Credit, Saving and Insurance

EC307 Economic Development

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Lecture 8

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READINGS

Tables and figures in this lecture are taken from:

Chapters 14 of Ray (1998)

Ghosh, P., Mookherjee, D., & Ray, D, (2000). Credit Rationing in Developing Countries: An Overview of the Theory. Mimeo.

Aniket, K. (2006). Does Subsidising the Cost of Capital Really Help the Poorest? An Analysis of Saving Opportunities in Group Lending. *ESE Discussion Paper*.

Burgess, R. and Pande, R. (2003). Do Rural Banks Matter?: Evidence from the Indian Social Banking Experiment. STICERD, LSE.

- **Class based on** Burgess, R., and R. Pande (2005). Do rural banks matter?: Evidence from the Indian social banking experiment. *American economic review* 95, no. 3: 780-795.

WHY IS ACCESS TO FINANCE IMPORTANT?

- Finance the shortfalls in consumption – *consumption smoothing*
- Finance ongoing production – *expand production opportunities*
- Appropriate public policy response to this is complicated by the fact that the extent of credit rationing in such situations / countries may be endogenously determined – *informational and enforcement problems as opposed to lack of funds may underlie credit rationing*
- If financial institutions don't have full information about the riskiness of projects that individuals plan to undertake, they may ration credit as a means of ensuring that citizens undertake less risky projects

Informal Financial Institutions

Informal financial institutions may be better at dealing with informational and enforcement problems

- They may be able to use social sanctions to guarantee loans as opposed to collateral requirements
- allowing poor (who would otherwise be screened out of credit market due to inability to comply with collateral and other requirements) to gain access to credit

$\Rightarrow$ credit deepening – work because they deal with informational problems which confound formal credit markets.

Why Intervene in Credit Markets: Market Failure

Market for loans – occurs between those who are willing to postpone consumption and those wanting to make investments / prepone consumption – determines price of credit (interest rate)

Market failure – competitive market fails to bring about an efficient allocation of credit – outcome is not Pareto efficient, i.e., not possible to make someone better off without making someone worse off

Generating trade in loans via introduction of credit market – should lead to Pareto improvements relative to autarky

First fundamental welfare theorem: *competitive markets without externalities generate a Pareto efficient outcome*

but in developing countries, problem of repayment may lead to deviations from this benchmark – unable to pay or unwilling to pay

- If *enforcement costs* too high – lender may be unwilling to lend to high risks – typically poor people – poor get rationed out of formal credit market and may have to rely on informal market where terms are much worse (evil moneylender etc.)
- Credit markets may also diverge from idealised market because of informational problems – problems with monitoring borrowers – may not know how reliable borrower is and how wisely they will use funds – again, this leads to some individuals being rationed out of the market or being offered smaller loans relative to where monitoring was costless

Credit Rationing in Developing Countries

Stylised facts about rural credit markets from various case studies and empirical work.

1. Loans advanced on basis of oral agreements rather than written one
2. No or very little collateral, making default a feasible option
3. Credit markets highly segmented, marked with long term exclusive relationships and repeat lending

1. Interest rates higher on average than bank interest rate with significant dispersion presenting arbitrage opportunities
2. Frequent inter-linkage with other markets, such as land, labour or crop
3. Significant *credit rationing*, whereby
   - borrowers are unable to borrow all they want (*micro credit rationing*)
   - or some applicants are unable to borrow at all (*macro credit rationing*)

Ghosh, Mookherjee & Ray show why credit rationing remains a pervasive phenomenon in the developing countries.

Micro credit rationing which places credit limits below first-best levels and

Macro credit rationing which randomly denies access to any credit to a fraction of the borrowers.

- Both forms of credit rationing co-exist
- They both play complementary roles
- Macro credit rationing gain in importance when information flow within the lending community is poor so that the defaulter have a fair chance of escaping detection.

DEBT OVERHANG

- There is trade-off between rent extraction and provision of incentives

Debt Overhang is caused by the problem of high interest rates

- A highly indebted farmer has very little stake in ensuring a good harvest or remaining solvent

  That is because a large repayment obligation associated with high interest rate ensures that he keeps a very small portion of the harvest.

- Keeping this in mind the lender may be reluctant to raise the interest rate beyond a certain point
- Volume of credit and effort level in this credit market would be less than first best
- Borrowers with greater wealth or collateral can obtain cheaper credit, work harder and earn more income as a result
- Existing asset inequalities within the borrowing class are projected and possibly magnified by the operation of the credit market causing persistence of poverty. (Recall the parallel Galor and Zeira argument that led to a similar result)

LESSONS

- Distribution of power across lenders and borrowers has a strong implication for the degree of credit rationing, effort levels and efficiency

  Greater bargaining power to the lender reduces available credit and efficiency

  - Rent extraction motives can run counter to the surplus maximization objectives beyond a point
- Social policies that empower the borrower and increase his bargaining strength are lively to increase efficiency

BREAKING THE NEOCLASSICAL MOULD

- Neo-classical theory:
  - Unique market interest rate
  - firms invest till marginal product of capital = market interest rate
- Typical firm in the developing world
  - marginal product greater than market interest rate
  - credit constrained firms cannot borrow as much as they want
  - Supply curve of credit upward sloping or vertical wrt interest rate
- Empirical Issues
  - Difficult to observe empirically
  - Investment levels and returns correlated with omitted variables

EMPIRICAL STUDIES

McKenzie Woodruff (2003): estimate relationship between firm's earnings and firm's capital in Mexico

Capital in $	<200	200-500	500-1000
Earnings	15%	7–10%	5%

Local informal market interest rates – 60%

Ability Bias: Is ability the omitted variable?

- control through owner's wage in previous employment
- *problem:* self selection into self employment

Goldstein Udry (1999)

Returns from switching from maize, cassava to pineapple estimated at 1200%!

Very few people grow pineapple

- unobserved heterogeneity between people who have switched others who have not

Fazzari et. al. (1988): cash flow has a positive effect on firm's investment

Cash flows could proxy for productivity shocks

- control for firms's market value to eliminate productivity shocks
- *problem:* market may not know everything about firm's productivity

Lamont (1997): effect of cash flow shock from unidentifiable source

shock to the price of crude

Looks at non-oil investment of companies that own an oil company in reaction to an oil price shock

- a strong cash flow effect
- managerial behaviour in response to "free cash flow"

Banerjee Duflo (2004) look at inflow of subsidised credit into newly eligible firms and find evidence that subsidised credit is being used to finance production and not as a substitute for other forms of credit.

firms	MP_K	Substitute for debt	New Investment & Production
unconstrained	$MP_K = r$	✓	×
constrained	$MP_K > r$	×	✓

Natural Experiment:

- Indian banks required to lender 40% of net credit to *priority sector* at prime lending rate + 4%
- Jan 1998: Eligibility criteria for capitalisation raised from Rs. 6.5m to Rs. 30m

Results

- Bank lending and firms revenues went up for the newly eligible firms relative to old firms implying subsided credit was used to finance production
- no evidence of substitution of bank credit for borrowing from the market
- many firms severely credit constrained with high MP_K

A Simple Model of Credit Constraint I

Credit market imperfection: borrower may choose not to repay since her revenue is invisible to the lender

Model

- Borrower has wealth W and access to a deterministic production process $F(\cdot)$.
- A lender lends L to the borrower at interest rate r to invest in the production process.
- Once the output $F(W+L)$ is realised, the borrower and lender choose their respective actions simultaneously.

  Lender's action: incur cost to increase chance of finding revenue

  - Maximise p, the probability of finding the borrower's revenue by incurring an effort cost of $L \cdot C(p)$

A Simple Model of Credit Constraint II

Borrower's action: incur cost to evade repayment

- Stall and keep revenues away from the lender at cost $\tau \cdot (W+L)$ and repay if the lender find the revenue with probability p.

- *Solving for borrower's action:*

Borrower's action	Repay	Stall
Borrower's payoff	$F(W+L)-rL$	$F(W+L)-\tau\cdot(W+L)-prL$

Borrowers will only repay if $L \leqslant L^*$ where

$$L^* = \frac{\tau W}{(1-p)r-\tau} \qquad \text{(Borrower's constraint)}$$

Borrower's constraint L^* increasing in W and decreasing in r and p.

A Simple Model of Credit Constraint III

- *Solving for lender's action*

Let $C(p) = -c \ln 1 - p$ which implies that $C(0) = 0$, $C(1) = \infty$ and $C'(p) > 0$. Lender's total cost of finding revenue is convex and increasing in p.

The lender's net benefit given by:

$$rPL - (-c \ln (1-p) \cdot L)$$

To find the optimal choice of p, differentiate the above expression and equate to 0.

The optimal choice of p is such that:

$$r(1-p) = c \qquad \text{(Optimal } p\text{)}$$

By substituting *Optimal p* in *Borrower's constraint*, we obtain the following:

$$\frac{L^*}{W} = \frac{1}{\left(\frac{c}{\tau}\right) - 1} = \mu \qquad \text{(Final Constraint)}$$

A Simple Model of Credit Constraint IV

Result

μ determines the multiple of the borrower's wealth that she can borrow.

- μ is increasing in τ, the cost of stalling the lender, and decreasing in c, the lender's cost of finding the borrower's revenue.

μ is increasing in the ratio $\frac{\tau}{c}$, the measure of the economy's financial development.

- As the economy develops financially, borrower's are less credit constrained.

WEALTH

Microfinance lenders across the world require that borrower repay much before the completion of the project

> **Periodicity**: Frequency of loan repayment

Periodicity used by microfinance institutions to compensate for lack of collateral

Force borrower to acquire stake in their own projects

Borrower need to have some wealth to be able to borrow.

SAVINGS

Poor have extremely volatile income streams

Require savings instruments to be able to

Smooth consumption
Self-insure
Save towards lumpy investments

Poor are offered no saving instruments in the rural credit market

Moneylender lends but does not take any saving deposits. Why?

Covariate Risks
Transaction Costs

How can Microfinance institutions help?

