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CAREER CONCERNS AND DISTORTION IN CREDIT UPTAKE: EVIDENCE FROM INDIA'S LEAD BANK SCHEME

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Career Concerns and Distortion in Credit Uptake: Evidence from India's Lead Bank Scheme

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Abstract

In the Lead Bank Scheme of India, a public sector bank, known as the Lead Bank of the district, reduces bottlenecks in financial service delivery. Another public sector bank, known as the Convenor Bank of the state, monitors the effort of Lead Banks across districts within a state. Given this organizational design, for some districts, defined as **aligned** districts, Lead and Convenor banks fall within the boundary of the same firm. I find that in aligned districts credit uptake is higher by 21%, consistent with higher effort by Lead Bank personnel owing to lower monitoring costs (Williamson, 1981) and higher career concerns (Holmstrom and Roberts, 1998) within a firm. I conduct two tests to identify the impact of alignment within a district on financial inclusion outcomes. First, using a plausibly exogenous (to district characteristics) change in alignment status of a district, I find that credit increases by nearly 28% when a district becomes aligned. Further, after an exogenous negative income shock of bad rainfall, saving withdrawals are lower in aligned districts, consistent with higher credit availability (Eswaran and Kotwal, 1990). The results show how organizational pressure within commercial banks in India may distort credit lending across districts.

JEL Codes : L22, D23, O25

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1 Introduction

The Lead Bank scheme of India plays a major role in the expansion of financial services at the district-level markets. Several papers have studied this scheme and its impact in financial inclusion and poverty alleviation (Shajahan, 1998; Burgess and Pande, 2005; Burgess et al., 2005; Ramesh, 2016). However, the organizational design features of the Lead Bank scheme may also be affecting its outcomes. Specifically, the scheme adopts an area-based approach where each district is assigned one of 26 Public Sector Banks (PSB)[1], defined as Lead Bank of the district, to reduce bottlenecks in financial services market. The Lead Bank does this through coordinating with all stakeholders involved in the market for financial services. In addition to the district-level agency, RBI assigns one of 26 PSBs to each state, defined as Convenor Bank of the state. The role of the Convenor Bank is to monitor the efforts of the Lead Banks in that state.

This organization structure creates variation across districts in the relationship between state- and district-level agents. Specifically, in some districts, defined as **aligned** districts, Convenor and Lead Banks fall within the boundary of the firm while for other districts, these two agencies fall outside. Using implications of transaction costs economics (Williamson, 1981; Holmstrom and Roberts, 1998), I predict that credit delivery should be higher in aligned districts. Intuition is simple. When Lead Bank and Convenor bank fall within the same corporate entity, monitoring costs are low and rewards for effort exertion are high. This may compel Lead Banks in aligned districts to perform better.

Using district-wise quarterly credit and deposit data from the third quarter of 2003 to fourth quarter of 2019, I show that credit disbursal in aligned district is 21.2% higher, using a Random Effects model. While this result is consistent with the above reasoning on higher effort in aligned districts, time-varying and time-invariant district characteristics can bias these effects. To identify the causal effect of alignment on financial inclusion outcomes, I conduct two tests. First, I exploit plausibly exogenous changes in alignment status of a district owing through various channels such as change in Convenor bank due to formation of a new state and mergers of banks. Exogenous change in alignment status of a district allows controlling for unobservable time-invariant district characteristics. Using a Fixed Effects model, I find that when alignment changes in this manner credit uptake increases by 28%. Second, I use scanty rainfall in a district as an exogenous negative income shock. While long term deposits in non-aligned districts go down by 25.4%, no such impact is seen on

[1] A Public Sector Bank in India can be considered as a wholly Government of India owned entity which gives it a sovereign guarantee.

savings of aligned districts. Thus, consistent with Eswaran and Kotwal (1990), higher credit availability in aligned districts prevent them from negative income shocks.

In addition to this, I conduct some diagnostics tests to show robustness of the results. First, I show that aligned and non-aligned are similar in observational economic characteristics, which may influence credit and deposit outcomes. Second, they are equally likely to receive a bank branch from their Lead Banks and are not significantly different from each other in the number of new branches opened in each quarter, ruling out allocation of alternative supply-side resources which may produce similar results but through a different channel. Finally, I show that change in alignment is uncorrelated with past trends in log credit, ruling out heterogeneity in time-varying characteristics between aligned and non-aligned districts.

The paper's primary contribution is toward the vast literature on policies in Indian banking sector and their outcomes. Previous studies of such policies have established their role in poverty alleviation (Shajahan, 1998; Dasgupta, 2002; Burgess and Pande, 2005; Burgess et al., 2005; Cole, 2009; Sarma and Pais, 2011; Ramesh, 2016; Kumar Panda et al., 2017; IMF, 2017; Young, 2019; Mandira and Jesim Pais, 2016; Kochar, 2018; Acharya and Kulkarni, 2019). Particularly, Burgess and Pande (2005) studies the nationalization of banks in 1969, which is the genesis of Lead Bank Scheme, to show that those areas which received a bank branch under the social banking initiative from 1969 onwards, have lower rates of poverty. Young (2019) studies another major policy reform in Indian banking sector in 2005, which eased restrictions on branch entry to show how new branch openings are correlated with improvement in district-level firm productivity and economic activities proxied by night lights. However, these papers do not investigate the organizational structure of the implementation of these schemes. In contrast, I analyse a previously unstudied feature—the relationship between district and state-level entities—to show that organization design of the schemes may also create spatial distortions.

The paper makes a contribution toward the vast empirical literature on organizational economics. Papers in this stream study the impact of different forms of governance and organization structures. Shelanski and Klein (1995), David and Han (2004) and Crook et al. (2012) survey the empirical evidence for this stream of papers. In India's context, however, the attention of this subject has remained limited to organization reforms in public administration. For instance, decentralization of governance to village-level agencies has found substantial attention (Bardhan and Mookherjee, 2004, 2006; Véron et al., 2006; Widmalm, 2005, 2008). However, in India, commercial entities are engaged in many services of public interest. These include delegation of tasks to fertilizer companies, airlines, oil & petroleum giants in many flagship programs. The results of the paper demonstrate that intra- and inter-

firm transactions costs may create a distorting effect on the outcome of these development programs. A dedicated investigation is required to discover the scope of these distortions in other areas.

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 and 7 provides some diagnostics for robustness checks. Section 8 concludes.

2 Institutional Background

RBI introduced the Lead Bank Scheme (LBS) in 1969 with the purpose of expanding financial services in overlooked regions of the country. Gadgil (1969) observed wide geographic disparity in banking services across different regions in the country, particularly in credit availability. To overcome that, Gadgil (1969) recommended a Service Area Approach, which was adopted by RBI. Under this approach, each under-banked district was assigned a commercial bank to expand financial service delivery, and coordinate with other agents to overcome them. Soon after, the scheme was introduced to all districts.

