# Distortion in Credit Availability in India's Lead Bank Scheme: A Transaction Costs-based approach

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**Abstract**

Do inter-oganizational transaction costs among commercial banks in India's oldest financial inclusion program distort credit lending across districts? I study the Lead Bank Scheme of India where since 1969, for each district a commercial bank (Lead Bank) has been supervising credit delivery and for each state a commercial bank (Convenor Bank) is coordinating the activities of the lead banks of the state. I find that in districts where lead bank and convenor bank of the state are same (aligned districts), credit disbursement is 2.7% higher after controlling for temporal shocks, demand side factors and supply side factors. Further, I show that following good rainfalls, deposits in aligned districts do not rise by a significant amount vis-à-vis non-aligned districts indicating that while alignment pushes the lead banks to provide more credit, credit provision may not be for more viable units. The results are explained by an approach of Transaction Costs Economics (TCE) where costs of coordinating across firm boundaries are higher than within firm boundaries. The paper shows how distortions created by organizational features may affect service delivery in welfare programs.

JEL Codes : L22, D23, O25

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# 1 Introduction

Financial inclusion of underprivileged sections of the society is crucial for economic progress (Sarma and Pais (2011), Mandira and Jesim Pais (2016), ?). In India, the task of financial inclusion is attempted through the Lead Bank Scheme, 1969. Under this scheme, each district has been assigned a public sector bank, known as Lead Bank, to supervise credit disbursement as per Annual Credit Plan[1] and conduct financial literacy camps. Each state is assigned a nationalized bank, known as Convenor Bank, to coordinate the efforts of Lead Bank of that state. Convenors are evaluated by Reserve Bank of India, annually.

Given the governance structure, some convenor and lead banks fall within the boundary of the firm while some fall outside. Using implications of transaction costs economics (Williamson (1981), Holmstrom and Roberts (1998)), I predict that when convenor and lead banks belong to the same corporate entity (aligned), then credit delivery should be higher. As an additional test, I also predict that credit delivery should increase progressively as year comes to an end, since impending evaluation by RBI compel all convenors to monitor more closely.

Using district-wise quarterly credit and deposit data from the third quarter of 2003 to fourth quarter of 2016, I show that credit disbursal in aligned district is 2.7% higher, after controlling for temporal variations (quarter-year fixed effects), supply side factors (lead bank and convenor fixed effects) and demand-side factors (district and state fixed effects). Further, I show that compared to the first quarter, credit disbursement in second, third and fourth quarter are 4.5%, 9.7% and 17.9% higher. However, I do not find higher deposit flows in aligned districts after a positive income shock of normal monsoon. Thus, this last point allows me to infer that while aligned lead banks may push more credit, they are not spreading financial awareness in an effective manner.

The paper contributes to various strands of research. Policies in Indian banking sector has been studied previously to establish the role played by financial inclusion in poverty alleviation (Burgess and Pande (2005), Burgess et al. (2005) Young (2019)). In this paper, I analyze a previously unstudied scheme to show that organizational features of nationalized Indian banking sector may create distortions in such policies. Recently, Acharya and Kulkarni (2019) showed how government guarantees of nationalized banks in India effect bank vulnerabilities during a crisis.

The paper also contributes to the literature on resource misallocation due to industrial

[1] Annual Credit Plan and Productivity-Linked Plans are designed by NABARD for each district in India to promote financial inclusion.

policies in developing countries (Hsieh and Klenow (2009), Collard-wexler et al. (2011), Restuccia and Rogerson (2017)). Midrigan and Xu (2014) has studied misallocation in plant-level productivity due to finance frictions. Peek and Rosengren (2005) finds evidence for credit misallocation in Japan due to a perverse incentive for firms to provide capital to the weakest firms. To the best of my knowledge, this is the first paper to show how welfare schemes led by commercial entities can also lead to misallocation due to organizational transaction costs.

Finally, the paper also contributes to the vast empirical literature on transaction costs economics. Williamson (1981)'s theoretical work has found evidence in wide-ranging fields. Papers in this stream have shown how certain forms of governance structure reduce transactions costs thereby facilitating production. Shelanski and Klein (1995), David and Han (2004) and Crook et al. (2012) provide surveys of empirical evidence for transaction costs economics.