CASESTUDY IN HARYANA, INDIA

- *Case-study of a Microfinance Institution in Harayana*

  Documents the innovative design features of India's new national microfinance programme.

  - Lender offers saving opportunities

    ...by *restricting* loans to the group

    ...creates intra-group competition for loans

  - Individuals can join a *group* as either a borrower or a saver
    - Borrower partly self-finance's the buffalo
    - Saver co-finance's the borrower's project

      ...and gets a premium interest rate on her savings

- We observed
  - *Intra-group income heterogeneity*
  - *savers were poorer than borrowers*

Role of Savings in Microfinance: Aniket 2006b

Offering saving opportunities in group lending would lead to *negative assortative matching* along *wealth* lines:

> Rich and poor match in the same group.

Could potentially initiate a chain where the poor who get wealthier match with the other poor people and uplift them out of poverty

Poverty Traps

without multiple market failures – marginal product of an individual in an occupation should not reflect any endowment effects and hence should not be explainable by parent's wealth

However, even in developed countries – observe that credit market constraints limit entry to entrepreneurial activities

$\Rightarrow$ endowments matter! – econometric evidence shows that wealthier individuals more likely to become entrepreneur, not because they have greater ability but because liquidity constraints bind less strongly

Two reasons for this –

(a) use inherited wealth to finance fixed costs of setting up own project

(b) use inherited wealth/assets as collateral to gain access to credit markets to finance own project

Poor in contrast –

(a) may have not inherited sufficient wealth to enable them to incur fixed cost of taking on their own project

(b) may have not inherited sufficient wealth/assets to serve as collateral to gain access to formal credit markets

Explain three things:

(i) *persistence of inequality and poverty*

(ii) why *interventions which affect the distribution of endowments can have large effects on welfare* – possible to get rid of source of market failure

(iii) *why lower inequality may be associated with higher growth* – policies which equalise opportunities across households may lead to improvements in both equity and efficiency

Positive Policies

- We are looking at a range of such opportunity enhancing policies (e.g., land reform, microfinance, education, off-farm diversification)
- Only by affecting distribution of endowments can we get permanent increases in welfare – tax/transfer mechanisms can help households deal with crisis situations but if don't change distribution of endowments then no effects on permanent income

Positive Policies

- Idea of poverty traps being caused by market failure and the importance of redistribution of opportunity in these contexts has led to complete rethinking of design of public policy to affect poverty and growth in developing countries – need more empirical work to establish which policies work and which don't
- In the context of this lecture, if we believe that imperfections in the credit market is a major factor behind why poor people stay poor, then we have to ask ourselves, what can be done?

Social Banking

State interventions in credit markets are very common in less developed countries. Are state-led credit programs useful in encouraging growth and fighting poverty?

Pro: lack of access to credit limits ability of the poor in engaging in productive activities and exiting poverty.

Con: Programs subject to elite capture and may actually worsen terms for the poor in rural credit markets.

However, there have been limited evaluations of such programmes.

Structural Change

Structural change: decline of agriculture ...

- positive correlation with economic growth
- positive correlation with rising living standards

→ Key area of research in economic history, development economics and macroeconomics (1950-70s)

... but most of the work is descriptive

→ We have a limited understanding of what drives structural change especially at the micro level.

Do Rural Banks Matter?: Evidence from the Indian Social Banking Experiment

- The paper exploits the social banking experiment in India to examine this issue carefully.
- Does the state-led expansion of commercial banks in rural areas lead to structural change and engender economic growth?
- Does improved access to banks enable households to transform their production activities?
- Idea that financial development may be a pre-requisite for economic development influential in post-war Indian governments

- *Social banking* experiment in India motivated by the idea that lack of access to bank was an impediment to modernisation and industrialisation in rural areas, ie, structural change.

Bank Company Acquisition Act, 1969

"The banking system touches the lives of millions and has to be inspired by larger social purpose and has to subserve national priorities and objectives such as ***rapid growth of agriculture, small industries and exports, raising of employment levels, encouragement of new entrepreneurs*** *and* ***development of backward areas****. For this purpose, it is necessary for the government to take direct responsibility for the extension and diversification of banking services and for the working of a substantial part of the banking system"*

Structural Change in India

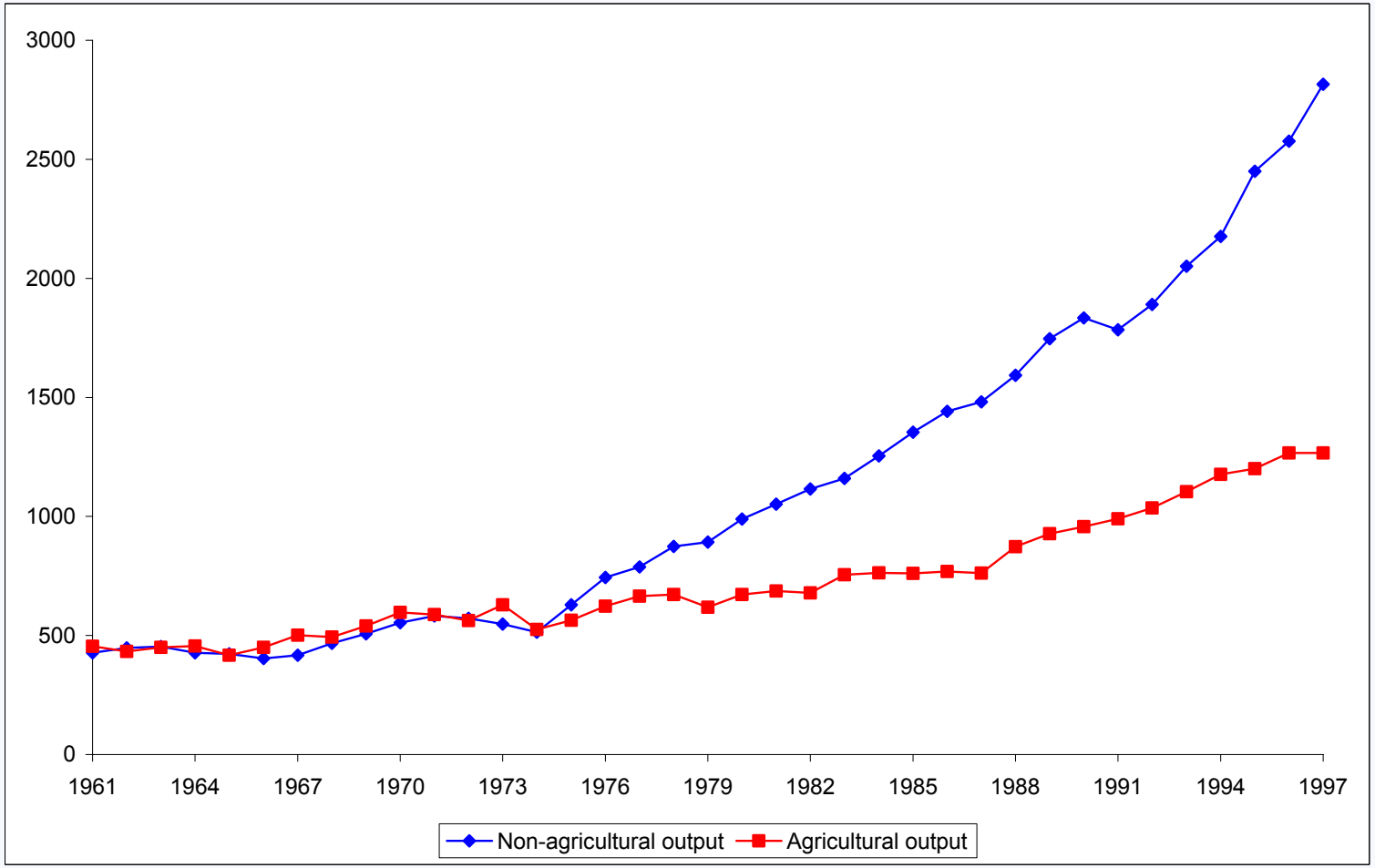
- Look at state domestic product data for 16 main states of India over the period 1960-2000 – these 16 states account for over 95% of Indian population
- *Real agricultural output per capita* relatively flat over period – growth in agricultural output basically keeps track with growth in population
- *Real non-agricultural output* per capita begins to diverge from agricultural output around mid-1970s – but pattern highly varied across states

INDIAN STATES

- *Backward states:* Assam, Bihar, Jammu and Kashmir, Madhya Pradesh, Orissa, Rajasthan, Ut- tar Pradesh see limited structural change and economic growth – poor economic and social indicators.
- *Modern states:* Andhra Pradesh, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, West Bengal – good economic and social indicators pattern even more marked when we look registered and unregistered manufacturing and services.

- What accounts for different rates of structural change and economic growth in Indian states? Answer has important ramifications, for example, for poverty reduction.