In 1977, each state was assigned a commercial bank to monitor the efforts of Lead Banks in its district on a regular basis. Convenor Bank of a state and all the Lead Banks of the district collectively form the State Level Bankers' Committee (SLBC) Figure 1 provides the organization chart for an SLBC.

2.1 Activities of Lead Banks

Ever since 1969, Lead Banks are responsible for expanding financial and banking services in under-banked and un-banked areas. Initially, the main task for Lead Banks was to increase physical presence of bank branches in districts where banking service was limited. This was done through assigning mandatory quotas of opening of new bank branches in each district (Burgess and Pande, 2005). In 1990, this role of Lead Bank scheme was withdrawn.

Under its current role, the scheme envisages the Lead Banks to reduce bottlenecks in delivery of financial services in wide-ranging areas, and expand financial inclusion. This broad objective is achieved through coordination with various entities involved in the market for financial services. 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**: The Lead Banks extensively coordinate with other financial institutions present in the sub-district territories to understand the scope of targeting credit delivery toward certain sections. In this role, the Lead Bank serves as the focal point for other banking and non-banking financial institutions to understand the gaps in financial services. For example, in February 2020, Lead Banks in Bihar had formed various sub-committees on increasing lending to agriculture, allied agriculture, increasing digital payments, and targeting small-scale industry (Bihar, 2020)[2]. Frequently, Lead Banks undertake pilot surveys to assess the gaps and hurdles faced in expanding financial services.

- **Interaction with Government**: The Lead Banks interact closely with high ranking government officials, through various fora such as the District Consultative Committee. In this, and other fora, Lead Banks inform government agents regarding the institutional and infrastructural bottlenecks faced by banks. For example, in meetings held in November 2019, Lead Banks of Madhya Pradesh raised concerns regarding bureaucratic hurdles from municipal corporations in the state toward credit-linked housing schemes for economically weaker sections of the society (Page 7, MP (2019)). To address these issues, the Urban Administration Development Department was nominated by the Government of Madhya Pradesh. Government officers also inform the banking entities regarding new credit assistance schemes. The banks and other financial institutions then act as information intermediaries bridging the gap between supply of government services and demand from public.

- **Public Awareness and Financial Literacy**: Lead Banks conduct extensive public outreach programs in their assigned areas. For example, Lead Banks in Odisha organized credit *melas* in 6 districts from October 3rd to October 2019 (Odisha, 2019), where bank employees conducted programs on financial literacy. Further, many of these camps are targetted for under-covered or uncovered sections of the societies such as farmers, women, and senior citizens.

- **Meeting Priority Sector Lending**: National Bank of Agriculture and Rural Development (NABARD) designs annual credit plan for each district[3]. In these plans, certain priority sectors such as agriculture, MSMEs, education etc. of all districts are

[2]SLBC of each state publishes its agenda and minutes of quarterly meetings online. These can be accessed from the website of their respective SLBCs.

[3]As per RBI's regulations, 40% of each bank's Adjusted Net Bank Credit is reserved for priority sectors. As per the ANBC available each bank, NABARD then sets a productivity-linked plan for each district, which is to be met by the branches of each bank in that district.

targetted for credit delivery. Lead Banks are responsible for monitoring the progress of annual credit plan, and report underachievement to banks.

Currently, around 25 public sector banks and 1 private sector bank act as Lead Banks for India's 641 districts.

2.2 Activities of Convenor Banks

Convenor Banks monitor the performance of Lead Banks of state 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. Various issues are brought up in these meetings such as financial inclusion, credit-deposit ratio of states, scaling up financial literacy efforts, expansion of bank branches etc. Different sub-committees of the district use this opportunity to share the challenges faced while discharging their duties.

Currently, around 16 public sector banks and 1 private sector bank act as Convenor Banks for India's 36 states/UTs.

2.3 Incentives for Lead Banks and Convenor Banks

Lead Banks conduct their operations through a district-level branch which is headed by a Chief Manager-level officer. This employee is a dedicated personnel engaged specifically for Lead Bank scheme activities[4]. I will use Lead Bank personnel, Lead Bank manager or Lead Banker inter-changeably to refer to this Chief Manager-level. There are three main reasons why career concerns are an important issue for Lead Bank personnel.

First, most public sector banks in India have only one port of entry, observe low exit or attrition rate and exhibit rare or almost non-existent lateral entries (Bhatt, 2012). Lead Bank managers are mid-to-high level employees who have climbed up the organization ladder for 6-7 years. For such a cadre of employees in an organizational environment separation probability from the firm is low, career progression occurs mostly through promotion within the same organization (Doeringer et al., 1972; Friedrich, 2015).

Second, promotions and rewards for mid-to-high level of employees in public sector banks are determined by a combination of merit and tenure. Specifically, in most public sector

[4]See Figure 3 for an organization ladder for a public sector bank in India.

banks, each employee is assigned an Annual Performance Appraisal Report (APAR) which evaluates the employee on various performance metrics[5]. The final score on these APARs and recommendations by immediate seniors determine promotion decision and plays a crucial role in career progression (Chowdary et al., 2013; Singh and Priyanka, 2016). Further, merit is given higher priority in promotions as the employee moves up the career ladder.

Finally, monetary incentives have become increasingly associated with performance in public-sector banks. Performance-based bonuses and incentive pay are common at senior-level hierarchies of public sector banks. Khandelwal Committee Report (Khandelwal, 2010) recommended that employees at Chief Manager-level can receive upto 40% of the compensation through rewards, and 25% of all bonuses and incentives should be reserved for departments engaged in financial inclusion activity.

Thus, single port of entry, performance appraisal system and merit-based rewards for mid-to-senior employees collectively make career concerns and performance in front of higher executives an important incentive for Lead Bank managers.

The role of Convenor Banks is to supervise the Lead Banks in the SLBC quarterly meetings. As per RBI's guidelines, the Convenor Banks 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 RBI of the chairman of Convenor Bank acts as an implicit incentive mechanism for the chairman of Convenor Banks. Thus, while Lead Bank personnel are motivated by career concerns, Convenor Bank representatives are guided by the supervision of regulator, RBI.

There are three key difference between the incentives for Lead and Convenor Bank personnel toward conducting Lead Bank scheme activities. First, the aligned Lead Bank manager reports directly to the chairman of her own bank once every quarter, but the non-aligned Lead Bank manager does not. On the other hand, incentives for Convenor banks are uniform across states and banks. Secondly, Lead Bank personnel are dedicated employees managing Lead Bank scheme responsibilities. In contrast, Convenor Bank chairman are engaged in a multi-tasking environment with responsibilities other than Lead Bank scheme. As chairman (or CEO-equivalent) of the bank, they are responsible for overall management and governance of the commercial entities which includes holistic profit-driven outcomes, and not only the development program at hand.