Rest of the paper is organized as follows. Section 2 provides the institutional background for Lead Bank Scheme. Section 3 provides a game-theoretical model building on the institutional features. In Section 4, I test the implications of the model. Section 5 concludes.

# 2 Institutional Background

Lead Bank Scheme (LBS) was started in 1969. Under this scheme, for each district of India, a nationalized bank[2] with its operational presence in that district was appointed as the agency to monitor credit disbursement activities. The appointed commercial bank at the district is known as the Lead Bank. To oversee the activities of the Lead Banks of a given state and to coordinate their efforts, RBI appointed a commercial bank for each state in 1977. The coordinating nationalized bank is termed as Convenor Banks. Collectively, the Convenor Bank at the state and Lead Banks in the districts constitute a State Level Bankers' Committee (SLBC).

## 2.1 Governance Structure of SLBC

Figure 1 provides the organization chart for an SLBC. Broadly speaking, the task of SLBC is to expand the scope of financial services in its assigned state/UT.

[2]A nationalized bank in India can be considered as a wholly Government of India owned entity which gives it a sovereign guarantee.

### 2.1.1 Lead Banks

Historically, Lead Banks are responsible for achieving credit delivery targets of Annual Credit Plan set by National Bank for Agricultural and Rural Development (NABARD). In its revamped role after 2009, apart from credit disbursements, Lead Banks also have the responsibility of spreading financial awareness. Figure 2 provides a schematic of how a lead bank conducts its responsibilities. Following summarizes the roles of a lead bank:

- **Coordination with Financial Institutions**: Lead Banks interact closely with banking and non-banking organizations to monitor credit delivery. These local financial institutions also convey the geographical and infrastructural issues faced by them while expanding financial services.
- **Public Outreach**: Lead Banks have an active reach-out program to attain financial literacy and awareness. This task is achieved by conducting financial literacy camps in rural areas or for the vulnerable citizens, establishing financial literacy centres, recommending financial literacy curriculum in schools, etc.
- **Interaction with Government**: Lead Banks interact with the government departments to share the infrastructure requirements for expanding financial and banking services. This is done through frequent meetings.

Currently, around 28 commercial banks act as Lead Banks for India's 700 districts.

### 2.1.2 Convenor Banks

Convenor Banks monitor the performance of Lead Banks of sate through quarterly meetings of SLBC. In these quarterly meetings, the chairman of the commercial bank, acting as Convenor, leads the meetings where the performance of each lead bank is evaluated. Convenor Banks are evaluated by RBI annually in terms of whether they achieve the Productivity Linked Annual Credit Plans or not.

Currently, around 18 nationalized banks act as Convenor Banks for India's 36 states/UTs.

## 2.2 Appointment of Lead Banks and Convenor Banks

Lead Banks are appointed by RBI from the set of 18 nationalized banks in India. Once appointed to a district, Lead Banks of a given district do not change. Further, when new districts are carved out of older ones, RBI issues a notification for appointment of a new

Lead Bank. The Lead Bank of a new district can be the same as or different from the Lead Bank of the mother district. The criteria for selection among the nationalized banks depends on the coverage and operational presence of the appointed bank in that district.

Similarly, Convenor Banks are appointed by RBI. When new states are formed, Convenor Banks are appointed for these new states. Apart from the formation of new states, in the last 15 years, RBI has also changed Convenor Banks for the state of Manipur and Jharkhand.

Define an Aligned district as those districts for which the Lead Bank and the Convenor Bank at the state level are the same Public Sector Bank. Around 28% of districts are Aligned. Further, alignment status of a district changes as Convenor Bank changes.

### 2.3 Incentives for Lead Banks and Convenor Banks

Incentives for following the government-set plans for Lead Bank Scheme are different for Lead Banks and Convenor Bank. While Lead Bank personnel are driven by career motivations, Convenor Bank representatives are motivated by the supervision of regulator, RBI.

Figure 3 provides a generalized organization chart of a PSB in India. Lead Banks conduct their operations through a district-level branch which is headed by a Chief Manager-level officer. Most public sector banks in India do not have lateral entries. Thus, Chief Managers are mid-to-high level employees in the bank who have climbed up the career ladder in the firm for around 6-7 years. Further, employee attrition in public sector banks remains low in India and thus, most Chief Manager are motivated by promotion. Hence, career concerns provide the incentives for Lead Bank personnel (Holmstrom (1999)).