EVOLUTION OF NON-AGRICULTURAL AND AGRICULTURAL OUTPUT 1961-2000 (AVERAGE ACROSS 16 STATES)



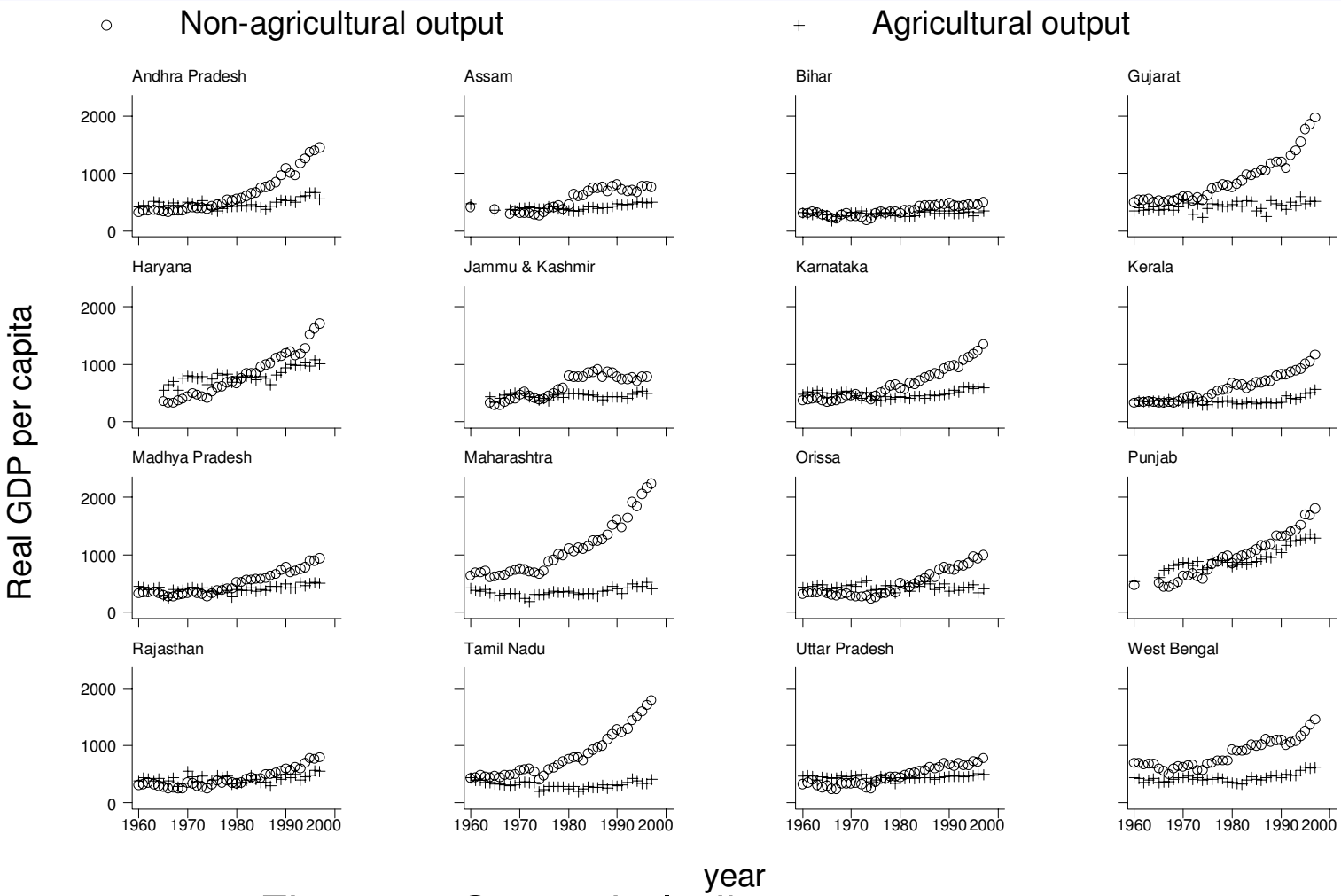


Figure 6: Output in Indian states: 1960-1997

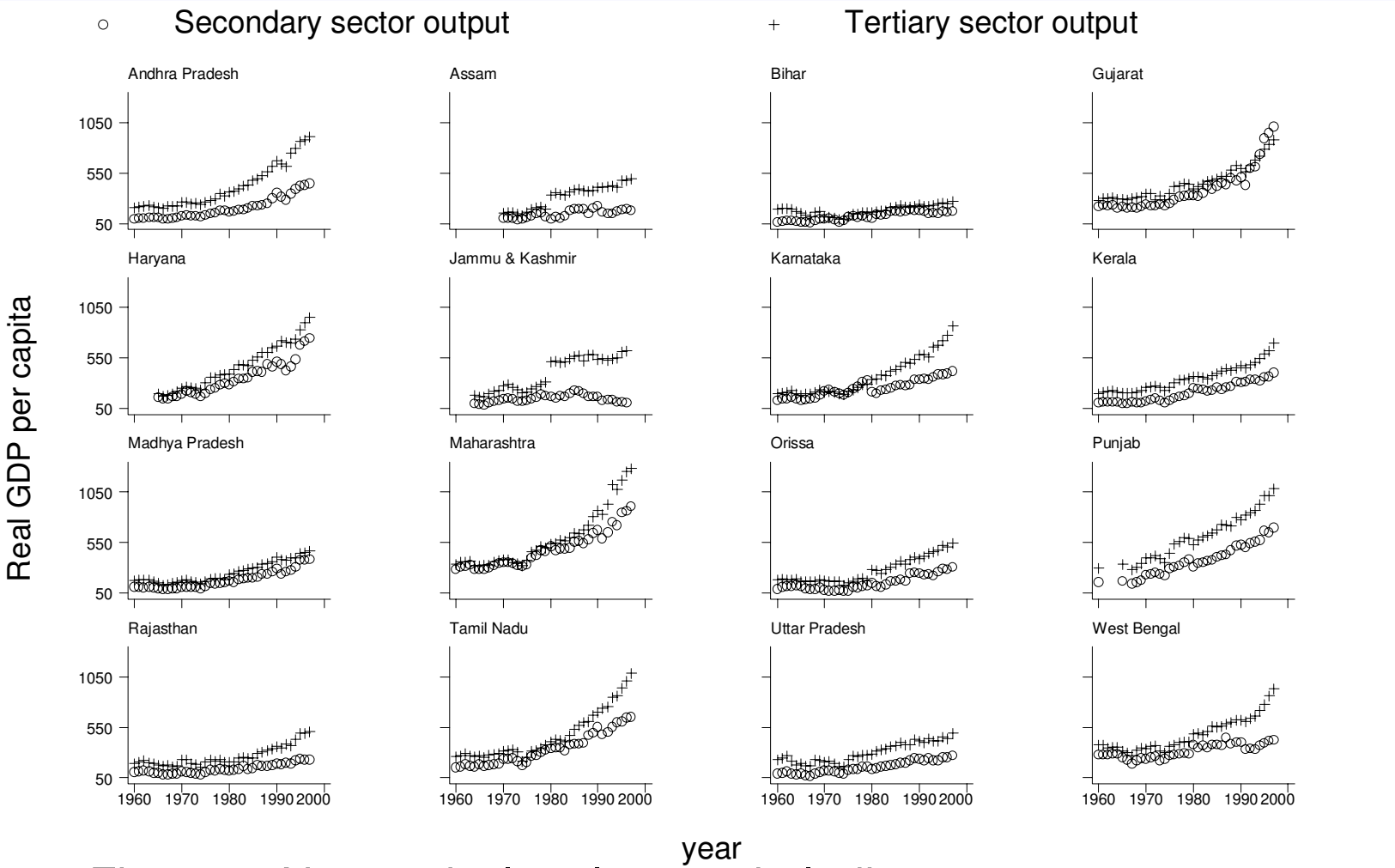


Figure 7: Non-agricultural output in Indian states: 1960-1997

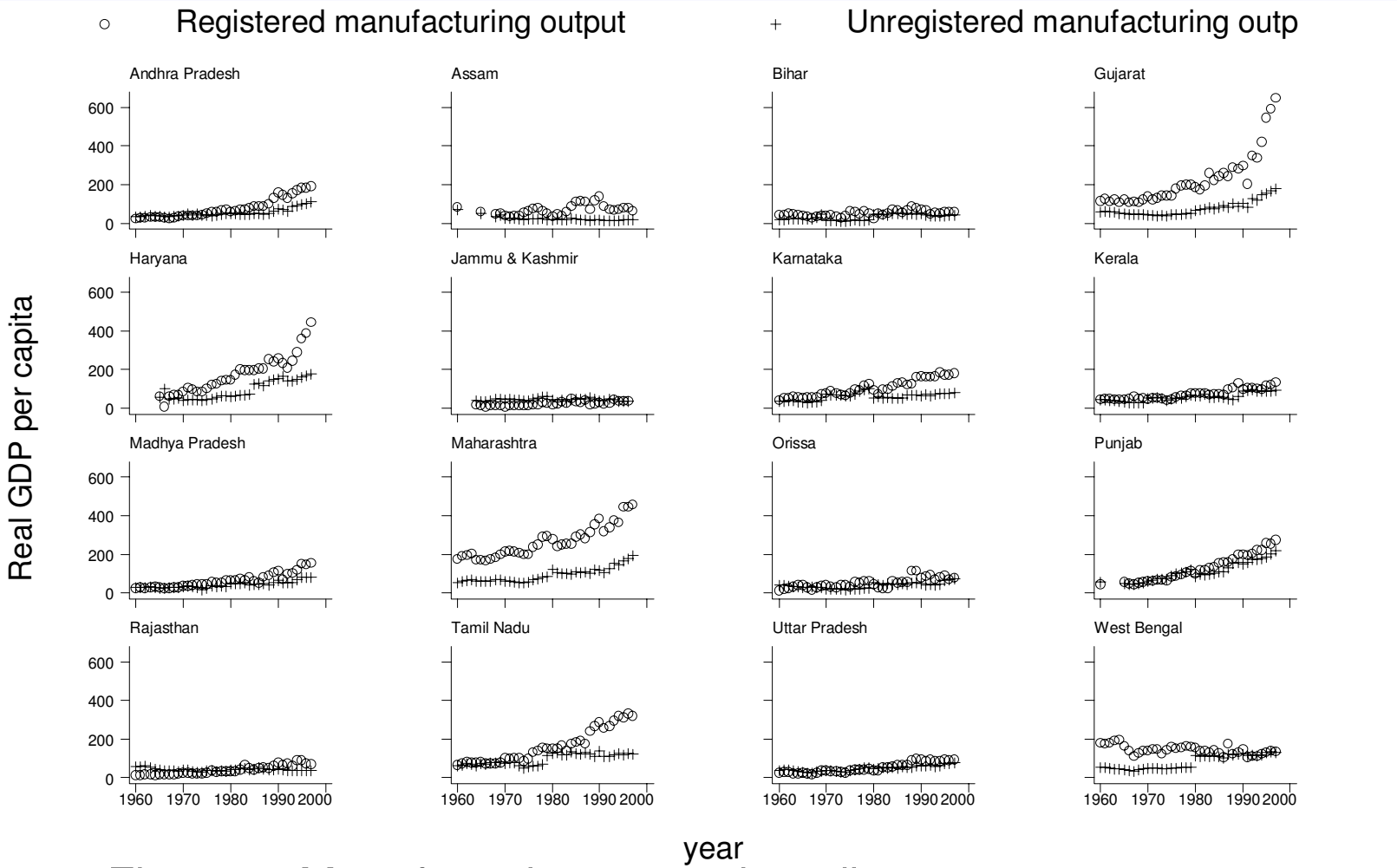


Figure 8: Manufacturing output in Indian states: 1960-1997

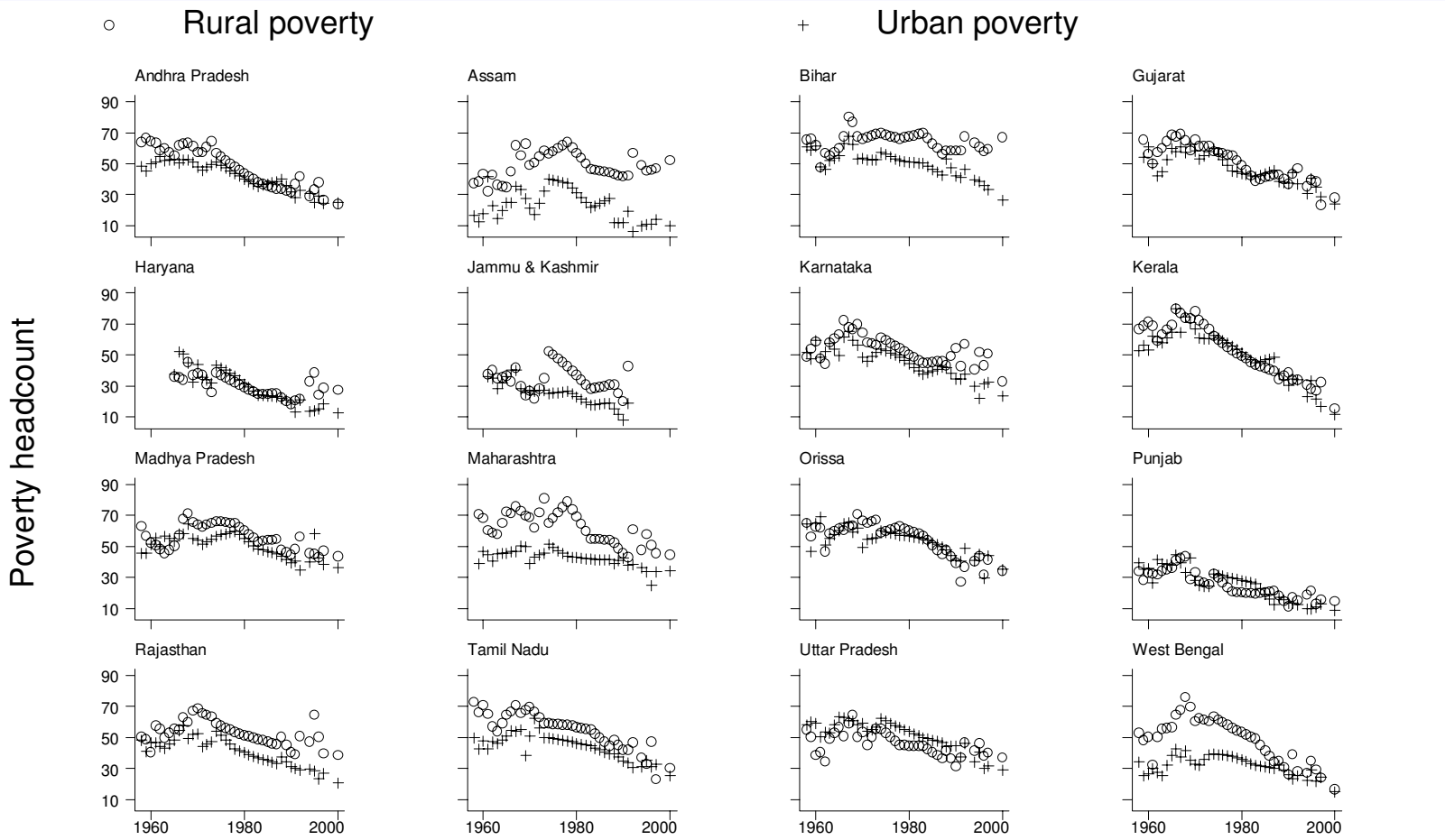


Figure 5: Poverty in Indian states: 1958-2000

Table: Poverty reduction and sources of growth (1960-97)

Dependent variable:	log of poverty headcount					log of rural poverty headcount	log of urban poverty headcount
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
log real GDP per capita	-0.372		-0.37			-0.326	-0.628
	[0.059]**		[0.063]**			[0.063]**	[0.193]**
diversification (non-ag GDP/ag GDP)		-0.004	-0.004				
		[0.0017]**	[0.0017]**				
log real primary GDP per capita				-0.059	-0.07	-0.062	-0.08
				[0.047]	[0.048]	[0.053]	[0.058]
log real non-primary GDP per cap				-0.294			
				[0.060]**			
log real registered manufacturing GDP pc					-0.014	0.006	-0.062
					[0.022]	[0.027]	[0.028]*
log real unregistered manufacturing GDP pc					-0.068	-0.078	0.065
					[0.024]**	[0.027]**	[0.036]
log real other secondary GDP per capita					-0.046	-0.07	0.036
					[0.025]	[0.029]*	[0.023]
log real tertiary GDP per capita					-0.149	-0.156	-0.062
					[0.050]**	[0.060]*	[0.058]
constant, state, year fixed effects	YES	YES	YES	YES	YES	YES	YES
Number of observations	568	568	568	568	563	563	563
R-squared	0.87	0.87	0.88	0.87	0.88	0.85	0.87

Notes: Robust standard errors are in parentheses. * significant at 5% level; ** significant at 1% level. Source: Besley and Burgess (2005).

BACKGROUND

- Between bank nationalization in 1969 and financial liberalization in 1990, over 30,000 bank branches opened in rural, un-banked locations.
- Limited evaluation of these type of state-led banking interventions, which were commonplace in the post war period, especially in terms of their impact on economic development.

THE LITERATURE

- + *The positive view:*
  - ⇝ access to bank pre-requisite for structural change and industrialization (Gerschenkron, 1962)
  - ⇝ access to credit necessary to promote occupational diversification (Banerjee and Newman, 1993)
- – *The negative view:*