[5]See Circular Number F.No.9/5/2009 and F.No.4/11/1/2011-IR, Department of Financial Services, Ministry of Finance, GoI and Human Resource Management Division Circular No. 355, Punjab National Bank

2.4 Appointment of Lead Banks and Convenor Banks

Lead Banks are appointed by RBI on the basis of physical and functional presence of the bank in that district. Specifically, RBI has adopted the following criteria in choosing a bank as a Lead Bank of a given district (Ban, 1972).

- Number of branches of the bank—The bank which has higher number of branches in the district receives priority in being appointed as Lead Bank of the district.
- Resources of the bank in the district—For resources, assets and liabilities are taken into account while selecting a Lead Bank for a district.
- Contiguity of districts with the same Lead Bank—RBI ensures neighbouring districts receive same Lead Bank to the extent possible.

For selecting a Convenor Bank, RBI considers the regional orientation of the bank. For example, when the state of Telangana was formed out of Andhra Pradesh in 2014, its convenorship was allotted to State Bank of Hyderabad, whereas Andhra Bank was retained as the Convenor Bank of Andhra Pradesh. Map of districts and state tagged by their Lead and Convenor Bank, respectively, can be found here.

Thus, Lead and Convenor Bank appointment is not driven by district-level demand factors but mostly by supply-side capabilities of the bank. Further, once appointed, a Lead Bank in a district does not change. Hence, for most districts, alignment status to a large extent is determined much before the period of the study. In Section 7, I show that aligned and non-aligned districts are not significantly different in observable supply-side factors.

Aligned Districts: I define a district as aligned if the Lead Bank of that district and Convenor Bank of the state fall within the same corporate entity. Around 44% of the districts in India are aligned. Figure 4 shows the map of districts in India tagged by their status of alignment. Aligned districts are not concentrated specifically in one region, suggesting any effect of alignment are not likely to be driven by only regional/geographic variation.

2.4.1 Change in Alignment

As mentioned above, Lead Bank of a district does not change. However, alignment of a district does change due to the following reasons:

- Formation of a New State—When a new state is formed, the Convenor of the new state may be different from the Convenor of the mother state. In such cases, the alignment

status of districts in new state may change. For the period of this study, Telangana was carved out of Andhra Pradesh. While Andhra Bank was Convenor of Andhra Pradesh, for Telangana, convenorship was allotted to State Bank of Hyderabad. Consequently, 8 districts in Telangana observed a change in alignment status.

- Change in Convenorship of a State—RBI also changed convenorship for Manipur in 2004 Q4 from Union Bank of India to State Bank of India. Similarly, Jharkhand's Convenor was changed from Allahabad Bank in 2016-17:Q4 to Bank of India. As a consequence, 17 districts in Jharkhand and 8 districts in Manipur observed a change in alignment.

- Bank Mergers—Alignment may also change if some banks merge. For example, for the period of our study, State Bank of India (SBI) was merged with six other banks. All those districts where the Lead Bank was one of the six junior banks, but the Convenor was SBI and vice versa exhibited a change in alignment. This merger led to a change in alignment for 4 districts in Andhra Pradesh.

Thus, alignment changes for 37 districts. These changes in alignment are not driven by local, district level factors. Rather, changes in Convenor is determined by state-level factors. Further, mergers of public sector banks in India are guided by the need to create internationally competitive banks with substantially high lending capacity for industrial needs (Gandhi, 2016). Lead Bank Scheme, on the other hand, pertains to local lending for much smaller needs.

3 Model

In this section, I formalize the incentive differential across aligned and non-aligned districts. Consider the following game:

- Players: There are 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 conducting tasks. 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 on exerting effort when Convenor monitors and notices the effort. This can be considered as the reward 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 if 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. Monitoring by Convenor Bank requires allocating time for supervising the effort. Thus, there are implicit opportunity costs in monitoring, which is modelled as c_M. b_{NM} is the benefit received when the Lead Bank exerts effort but Convenor Bank does not monitor.
- 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.
- δ 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,

α and β are given by:

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

and

$$\beta = \frac{C_E - \delta C_{NE}}{V + (1 - \delta) C_{NE} + V}$$

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.

4 Summary Statistics

I collect quarterly credit disbursement by all commercial banks made in each district from fourth quarter of 2003 to first quarter of 2018[6]. The data is publicly available from Reserve

[6] Click here for data.

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[7].

Panel A and B of Table 2 provides the summary statistics for quarterly credit and deposits for aligned and non-aligned districts. In addition to aggregate deposits, break-up of deposits in long-term, short-term and saving deposits is available quarterly from 2012 to 2016. 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.

In Table 3, I decompose log of credit in each district on various dummy indicators. In column 1, I add year-quarter dummy indicators only. Adjusted R^2 is 0.144. Thus, temporal variation and business cycles account for only 10% of variation in log of credit availability. In column 2, I add Lead Bank dummies. Now, adjusted R^2 rises to 0.219. Thus, the agency appointed to reduce bottlenecks in financial markets in a district explains a significantly higher variation in district level credit compared to temporal shocks. In column 3, I add Convenor Bank dummies. These can be considered as state-level supply side factors. The adjusted R^2 in column 5 increases to 0.324. Finally, I add state dummies in column 4 and district dummies in column 5, respectively. Adjusted R^2 rises to 0.831 on adding district level dummies—unobservable district factors explain a significant amount of variation in log of credit.

Table 4 repeats the same analysis for log of deposits. Year-quarter dummies explain 16.3% of variation in deposit at the district level (Column 1). Lead and Convenor Bank dummies respectively explain 18% and 23% of variation in log of deposit at the district level. On adding district level dummies in column (5), adjusted R^2 increases to 0.814. Various factors, thus, have similar explanatory power for district-level deposits as they had for explaining district-level credit in Table 3.

As discussed in Section 2, appointment of Lead and Convenor Bank is not guided by demand-side characteristics of the districts. To test this, I observe whether aligned and non-aligned districts vary in observable demand-side factors. Several papers explore demand-side factors for financial services (Binswanger et al., 1993; Tang and Guam, 2010; Raj and Das, 2020). In particular, Raj and Das (2020) suggests household income levels and industrial activities as potential determinants of demands for financial services. In Table 5, I regress metrics of demand for financial services on indicator of alignment. In column (1), I regress log of average

[7] Click here for more information on Lead Banks and Convenor banks.

size of an enterprise in a district on the indicator of alignment. The coefficient is -0.087 with a standard error of 0.059; the average size of an enterprise is not significantly different across the two types of districts. In column (2), I regress share of agricultural activity on indicator of alignment. The coefficient is -0.001 indicating the nature of economic activity is not dissimilar between the two types of districts. Column (3) shows that aligned and non-aligned districts do not have significantly different number of MSMEs, whereas Column (4) suggests the log of GVA of MSMEs in 2006-07 is similar across the two types of districts. Finally, in column (3), I use share of rural population in a district as a measure of urbanization, and thus, demand for credit. One cannot reject insignificant difference between urbanization of the two types of districts. Thus, across these observable demand-side factors for financial services, aligned and non-aligned districts are not significantly different, consistent with appointment criteria for Lead and Convenor banks.