The role of convenor banks is to supervise the Lead Banks in the SLBC quarterly meetings. As per RBI's guidelines, the Convenor Bank are required to send the Chairman or second-in-command officer to these meetings. Since these banks are wholly-owned government entities, their top most officers are *de facto* government employees, and are thus, fully answerable to the regulator. The close supervision by the regulator of the chariman of Convenor Bank acts as the implicit incentive mechanism for the chairman of Convenor Banks.

## 3 Model

Consider a game with the following features:

- Players: The game has two players. Lead Bank, denoted by L, and Convenor Bank, denoted by C.
- Strategies: Each player has two strategies. Denote by $s_L \in \{E, NE\}$ as the strategy for Lead Bank. $s_L = E(NE)$ is the strategy of Lead Bank to exert effort (not exert effort) in expanding financial services. Denote by $s_C \in \{M, NM\}$ as the strategy for Convenor Bank. $s_C = M(NM)$ is when Convenor Bank monitors (does not monitor) the Lead Bank.
- Payoffs: The payoffs for strategy pairs for L and C are given by Table 1.

Table 1: Payoff Matrix

| | M | NM |
|---|---|---|
| E | $V - C_E, b_M - c_M$ | $-C_E, b_{NM}$ |
| NE | $-C_{NE}, v$ | $-\delta C_{NE}, -\delta c$ |

  - $V$ is the value received by Lead Bank manager on exerting effort when the Convenor Bank monitors and notices the effort. This can be considered as the reward in terms of career progression.
  - $C_E$ is the cost of exerting the effort. $C_{NE}$ is the punishment given to the Lead Bank on not exerting effort. This can be considered as delay in career advancements when the Convenor Bank eventually finds out that the Lead Bank did not exert effort.
  - $(b_M - c_M)$ is the net benefit received by Convenor Bank for monitoring a Lead Bank which exerts effort, whereas $b_{NM}$ is the benefit received when the Lead Bank exerts effort but Convenor Bank does not monitor. Monitoring by Convenor Bank requires allocating time for supervising the effort. Thus, there are implicit opportunity costs in monitoring.
  - $v$ is the value received by Convenor Bank when it monitors a Lead Bank which does not exert effort. This value can be considered as discovering an inefficient Chief Manager in a district and possibly alleviating the reasons for his inefficiencies. Since Convenor Banks have to report to RBI annually, any shortcomings in targets set for Lead Banks are discovered eventually by the regulator which can then discipline the Convenor. $c$ is the cost that the Convenor Bank faces when RBI discovers the shortfall of credit disbursement in a district.

– $\delta$ is the discount factor.

**Assumption-1**: $b_{NM} > b_M - c_M$

Assumption 1 states that the benefit to Convenor Bank for not monitoring is greater than net benefit from monitoring when the Lead Bank exerts effort. Under this condition, there is no pure strategy Nash Equilibrium of the game in Table 1. Thus, I explore a mixed strategy Nash Equilibrium.

## 3.1 Equilibrium

Let $\alpha \in (0,1)$ be the probability with which Lead Bank plays $s_L = E$ and let $\beta \in (0,1)$ be the probability with which Convenor Bank plays $s_C = NM$. Given the above payoff matrix, $\alpha$ and $\beta$ are given by:

$$\alpha = \frac{v + \delta c}{v + \delta c + b_{NM} - (b_M - c_M)}$$

and

$$\beta = \frac{C_E - \delta C_{NE}}{C_E - \delta C_{NE} + V}$$

## 3.2 Comparative Statics

The equilibrium strategy profile provides the following comparative statics for the probability of effort put by Lead Bank.

$$\frac{\partial \alpha}{\partial v} = \frac{b_{NM} - (b_M - c_M)}{(v + \delta c + b_{NM} - (b_M - c_M))^2}$$

Thus, as the value received by Convenor Bank on catching an inefficient Chief Manager increases, the probability of effort exerted by the Lead Banker will also increase. The intuition is simple. As the Convenor Bank gains more on catching an inefficient lead banker, the Convenor Chairman would monitor with higher probability. As the Chief Manager in the district realizes that, he will put in more effort.

Given the governance structure explained in Section 2, $v$ is likely to be higher when the convenor and lead bank belong to the same nationalized bank. The intuition is simple.