  - ⇝ cheap credit stunts development of private credit markets and undermines rural development (Adams et al, 1983)
  - ⇝ State ownership and control of banks retards financial development and hinders economic growth (La Porta, Silanes and Shleifer, 2002)

India's Bank Nationalisation

- **India:** largest state led rural branch expansion program ever attempted in a low income country
  - sharp reduction in regional disparities in population served per bank branch – more branches were opened in Indian states with fewer bank branches per capita pre-program (1961)
  - Hence OLS estimates of the impact of rural branch expansion on output likely to be biased. (Endogenity)
- $\rightsquigarrow$ Exploit program features to isolate plausibly exogenous (policy driven) determinants of branch expansion in a state, and use these as instruments for number of branches opened in rural, un-banked locations in a state

The Social Banking Experiment

Branch licensing rule (1977-1990): *A bank must open 4 branches in "un-banked" locations to be eligible to open one in an already banked location.*

1977–90 Negative correlation between state's initial financial development and extent of rural branch expansion. The reverse was true outside this period

1977–90 Output (and more specifically non-agricultural output) fell more in financially less developed states. The opposite was true outside this period.

Controlling for a state's initial financial development and its linear trend effect on rural branch expansion, state-wise deviations from the trend in 1977 and 1990 are plausible instruments for the number of branches opened in un-banked locations in a state

TABLE: SHARE OF RURAL HOUSEHOLD DEBT HELD BY DIFFERENT CREDITORS (percentage)

YEAR	INSTITUTIONAL SOURCES		NON-INSTITUTIONAL SOURCES		OTHERS
	Banks	Cooperatives	Relatives and Friends	Moneylenders	
1951	1.1	4.6	14.4	68.6	9.3
1961	0.3	10.4	5.8	60.9	22.6
1971	2.4	20.1	13.8	36.9	26.8
1981	28.6	28.6	9	16.9	16.9
1991	29	18.6	6.7	15.7	30

Loans from relatives and friends refer to interest-free non-institutional loans. `Others' category includes loans from government, landlords and traders/commissioners. The data source for 1951 is the "All India Rural Credit Survey", and for all subsequent years "All India Debt and Investment Surveys".