Thus, aligned and non-aligned districts do not differ from each other in several observable demand-side factors for financial services. Tables 3 and 4 show Lead and Convenor Bank explain substantial variation in credit and deposit at the district level. In the next section, I explore whether alignment can explain variation in financial inclusion outcomes.

5 Credit Disbursement in Aligned and Non-Aligned Districts

In this section, I explore the difference in credit uptake across all aligned and non-aligned districts. Table 6 provides the results of a Random Effects model. The coefficient on indicator for alignment in column (1) is 0.212 with a standard error of 0.035. Under the assumption of alignment being uncorrelated with unobservable district characteristics, the aligned districts have nearly 21% higher credit uptake. To address serial correlation under random effects assumption (Wooldridge, 2013), I cluster standard errors around districts. The standard error now is 0.122. Thus, while the standard error increases, indicating serial correlation, the effect remains significant at 10% confidence internal level.

5.1 Identification Strategy

Models in Table 6 provide unbiased effect of alignment only if unobservable district-level characteristics and status of alignment are uncorrelated. As explained in Section 2, appointment of a Lead Bank to a district is orthogonal to district-level demand characteristics for

financial services. However, Lead Banks are appointed to a district on the basis of supply-side capabilities of the banks. Additionally, Convenors are appointed on the basis of regional orientation of the bank in the state. Thus, such supply-side factors can affect credit disbursement. Moreover, using a Random Effects model, one cannot rule out unobservable demand-side factors which are correlated with alignment status. Therefore, to identify the effect of alignment on a district, I exploit the change in alignment of 37 districts in the period of the study. Specifically, observing within-district change in alignment allows for controlling unobservable time-invariant district-characteristics, such as supply-side capacity of the Lead Bank.

I explore the effect of alignment on those 37 districts where alignment status changes. Table 7 provides the results. Column (1) shows the results from a Random Effects model. The coefficient on alignment indicator is 0.29 with a standard error of 0.036. However, as discussed above, the underlying assumption of RE model is the absence of correlation between unobservable district characteristics and alignment status. To control for unobservable time-invariant district-level factors, I use the Fixed Effects model in column (2). The coefficient on alignment indicator in column (2) is 0.28 with a standard error of 0.036. Thus, after holding constant the unobservable time-invariant district characteristics, alignment between Lead and Convenor Bank increases credit uptake by 28%. Hausman test on results in columns (1) and (2) does not reject the difference in the RE and FE estimates. As Hausman (1978) notes, failure to reject the two estimates indicates orthogonality between unobservable district-level factors and variable of interest, which is alignment status.

Column (3) repeats the analysis in column (2) but with standard errors robust to heteroscedasticity. Now, the standard error increases to 0.13. The effect of change in alignment remains significant at 5% confidence interval level. The standard errors in column (3) are unlikely to be asymptotically consistent due to serial correlation of errors within a district. With only 38 districts observed over 60 quarters, merely clustering the standard errors may not suffice (Angrist and Pischke, 2008; Wooldridge, 2013), . Thus, I use the remedy suggested in Newey and West (1987) which provides a heteroscedasticity and auto-correlation robust standard errors correction. Column (4) shows the results. The standard error rises to 0.077. The coefficient on alignment indicator remains robust to this correction of the standard errors.

6 Deposits in Aligned and Non-Aligned Districts

Several papers have highlighted the advantages of higher credit uptake. For instance, short-term credit availability in aligned districts may prevent depletion of long-term savings during economic downturns (Eswaran and Kotwal, 1990).

6.1 Identification Strategy

To test this hypothesis, I observe the difference in long term savings deposits in aligned and non-aligned districts after a negative income shock. I use scanty monsoon in a district as a negative income shock event. Bad rainfall events have been used as proxies for economic downturns in many studies in India and other developing countries (Miguel et al., 2004; Yang and Choi, 2007; Fichera and Savage, 2015; Iyer and Topalova, 2014). Further, Indian agriculture and economy is heavily reliant on monsoons (Kaur et al., 2009; Saikia, 2011). Thus, inadequate monsoon rainfall in a district are an appropriate local negative income shock. Higher credit disbursement in aligned districts should ameliorate the impact on savings.

I obtain district-wise monsoon rainfall departure from 2012 to 2016. Since monsoon rainfalls occur in second quarter of the financial year, I regress the log of term deposits in quarter 3 on an indicator for scanty rainfall and alignment dummy along with various dummies[8][9]. Table 8 provides the results. In column (1,) I regress log of term deposits in quarter 3 of districts on a dummy which takes value 1 if the district received scanty monsoon. The coefficient is -0.167; districts which receive poor rainfall observe a 16% lower deposit in long term savings account compared to districts with normal rainfall. I disaggregate the sample into aligned and non-aligned districts in column (2)and column (3), respectively. The coefficient on income shock dummy in aligned district (column (2)) is -0.043; income shock does not significantly affect the savings in aligned districts. On the other hand, non-aligned districts observe a 25.4% decline in long term savings after a negative income shock compared to other non-aligned districts with no good rainfall. Thus, following economic downturns, savings in non-aligned districts suffer whereas aligned districts do not exhibit such a phenomenon; higher credit provision protects households from negative income shocks.

Empirical models in column (2) and column (3) estimate the impact of a negative income

[8]Indian Meteorological Department classifies monsoon rainfall as *Scanty* if the seasonal rainfall was less than 20% of the long-term average.

[9]Term deposits are long term interest-bearing savings account offered by most major banks in India.

shock in aligned and non-aligned districts, separately. To explore the differential impact of income shock across aligned and non-aligned districts, I use the following specification

$$\log y_{dt} = \gamma \mathbb{1}\{Scanty\}_{dt} + \beta \mathbb{1}\{align\}_{d} + \theta \mathbb{1}\{align\} * \mathbb{1}\{Scanty\}_{dt} + \Sigma\phi + \epsilon_{dt} \qquad (1)$$

where, $\log y_{dt}$ is log of Q3 term deposits in district d in year t $\mathbb{1}\{Scanty\}$ is a dummy which takes value 1 if district d in year t received a scanty monsoon. The impact of a scanty monsoon on savings in non-aligned district will be given by γ. For aligned districts, the effect is $\gamma + \beta + \theta$.

Column (4) provides the results. Now, the coefficient on income shock is -0.303 with a standard error of 0.108. Consistent with results in column (3), a negative income shock dents the long term savings for non-aligned districts. The F-statistics on $\gamma + \beta + \theta$ is $F(1, 618) = 0.01$ with a p-value of 0.9031. Thus, an income shock has nearly no impact on savings of households in aligned districts.

