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Bank Deposit Franchise, Interest Rate Risk, and Default Risk: Evidence from India *

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A. Summary

In this paper, we show that the deposit franchise of banks significantly influences their lending behaviour, and correspondingly, risk management. Deposit franchise allows banks to pay deposit rates that are low and insensitive to market interest rates. However, maintaining this franchise requires high fixed costs. In order to hedge against interest rate risk arising from these fixed costs, banks with strong deposit franchises seek to reduce sensitivity of their interest income to market rates by holding longer-term fixed-rate assets. We provide evidence for this theory from India, and show that this behaviour can help partially rationalise India's infrastructure credit boom of the 2000s. During this period, banks with stronger deposit franchise switched from long-term government securities to long-term fixed rate loans, particularly in the risky infrastructure sector. We highlight that rising bond yields and associated mark to market losses on bond holdings may have exacerbated the switch towards infrastructure sector, eventually resulting in high non-performing loans. Overall, while maturity transformation allows banks to shield their net interest margins from interest rate risk, we propose that market incompleteness in developing economies may lead to a tradeoff between stabilising net interest margin and default risk.

B. Indian Context

Infrastructure credit boom: Share of bank credit to the infrastructure sector in India doubled within a span of four years from 2004 to 2008. We highlight the stark change in the average asset portfolio of Indian banks during this period. At the outset of this period, Indian banks were characterised by extremely high holdings of long term government securities, among the highest in the world. In 2004, as the Fed raised rates for the first time since May 2000, and oil prices rose sharply due to a Hurricane that hit the United States and neighbouring countries, there was a sudden and significant rise in Indian government bond yields. On account of this rise in long term yields and corresponding fall in prices, banks suffered substantial mark-to-market losses, and rapidly substituted away from long-term securities towards long-term loans. From 2004 to 2008, the average ratio of long term securities to bank assets declined drastically from about 0.30 to 0.17, while the ratio of infrastructure loans to assets doubled from 0.035 to close to 0.07.

Institutional details: In principle, both public and private sector banks are insured by the Deposit Insurance and Credit Guarantee Corporation (DICGC). However, as of 2007, this deposit insurance coverage was limited to only Rs.100,000 (approximately $2000) per depositor. Moreover, as highlighted in

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Iyer and Puri (2012), the processing of deposit insurance claims is associated with significant uncertainty and delay which reduces their effectiveness. In this context, explicit government guarantees endowed to public sector banks by virtue of The Banking Regulations Act (1949), as highlighted by **?**, which guarantees all obligations of public sector banks in the event of their failure, assume much greater importance.

This sovereign backing, however, is not free of cost. Public sector banks are subject to the same operational constraints and rigidities as the rest of government enterprises in India. In order to satisfy the governments financial inclusion goals, public sector banks operate a wider network of branches across urban as well as rural regions. This means that they significantly lag behind private and foreign sector banks in terms of average deposits/credit per branch (Chatterjee, 2006). Moreover, PSB employee productivity is also significantly lower as compared to private sector banks because of a difference in the employment practices across the two sets of institutions. A report by Financial Express (Financial Express, 2019) highlights this stark difference: the officer to clerk ratio for private banks was 16:1 compared to the 1.25:1 ratio for public sector banks. To the extent that banking is an increasingly specialised service, hurdles faced by government owned institutions in changing their hiring practices contribute significantly to the cost inefficiencies of the PSBs relative to PVBs. In this paper, we treat these costs as the fixed costs of sovereign guarantees.

While sovereign guarantees are the source of the strong deposit franchise of public sector banks, private sector banks have to invest in building deposit market concentration in order to strengthen theirs. In this sense, the functioning of private sector banks corresponds directly to the setup in Drechsler et al. (2021).

C. Data

We use annual branch and bank level data from the Reserve Bank of India to compute our bank-level HHI measure, for our bank-district level regressions, for data on sector and maturity wise bank lending, and for our subsequent analysis on branch level non-performing loans. Data on the Repo rate is also obtained from the Reserve bank of India website. While bank level data is publicly available, branch-level data is from Basic Statistical Returns (BSR) and provided by the Reserve Bank of India. We use quarterly financial data from CMIE Prowess in order to compute the sensitivity of bank level interest expense, interest income, and return on assets to changes in the RBI Repo rate and to derive the aggregate time series for average net interest margin and return on assets.

