capita in the state in 1961. We measure rural branch expansion and branch expansion in already banked locations by the cumulative number of branches per capita opened in rural unbanked and already banked locations in a state respectively. Between 1961 and 2000, the number of branches opened in rural unbanked locations in our sample states increased from 105 to 29,109. Eighty percent of this expansion occurred between 1977 and 1990.[6] After 1990 there was no further expansion into unbanked rural locations.

Indian national household survey data document a dramatic rise in the importance of banks as a source of rural household credit. Between 1961 and 1991 bank borrowing as a share of total rural household debt increased from 0.3 to 29 percent. This rise came largely at the expense of borrowing from moneylenders, the share of which fell from 60.9 to 15.7 percent (for details see Burgess and Pande 2003). To examine whether rural branch expansion contributed to this rise in rural credit flows and savings mobilization we use data on the shares of total outstanding bank credit and savings accounted for by rural branches (rural credit share and rural savings share respectively).

Finally, to examine how rural branch expansion affected rural household welfare we focus on rural poverty outcomes. We exploit the fact that national household expenditure surveys have been regularly conducted in India since the 1950s to construct consistent and comparable annual state-level rural and urban poverty measures. Throughout, we measure poverty by the headcount ratio which measures the proportion of population below the Indian poverty line. Across our sample period, the average rural and urban headcount ratios were 48 and 40 percent. We also use data on agricultural wages, an important income source for the rural poor, as an alternative measure of rural household welfare. Agricultural wage and poverty data are independently collected by separate government agencies.[7]

[5] These cover over 95% of the Indian population. State-wise summary statistics are in Table A1.

[6] In Figure A1 we show that branch expansion lowered and equalized population per bank branch across Indian states.

[7] We are grateful to Gaurav Datt and Martin Ravallion for providing the state-level poverty figures for 1961-1994 (see Ozler, Datt and Ravallion 1996), and to Gaurav Datt for the 1994-2000 data. 1961 is the first, and earliest, census year preceding bank nationalization for which annual poverty series are available. Figures A2 and A3 show the state-wise evolution of rural credit and savings shares and of rural and urban poverty outcomes respectively.

3 Research Design

We are interested in using our state-level panel of data on the number of bank branches, rural credit and saving shares and poverty outcomes to identify whether the branch expansion program affected rural poverty. The simplest way is to estimate, for an Indian state i in year t, a OLS regression of the form:

$$y_{it} = \alpha_i + \beta_t + \phi B_{it}^R + \varepsilon_{it} \tag{1}$$

where y_{it} denotes the rural headcount ratio, B_{it}^R cumulative branch openings in rural unbanked locations per capita, and α_i and β_t state and year fixed effects. Causal interpretation of the estimated ϕ parameter, however, is problematic. Absent policy constraints on branch placement, we would expect relatively greater branch expansion in richer states. If richer states are more effective at reducing poverty then ϕ would be an overestimate of the true poverty impact of rural branch expansion. On the other hand, if the Indian central bank was successful in forcing banks to open relatively more branches in poorer states then the above logic suggests that ϕ would underestimate the true poverty impact of rural branch expansion.

This problem can be solved if we have instruments for rural branch expansion. Arguably, the imposition and removal of the 1:4 branch licensing policy, which linked branch expansion in unbanked locations to that in already banked locations, can provide such instruments. Between 1977 and 1990 this policy, if effective, should have caused more rapid branch expansion in financially less developed states since they contained more unbanked locations. Outside this period the opposite should have held if locations in financially less developed states offered banks lower profits and were therefore less attractive to banks. These trend reversals between 1978-1990 and post-1990 in how a state's initial financial development affects rural branch expansion constitute valid instruments for branch openings in rural unbanked locations if, relative to the 1961-1977 trend, these trend reversals were significant and had no direct impact on poverty outcomes. In the remainder of this section we examine the validity of both these assumptions. We start by estimating:

$$B_{it}^R = \alpha_i + \beta_t + \gamma_t \times B_{i1961} + \delta_t \times X_{i1961} + \epsilon_{it} \tag{2}$$

B_{i1961}, our measure of initial financial development, denotes the number of bank branches per capita in state i in 1961. This variable enters the regression interacted with year dummies, with γ_t denoting the year-specific coefficients. The difference between γ_{t+1} and γ_t tells us how a state's initial financial development affected rural branch growth between years t and $t+1$. X_{i1961} denotes a vector of initial state conditions which includes log real state income per capita, population density and the number of rural locations per capita, all measured in 1961. These enter the regression with year-specific coefficients δ_t.

The diamonds on the solid line in Figure 1 graph the γ_t coefficients from this regression (the reference year is 1961). Consistent with the idea that financially more developed states offered banks greater profit opportunities, we observe more branch openings in rural unbanked locations in these states between 1961 and 1977. This is reflected in a positive trend in γ_t coefficients. This trend is reversed in 1977 precisely when the 1:4 license policy was imposed. Between 1977 and 1990 the γ_t coefficients decrease with time – financially less developed states witness higher growth of branch openings in rural unbanked locations. After 1990 branch expansion into rural unbanked locations comes to a halt. The shape of this graph is unaltered by the exclusion of the X_{i61} controls (see Burgess and Pande 2003). We also observe identical trend reversals in 1977 and 1990 at the district level. This indicates that the 1:4 licensing policy caused banks to target financially less developed districts within a state.[8]

We summarize these trend reversals by a linear trend break model:

$$\begin{aligned} B_{it}^{R} &= \alpha_i + \beta_t + \gamma_1(B_{i1961} \times [t-1961]) + \gamma_2(B_{i1961} \times [t-1977]) + \\ &\quad \gamma_3(B_{i1961} \times [t-1990]) + \gamma_4(B_{i1961} \times P_{1977}) + \gamma_5(B_{i1961} \times P_{1990}) + \epsilon_{it}. \end{aligned} \tag{3}$$

State and year fixed effects account for permanent differences across states, and national events which may affect branch expansion. $[t-1961]$, $[t-1977]$ and $[t-1990]$ denote linear time trends starting in 1961, 1977 and 1990 respectively. These enter the regression interacted with our measure of a state's initial financial development, B_{i1961}. P_{1977} and P_{1990} are dummy variables which equal one from 1977 and 1990 respectively.

The main coefficients of interest γ_1, γ_2 and γ_3 measure the average 1961-1977 trend relationship between a state's initial financial development and rural branch expansion and the subsequent changes in this trend relationship (between 1978 and 1990, and between 1991 and 2000). Finally, γ_4 and γ_5 measure the intercept changes in this relationship in 1977 and 1990 respectively. The set of additional controls, X_{i1961}, enter the regression in the same way as B_{i1961}. Their inclusion ensures that any observed trend reversals in B_{i1961} do not proxy for trend breaks in a state's economic and demographic characteristics (as measured by X_{i1961}). To account for possible serial correlation in errors we cluster standard errors by state (on this, see Bertrand, Duflo and Mullainathan 2004).

Column (1) of Table 1 reports the results. Between 1961 and 1977, one additional point of initial financial development increased branch openings in rural unbanked locations per capita in that state by 0.07. There was a significant trend reversal in 1977 and between 1977 and 1990 one additional point of initial financial development reduced annual branch expansion by 0.18 branches per capita. Finally, after 1990 a state's level of initial financial development and extent of rural branch expansion were unrelated.

[8] For the district-level analysis see Figure A4.

The squares on the dotted line in Figure 1 show the γ_t coefficients implied by these estimates. The pattern of coefficients for the unrestricted model and linear trend break model are extremely similar and a F test shows that the imposed restrictions do not lead to any significant loss in overall fit.[9]

The rural branch expansion program sought to increase rural household access to formal sector credit and saving opportunities. In Figure 2 we graph the estimated γ_t coefficients from a regression of the form described by equation (2) where the dependent variable is rural credit share. Similar to the pattern observed for rural branches, rural credit shares are initially higher in more financially developed states but this pattern is reversed between 1976 and 1990. After 1990, the relationship reverts to being positive. Column (2) of Table 1 reports the corresponding results for the linear trend-break model. Prior to 1977 rural credit share and initial financial development are uncorrelated. However, between 1977 and 1990 these two variables are negatively correlated. The correlation is, again, reversed between 1990 and 2000. In column (3) we see that the rural savings share exhibits a similar trend reversal in the mid 1970s. This suggests that the rural branch expansion associated with the 1:4 branch license policy increased savings mobilization and credit disbursement in rural India.