In the above models, I do not control for district dummies since alignment status does not change for the time period for which district-wise monsoon rainfall data are available. However, estimates could be biased if monsoon rainfall and alignment status are correlated. For example, aligned districts may be geographically located in areas which receive less monsoon rainfall historically. Thus, households in such areas may be better prepared for such negative income shocks. To address this concern, I run a t-test of district-wise monsoon departures on the indicator for alignment, where monsoon departure is defined as the percentage of rainfall deviation from long-term average. Table 9 shows the results. The difference in the mean of monsoon departures in aligned and non-aligned districts was 0.003 with a standard error of 0.012; the null hypothesis of similar monsoon departures between aligned and non-aligned districts cannot be rejected. In Table 10, I regress district-wise monsoon rainfall departure on the indicator for alignment along with state and year dummies. The coefficients on alignment indicator is -0.017 with a standard error of 0.013. Thus, alignment status of a district is not correlated with monsoon rainfall in that district.

Discussion of the results

In districts where Lead and Convenor bank fall within the same boundary of the firm (aligned district), credit uptake is 21% higher on using a Random Effects model. The criteria used by RBI to appoint a Lead Bank to a district, and thus, determining alignment, does not depend on district-level demand for financial services but on supply capabilities of the bank. To account for the unobservable district-level factors which may be correlated with alignment

status, I use the sample of districts which observe a plausibly exogenous change in alignment. Using a Fixed Effects model for these districts, I show that credit uptake rises by 28%. Thus, time-invariant district-level factors do not explain the difference between aligned and non-aligned status. Interestingly, Hausman test does not reject the difference in the RE and FE estimates for this sample of districts. This indicates support for the assumptions under RE model; viz. orthogonality between unobservable demand characteristics and alignment status.

As explained above, the Lead Bank plays a multi-faceted role of expanding financial services. This includes reducing infrastructural or institutional bottlenecks and market failures in its assigned district. Further, Convenor Bank have a monitoring role in the scheme and do not have discretion over budgetary support to different Lead Banks. Hence, the higher uptake in credit can be attributed to higher effort of Lead Bank personnel, driven by incentives of being monitored by her immediate boss.

Higher credit availability is associated with several forms of economic benefits (Aghion and Bolton, 1997). One such benefit is the prevention of long-term savings during economic downturns as argued in Eswaran and Kotwal (1990). Using a scanty monsoon as a negative income shock, I show that savings of aligned districts remain invariant after scanty monsoons, but the term deposits in non-aligned districts fall.

Higher credit availability has other advantages in developing countries. These advantages include diversification of occupation choice (Banerjee and Newman, 1993) and higher production for credit constrained firms (Banerjee and Duflo, 2013). At the same time, higher credit may also lead to higher risk-taking behaviour or create Non-Performing Assets, risking stabilization of financial markets. Isolating the overall benefits against costs of alignment indicator is beyond the scope of this study. I leave that for future exploration.

7 Robustness Checks

The model posits that lower intra-firm monitoring costs compel Lead Bank personnel to exert more effort driving higher credit uptake. In this section, I provide additional robustness checks to rule out alternative channels which may drive differences in aligned and non-aligned districts.

7.1 Time Trends for Districts which change Alignment

Using a FE model for the sample of districts which undergo change in alignment allows controlling for time-invariant characteristics. What if time-varying factors induced a change in alignment? For instance, a declining trend in credit uptake in Manipur and Jharkhand may compel RBI to change Convenor Banks of these states. In such a case, alignment may be correlated with time-varying factors of the districts.

To test this hypothesis, I compare the trends in credit uptake of these districts which observe a change in alignment (Treated) against trends of neighbouring districts where alignment remains unchanged (Control). Figure 5 plots the trends of log of credit in Treated and Control groups before alignment change. The figure shows that the *pre-treated* trends are nearly parallel. This indicates absence of time-trends influencing change in alignment for districts.

7.2 Entry of New Bank Branches

Appointment of a bank as a Lead or Convenor depends on its presence in the district and state, respectively. Conventionally, the Lead Bank Scheme was envisaged to increase presence of bricks-and-mortar branches in the districts. A bank headquarter may decide to build on this legacy of market presence. If a bank head quarter decides to open more branches in aligned districts, then this may imply more outlets for credit disbursement. If so, the above results may then be driven by a resource-based view of firm (Wernerfelt, 1984), rather than a transaction costs approach (Williamson, 1981).

I conduct two tests to address this hypothesis. First, I regress number of new commercial bank branches opened each quarter from 2003:Q4 to 2016:Q3 on indicator for alignment. Column (1) of Table 11 provides the results. The coefficient on alignment is -0.163 with a standard error of 0.168; aligned districts are not more likely to receive new branches. Second, I regress an indicator which takes value 1 if the Lead Bank opens a branch in its assigned districts on indicator for alignment. Column (2) shows that the coefficient on alignment indicator is -0.017 with a standard error of 0.008. Thus, aligned districts are not more likely to receive a bank branch from its assigned Lead Bank.

7.3 Annual Credit Plans

National Bank of Agriculture and Rural Development (NABARD) determines annual credit plans for each district which are linked to local productivity factors. These plans are a major component of credit supply in the district. In Table 12, I regress log of annual credit plan on alignment indicator, the coefficient is -0.084 with a standard error of 0.130. Thus, on this key supply-side metric of credit, these two types of districts are not dissimilar.

8 Conclusion

In this paper, I show that in India's oldest financial inclusion program, organizational transactions cost lead to variation in credit disbursement across districts. Particularly, a Random Effects model suggests that in districts where district-level and state-level entity in the financial inclusion program are within the the boundary of the corporate entity (aligned district), credit disbursement is 21% higher. To identify the effect of alignment independent of unobservable time-invariant district-level factors, I provide two tests. First, a plausibly exogenous change in alignment of a district increases credit lending within the district by 28%. Higher credit lending should imply lower impact on savings during negative income spells. To identify the effect on savings, I show that after an exogenous negative income shock of scanty monsoons, long term savings in non-aligned districts reduce by 25%. However, no such change in aligned districts is observed, which is consistent with higher credit availability.

The paper provides several inferences on organizational design of welfare service delivery in India. While corruption in public sector agencies for welfare services has been extensively studied, design of such institutions and consequent distortions remains understudied. In the current context, sub-regional agencies exert effort to follow certain targets set by the regulator, whereas the upper hierarchies have only a monitoring role. Despite such separation of powers, organizational connections between upper and lower levels seem to distort performance across lower level hierarchies. Many current welfare services such as crop insurance scheme*Pradhan Mantri Fasal Bima Yojana* and civil aviation scheme *UDAN* involve extensive participation of private corporate sector. The implications of theories in organizational economics, industrial organization and personnel economics may allow a fresher perspective on impact of these policies.