An inefficient employee inside the organization can be disciplined more easily than the one outside. Further, restricting career advancement of inefficient of a Lead Bank Manager has added value for the Convenor when the Lead Manager is in the same firm. This reasoning provides the first testable implication.

**Testable Implication-1**: Performance of Lead Banks in Aligned Districts is better.

Another comparative static from the above model is:

$$\frac{\partial \alpha}{\partial \delta} = \frac{c(b_{NM} - (b_M - c_M))}{(v + \delta c + b_{NM} - (b_M - c_M))^2}$$

As discount factor increases, the effort exerted by Lead Bank will increase. The intuition is simple. The costs of an inefficient Lead Bank are received by the Convenor in the next period when RBI monitors all Convenors. As the time period of evaluation comes closer, all nationalized banks would monitor with higher probability. Knowing this, Lead Banks will exert effort with higher probability. Empirical implication of the above reasoning is the following:

**Testable Implication-2**: Performance of Lead Bank improves as the year ends.

# 4 Empirical Results

I test the above implications on quarterly credit disbursement and deposits made in each district from fourth quarter of 2003 to first quarter of 2018. The data is publicly available from Reserve Bank of India's Basic Statistical Returns and Database of Indian Economy. Information on Lead Banks and Convenor Banks is available from notifications and guidelines of Reserve Bank of India. These guidelines also provide information on appointment of new Lead and Convenor Banks, or changes in Convenorship of SLBC.

Table 2 provides the summary statistics for quarterly credit and deposits for each of India's district. Around 44% of districts are aligned; i.e. Lead Bank in the district and Convenor Bank of the state in that district are the same nationalized bank.

## 4.1 Credit Disbursements

In Table 3, I decompose log of credit in each district on various fixed effects. Each column controls for year-quarter fixed effects to absorb temporal variations. In column 1, I add year-quarter fixed effects only. Adjusted $R^2$ is 0.104. Thus, temporal variation and business cyclicality account for only 10% of variations in log of credit availability. In column 2, I add lead bank fixed effects. Now, adjusted $R^2$ rises to 0.34. Thus, local supply side factors explain a significant proportion in credit availability. In column 3, I add convenor bank fixed effects. These can be considered as state-level supply side factors. The adjusted $R^2$ now increases to 0.52. Finally, I add state fixed effects in column 4 and district fixed effects in column 5. These account for state-level and local demand-side factors. The adjusted $R^2$ now rises to 0.99. Table 4 repeats the same analysis for log of deposits.

The model in column 5 controls for temporal, supply and demand side factors. This empirical model will act as baseline for testing the implications of the theoretical model.

I use the following empirical model to test the implications of the theoretical model:

$$\log y_{dslcyq} = \beta \mathbb{1}\{Align\} + \phi_d + \phi_s + \phi_l + \phi_c + \phi_{qy} + \epsilon_{dslcyq}$$

where,

- where $y_{dslcyq}$ are measures of financial access. This is log of credit or deposit.
- $\mathbb{1}\{Align\}$ is 1 when Lead Bank and Convenor are same firm; 0 otherwise
- $\phi_d$ and $\phi_s$ are district and state fixed effects to control for demand and administrative factors
- $\phi_l$ and $\phi_c$ are lead bank and convenor fixed effects to control for supply-side interventions
- $\phi_{qy}$ are quarter-year fixed effects

Following Abadie et al. (2017), I cluster the standard error at the level of district.

In Table 5, I regress log of credit on an indicator for alignment including all fixed effects. The coefficient on $\mathbb{1}\{Align\}$ is 0.028 with a standard deviation of 0.005. Thus, after holding constant, supply, demand and temporal variation, credit availability in aligned district is 2.8% higher. District-level average credit uptake is Rs. 58356 lakhs. Thus, on average, credit availability in aligned district is around Rs. 1633 lakhs higher. In column 2, I restrict the sample to those districts which underwent a change in alignment status. The coefficient

on $\mathbb{1}\{Align\}$ is 0.085, implying an increase in credit availability by 8.5% when a district becomes aligned.

To test the second implication, I use the following model:

$$\log y_{dslcyq} = \beta \mathbb{1}\{Align\} + \gamma \mathbb{1}\{Quarter4\} + \theta \mathbb{1}\{Align\} * \mathbb{1}\{Quarter4\} + \phi_d + \phi_s + \phi_l + \phi_c + \phi_y + \epsilon_{dslcy}$$

where apart from the variables explained above, $\mathbb{1}\{Quarter4\}$ is fourth quarter fixed effect. Thus, instead of using quarter-year fixed effects, I control for year fixed effects and observe variation in credit disbursement in fourth quarter compared to other quarters.