D. Research methodology

Interest rate risk hedging: In the preliminary baseline analysis, we follow the approach in Drechsler et al. (2021) to test whether banks hedge against market interest rates by matching sensitivities of their interest income and interest expense. We use a two-stage panel setup: in the first stage we compute the interest expense sensitivity to changes in market interest rate (Repo rate) by regressing the change in interest expense divided by assets on contemporaneous and lagged changes in the Repo rate. The interest expense beta, which we use as a measure of bank deposit franchise, is obtained as the cumulative value of the coefficients of Repo rate changes in the first stage. In the second stage, we regress the change in interest income ratio on the predicted changes in interest expense ratio obtained from the first stage to analyse the degree to which banks match their interest expenses to their income.

Sources of deposit franchise: In order to investigate the sources of deposit franchise of banks in India, we run a modified version of the first stage panel regression described above, with interest expense rate regressed on contemporaneous and lagged changes in Repo rate interacted with the examined source such as bank HHI or state ownership. We further substantiate this evidence using scatter plots of interest expense betas plotted against bank HHI separately for private and state owned banks.

Deposit franchise and lending behaviour of banks: We hypothesise that banks with strong deposit

franchise had high exposure to long term fixed rate securities at the outset of the boom period in consideration, which they then substituted for long term fixed rate loans in infrastructure during the boom. Using the regression specifications described above, we study whether banks' exposure to long term fixed rate securities, as measured by the investment fluctuation reserve ratio, is related to their deposit franchise. In order to then examine the substitution of assets from long term securities to infrastructure loans, we employ a triple difference specification using ex-ante heterogeneity across banks in exposure to long-term fixed rate securities in 2004 to study the relevance of deposit franchise for district level bank lending behaviour during the period after 2004. As a robustness test, we also run the same regression specification utilising heterogeneity in interest expense beta, measured using data up to 2004, across the cross section of banks as a more direct test of the relevance of banks liability structure for their lending behaviour.

Accounting for demand variations: Importantly, in the triple difference regressions employed, we control for district-time fixed effects in order to account for important demand side variations during this period. However, it is possible that demand variations were limited to a subset of the banks, in which case district-time fixed effects do not conclusively provide evidence of a supply side effect. We therefore estimate state level lending rates for each bank and sector, and use these as the dependent variable in the triple difference regression specification. If demand played an important role in driving the lending behaviour observed during this period, one would expect bank lending rates to vary accordingly.

E. Findings

We present four main sets of findings.

- First, we show that even in the face of a volatile central bank policy rate (RBI Repo rate), banks managed to maintain stable net interest margins. This appears to be the result of banks matching the sensitivity of their interest expenses and interest income to the RBI Repo rate.
- Second, we hypothesise and provide evidence for two distinct channels of deposit franchise for private and public sector banks: deposit market concentration of private sector banks and the government guarantees of state-owned banks allow them to maintain stable interest expense through changing Repo rate environments. We find a significant negative relationship between deposit market concentration and interest expense sensitivity to Repo rate for private sector banks. Public sector banks, on the other hand, show lower interest expense sensitivity than private banks in general, and unlike the private sector banks, this measure is not linked to their deposit market concentration. We interpret this finding as evidence that public sector banks derive their deposit franchise from the explicit sovereign guarantee, and thus deposit market concentration is of less relevance to these set of banks.
- Third, an immediate consequence of the matching is that banks with strong deposit franchise, whose interest expenses are low and insensitive to RBI Repo rate, tend to engage in substantial maturity transformation. We find evidence for this: banks with low sensitivity of interest expenses to market rates tend to hold significantly more long-term fixed rate securities, which are primarily government bonds in the Indian context, and long-term fixed rate loans such as infrastructure, as compared to banks with higher sensitivity of interest expenses to market rates.
- Fourth, we document that with the sudden rise in government bond yields starting in 2004, banks with stronger deposit franchises shift away from long-term investments to the default risk prone infrastructure sector. Correspondingly, we also find that ex-post, banks with lower sensitivity of interest expense to Repo rate have higher non-performing loans.

F. Conclusion and Policy Relevance

In this paper, we examine the role of deposit franchise in banks' lending behaviour in India. The key message is that while maturity transformation may allow banks with substantial fixed operating costs to hedge against interest rate risk, it may expose them to higher default risk due to the scarcity of safe long-term fixed-rate lending avenues in developing economies such as India. Co-existence of state owned banks and private banks in India also allows an analysis of how state ownership in banking determines their deposit franchise. While state ownership provides banks with stable and cheap deposits due to explicit government guarantees, it may affect their lending behaviour through higher fixed operating costs, which commonly arise due to employment and financial inclusion objectives of the government imposed upon banks. In the absence of diverse long-term fixed rate lending opportunities needed to balance the significant fixed operating costs, banks may be inclined to undertake excessive exposure to the few available sectors such as infrastructure as in the case of India, leading to financial stability risks as observed in the infrastructure boom in India.

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