The paper explores spatial distortion of resources across districts due to the Lead Bank

Scheme. This scheme emphasises on credit allocation to priority sectors such as agriculture, education, housing, etc. An interesting extension of the paper may be in understanding misallocation of credit across different sectors within a district. To be precise, within-bank organizational pressures should compel Lead Bank personnel in aligned districts to devote not only more effort but more effort toward priority sector as opposed to other areas. I leave this exploration for future work.

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9 Figures

Figure 1: Organization Chart for State Level Bankers' Committee

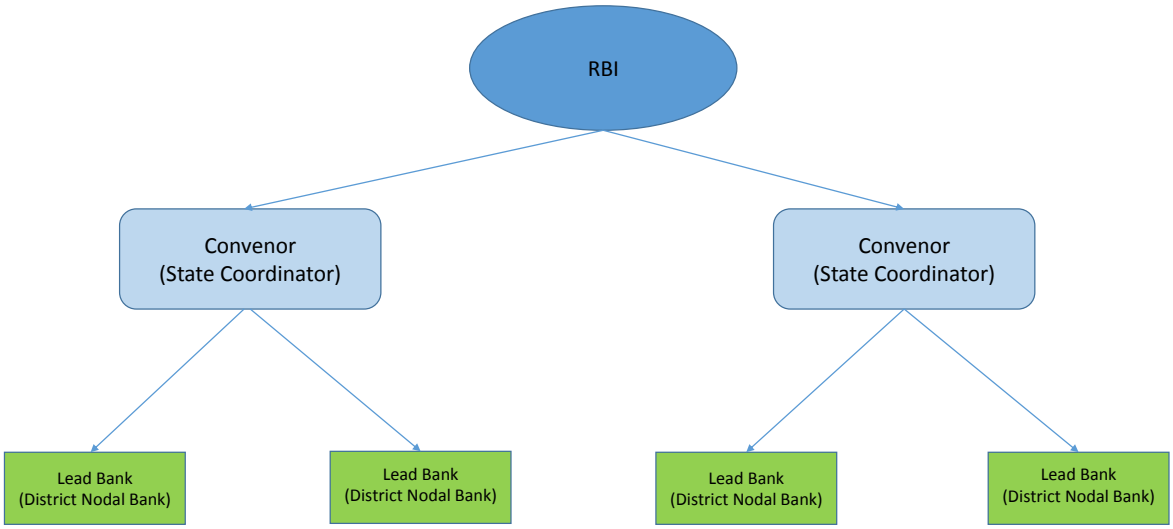


Figure shows the organization chart of State Level Bankers' Committee in the Lead Bank Scheme. Each district is assigned a nodal bank to monitor the activities of credit delivery and financial inclusion. Each state is assigned a Convenor to coordinate the efforts of the Lead Bank. The entire set-up is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