We now provide further evidence that the reversals observed in columns (1) - (3) are policy driven. In the absence of policy constraints we would expect banks to choose locations which offered them the highest expected profits. Between 1961 and 2000 banks were free to choose where to locate branch openings in already banked locations. In column (4) of Table 1 we observe more branch openings in already banked locations in financially more developed states throughout our sample period. This indicates that these states were more attractive to banks and that regulation was needed to coerce banks to locate elsewhere. We also observe that the rate of branch expansion into already banked locations was lower between 1977 and 1990. This makes sense as, during this period, branch openings in bank locations were less profitable as each such branch opening had to be accompanied by four branch openings in unbanked locations.

We also check whether bank and state level policies which should be unaffected by the 1:4 licensing policy exhibit trend reversals in 1977 and 1990. In column (5) we look at the fraction of bank credit going to priority sectors. Priority sector targets were binding at the bank-level, and remained independent of the state-wise distribution of a bank's rural and urban branches. In column (6) we look at the fraction of total bank and cooperative credit accounted for by primary agricultural cooperatives. Cooperative credit policy is controlled by state governments. In neither case do we find evidence of trend breaks. Burgess and Pande (2003) also show that important state economic, political and policy variables, which have the potential to affect rural poverty, did not exhibit similarly timed trend breaks. When they looked

[9] The value of the F-statistic is 0.04, see Greene (1993: 208) for the test.

at state political representation, center-state alignment, passage of land reforms, and spending on public food distribution, health and education, and on other development programs they found no evidence of trend breaks in the relationship with initial financial development.

4 Results

This section presents our main results. We start with reduced form evidence on the relationship between a state's initial financial development and poverty outcomes, and then provide instrumental variable estimates of how increases in the number of branches in rural unbanked locations affected poverty outcomes.

4.1 Reduced form evidence

We estimate a regression of the form:

$$y_{it} = \alpha_i + \beta_t + \lambda_t \times B_{i1961} + \delta_t \times X_{i1961} + \epsilon_{it} \tag{4}$$

and report the findings in Figure 3. The diamonds on the solid line depict the λ_t coefficients when y_{it} is the rural headcount ratio, while the squares on the dotted line depict the γ_t coefficients when y_{it} is the urban headcount ratio.[10] Between 1970 and 1978, and after 1990, both rural and urban poverty declines were more pronounced in financially more developed states. However, between 1978 and 1990 the relationship differs by poverty measure. Urban poverty and a state's initial financial development are largely uncorrelated. In contrast, between 1983 and 1990 rural poverty reductions are more pronounced in states with lower initial financial development. The graph for rural poverty is thus the inverse of that for rural branch expansion. To see this more clearly, we estimate a regression of the form:

$$\lambda_t = a + b\gamma_t + c_1 P_{1977} + c_2 P_{1990} + \epsilon_t \tag{5}$$

where λ_t and γ_t are the year-wise coefficients from regressions of the form described in equations (4) and (2). The dependent variables are the rural headcount ratio and branch openings in rural unbanked locations respectively. We allow for intercept changes in this relationship in 1977 and 1990. Column (1) of Table 2 demonstrates a strong inverse relationship between λ_t and γ_t.

The remainder of Table 2 reports results from the linear trend break regression model for alternative poverty outcomes. Column (2) shows that rural poverty reductions were more rapid in financially more developed states before 1977 and after 1990.

[10] The rural and urban headcounts are defined as the percentage of rural and urban households with per capita monthly expenditures below the rural (49 rupees at 1973-June 1974 all-India rural prices) and urban (Rs. 57 at 1973-June 1974 all-India urban prices) poverty lines.

Specifically, a one point increase in financial development reduced rural poverty annually by an additional 0.77 points. This trend was reversed between 1977 and 1990 – a one point decrease in financial development reduced rural poverty annually by an additional 0.37 points. Consistent with the fact that branch expansion into unbanked locations was predominantly rural, we observe in column (3) that a state's initial financial development and urban poverty outcomes are unrelated. Results for aggregate poverty mirror those for rural poverty (column (4)). In column (5) we observe that, between 1977 and 1990, wages for agricultural laborers, which are a marker of the welfare of the poorest group in the countryside, also increased more rapidly in financially less developed states. The reverse is true after 1990. In contrast, wages in factories (which are located mainly in urban areas), show no relationship with a state's initial financial development (column (6)).

4.2 Instrumental Variables Evidence

Column (1) of Table 3 reports estimates from an OLS regression of branch openings in rural unbanked locations on the rural headcount ratio (equation (1)). The coefficient on branch openings in rural unbanked locations is positive and significant. This is consistent with a 'program' based explanation wherein poorer, financially less developed states attracted more rural branches between 1977 and 1990. The result highlights the pitfalls of using OLS estimation to assess the impact of rural branch expansion on poverty. Inclusion of the interaction between a state's initial financial development and a time trend, and the vector of state initial conditions as additional covariates renders this relationship statistically insignificant (column (2)).

Our IV regressions exploit the documented trend reversals between 1978 and 1990 and between 1991 and 2000 (relative to the 1961-1977 trend) in the relationship between a state's initial financial development and rural branch expansion as instruments for branch openings in rural unbanked locations. The first stage regression is as in column (1) of Table 1. The second stage regression takes the form:

$$y_{it} = \alpha_i + \beta_t + \phi B^R_{it} + \eta_1([t-1961] \times B_{i1961}) + \eta_2(P_{1977} \times B_{i1961}) + \eta_3(P_{1990} \times B_{i1961}) + u_{it} \quad (6)$$

Deviations from the linear state-specific trend, $[t-1961] \times B_{i1961}$, which we characterize as $[t-1977] \times B_{i1961}$ and $[t-1990] \times B_{i1961}$, are our instruments for B^R_{it}.

Columns (3) - (5) of Table 3 report IV estimates for poverty outcomes. Opening a bank branch in a rural unbanked location reduces rural poverty by 4.74 percent (column (3)). Evaluated at the sample average, our results imply that rural branch expansion in India can explain a 17 percent reduction in the headcount ratio. In contrast, rural branch expansion did not affect urban poverty (column (4)).[11] Opening a bank branch in an additional rural location per 100,000 persons lowers aggregate

[11] Consistent with this we also find that rural branch expansion reduces the gap between rural and urban poverty – a variable which exhibits no clear trend over the period.

poverty by 4.10 percentage points (column (5)). In columns (6) and (7) we exclude the post-1990 period and pre-1977 periods respectively to demonstrate the robustness of our results to using a single instrument ($[t-1977] \times B_{i1961}$, and $[t-1990] \times B_{i1961}$ respectively). In column (8) we show that our results are robust to restricting our sample to years in which National Sample Surveys (on which the poverty measures are based) were carried out.

Finally, we consider alternative measures of household welfare. As agricultural laborers constitute one of the largest and poorest occupation groups their wages constitute an important independent marker of rural welfare (Dreze and Mukherjee 1991, Deaton and Dreze 2002). In column (9) we see that a branch opening in an unbanked rural location increases the wages of agricultural laborers. Wages of factory workers, who typically reside in urban areas, are unaffected (column (10)). The fact that wage data come from independent data sources makes this a useful robustness check.

In Table 1 we saw that rural credit and saving shares exhibited trend reversals in their relationship with states' initial financial development in 1977 and, in the case of rural credit, in 1990 as well. This implies that we can replicate the above IV procedure for rural credit and savings shares. The first stage regressions are in columns (2) and (3) of Table 1. The IV estimates in Table 4 tell us that increases in rural credit and savings shares reduce rural poverty. A one percentage point increase in the share of credit disbursed by rural branches reduces rural poverty by 1.52 percentage points (column (1)). Similarly, a one percentage point increase in the share of savings held by rural banks reduces poverty by 2.22 percentage points (column (2)). In columns (3) and (4) we see that urban poverty is unaffected by increases in rural credit and savings shares. Columns (5) and (6) confirm that policy induced increases in rural credit and savings shares reduce aggregate poverty.