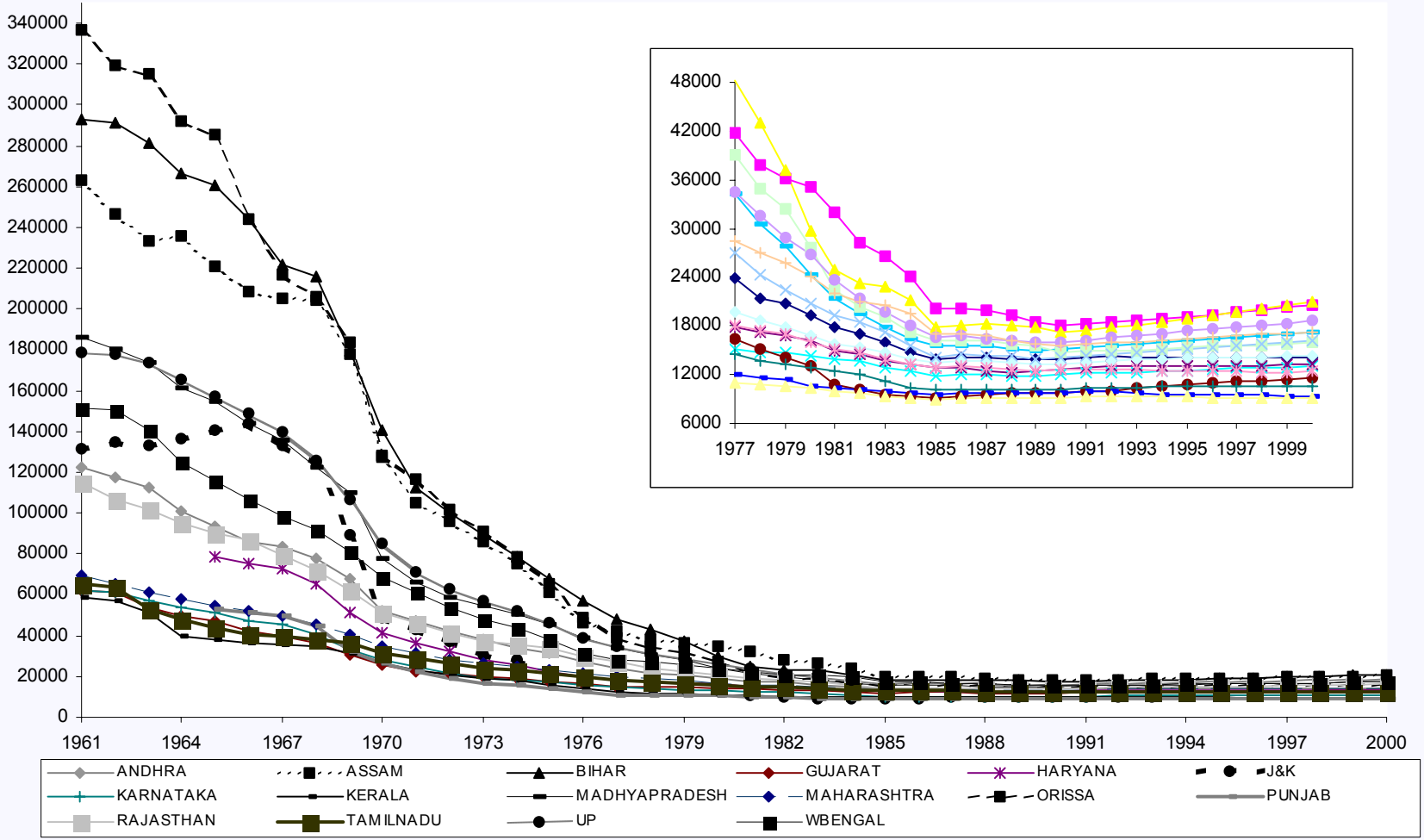


FIGURE 2: POPULATION PER BANK BRANCH ACROSS 16 INDIAN STATES

Notes: This variable is the ratio of the state's current population divided by the total number of bank branches in the state. The Data Appendix describes the data sources.

DATA

Use bank branch level data set which records opening date and location of every commercial bank branch going back to 1800 to construct the the following measures:

- **Initial financial development measure** (B_{i1961}): number of bank branches per capita in state i in 1961 (i.e. pre-program)
- **Rural branch expansion measure** (B_{it}^{R}): *cumulative* number of branches opened per capita in rural un-banked locations in state i and year t;

IDENTIFICATION STRATEGY

What is the relationship between initial financial development of a state and subsequent rural branch expansion?

$$B^R_{it} = \alpha_i + \beta_t + \gamma_t \times B_{i1961} + \delta_t \times X_{i1961} + \varepsilon_{it}$$

$$= \alpha_i + \beta_t + \sum_{t=1961}^{2000} (B_{i1961} \times D_k)\gamma_k + \sum_{t=1961}^{2000} (X_{i1961} \times D_k)\delta_k + \varepsilon_{it}$$

where $D_k = 1$ for $k = t$ and $D_k = 0$ for $k \neq t$.

B_{i1961}, the measure of initial financial development, enters the regression interacted with year dummies, with t denoting the year-specific coefficients the difference between $t+1$ and t tells us how a state's initial financial development affected rural branch growth between years t and $t+1$.

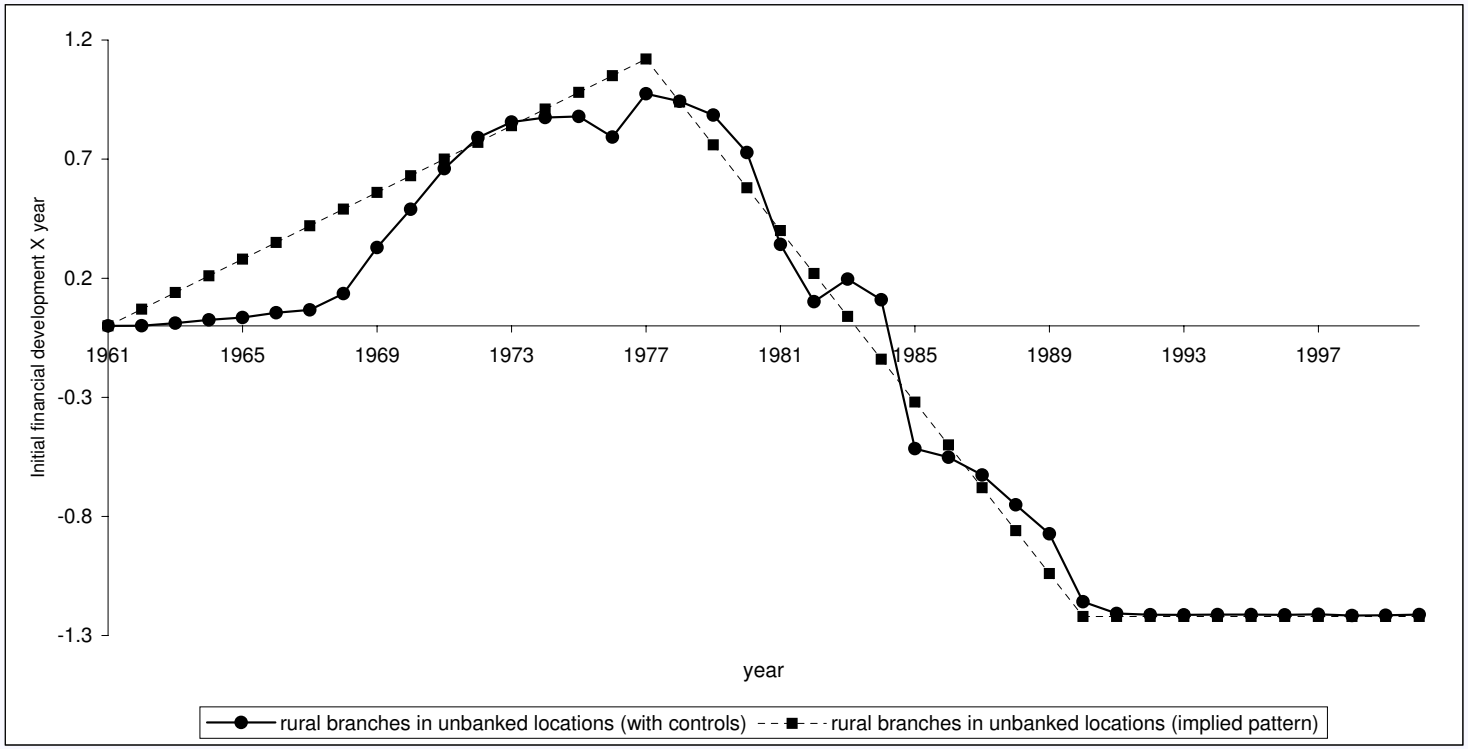


FIGURE 1: INITIAL FINANCIAL DEVELOPMENT AND BRANCH EXPANSION INTO RURAL UNBANKED LOCATIONS

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.