Figure 2: Activities of Lead Banks

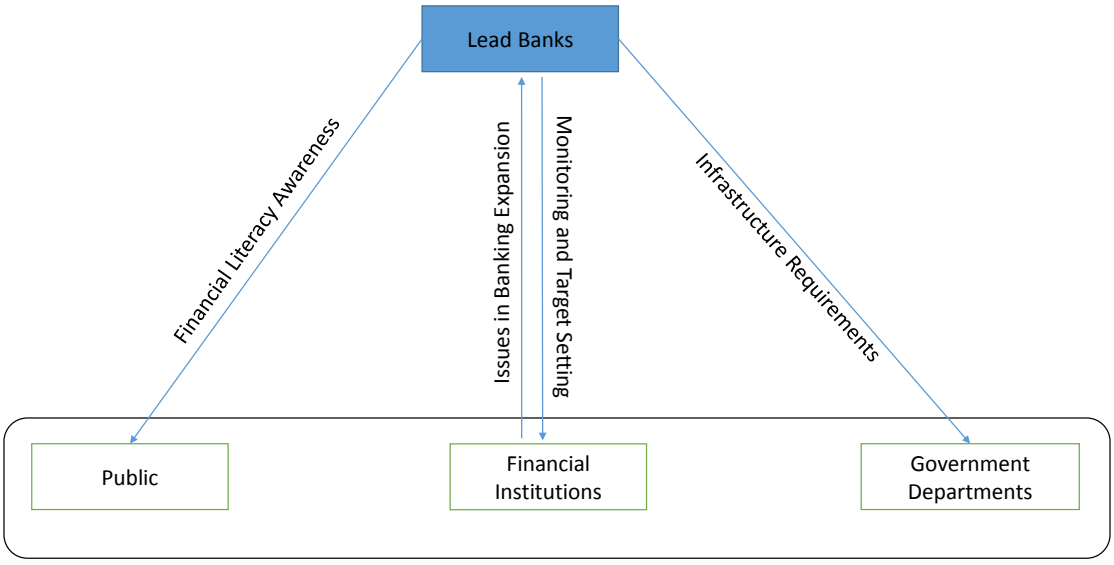


Figure 3: Organization Chart for Nationalized Banks in India

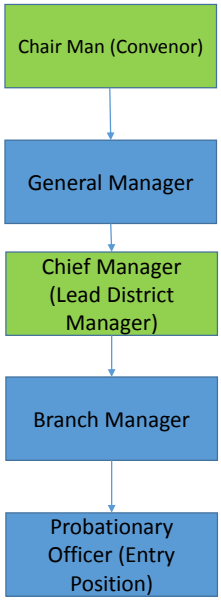
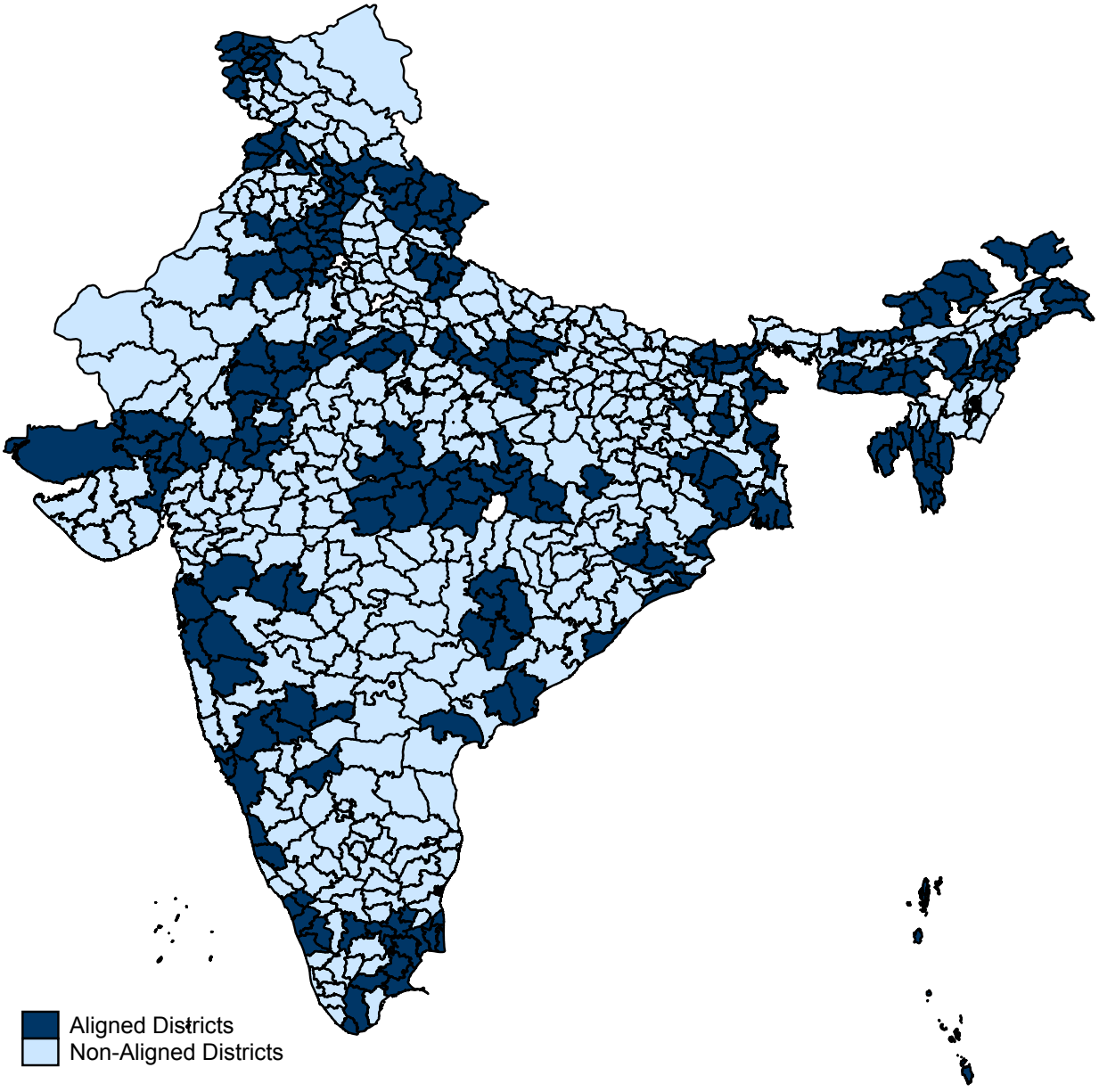


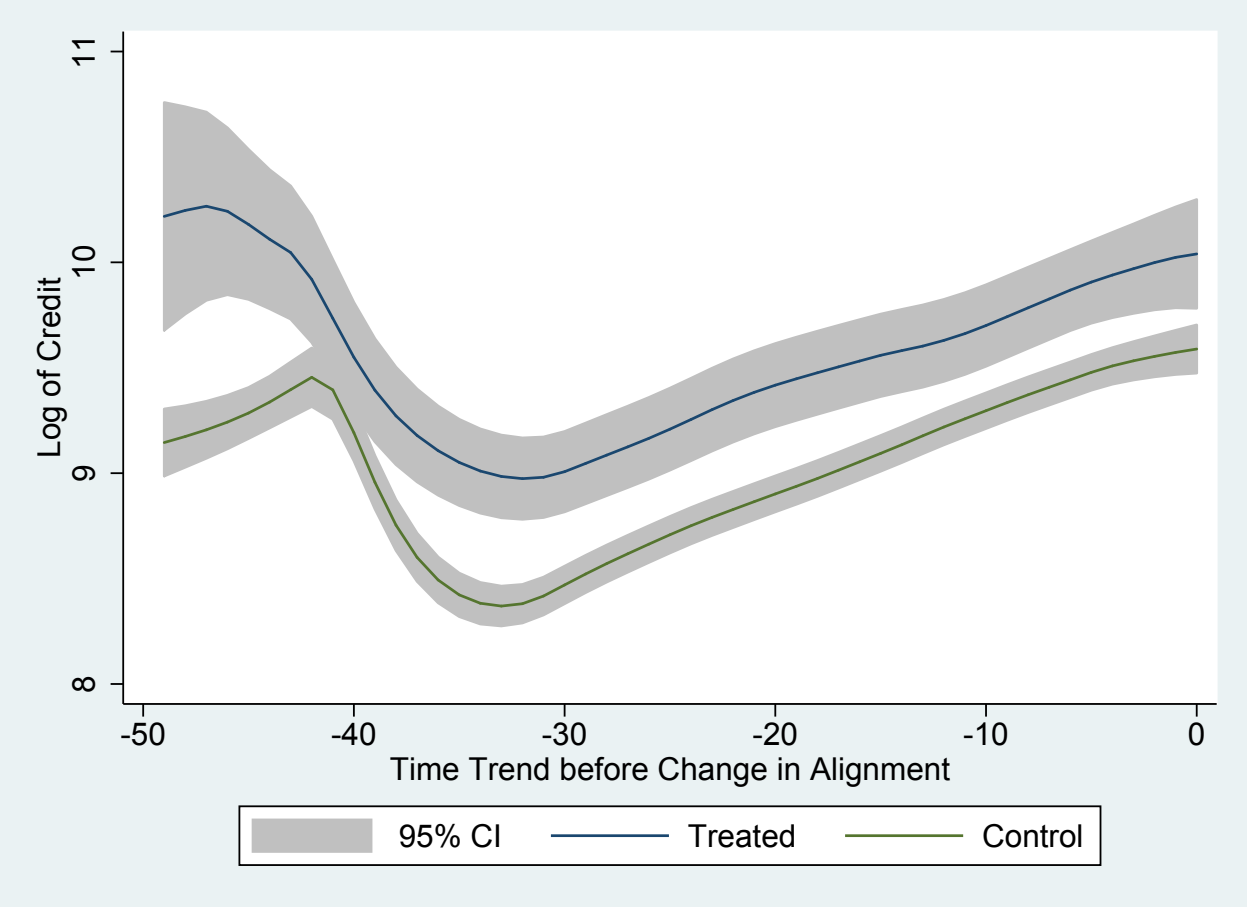
Figure shows the organization chart of a typical nationalized bank in India. Probationary Officer is the entry level position in the firm. Employees work up the ladder. Chief Manager, which is in-charge of Lead Bank activities, is reached after 6-7 years.

Figure 4: Aligned and Non-Aligned Districts



District boundaries as per Population Census 2011

Figure 5: Time-Trend in Log of Credit and Alignment Changes



Treated Group is the group of districts which underwent a change in alignment. Control Group is the group of neighbouring districts for which alignment remains the same.