Finally, in Table 5 we check that our IV poverty results are robust to controlling for an array of time-varying political and policy variables. In column (1) we include multiple measures of state policy activism. These include the cumulative land reform acts passed in a state and state spending on health, education and on other development programs. Other development spending includes spending on agriculture, rural development, irrigation, public works and community development programs. In line with previous studies, we find increases in land reform and development spending reduce rural poverty (Besley and Burgess 2000). However, the effect of branch expansion on rural poverty remains negative and significant. In column (2) we control for the political make-up of state legislatures. While political parties differ with respect to both their commitment to redistribution and the groups in whose favor they redistribute the political make-up of state legislature does not affect rural poverty outcomes and the negative effect of rural banks on rural poverty is robust to the inclusion of these controls. Evaluated at the sample mean the coefficient in column (2) implies that rural branch expansion can explain a 14 percent drop the rural head-

count over the 1961-2000 period. In columns (3) and (4) we find no impact of rural bank branches, land reform, development spending or political composition on the urban headcount ratio.

5 Conclusion

The main contribution of this paper is to test whether state-led rural branch expansion was associated with poverty reduction in India. The widespread use of these programs, the mixed opinions on them and the lack of previous evaluation make this an issue of considerable interest. Looking specifically at India is relevant given the high incidence of poverty and the fact that it was home to the largest rural branch expansion ever attempted. We provide robust evidence that opening branches in rural unbanked locations in India was associated with reductions in rural poverty.

The effect of the Indian central bank's licensing policy on banks' location choices is key to understanding how rural banks reduced poverty. Between 1977 and 1990 the 1:4 licensing policy caused commercial banks to open more bank branches in financially less developed states. A similar pattern exists for districts within Indian states with more rural branch openings in financially less developed districts between 1977 and 1990. The licensing policy, therefore, helped increase and equalize bank branch presence across and within Indian states.

We also find that the reductions in rural poverty were linked to increased savings mobilization and credit provision in rural areas. Taken together, these findings suggest that the central bank's licensing policy enabled the development of an extensive rural branch network, and that this, in turn, allowed rural households to better accumulate capital and to obtain loans for longer term productive investments. Starting from a low base at nationalization the number of rural savings and loan accounts increased to 126 million and 25 million respectively by 2000 (Reserve Bank of India 2001). Interest rates on loans and deposits are attractive relative to those available in informal markets (Banerjee 2004, Banerjee and Duflo 2004).

It is not possible to discern, in the state panel data we use, who has access to these credit and savings accounts. Rural household data for the 1980s, however, suggests that the poor had some success in obtaining loans from banks. In Burgess and Pande (2003) we find that landless households and households with more than 2.5 acres of land were equally likely to get a loan from a commercial bank.[12] This stands in stark contrast to evidence reported for other developing countries (e.g. Brazil and Costa Rica – see Besley 1995). The 1:4 licensing policy which coerced

[12] Data from the Indian central bank reveals a similar picture. In 1985 marginal farmers (those with less than 2.5 acres of land) accounted for 12.2 percent of operational land holdings but 33 percent for bank short term agricultural credit. In contrast, large farmers (with more than 5 acres of land) controlled 73.7 percent of operational land holdings but only received 38 percent of the short term credit (Reserve Bank of India 1989).

banks into opening branches in less financially developed states (and districts) and the stipulation that banks reserve 40 percent of their lending for the priority sectors of small scale industries, services and agriculture help us to understand the pattern we observe in the household data. We are unable, however, to disentangle the respective roles of trickle down and of direct access by the poor to credit and savings accounts in explaining the reductions in poverty we observe in the state level data .

Our focus has been on poverty outcomes. However, in Burgess and Pande (2003) we also report evidence that rural branch expansion significantly affected economic growth. Using the same IV procedure, we find that rural bank branch expansion and savings mobilization and credit disbursement increased total per capita output. Non-agricultural output and, in particular, small scale manufacturing and services were most affected by rural branch expansion. These are important sources of employment in rural areas.

Evaluated at the sample mean, we find that rural branch expansion can explain a 14-17 percent drop in rural headcount – roughly half the overall fall across the period. Economic growth overall, and of non-agricultural output in particular, has is strongly linked to rural poverty reduction over the period (see Datt and Ravallion, 2002). The fact that rural branch expansion promoted growth in sectors which have been shown to most strongly affect rural poverty help us to understand our findings.[13] Our findings are also consistent with recent evidence that returns to capital in low income countries, and in India in particular, are extremely high (see Banerjee and Duflo 2004 for a review of this evidence). Banerjee and Duflo (2003), for example, find that annual returns to capital for Indian firms borrowing from commercial banks exceed 90%. Using simulations parameterized on Thai household data Townsend and Ueda (2003) show that increased participation in formal financial institutions significantly increased economic growth between 1976 and 1990.

To achieve this reduction in poverty the Indian state invested substantial resources into the development of a state banking sector. In 2000 the value of deposits in commercial banks constituted 39% of GDP and the value of and loans outstanding 21% of GDP. Both saving and borrowing activities of commercial banks entail a significant element of subsidy from the central bank via interest rate subsidies and the refinancing of loss making branches.[14] Whether state monies invested in the banking sector would have generated greater poverty reduction if spent elsewhere is not a question we can address. Absence of consistent data on program costs or on alternative programs prevent us from comparing the cost effectiveness of this program relative to potential alternatives. Indeed the fact that bank loan default rates were

[13] Other programs of redistribution in operation in the Indian countryside during the same period such as land reforms may have had less impact on rural poverty in part because they exhibit a negative association with economic growth (Besley and Burgess, 2000).

[14] Consistent data on resource flows from the central bank to commercial banks is unavailable. However, the size of the Indian banking sector is testimony to the state subsidy being substantial.

in the range of 40 percent during the 1980s, and that this led to the demise of the rural branch expansion program should make us sanguine about the advisability of attempting such a program without careful consideration of both costs and benefits. Working out how NGOs, private and state-run financial institutions can best design cost-effective interventions which improve access to credit and saving opportunities remains an important task for future research.

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6 Data Appendix

Our data set covers the sixteen main Indian states, 1961-2000.[15] It builds on Ozler, Datt and Ravallion [1996] who assembled the 1961-1992 urban and rural headcount series. The 1993-2000 update was provided by Gaurav Datt.[16] These measures are based on 25 rounds of the National Sample Survey (NSS).We supplement this data set with the following sets of variables.

Banking data Bank branch data is from Reserve Bank of India (RBI) (2000).[17] All bank branch variables are normalized by 1961 state population. Credit and saving data span 1969-2000 and are from an annual RBI publication *Statistical Tables Relating to Banks in India*.

Wage Agricultural wages (1961-1998) are from the Agricultural Wages in India (Ministry of Agriculture).[18] Factory wages (1961-1995) are from Annual Survey of Industries (Ministry of Planning).

Policy and Political variables. Education, health and development expenditures are from Public Finance Statistics (Ministry of Finance, Government of India) and RBI Report on Currency and Finance, 1961-1999. The land reform variable is the cumulative number of land reform acts undertaken by a state and is from Besley and Burgess (2000). Political variables are from the Election Commission of India State Election Reports.

Deflators and Population Deflators used are the Consumer Price Index for Agricultural Laborers (CPIAL) and Consumer Price Index for Industrial Workers (CPIIW) (reference period October 1973-March 1974) from Ozler, Datt and Ravallion [1996]. Population and rural location data is from the Census of India. Rural locations are defined as towns with less than 10,000 persons and villages with between 2,000 and 10,000 persons.

[15] Sample states are Andhra Pradesh, Assam, Bihar, Gujarat, Haryana (enters in 1965), Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

[16] Post 1991 data is missing for Jammu-Kashmir, giving 627 observations.

[17] It includes (1) State Bank of India and its associates, (2) Nationalized banks, (3) Regional rural banks, (4) Private sector banks, and (5) Foreign banks.

[18] No separate wage data exists for Haryana and data is unavailable for Jammu and Kashmir. Data is missing for Kerala after 1992, and for Orissa in 1968. This gives a total of 545 observations.