Table 6 shows the results. The coefficient on alignment dummy is 0.026 with a standard error of 0.005, consistent with evidence in Table 5. Coefficient on the indicator for fourth quarter is 0.134 with a standard error of 0.002. Thus, compared to the first three quarters, credit disbursement in the fourth quarter is 13% higher, controlling for demand, supply and annual factors. Coefficient on the interaction between alignment and fourth quarter dummy is -0.006 with a standard error of 0.003. Thus, there is weak evidence for convergence in performance of aligned and non-aligned lead banks. A key takeaway is that the organizational pressure on aligned lead banks are higher than the incentive to meet annual targets. In column 2, I use fixed effects for each quarter separately. The coefficients on quarter 2, quarter 3 and quarter 4 fixed effects are 0.045, 0.097 and 0.179, respectively, with each of them significant at 1% level. Thus, credit disbursement increases as annual evaluation comes closer.

## 4.2 Deposits

Lead banks can also influence deposits in a district by imparting financial literacy in their assigned regions. However, deposit stock and flows are function of income shocks. To test the effectiveness of alignment on deposit flows, I use a normal monsoon in a state as a positive income shock. I obtain data on monsoon rainfall from Indian Meteorological Department from 2012-2016. IMD classifies monsoon rainfall in three categories—Normal, Scanty and Excessive.

I use the following model to test the above hypothesis:

$$\Delta \log y_{dslcy} = \beta \mathbb{1}\{Align\} + m_i^{sy} + \mathbb{1}\{Align\} * m_i^{sy} + \phi_d + \Sigma_k \phi_k + \epsilon_{dslcy}$$

where, $m_i^{sy}$ is monsoon-type fixed effect for state $s$ in year $y$, where $i \in \{\text{Normal}, \text{Excessive}, \text{Scanty}\}$.

Monsoon rainfall begins from end of June and stretches upto end of September, which corresponds with the second quarter of financial calender. Harvesting and selling of agricultural products starts after the monsoon ends. Thus, a positive income shock in the second quarter should result in higher savings and thus, higher deposits in the third quarter[3]. If aligned lead banks are better at imparting financial literacy, deposit flows in quarter 3 should be higher in aligned districts after a normal monsoon.

Table 7 provides the results. Coefficient on the alignment dummy is 0.014 with a standard deviation of 0.009. Thus, controlling for monsoon-type, deposit flow between quarter 2 and 3 are higher in aligned district, although the result is not significant. However, the coefficient on the interaction between alignment and normal monsoon dummies is 0.004 with a standard deviation of 0.007. Thus, impact of financial literacy on deposit flow is invariant between aligned and non-aligned districts.

At first, the lack of any evidence on higher deposit flows in aligned districts appears to contradict the theoretical implications. However, this evidence is in line with existing research which indicates the marginal or negligible impacts of financial literacy on financial inclusion (Miller et al. (2014), Fernandes et al. (2014)). Thus, the results may emerge from disinterested beneficiaries rather than lack of effort from the aligned lead banks.

## 4.3 Robustness Checks

The above results do not stem from a randomized control trial where the alignment status is orthogonal to all relevant characteristics of districts. Appointment of nationalized bank as a lead bank of a district may depend on factors which are correlated with credit delivery but unrelated to Lead Bank Scheme. To address this concern, I check for the following conditions.

### 4.3.1 Test for Resource-based view of the Firm

Appointment of a nationalized bank as a lead bank of a district depends on the physical presence of the nationalized bank as a Given its higher presence, a bank may want to build up on its strength and open more branches. Further, if a bank head quarter decides to open more branches in aligned districts, then this may imply more outlets for credit disbursement. Thus, the above results may then be driven by a resource based view of firm (Wernerfelt (1984)), rather than a transaction costs approach (Williamson (1981)).

[3]The implicit assumption in this reasoning is Permanent Income Hypothesis.