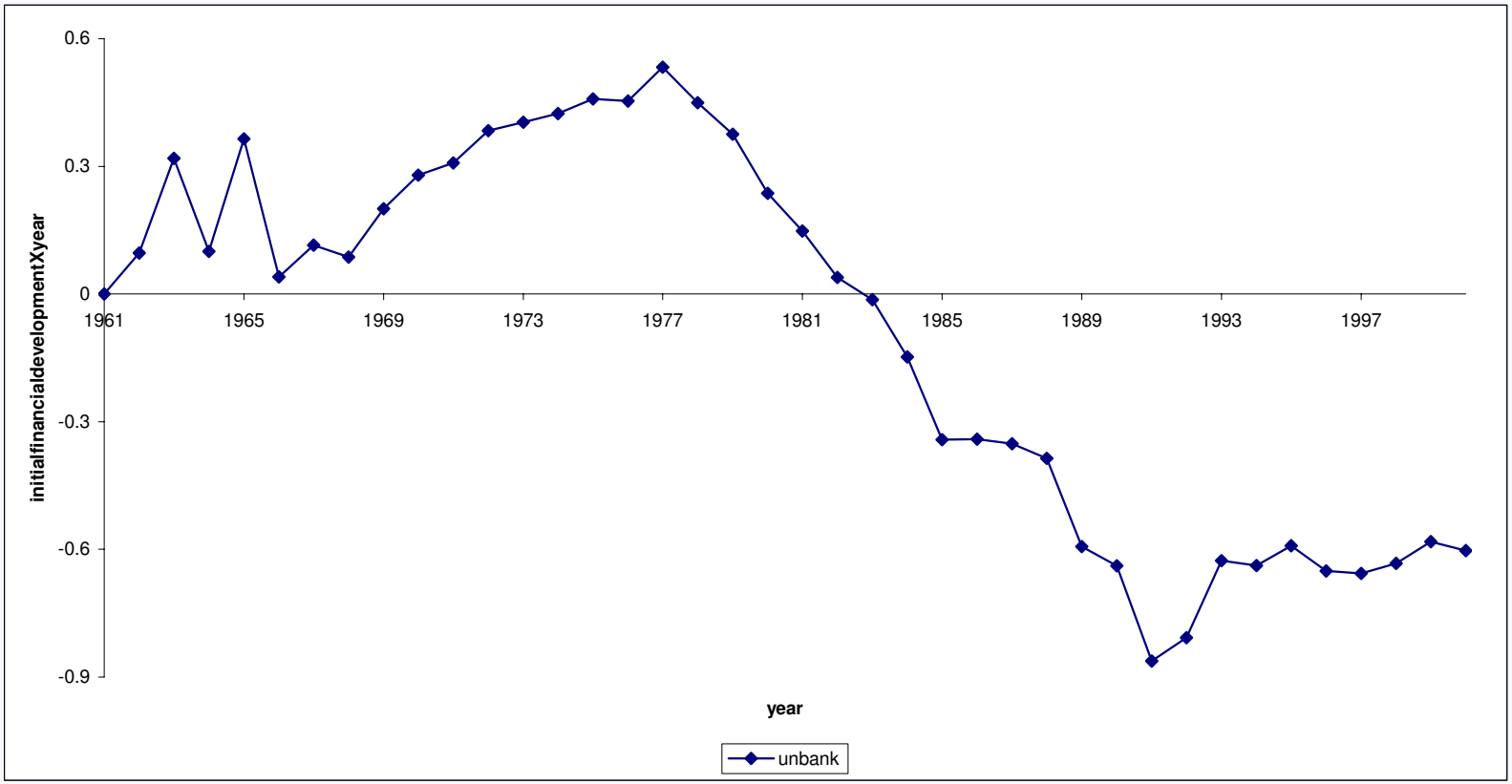
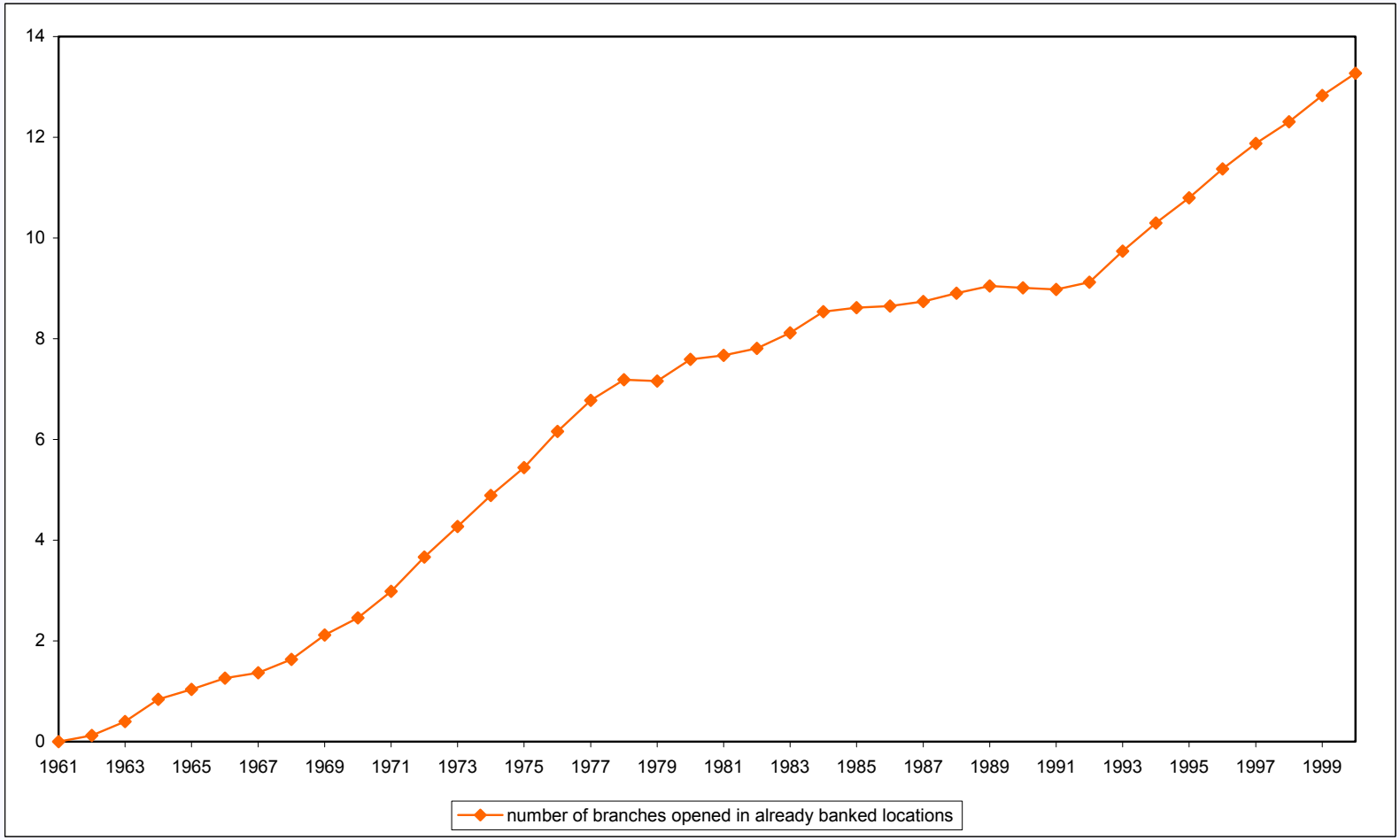


FIGURE: District level analysis

INITIAL FINANCIAL DEVELOPMENT AND BRANCH EXPANSION IN ALREADY BANKED LOCATIONS



Notes: This figure graphs the set of "Number of banked locations in 1961 × Year" Interaction terms from a regression in which the dependent variable is the number of branches opened in already banked locations. The regression includes population, income and location controls,

TREND BREAK MODEL

$[t-1977]$ denotes the linear time trends over 1977–2000. Similarly, $[t-1961]$ and $[t-1990]$ ... these time trends are interacted with the state's initial financial development, B_{i1961}.

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

γ_1, γ_2 and γ_3 measure the *cumulative* changes in the average trend relationship between B_{i1961}, the state's initial financial development and rural branch expansion in periods 1961–77, 1978–1990 and 1991–2000.

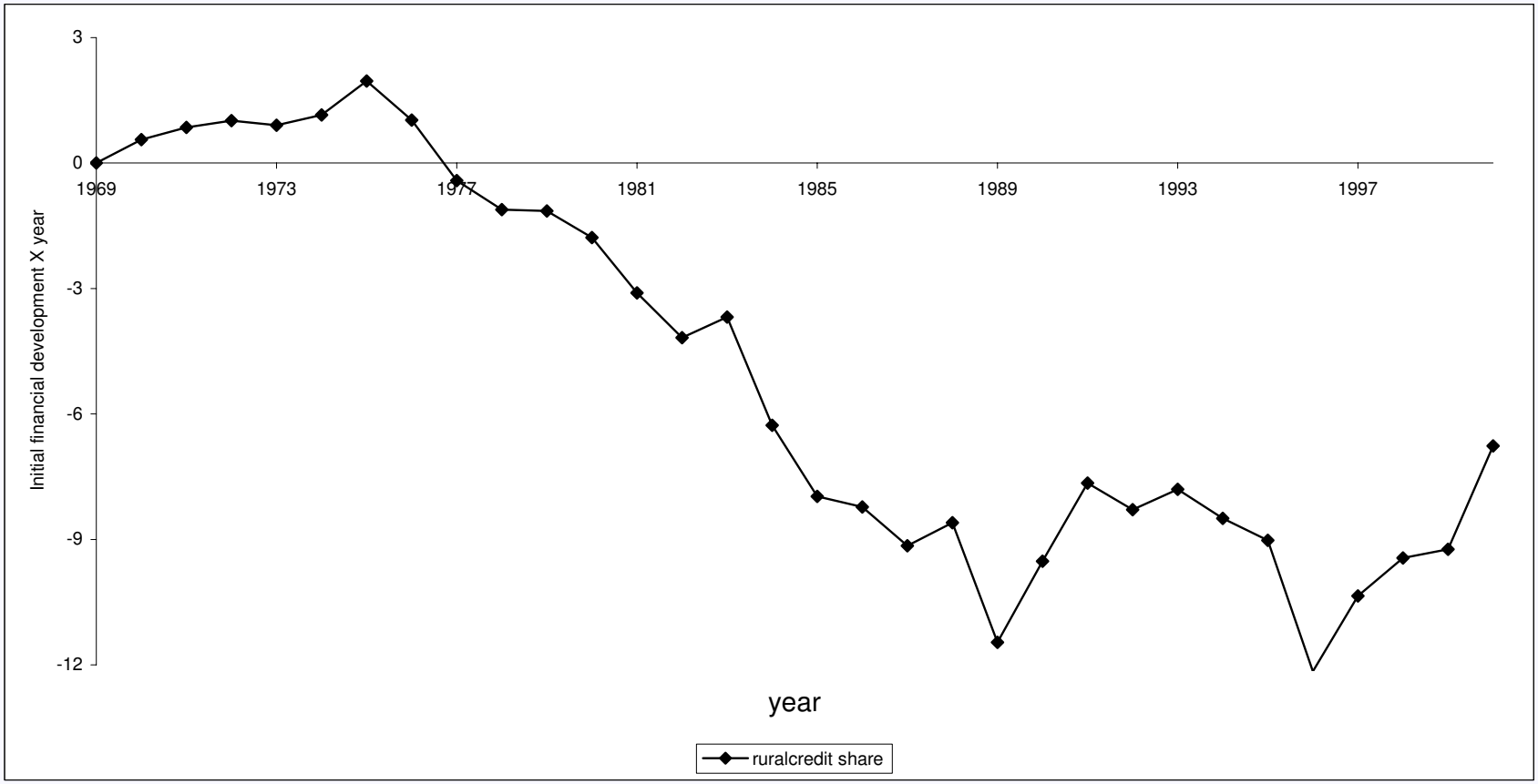


FIGURE: INITIAL FINANCIAL DEVELOPMENT AND RURAL CREDIT SHARE

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.