TABLE 1: BANKING AS A FUNCTION OF INITIAL FINANCIAL DEVELOPMENT

	Branches in rural	Rural bank		Branches in	Credit share	
	unbanked locations	credit share	savings share	banked locations	Priority sector	Cooperative
	(1)		(3)		(5)	(6)
Number of bank branches in 1961	0.07**	0.18	-0.03	0.14***	-0.08	0.41
per capita *(1961-2000) trend	(0.03)	(0.21)	(0.24)	(0.01)	(0.62)	(0.33)
Number of bank branches in 1961	-0.25***	-1.09**	-0.82***	-0.07***	0.08	-0.02
per capita*(1977-2000) trend	(0.03)	(0.43)	(0.25)	(0.02)	(0.86)	(0.41)
Number of bank branches in 1961	0.17***	0.87***	0.43*	0.10**	-0.18	0.03
per capita*(1990-2000) trend	(0.04)	(0.26)	(0.23)	(0.04)	(0.33)	(1.00)
Post-1976 dummy* (1977-2000) trend	0.34	-0.30	-0.16	0.53**	-3.36	-3.64
	(0.25)	(1.49)	(0.77)	(0.19)	(2.40)	(2.22)
Post-1989 dummy*(1990-2000) trend	-0.24	2.03	0.28	-0.40***	-0.04	-3.15
	(0.15)	(1.52)	(0.55)	(0.10)	(1.85)	(2.61)
State and year dummies	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.96	0.91	0.92	0.98	0.88	0.83
F-test 1	16.87	12.8	25.67	8.97	0	5.75
	[0]	[0]	[0]	[0]	[0.99]	[0.02]
F-test 2	0.49	0.1	9	27.22	1.79	0.17
	[0.49]	[0.75]	[0]	[0]	[0.20]	[0.68]
Number observations	636	512	512	636	512	491

Notes: Standard errors clustered by state are reported in parenthesis, p-values are in square brackets. Explanatory variables reported are bank branches in 1961 per 100,000 persons interacted with (row-wise) (i) a time trend, (ii) a post-1976 time trend, (iii) a post-1989 time trend. 'F-test 1' tests if the coefficients in first two rows sum to zero, and `F-test 2' whether the coefficients in the first three rows sum to zero. All regressions include as other controls population density, log state income per capita and log rural locations per capita (measured in 1961). These enter the regression in the same way as branches per capita in 1961. Branch variables are normalized by 1961 population. Rural bank credit (saving) share is the percent of total bank credit (saving) accounted for by rural branches. Priority credit share is share of bank lending going to `priority sectors' . Cooperative share is primary agicultural cooperative credit as a percent of total cooperative and bank lending. The sample covers 16 states, 1961-2000. Haryana enters in 1965. Credit and savings data span 1969-2000; cooperative data ends 1992. * indicates significance at 10%, ** at 5% and *** at 1%.

TABLE 2: BANK BRANCH EXPANSION AND POVERTY: REDUCED FORM EVIDENCE

	Annual coefficients	Headcount ratio			Wage	
	rural headcount ratio	Rural	Urban	Aggregate	Agricultural	Factory
	(1)	(2)	(3)	(4)	(5)	(6)
Annual coefficients for branches	-4.71***					
in rural unbanked locations	(1.01)					
Number of bank branches in 1961		-0.77***	-0.27	-0.71***	-0.003	0.01
per capita *(1961-2000) trend		(0.23)	(0.24)	(0.22)	(0.006)	(0.02)
Number of bank branches in 1961		1.15**	0.15	0.99***	-0.01*	-0.01
per capita*(1977-2000) trend		(0.42)	(0.26)	(0.33)	(0.008)	(0.02)
Number of bank branches in 1961		-1.15***	-0.31	-1.04***	0.05**	-0.02*
per capita*(1990-2000) trend		(0.34)	(0.38)	(0.31)	(0.02)	(0.01)
Post-1976 dummy* (1977-2000) trend		-3.77*	-2.76	-3.53**	0.08*	0.04
		(1.94)	(2.29)	(1.71)	(0.04)	(0.05)
Post-1989 dummy*(1990-2000) trend		1.2	0.5	0.62	-0.04	0.01
		(2.39)	(0.96)	(1.82)	(0.05)	(0.02)
State and year dummies		YES	YES	YES	YES	YES
Other controls		YES	YES	YES	YES	YES
Adjusted R-squared		0.84	0.91	0.88	0.9	0.72
F-test 1		1.5	0.37	1.76	23.95	0.23
		[0.24]	[0.55]	[0.18]	[0]	[0.63]
F-test 2		2.97	3.95	4.15	1.88	6.07
		[0.10]	[0.04]	[0.04]	[0.17]	[0.02]
Number observations	39	627	627	627	545	553

Notes: Standard errors clustered by state are in parenthesis, p-values in square brackets. Dependent and explanatory variable in Column (1) are the annual coefficients on initial financial development from a regression of the form in equation (4), the dependent variable are rural headcount ratio, and branches opened in unbanked locations respectively. Unreported controls are post-1976 and post-1990 dummies. For definitions of explanatory variables, other controls and F-tests for columns (2)-(6) see Table 1 notes. Headcount ratio is the percentage population with expenditure below the poverty line. Agricultural wage is log real male daily agricultural wage, and factory wage log real remunerations per worker in registered manufacturing. The sample covers 16 states, 1961-2000. Haryana enters in 1965.
* indicates significance at 10%, ** at 5% and *** at 1%.

TABLE 3: BANK BRANCH EXPANSION AND POVERTY -- INSTRUMENTAL VARIABLES EVIDENCE

	Headcount ratio								Wage	
	Rural			Urban	Aggregate	Rural			Agricultural	Factory
	OLS		IV	IV	IV	IV: 1961-1989	IV: 1977-2000	IV: survey years	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number branches opened in rural unbanked locations per capita	2.09**	1.16	-4.74**	-0.66	-4.10**	-4.70**	-6.84**	-4.21*	0.08*	0.05
	(0.79)	(1.02)	(1.79)	(1.07)	(1.46)	(1.82)	(2.81)	(2.26)	(0.04)	(0.08)
Number of bank branches in 1961 per capita * 1961-2000 trend		-0.43***	-0.48	-0.26*	-0.46*	-0.43	-0.79*	-0.46	-0.01	0.01
		(0.17)	(0.27)	(0.13)	(0.23)	(0.26)	(0.44)	(0.28)	(0.003)	(0.01)
Post-1976 dummy* (1977-2000) trend		-0.31	-1.42	-2.06	-1.39	-2.13		-1.31	0.04	0.03
		(1.23)	(2.30)	(1.65)	(2.03)	(2.59)		(3.32)	(0.06)	(0.06)
Post-1989 dummy*(1990-2000) trend		5.38**	-1.08	-0.47	-1.55		-0.45	-0.79	0.11	-0.05
		(2.47)	(2.33)	(1.01)	(1.75)		(2.90)	(2.61)	(0.07)	(0.04)
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Other controls	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES
Overidentification test p-value			0.99	0.98	0.99			1	0.98	0.99
R-squared	0.82	0.85	0.78	0.92	0.81	0.8	0.8	0.77	0.98	0.7
Number observations	627	627	627	627	627	460	375	375	545	553

Notes: Standard errors clustered by state are reported in parenthesis. See notes to Table 2 for variable and other controls description. In IV regressions instruments are the number of branches in 1961 per capita interacted with (i) a post-1976 time trend (ii) a post-1989 time trend respectively. Table 1, column (1) reports the corresponding first stage regression. The p-value for an overidentification test due to Sargan [1958] is reported -- number of observations times R-squared from the regression of stage two residuals on the instruments is distributed chi-squared (T+1) where T is the number of instruments.
* indicates significance at 10%, ** at 5% and *** at 1%.

TABLE 4: RURAL CREDIT AND SAVINGS AND POVERTY -- INSTRUMENTAL VARIABLES EVIDENCE

	Head count ratio					
	Rural		Urban		Aggregate	
	(1)	(2)	(3)	(4)	(5)	(6)
Share of bank credit disbursed by rural branches	-1.52**		-0.67		-1.37**	
	(0.69)		(0.47)		(0.59)	
Share of bank savings held by rural branches		-2.22**		-1.05		-2.01***
		(0.78)		(0.67)		(0.65)
Number bank branches in 1961 per capita * (1961-2000) trend	-1.01*	-1.51**	-0.70**	-0.96**	-0.96**	-1.42***
	(0.50)	(0.54)	(0.25)	(0.34)	(0.41)	(0.44)
Post-1976 dummy* (1977-2000) trend	-2.89	-2.05	-1.59	-1.23	-2.6	-1.84
	(1.68)	(2.34)	(1.98)	(2.55)	(1.68)	(2.52)
Post-1989 dummy*(1990-2000) trend	4.4	2.13	2.87	1.88	3.53	1.47
	(2.64)	(2.65)	(2.35)	(1.31)	(2.35)	(1.98)
State and year dummies	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES
Overidentification test p-value	0.99	0.99	0.99	0.99	0.99	0.99
Adjusted R-squared	0.72	0.66	0.91	0.89	0.75	0.67
Number observations	503	503	503	503	503	503

Notes: Standard errors clustered by state are reported in parenthesis. Table 1 notes describe the variables and other controls. Table 3 notes describe the instruments and the overidentification test. Table 1, columns (2) and (3) report the first stage regressions. * indicates significance at 10%, ** at 5% and *** at 1%.