To test this hypothesis, I obtain data on quarterly opening of commercial bank branches for each district in India from 2003 quarter 4 to 2016 quarter 3. I use the following model:

$$I\{BankBranch\}_{dslcyq} = \beta \mathbb{1}\{Align\} + \phi_d + \phi_s + \phi_l + \phi_c + \phi_{qy} + \epsilon_{dslcyq}$$

where, $I\{BankBranch\}_{dslcyq}$ takes value 1 if lead bank $l$ opens a branch in its district $d$ in state $s$ in quarter-year $qy$.

Table 8 shows the result. The coefficient on $\mathbb{1}\{Align\}$ is -0.011 with a standard deviation of 0.014. Thus, there is no evidence of additional resource allocation to aligned districts.

# 5 Conclusion

In this paper, I show that in India's oldest financial inclusion program, organizational transactions cost lead to distortion in credit disbursement across districts. Particularly, in districts where local agency and state-level entities are the same, credit disbursement is 2.7% higher controlling for temporal variations, demand-side and supply-side factors. However, deposit flows after positive income shocks are invariant across aligned and non-aligned districts. This could be due to two major reasons. First, financial literacy in its current form does not have or has marginal impact on financial inclusion. Evidence for this has been recorded in Miller et al. (2014) and Fernandes et al. (2014). Alternatively, it is possible that in its current set-up, Lead Bank Scheme emphasizes credit disbursal over deposit flow. Both these issues are subjects for further research.

The bigger takeaway from the paper is that inter-firm and intra-firm behaviour may affect welfare services as well. The role of firms in various welfare schemes in India is vast but has remain understudied. For example, *Pradhan Mantri Fasal Bima Yojana* involves participation of private sector insurers for crop insurance. Similarly, *UDAN* scheme seeks initiatives from private sector airlines to increase regional connectivity. The implications of various organizational economics, industrial organization and personnel economics may allow a fresher perspective to design these policies.

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# 6 Figure

Figure 1: Organization Chart for State Level Bankers' Committee

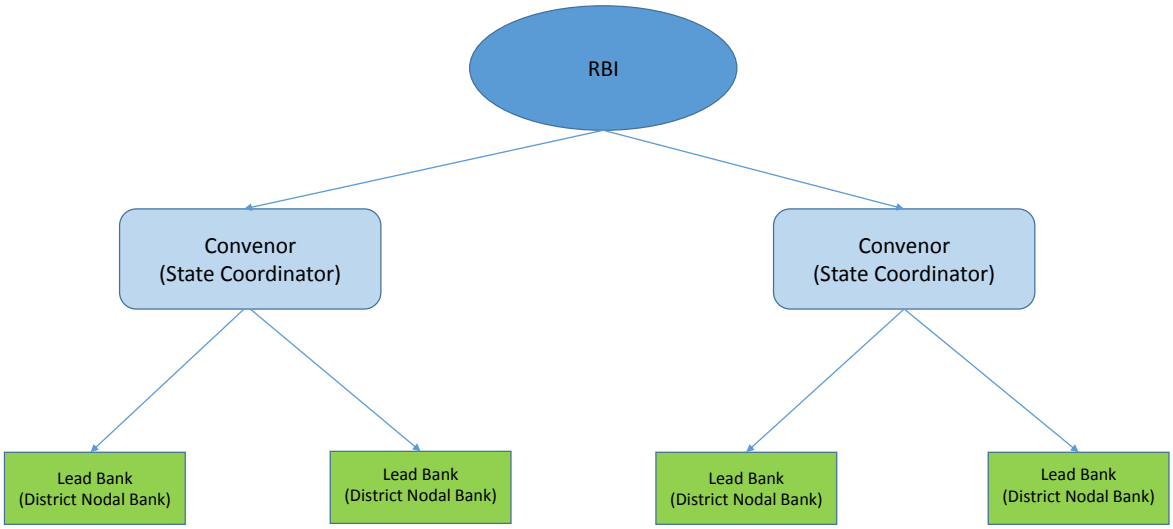


Figure shows the organization chart of State Level Bankers' Committee in the Lead Bank Scheme. Each district is assigned a nodal bank to monitor the activities of credit delivery and financial inclusion. Each state is assigned a Convenor to coordinate the efforts of the Lead Bank. The entire set-up is under the supervision of Reserve Bank of India, the regulator of banking sector.