TABLE 3: BANKING AS A FUNCTION OF INITIAL FINANCIAL DEVELOPMENT

	Number branches, by location:		Rural bank credit	Rural bank saving	Priority sector	Cooperative
	Rural unbanked	Banked	share	share	credit share	credit share
	(1)	(2)	(3)	(4)	(5)	(6)
Number of bank branches in 1961	0.07**	0.14***	0.17	-0.02	-0.08	0.41
per capita *(1961-2000) trend	(0.03)	(0.01)	(0.20)	(0.23)	(0.62)	(0.33)
Number of bank branches in 1961	-0.25***	-0.07***	-1.09**	-0.82***	0.08	-0.02
per capita*(1977-2000) trend	(0.03)	(0.02)	(0.43)	(0.25)	(0.86)	(0.41)
Number of bank branches in 1961	0.17***	0.10**	0.89***	0.39*	-0.18	0.02
per capita*(1990-2000) trend	(0.04)	(0.04)	(0.26)	(0.20)	(0.33)	(0.99)
Post-1976 dummy* (1977-2000) trend	0.34	0.53**	-0.30	-0.16	-3.36	-3.64
	(0.25)	(0.19)	(1.49)	(0.77)	(2.40)	(2.22)
Post-1989 dummy*(1990-2000) trend	-0.24	-0.40***	2.03	0.28	-0.04	-3.15
	(0.15)	(0.10)	(1.52)	(0.55)	(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	0.98	0.91	0.92	0.88	0.83
F-test 1	16.87	8.97	12.8	25.67	0	5.75
	[0]	[0]	[0]	[0]	[0.99]	[0.02]
F-test 2	0.49	27.22	0.03	10.35	1.79	0.17
	[0.49]	[0]	[0.86]	[0]	[0.20]	[0.68]
Number observations	636	636	512	512	512	491

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 dummy and a post 1976 time trend, (iii) a post 1989 dummy and a post-1989 time trend. 'F-test 1' tests if first two row coefficients sum equals zero, and `F-test 2' whether the sum of coefficients in first three rows equals 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 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 sector' . Cooperative share is primary agicultural cooperative credit as a percent of 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%, ** significance at 5% and *** significance at 1%.

TABLE 4: BANK BRANCH EXPANSION AND POVERTY: REDUCED FORM EVIDENCE

	Head count ratio			Wage	
	Rural	Urban	Aggregate	Agricultural	Factory
	(1)	(2)	(3)	(4)	(5)
Number of bank branches in 1961 per capita *(1961-2000) trend	-0.77***	-0.27	-0.71***	-0.003	0.01
	(0.23)	(0.24)	(0.22)	(0.006)	(0.02)
Number of bank branches in 1961 per capita*(1977-2000) trend	1.15**	0.15	0.99***	-0.01*	-0.01
	(0.42)	(0.26)	(0.33)	(0.008)	(0.02)
Number of bank branches in 1961 per capita*(1990-2000) trend	-1.15***	-0.31	-1.04***	0.04**	-0.02
	(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]	[0.20]	[0]	[0.63]
F-test 2	2.97	3.95	4.15	1.88	6.07
	[0.10]	[0.06]	[0.05]	[0.19]	[0.02]
Number observations	627	627	627	545	553

Standard errors clustered by state are reported in parenthesis, p-values are in square brackets. Explanatory variables reported are number branches in 1961 per 100,000 persons interacted with (row-wise) (i) a time trend (t), (ii) an indicator variable=1 if the year>1976, and a post 1976 time trend (t-1976), (iii) an indicator variable=1 if the year>1989 and a post-1989 time trend (t-1989). 'F-test 1' tests if the sum of coefficients for first two rows equals zero, and `F-test 2' whether sum of coefficients in first three rows equals zero. Other controls are population density, log state income per capita and log rural locations per capita (measured in 1961). These enter the same way as number of bank branches per capita in 1961. Head count ratio is the percentage of the population with monthly expenditure below the poverty line. The 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 and spans 1961-2000. Haryana enters in 1965. Differences in sample size are due to missing data, details are in Appendix. * indicates significance at 10%, ** significance at 5% and *** significance at 1%.

TABLE 5: BANK BRANCH EXPANSION AND OUTPUT: REDUCED FORM EVIDENCE

	State output	Primary sector output		Non-primary output	Secondary sector output				Tertiary output	Employment
	Total	Total	Agriculture	Total	Construction	Manufacturing		Electricity, water, gas	Total	Rural non-agricultural
						Registered	Unregistered			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of bank branches in 1961 per capita *(1961-2000) trend	0.01**	-0.01	-0.01*	0.02***	-0.02	0.01	0.03*	0.01	0.02**	0.06***
	(0.002)	(0.01)	(0.004)	(0.004)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Number of bank branches in 1961 per capita*(1977-2000) trend	-0.02***	-0.01	-0.01	-0.03***	0.02	-0.01	-0.06*	-0.07***	-0.03***	-0.06**
	(0.004)	(0.01)	(0.01)	(0.004)	(0.04)	(0.01)	(0.03)	(0.02)	(0.01)	(0.02)
Number of bank branches in 1961 per capita*(1990-2000) trend	0.03***	0.02**	0.02*	0.03***	0.02	0.05	0.04*	-0.04	0.02***	
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.03)	(0.02)	(0.05)	(0.01)	
Post-1976 dummy* (1977-2000) trend	0.06	0.13**	0.14***	-0.02	0.05	0.12	0.03	0.39*	-0.08	5.59
	(0.03)	(0.05)	(0.05)	(0.03)	(0.12)	(0.08)	(0.06)	(0.21)	(0.06)	(28.35)
Post-1989 dummy*(1990-2000) trend	0.07*	0.08**	0.05	0.08*	0.06	-0.02	0.29**	0.92*	0.06	
	(0.03)	(0.03)	(0.03)	(0.04)	(0.08)	(0.09)	(0.11)	(0.49)	(0.03)	
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.98	0.94	0.93	0.98	0.98	0.86	0.94	0.96	0.98	0.89
F-test 1	20.25	6.73	4.54	31.4	0.01	0.04	2.69	8.15	5.06	0.09
	[0]	[0.02]	[0.05]	[0]	[0.94]	[0.85]	[0.12]	[0.18]	[0.03]	[0.77]
F-test 2	4.65	2.13	1.87	4.47	2.05	3.96	0.38	3.48	4.01	
	[0.04]	[0.16]	[0.19]	[0.05]	[0.17]	[0.06]	[0.54]	[0.08]	[0.06]	
Number observations	579	579	579	579	577	579	579	561	573	365

Standard errors clustered by state are reported in parenthesis, p-values are in square brackets. Co-variates are number branches in 1961 per 100,000 persons interacted with: (i) time trend, (ii) a post-1976 dummy, and a post-1976 time trend , (iii) a post-1989 dummy and a post-1989 time trend. 'F-test 1' tests if the sum of coefficients for first two rows equals zero, and `F-test 2' whether sum of coefficients in first three rows equals zero. Other controls are population density, log state income per capita and log rural locations per capita (measured in 1961). These enter the same way as number of branches per capita in 1961. Output is in log real rupees per capita. Non agricultural employment is log non-agri workers as fraction of all rural labor. The sample covers 16 states, and spans 1961-1997. Haryana enters in 1965. Sample size variations are due to missing data (see Data Appendix). * indicates significance at 10%, ** at 5% and *** at 1%.

TABLE 6: BANK BRANCH EXPANSION, POLITICS AND POLICY: REDUCED FORM EVIDENCE

	POLITICS		POLICY			
	Fraction Congress legislators	Center-state alignment	Land reform	Public food distribution	Share of state spending on Health and education	Share of state spending on Other development
	(1)	(2)	(3)	(4)	(5)	(6)
Number of bank branches in 1961 per capita *(1961-2000) trend	-0.01	-0.04*	0.005	35.62	-0.0004	0.002
	(0.01)	(0.02)	(0.05)	(71.37)	(0.0013)	(0.001)
Number of bank branches in 1961 per capita*(1977-2000) trend	0.005	0.04	-0.09	45.54	-0.001	-0.0001
	(0.02)	(0.03)	(0.04)	(77.42)	(0.0016)	(0.0030)
Number of bank branches in 1961 per capita*(1990-2000) trend	-0.004	0.08	0.08*	-20.04	0.0002	-0.001
	(0.017)	(0.04)	(0.04)	(217.92)	(0.0019)	(0.005)
Post-1976 dummy* (1977-2000) trend	0.14	0.3	-0.85**	-530.33	-0.01	-0.002
	(0.24)	(0.27)	(0.29)	(1029.74)	(0.01)	(0.01)
Post-1989 dummy*(1990-2000) trend	0.23**	-0.10	-0.54***	464.14	-0.004	0.01
	(0.10)	(0.34)	(0.19)	(292.69)	(0.01)	(0.01)
State and year dummies	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.56	0.59	0.73	0.79	0.72	0.7
F-test 1	0.16	0.01	3.82	0.41	5.32	1.61
	[0.69]	[0.91]	[0.06]	[0.53]	[0.03]	[0.22]
F-test 2	0.33	2.95	0.01	0.16	1.34	0.16
	[0.57]	[0.10]	[0.91]	[0.69]	[0.26]	[0.69]
Number observations	634	539	636	522	613	613

Standard errors clustered by state are reported in parenthesis, p-values in square brackets. Explanatory variables are number branches in 1961 per 10,000 persons interacted with (i) a time trend (ii) a post-1976 dummy, and a post-1976 time trend, (iii) a post-1989 dummy and a post-1989 time trend. 'F-test 1' tests if first two row coefficient sum to zero, `F-test 2' whether coefficient sum for first three rows equals zero. Other controls are population density, log state income per capita and log rural locations per capita (measured 1961). These enter the same way as number of branches per capita in 1961. Fraction congress legislators is the percentage of state legislators belonging to Congress party. Center-state alignment is a dummy=1 when same party is in power in the center and state. Land reform is a cumulative index of state land reform acts (1961-2000); public food distribution is per capita food grains (in tonnes) distributed via public food distribution system (1961-1993). Health and education spending is as share of government spending (1961-1999). Other development activities includes all other development expenditures excluding health and education. * indicates significance at 10%, ** significance at 5% and *** significance at 1%.