TABLE 5: BANK BRANCH EXPANSION AND POVERTY REDUCTION -- ROBUSTNESS CHECKS

	Rural headcount ratio		Urban headcount ratio	
	(1)	(2)	(3)	(4)
Number bank branches in rural	-4.12**	-3.77**	-1.05	-0.81
unbanked locations per capita	(1.54)	(1.54)	(1.06)	(0.91)
Cumulative land reform	-1.75**	-1.87**	0.41	0.27
	(0.70)	(0.68)	(0.29)	(0.30)
Health and education	-10.97	-3.31	23.52	23.74
spending	(30.91)	(28.40)	(14.53)	(14.80)
Other Development	-40.84***	-37.32**	6.31	5.73
spending	(12.39)	(13.37)	(12.08)	(11.89)
Fraction legislators from:				
Congress party		-13.07		0.22
		(8.90)		(3.14)
Janata party		-11.62		1.62
		(6.90)		(3.18)
Hindu party		6.15		9.61
		(12.91)		(8.36)
Hard left		-14.81		1.76
		(9.07)		(3.72)
Regional parties		-15.11		-2.34
		(12.91)		(4.60)
State and year dummies	YES	YES	YES	YES
Other controls	YES	YES	YES	YES
Overidentification test p-value	0.99		0.99	
Adjusted R-squared	0.79	0.81	0.91	0.91
Number observations	605	603	605	603

Notes: Standard errors clustered by state are reported in parenthesis. Table 1 and 2 notes and appendix describe variables and other controls. Table 3 notes describe the instruments and overidentification test. * indicates significance at 10%, ** at 5% and *** at 1%.

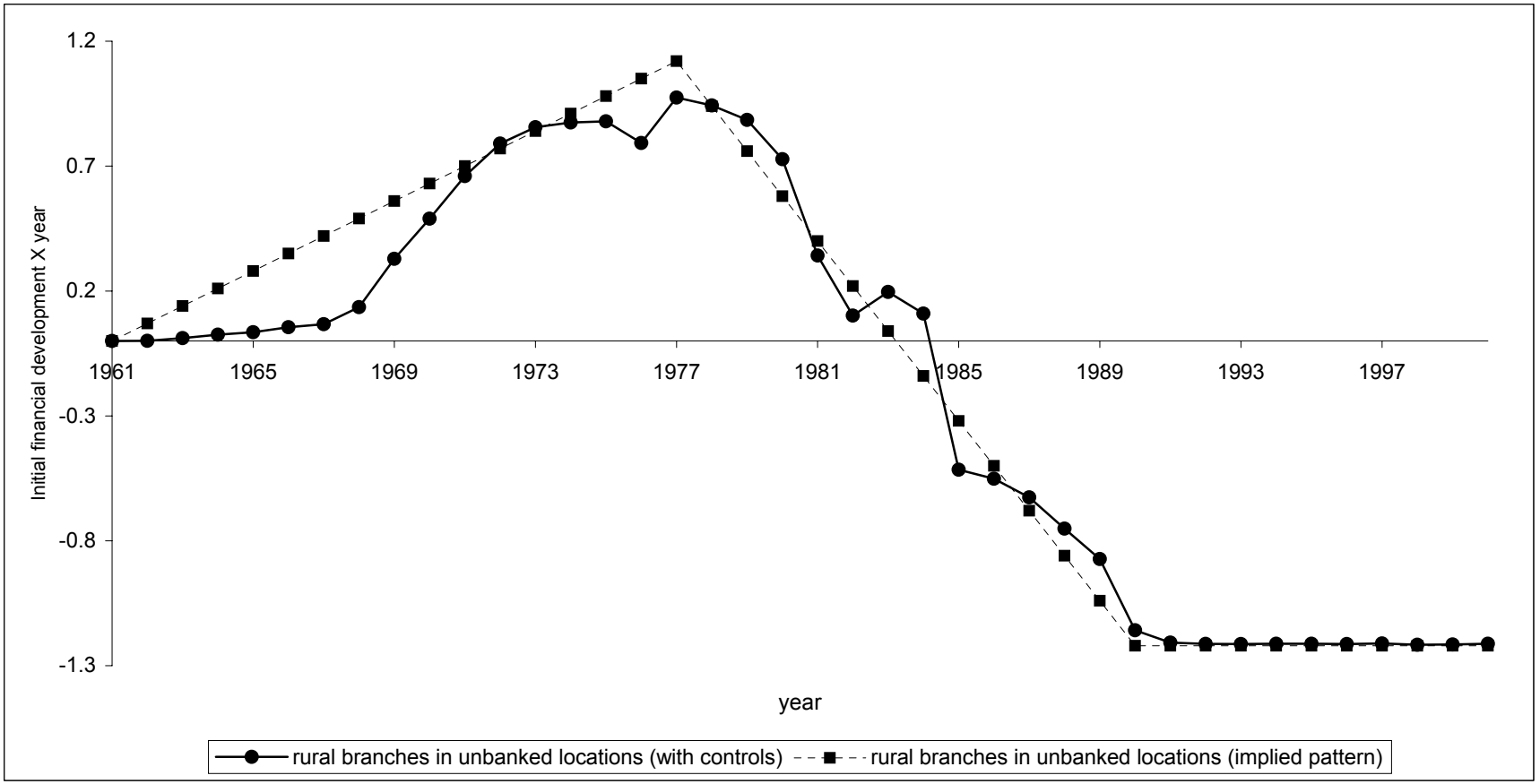

FIGURE 1: INITIAL FINANCIAL DEVELOPMENT AND BRANCH EXPANSION INTO RURAL UNBANKED LOCATIONS

Notes: The series `rural branches in unbanked locations (with controls)' graphs the yearwise coefficients on initial financial development (measured as number of bank branches in 1961) from a regression of the form described in equation (2). The series `rural branches in unbanked locations (implied pattern)' graphs the yearwise coefficients implied by the trend break model in column (1), Table 1. In both cases the dependent variable is the number of rural branches opened in unbanked locations.