10 Tables

Table 2: Summary Statistics

Panel A: Aligned Districts

	Mean	Standard Deviation	Minimum	Median	Maximum	Observations
Credit	45805.39	326666.3	1.000	7604.002	9705966.000	16,147
Deposit	65088.686	391607.373	6.000	15292.000	9930473.000	13189
Term Deposit	58632.648	170342.259	1.045	13199.415	1845992.951	4706
Saving Deposit	29316.163	51941.085	1.380	15293.645	574588.898	4706
Current Deposit	7393.437	23441.370	0.000	1969.947	325017.506	4706

Panel B: Non-Aligned Districts

	Mean	Standard Deviation	Minimum	Median	Maximum	Observations
Credit	78508.01	508588.6	13.000	11262	12111158.822	24,575
Deposit	92865.424	465476.210	35.000	21626.000	11148226.000	20185
Term Deposit	96329.449	586837.683	5.263	13278.429	9258378.115	6636
Saving Deposit	33206.113	91744.764	9.211	14901.674	1571518.776	6636
Current Deposit	12012.960	74557.201	0.000	2075.235	1532658.657	6636

Credit and Deposit, in Rs. Millions, 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 Dummies	Yes	No	No	No	No
Lead Bank Dummies	No	Yes	No	No	No
Convenor Bank Dummies	No	No	Yes	No	No
State Fixed Dummies	No	No	No	Yes	No
District Fixed Dummies	No	No	No	No	Yes
Observations	38320	37781	37781	37781	37781
No. of Dummies	60	27	17	36	666
R^2	0.146	0.219	0.324	0.478	0.834
Adjusted R^2	0.144	0.219	0.324	0.477	0.831

Table 4: Decomposing Variation in Log of Deposit

	(1)	(2)	(3)	(4)	(5)
Quarter-Year Dummies	Yes	No	No	No	No
Lead Bank Dummies	No	Yes	No	No	No
Convenor Bank Dummies	No	No	Yes	No	No
State Fixed Dummies	No	No	No	Yes	No
District Fixed Dummies	No	No	No	No	Yes
Observations	38322	37781	37781	37781	37781
R^2	0.163	0.181	0.235	0.412	0.817
Adjusted R^2	0.162	0.181	0.234	0.410	0.814

Table 5: District-level Demand-side Factor

	1	2	3	4	5
$\mathbb{1}\{Align\}$	-0.087	-0.001	0.069	-0.152	-0.00005
	(0.059)	(0.003)	(0.103)	(0.128)	(0.016)
Observations	618	618	554	554	622

Dependent variable in column (1) is log of average size of enterprises in a district, computed from Economic Census 2013-14. Dependent variable in column (2) is share of enterprises in agricultural sector, computed from Economic Census 2013-14. Dependent variable in column (3) is log of number of MSMEs, computed from MSME Census 2006-07. Dependent variable in column (3) is log of GVA of MSMEs in a district, computed from MSME Census 2006-07. Dependent variable in column (5) is share of rural population, computed from Population Census 2011. State level dummies are included in all models.

Table 6: Credit Disbursement and Aligned Districts

	(1)	(2)
$\mathbb{1}\{align\}$	0.212***	0.212***
	(0.035)	(0.122)
Observations	40722	40722
Model	RE	RE

Column 1 estimates the coefficient on $\mathbb{1}\{align\}$ using a Random Effect Model. Column 2 reports the results of a RE model with standard errors clustered at the district level (Abadie et al., 2017).

Table 7: Credit Disbursement and Change in Alignment

	(1)	(2)	(3)	(4)
$\mathbb{1}\{Align\}$	0.291***	0.288***	0.288**	0.288***
	(0.037)	(0.037)	(0.132)	(0.078)
Observations	2401	2401	2401	2401
Model	RE	FE	FE	FE

The sample for this analysis consists of all those districts where alignment changed. Column 1 estimates the coefficient on $\mathbb{1}\{align\}$ using a Random Effects model. Column 2 estimates the coefficient on $\mathbb{1}\{align\}$ using a Fixed Effects model. Column 3 uses standard errors robust to heteroscedasticity (Wooldridge, 2013). Column 4 reports the results of a FE model with standard errors corrected for auto-correlation and heteroscedasticity (Newey and West, 1987).

Table 8: Log of Term Deposit after a Scanty Monsoons

	(1)	(2)	(3)	(4)
$\mathbb{1}\{Scanty\}$	-0.167*	-0.043	-0.254**	-0.303***
	(0.097)	(0.177)	(0.101)	(0.108)
$\mathbb{1}\{Align\}$				-0.025
				(0.201)
$\mathbb{1}\{Align\}$*$\mathbb{1}\{Scanty\}$				0.355*
				(0.199)
Observations	2426	949	1477	2426
R^2	0.123	0.137	0.159	0.125
Adjusted R^2	0.098	0.101	0.127	0.099

The dependent variable is log of term deposit in quarter 3 from years 2012 to 2017. $\mathbb{1}\{Scanty\}$ is an indicator which takes value 1 if the district received less than 20% of long-term average of monsoon rainfall. State, Year, Lead Bank and Convenor Bank dummies are added in each specification. Following Abadie et al. (2017), I cluster the standard errors at the district level.

Table 9: Difference of Mean in District-wise Departure of Monsoon Rainfall

Group	Observations	Mean	Standard Error
Non-Aligned	1803	-0.085	0.007
Aligned	1072	-0.088	0.011
Difference		0.003	0.012

Dependent variable is district-wise departure from normal monsoon in percentage points.

Table 10: District-wise Monsoon Rainfall Departure

	(1)
$\mathbb{1}\{Align\}$	-0.017
	(0.014)
Observations	2875

Dependent variable is district-wise departure from normal monsoon in percentage points of monsoon rainfall. State and Year dummies are controlled.

Table 11: Opening of Bank Branches

	1	2
$\mathbb{1}\{Align\}$	-0.163	-0.017**
	(0.161)	(0.008)
Observations	35848	31499

Dependent variable in column (1) is the number of new commercial bank branches opened in a district from 2005:Q1 to 2017:Q4. Dependent variable in column (2) is an indicator which takes value 1 when a Lead Bank opens a branch in the district and 0 otherwise from 2005:Q1 to 2017:Q4. Quarter-Year, and State dummies are provided in each specification. Following Abadie et al. (2017), I cluster the standard errors at the district level.

Table 12: Annual Credit Targets

	log(Annual Credit Targets)
$\mathbb{1}\{Align\}$	-0.084
	(0.130)
Observations	294

Dependent variable in column (1) is log of annual credit targets set by NABARD for districts in 2018-19. District-wise credit targets for priority sector were available only for 11 states. These states are Bihar, Chattisgarh, Gujarat, Harayana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra and West Bengal.