Figure 2: Activities of Lead Banks

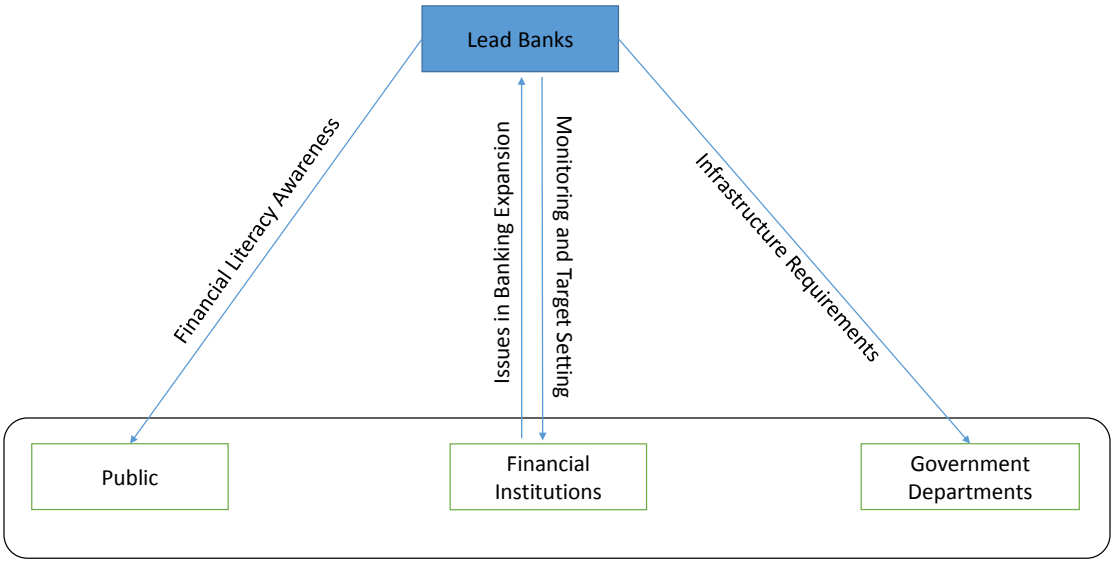

Figure 3: Organization Chart for Nationalized Banks in India

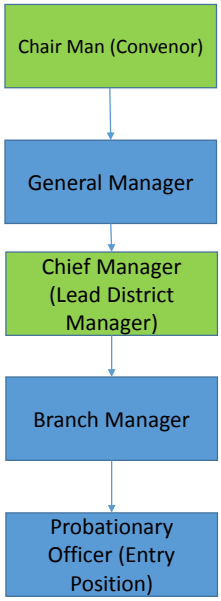


Figure shows the organization chart of a typical nationalized bank in India. Probationary Officer is the entry level position in the firm. Employees work up the ladder. Chief Manager, which is in-charge of Lead Bank activities, is reached after 6-7 years.

# 7 Table

Table 2: Summary Statistics

Panel A: Aligned Districts

| | Mean | Standard Deviation | Minimum | Median | Maximum | Observations |
|---|---|---|---|---|---|---|
| Credit | 42839.621 | 348530.547 | 0.000 | 6478.500 | 9705966.000 | 13140 |
| Deposit | 62069.475 | 391126.703 | 2.000 | 14195.000 | 9930473.000 | 13140 |
| Term Deposit | 59309.232 | 171636.380 | 1.045 | 13271.978 | 1845992.951 | 5008 |
| Saving Deposit | 29383.235 | 52092.376 | 1.380 | 15362.625 | 574588.898 | 5008 |
| Current Deposit | 7536.129 | 24120.818 | 0.000 | 1963.989 | 325017.506 | 5008 |
| Rural Density | 0.743 | 0.197 | 0.000 | 0.802 | 1.000 | 12350 |

Panel B: Non-Aligned Districts

| | Mean | Standard Deviation | Minimum | Median | Maximum | Observations |
|---|---|---|---|---|---|---|
| Credit | 69461.302 | 453393.554 | 13.000 | 9964.000 | 12082970.000 | 18361 |
| Deposit | 89239.086 | 457888.058 | 35.000 | 20634.000 | 11148226.000 | 18361 |
| Term Deposit | 96416.925 | 594306.617 | 5.263 | 13123.704 | 9258378.115 | 6441 |
| Saving Deposit | 33062.062 | 92427.123 | 9.211 | 14732.673 | 1571518.776 | 6441 |
| Current Deposit | 11991.608 | 75351.910 | 0.000 | 2060.927 | 1532658.657 | 6441 |
| Rural Density | 0.745 | 0.197 | 0.000 | 0.802 | 1.000 | 18170 |

Credit and Deposit are at the district-quarter-year level from 2003:Q4 to 2016:Q1. Term deposits, saving deposits and current deposits are at the district-quarter-year-level from 2011 to 2016. Rural density is the share of population living in rural areas as per Census 2011.