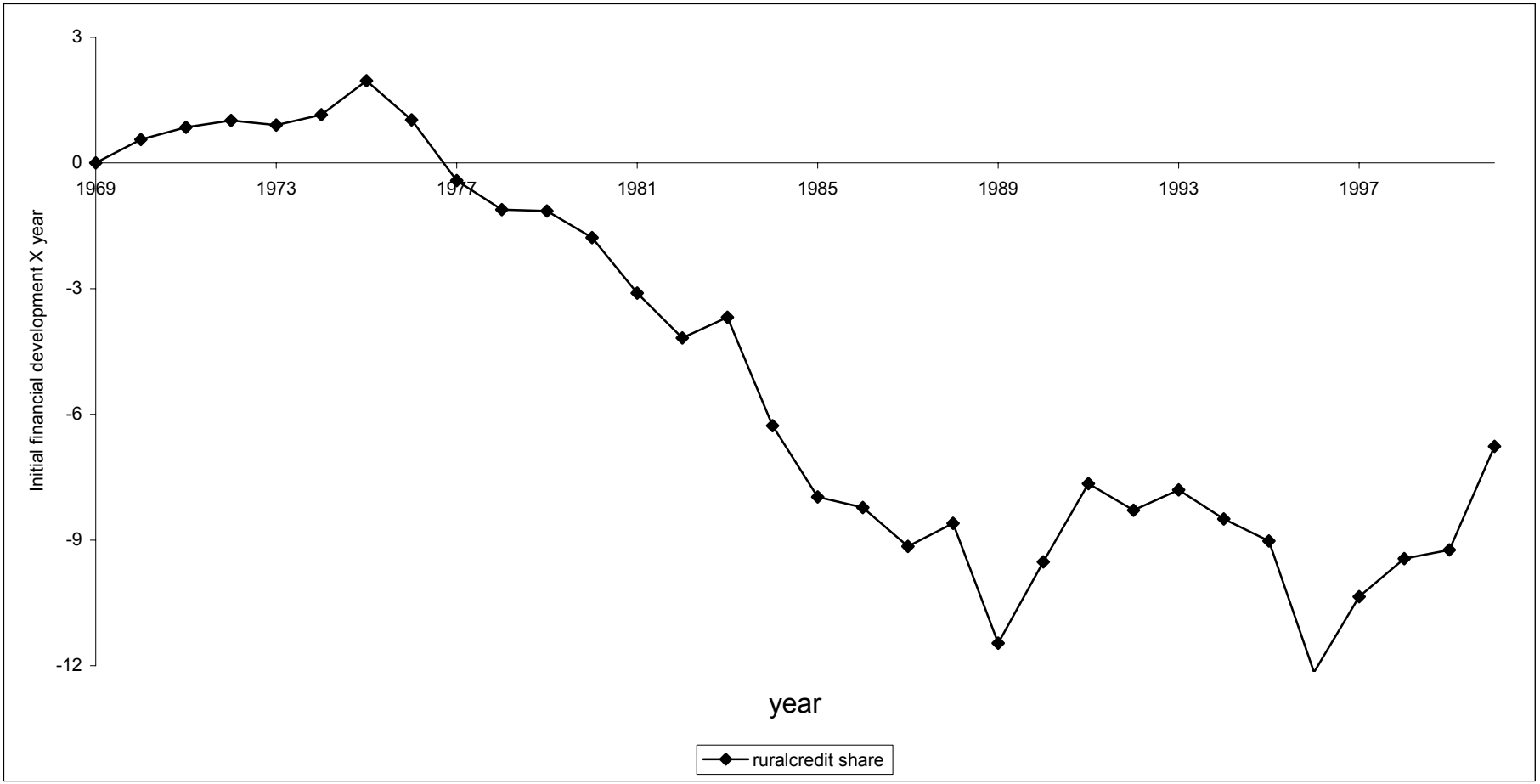

FIGURE 2: INITIAL FINANCIAL DEVELOPMENT AND RURAL CREDIT SHARE

Notes: The series `rural credit share' graphs the set yearwise coefficients on initial financial development (measured as number of bank branches in 1961) from a regression of the form described in equation (2). The dependent variable is share of total bank credit disbursed by rural bank branches.

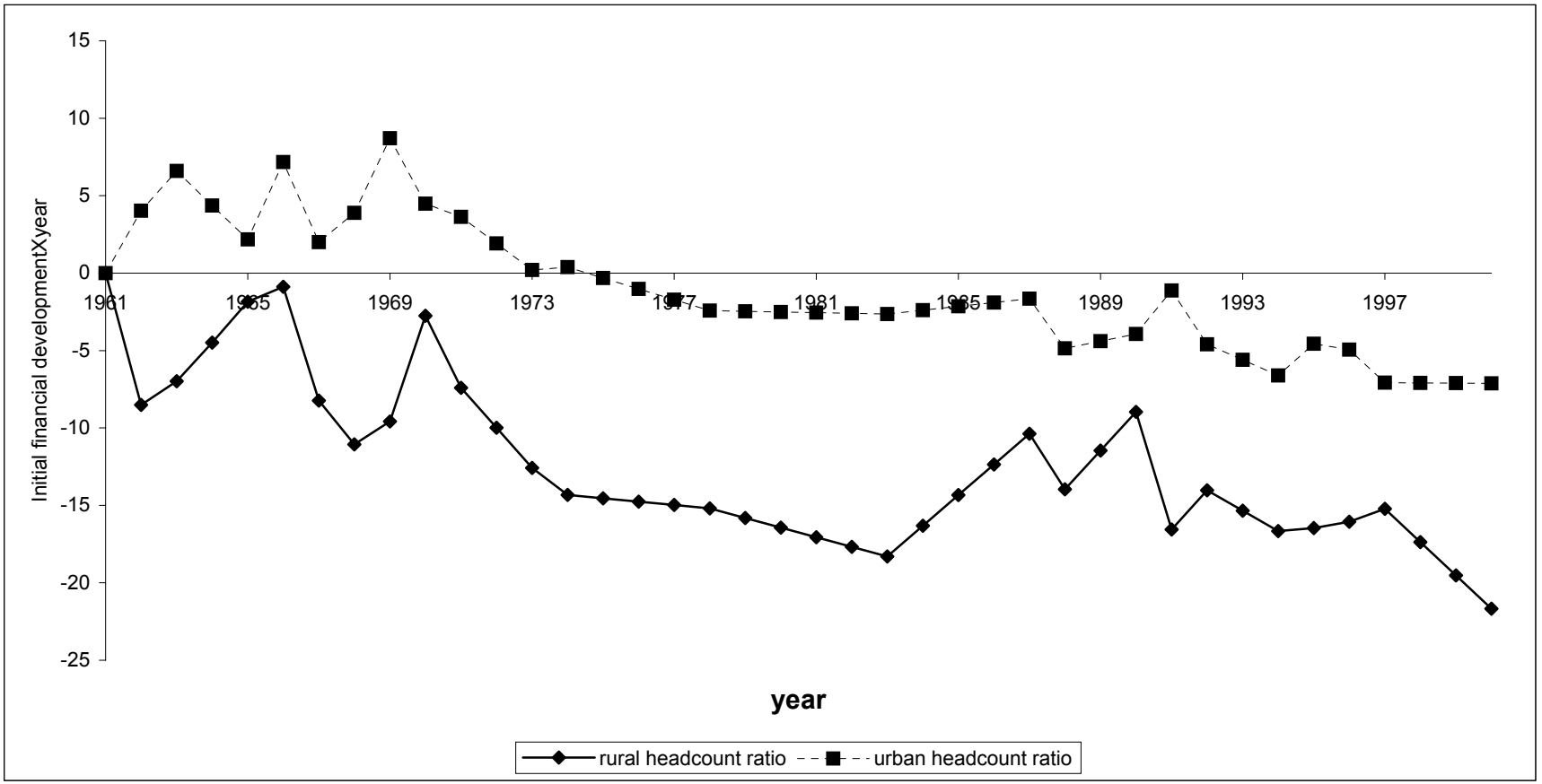

FIGURE 3: INITIAL FINANCIAL DEVELOPMENT AND POVERTY

Notes: The series `rural head count ratio' and `urban headcount ratio' graph the yearwise coefficients on initial financial development (measured as number of bank branches in 1961) from regressions of the form described in equation (2). The dependent variables are the rural and urban head count ratio respectively.

TABLE A1 -- SUMMARY OF MAIN VARIABLES

STATE	BANKING			POVERTY		
	Bank branches per capita, 1961	Bank branches, by location		Head count ratio (percent)		Agri. Wages (in Rs.)
		Rural unbanked	Banked	Rural	Urban	
Orissa	0.29	4.10	1.7	52.6	51.9	4.45
		(3.76)	(1.23)	(11.5)	(8.7)	(1.1)
Bihar	0.34	3.33	1.62	64.2	48.3	4.36
		(3.06)	(1.07)	(6.2)	(8.9)	(1.1)
Assam	0.38	3.22	2.08	49.6	23.2	5.46
		(2.97)	(1.48)	(8.2)	(10.3)	(1.1)
Madhya	0.53	3.5	2.9	54.9	49.6	4.26
Pradesh		(3.15)	(2.12)	(8.4)	(8.2)	(1.4)
Uttar	0.56	3.25	2.52	45.3	49.5	5.36
Pradesh		(2.94)	(1.59)	(7.4)	(10.2)	(1.7)
W.Bengal	0.66	2.77	3.48	46.2	31.3	6.67
		(2.60)	(1.99)	(16.0)	(6.7)	(2.1)
Jammu&	0.76	7.06	5.07	34.5	24.9	
Kashmir		(5.64)	(3.30)	(8.1)	(7.7)	
Andhra	0.82	3.17	3.49	45.3	40.7	5.01
Pradesh		(2.72)	(2.16)	(12.9)	(9.7)	(1.4)
Rajasthan	0.87	4.33	3.4	52.4	39.4	5.47
		(3.68)	(2.24)	(8.3)	(9.9)	(1.1)
Haryana	1.20	4.46	4.92	29.9	28.4	8.87
		(3.55)	(3.09)	(6.4)	(11.3)	(1.7)
Maharashtra	1.43	2.72	5.6	60.5	41.6	4.07
		(2.08)	(2.23)	(10.7)	(5.4)	(1.3)
Tamil Nadu	1.53	2.72	4.82	52.2	42.9	4.38
		(2.08)	(2.23)	(12.5)	(8.9)	(1.2)
Gujarat	1.61	3.88	5.76	48.9	45.3	4.81
		(2.73)	(2.98)	(12.7)	(10.4)	(1.3)
Karnataka	1.62	4.84	5.77	52.4	43.6	3.97
		(3.53)	(3.18)	(9.0)	(10.5)	(0.8)
Kerala	1.70	1.1	6.56	50.0	47.8	6.42
		(0.74)	(3.58)	(17.8)	(17.8)	(1.5)
Punjab	1.75	5.31	6.73	22.7	22.7	8.58
		(3.67)	(3.88)	(8.3)	(10.3)	(1.3)
Total	1.00	3.7	4.1	48.1	39.8	5.42
		(3.40)	(3.00)	(14.7)	(13.8)	(2.0)
Number obs.	636	636	636	627	627	545

Notes: Standard deviations in parentheses. Banking variables are normalized by 1961 population.