Rural Banks and Economic Development: IV Estimates

OLS: makes little sense in this context as design of program means that more backward areas receive more bank branches

IV Approach (2SLS): Assume that state specific trend in y_{it} is potentially correlated with initial financial development B_{i1961} but there is no change in trend in the absence of the 1:4 license policy

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

where instruments for B_{it}^R are $[t - 1977] \times B_{i1961}$ & $[t - 1990] \times B_{i1961}$, the deviations from the linear state-specific trend $[t - 1961] \times B_{i1961}$.

TABLE 7: BANK BRANCH EXPANSION AND POVERTY -- INSTRUMENTAL VARIABLES EVIDENCE

	Head count ratio								Wage	
	Rural			Urban	Aggregate	Rural			Agricultural	Factory
	OLS		IV	IV	IV	IV	IV	IV	IV	IV
						1961-89	1977-2000	survey years		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number branches opened in rural unbanked locations per capita	2.09**	1.15	-4.74**	-0.65	-4.10**	-4.70**	-6.83**	-4.20*	0.07*	0.04
	(0.79)	(1.02)	(1.79)	(1.06)	(1.46)	(1.82)	(2.80)	(2.26)	(0.04)	(0.08)
IMPLIED ELASTICITY			-0.36		-0.32				0.25	
Number of bank branches in 1961 per capita * 1961-2000 trend		-0.43***	-0.47	-0.26*	-0.46*	-0.43	-0.79*	-0.45	-0.006	0.005
		(0.16)	(0.26)	(0.13)	(0.22)	(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
		(1.22)	(2.29)	(1.65)	(2.03)	(2.58)		(3.32)	(0.05)	(0.06)
Post-1989 dummy*(1990-2000) trend		5.37**	-1.08	-0.47	-1.55		-0.45	0.78	0.11	-0.05
		(2.46)	(2.33)	(1.01)	(1.75)		(2.90)	(2.61)	(0.06)	(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	0.99	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

Standard errors clustered by state are reported in parenthesis. See notes to Table 4, and Data Appendix for variable descriptions. Branch variables are normalized by 1961 population, and expressed per 100,000 persons. Other controls are log state income per capita, population density and log rural locations per capita, measured in 1961 and interacted (separately) with a 1961-2000; 1977-2000 and 1990-2000 trend and with post-1976 and post-1989 dummies. In IV regressions instruments are number branches in 1961 per capita interacted with (i) a post-1976 dummy and a post-1976 time trend (ii) a post-1989 dummy and a post-1989 time trend respectively. Table 3, column (1) reports corresponding first stage regression. The p-value for an overidentification test due to Sargan [1958] is reported -- number of observations times R-2 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%, ** significance at 5% and *** significance at 1%

TABLE 8: BANK BRANCH EXPANSION AND OUTPUT -- INSTRUMENTAL VARIABLES EVIDENCE

	State output	Primary sector output		Non-primary output	Secondary sector output				Tertiary	Employment
						Manufacturing		Electricity,	total	Non-agri
	Total	Total	Agriculture	Total	Construction	Registered	Unregistered	water, gas	output	labor
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number bank branches in rural	0.08***	0.04	0.01	0.15***	-0.09	0.05	0.29*	0.30**	0.17***	0.3
unbanked locations per capita	(0.02)	(0.03)	(0.03)	(0.03)	(0.19)	(0.07)	(0.15)	(0.13)	(0.05)	(0.22)
IMPLIED ELASTICITY	0.29			0.55			1.07	1.11	0.62	
Number bank branches in 1961	0.004	-0.01*	-0.01**	0.01**	-0.01	0.01	0.02*	-0.02	0.02*	0.06***
per capita * (1961-2000) trend	(0.003)	(0.00)	(0.00)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
Post-1976 dummy* (1977-2000)	0.004	0.09**	0.12***	-0.1	0.06	0.06	-0.1	0.38*	-0.15*	-0.03
trend	(0.04)	(0.04)	(0.03)	(0.06)	(0.17)	(0.06)	(0.14)	(0.19)	(0.08)	(0.22)
Post-1989 dummy*(1990-2000)	0.15***	0.16***	0.13**	0.14***	0.18	0.16*	0.33**	0.70*	0.08**	
trend	(0.03)	(0.05)	(0.04)	(0.03)	(0.11)	(0.08)	(0.14)	(0.35)	(0.03)	
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Overidentification test p-value	0.98	0.97	0.97	0.99	0.91	0.97	0.99	0.98	0.99	
Adjusted R-squared	0.96	0.93	0.93	0.96	0.98	0.94	0.82	0.7	0.96	0.88
Number observations	579	579	579	579	577	579	579	561	573	365

Standard errors clustered by state are reported in parenthesis. See notes to Table 4, and Data Appendix for variable descriptions. Branch variables are normalized by 1961 population. Other controls are log state income, population density and log rural locations per capita, measured in 1961 and interacted (separately) with 1961-2000; 1977-2000 and 1990-2000 trend and with post-1976 and post-1989 dummies. In IV regressions the instruments are the number of branches in 1961 per capita interacted with (i) a post-1976 dummy and a post-1976 time trend (ii) a post-1989 dummy and a post-1989 time trend respectively. Table 3, column (1) reports the corresponding first stage regression. The p-value for an overidentification test due to Sargan [1958] is reported -- the test assumes that number of observations times R-2 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%, ** significance at 5% and *** significance at 1%

TABLE 9: THE IMPACT OF RURAL CREDIT AND SAVINGS ON POVERTY AND OUTPUT -- INSTRUMENTAL VARIABLES EVIDENCE

	Head count ratio				Output					
	Rural		Urban		Total		Primary sector		Non-primary sector	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share of bank credit disbursed by rural branches	-1.49**		-0.64		0.02*		0.01		0.03**	
	(0.67)		(0.45)		(0.01)		(0.01)		(0.02)	
Share of bank savings held by rural branches		-2.27**		-1.09		0.02*		0.01		0.03***
		(0.80)		(0.69)		(0.01)		(0.01)		(0.01)
Number bank branches in 1961 per capita * (1961-2000) trend	-0.98*	-1.56**	-0.69**	-1.00**	0.01	0.02**	-0.001	-0.001	0.01**	0.02**
	(0.48)	(0.59)	(0.24)	(0.36)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Post-1976 dummy* (1977-2000) trend	-3.00*	-1.83	-1.64	-1.13	0.05	0.04	0.11**	0.11**	-0.02	-0.03
	(1.62)	(2.29)	(1.96)	(2.55)	(0.05)	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)
Post-1989 dummy*(1990-2000) trend	4.56	1.63	2.92	1.65	0.08	0.13***	0.11	0.14***	0.05	0.12***
	(2.64)	(2.54)	(2.40)	(1.27)	(0.07)	(0.04)	(0.07)	(0.04)	(0.08)	(0.04)
State and year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Other controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Overidentification test p-value	0.99	0.99	0.99	0.99	0.98	0.95	0.99	0.93	0.99	0.99
Adjusted R-squared	0.72	0.66	0.91	0.89	0.97	0.94	0.98	0.96	0.99	0.97
Number observations	503	503	503	503	463	463	463	463	463	463

Standard errors clustered by state are reported in parenthesis. See Table 4 and 5 notes, and Data Appendix for variable description. All output variables are normalized by 1961 population. Other controls are log state income, population density and log rural locations per capita, all measured in 1961 and interacted (separately) with a (1961-2000), (1977-2000) and (1990-2000) trend. The instruments are the number of branches in 1961 per capita interacted separately with (i) a post-1976 dummy and a post-1976 trend, and (ii) a post-1989 dummy and a post-1989 trend respectively. Table 3, columns (3) and (4) report the corresponding first stage regression. We report the p-value for Sargan overidentification test [1958]. This assumes number observations times R-2 from a regression of the stage two residuals on the instruments is distributed as chi-squared (T+1) where T is the number of instruments. * indicates significance at 10%, ** significance at 5% and *** significance at 1%.

TABLE 10: BANK BRANCH EXPANSION AND POVERTY REDUCTION -- IV ESTIMATES WITH TIME VARYING CONTROLS

	Rural head count ratio			Urban head count ratio		
	(1)	(2)	(3)	(4)	(5)	(6)
Number bank branches in rural	-4.04**	-4.12**	-3.77**	-0.83	-1.05	-0.81
unbanked locations per capita	(1.83)	(1.54)	(1.54)	(1.08)	(1.06)	(0.91)
Cumulative land reform	-1.87**	-1.75**	-1.87**	0.45	0.41	0.27
	(0.79)	(0.70)	(0.68)	(0.28)	(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 belonging to:						
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	YES	YES
Other controls	YES	YES	YES	YES	YES	YES
Overidentification test p-value	0.99	0.99		0.98	0.99	
Adjusted R-squared	0.78	0.79	0.81	0.92	0.91	0.91
Number observations	627	605	603	627	605	603

Standard errors clustered by state are reported in parenthesis. Table 4 notes, and Data Appendix provide variable description. Branch variables are normalized by 1961 population. Other controls are log state income, population density and log rural locations per capita, measured in 1961 and interacted (separately) with a (1961-2000), (1977-2000) and (1990-2000) trend. Instruments are number branches in 1961 per capita interacted with (i) a post-1976 dummy and a post-1976 time trend (ii) a post-1989 dummy and a post-1989 trend respectively. * indicates significance at 10%, ** significance at 5% and *** significance at 1%.

CONCLUSIONS

- Rural branch expansion has been a key driver of structural change and economic growth.
- Results counter widespread pessimism concerning potential of these types of programmes
- 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.

- Evidence suggests that *state led rural branch expansion has been central to tackling economic backwardness in India*

Thought Experiment

- Basic thought experiment: What happens when a bank opens in a village or small town?
- Answer seems to be that it helps households to start small businesses – informal manufacturing and services
- Engine for economic growth and poverty reduction
- At this point, mechanisms through which effects achieved unclear
- The paper is silent of whether intervention cost-effective relative to alternatives, i.e., microfinance.