Table 3: Decomposing Variation in Log of Credit

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Quarter-Year Fixed Effects | Yes | No | No | No | No |
| Lead Bank Fixed Effects | Yes | Yes | No | No | No |
| Convenor Bank Fixed Effects | Yes | Yes | Yes | No | No |
| State Fixed Effects | Yes | Yes | Yes | Yes | No |
| District Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Observations | 31499 | 30960 | 30960 | 30960 | 30960 |
| $R^2$ | 0.105 | 0.351 | 0.521 | 0.638 | 0.991 |
| Adjusted $R^2$ | 0.104 | 0.350 | 0.519 | 0.636 | 0.991 |

Table 4: Decomposing Variation in Log of Deposit

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Quarter-Year Fixed Effects | Yes | No | No | No | No |
| Lead Bank Fixed Effects | Yes | Yes | No | No | No |
| Convenor Bank Fixed Effects | Yes | Yes | Yes | No | No |
| State Fixed Effects | Yes | Yes | Yes | Yes | No |
| District Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Observations | 31501 | 30960 | 30960 | 30960 | 30960 |
| $R^2$ | 0.115 | 0.324 | 0.449 | 0.590 | 0.993 |
| Adjusted $R^2$ | 0.114 | 0.323 | 0.447 | 0.589 | 0.993 |

Table 5: Log of Credit

| | (1) | (2) |
|---|---|---|
| $\mathbb{1}\{align\}$ | 0.028*** | 0.086*** |
| | (0.005) | (0.011) |
| Observations | 30960 | 1681 |

Both specifications control for quarter-year, district, state, lead bank and convenor bank fixed effects. Following Abadie et al. (2017), I cluster my standard errors at district level.

Table 6: Quarterly Variation in Log of Credit

| | (1) | (2) |
|---|---|---|
| $\mathbb{1}\{align\}$ | 0.026*** | 0.025*** |
| | (0.005) | (0.005) |
| Q4 | 0.134*** | |
| | (0.002) | |
| $\mathbb{1}\{align\} * Q4$ | -0.006** | |
| | (0.003) | |
| Q2 | | 0.045*** |
| | | (0.0011) |
| Q3 | | 0.097*** |
| | | (0.0012) |
| Q4 | | 0.18*** |
| | | (0.0011) |
| Observations | 30960 | 30960 |

District, State, Lead Bank and Convenor Bank fixed effects are provided in each specification. Following Abadie et al. (2017), I cluster the standard errors at the district level.

Table 7: Change in Log Deposit After Positive Income Shock

| Dpdt. var.: Change in log(*deposits*) | |
|---|---|
| | (1) |
| $\mathbb{1}\{Align\}$ | 0.014 |
| | (0.009) |
| $\mathbb{1}\{Normal\}$ | 0.002 |
| | (0.006) |
| $\mathbb{1}\{Excessive\}$ | -0.001 |
| | (0.006) |
| $\mathbb{1}\{Align\}$*$\mathbb{1}\{Normal\}$ | 0.004 |
| | (0.007) |
| $\mathbb{1}\{Align\}$*$\mathbb{1}\{Excessive\}$ | 0.003 |
| | (0.008) |
| Observations | 2510 |

The dependent variable is the change in log of deposit from quarter to quarter 3 from years 2012 to 2016. District, State, Lead Bank and Convenor Bank fixed effects are provided in each specification. Following Abadie et al. (2017), I cluster the standard errors at the district level.

Table 8: Opening of Bank Branches

| | $I\{BankBranch\}$ |
|---|---|
| $\mathbb{1}\{Align\}$ | -0.011 |
| | (0.014) |
| Observations | 30960 |

Dependent variable is an indicator which takes value 1 when a lead bank opens a branch and 0 otherwise. Quarter-Year, District, State, Lead Bank and Convenor Bank fixed effects are provided in each specification. Following Abadie et al. (2017), I cluster the standard errors at the district level.