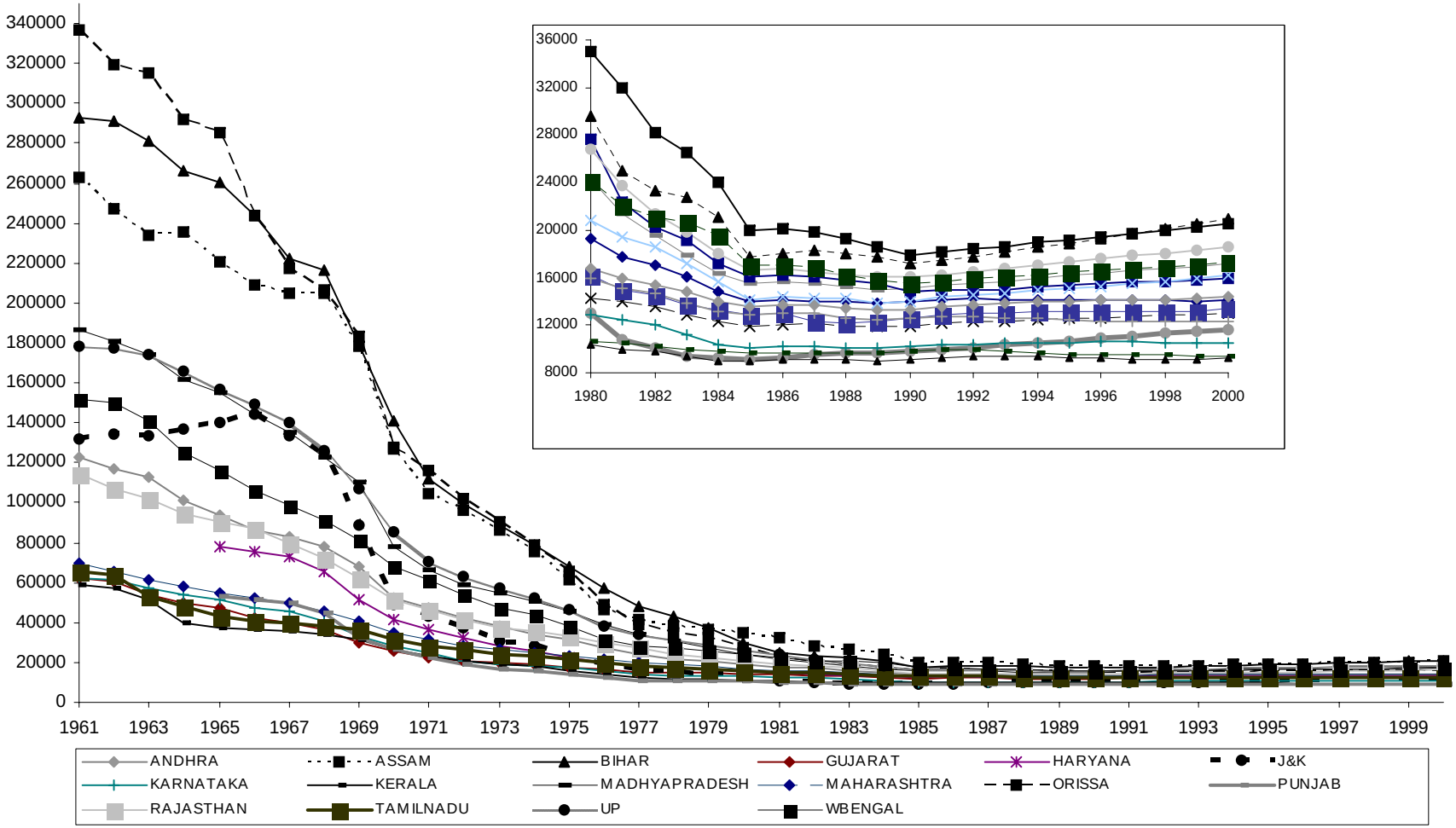

FIGURE A1: Population per bank branch across 16 Indian states

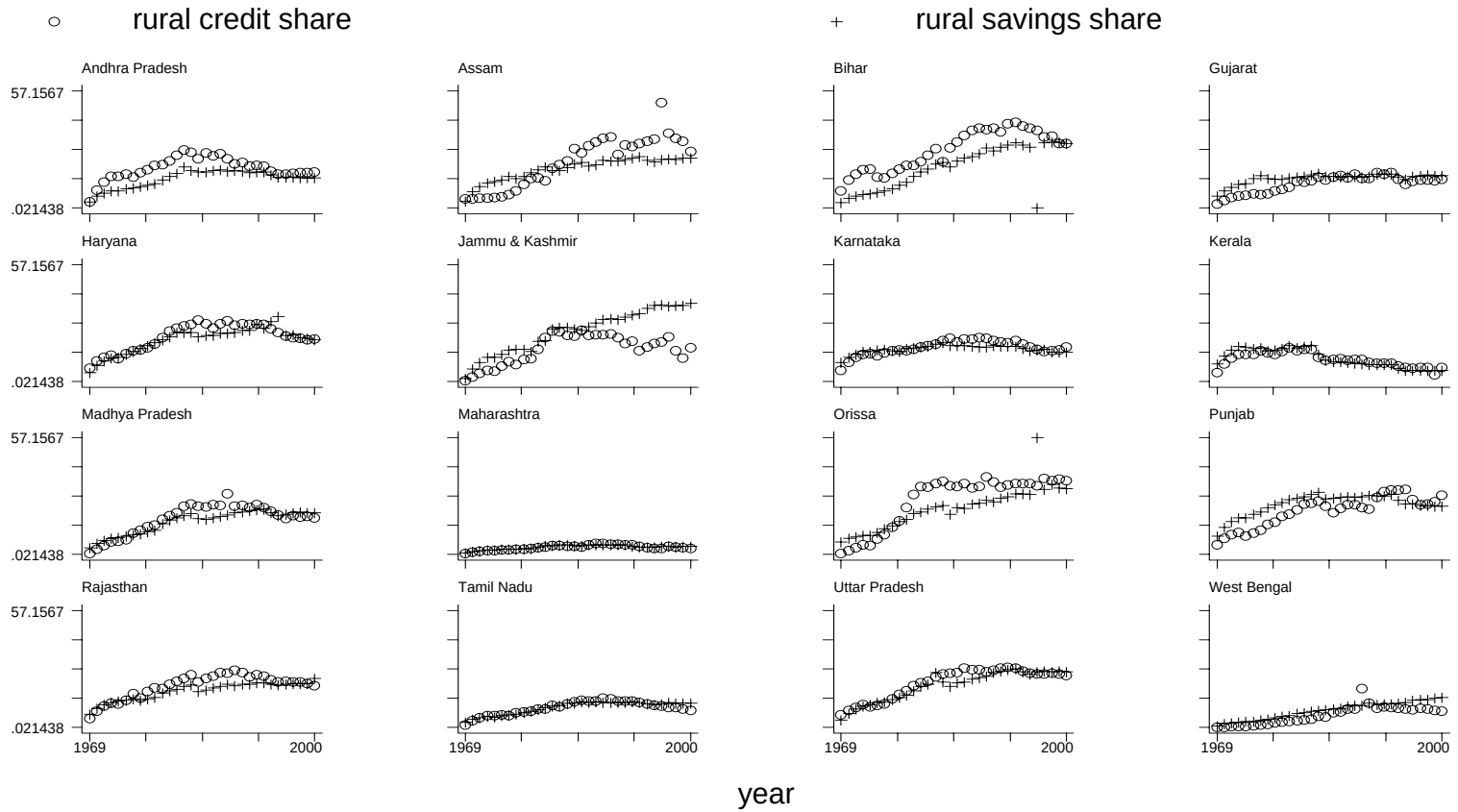

FIGURE A2: Rural Credit and Saving Shares in Indian States

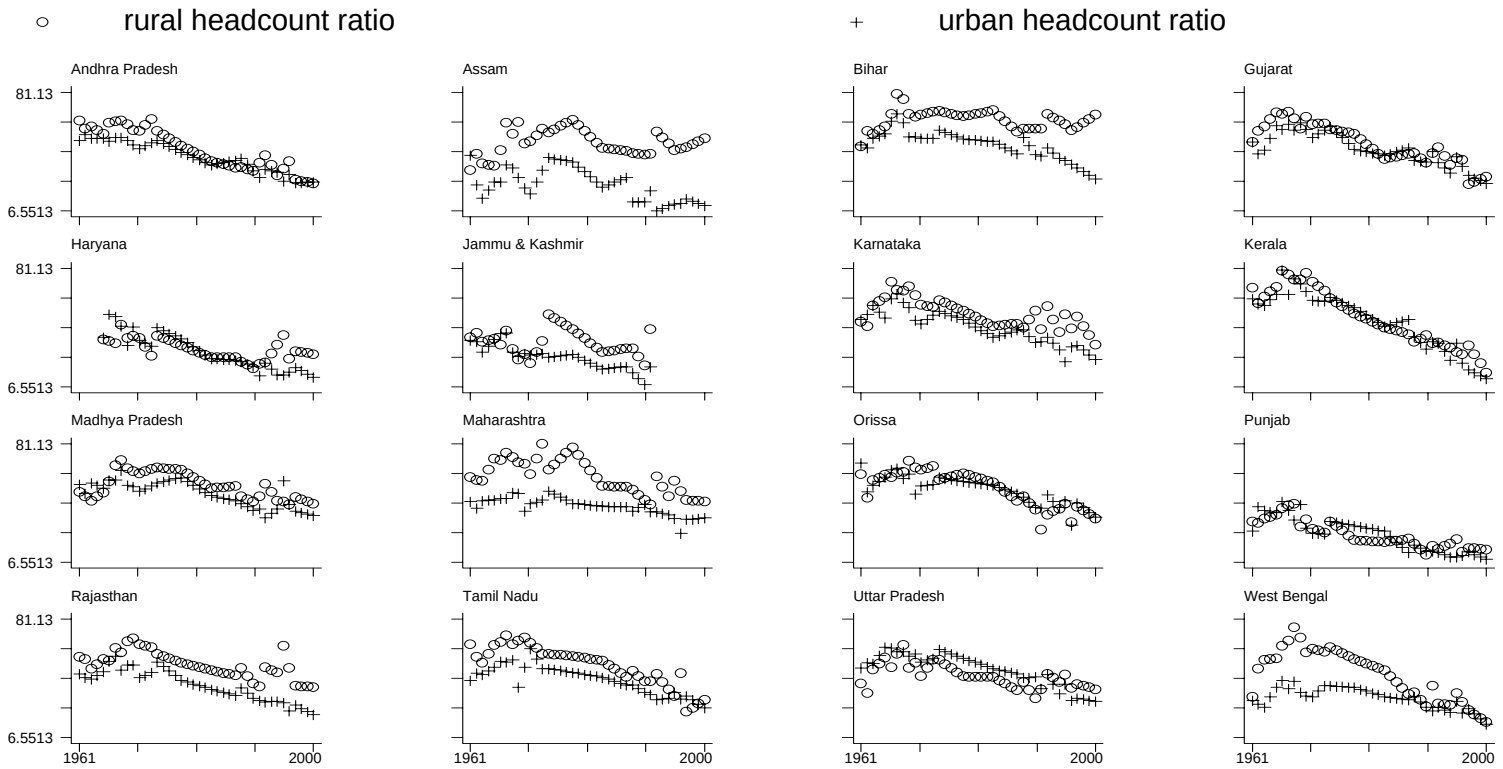

FIGURE A3: Rural and Urban Poverty across Indian States

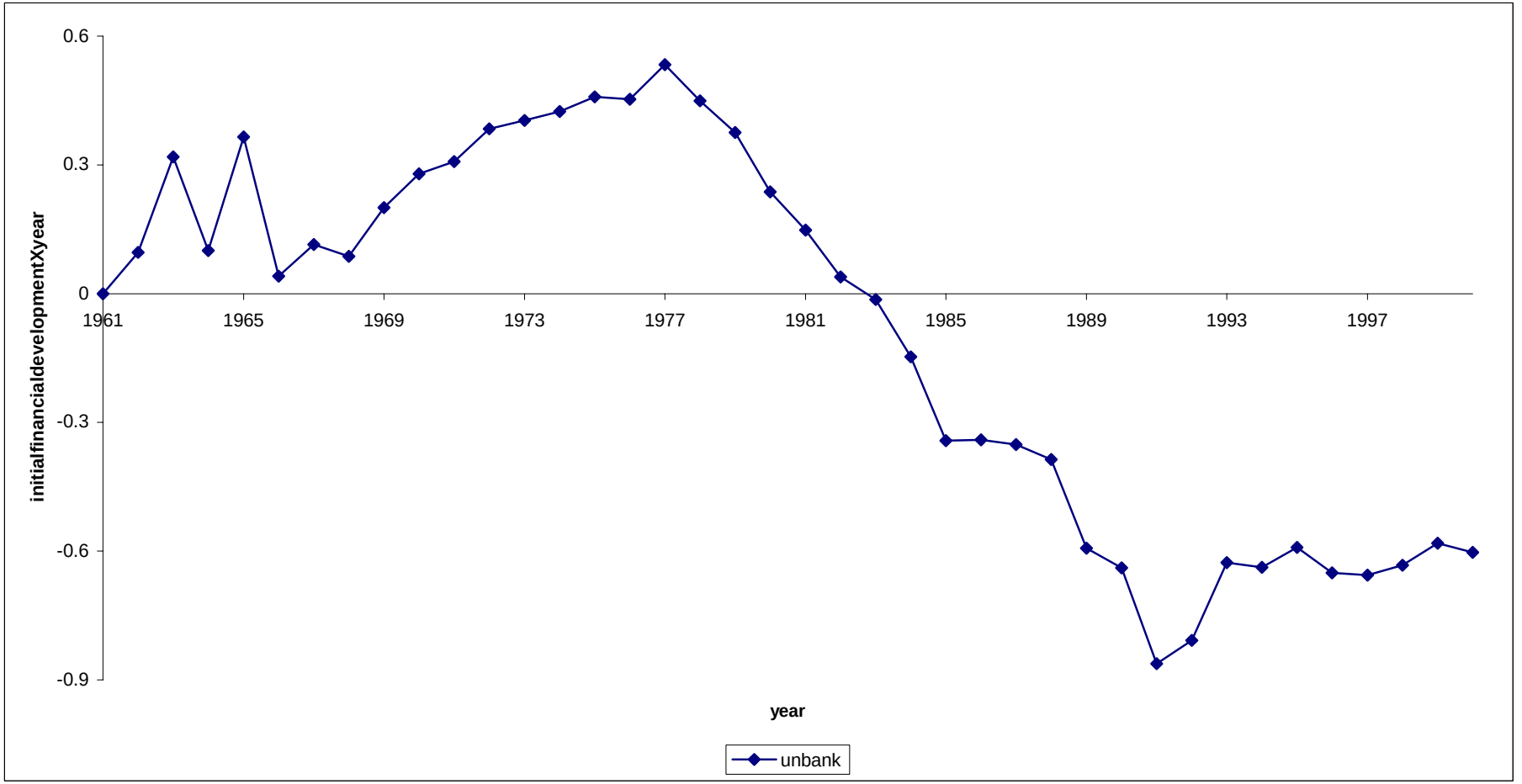

FIGURE A4: District level analysis

Notes: This figure graphs the year-wise coefficients from a district level regression (includes district and year fixed effects) of the form described in equation (2).