

Financial Repression, Deposit Rate Deregulation and Bank Market Power

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ABSTRACT

Mandating low deposit rates, a form of financial repression, allows banks to raise deposits cheaply and makes investment in government securities profitable but limits credit access. Using regulatory data, we exploit India's 2011 deregulation of savings deposit rates to show that deposit rates increase after deregulation, more so for banks with low market power — consequently, deposits increase and deposit maturity contracts. These banks shift from low-yielding government securities to loans, including personal, services, and small business loans. Loan maturity shortens to match deposit-maturity shortening. A structural model demonstrates that high-market power banks restrain deposit growth. Deregulation improves financial intermediation, but banks' market power limits gains.

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1 Introduction

Financial intermediation facilitates the transfer of funds from savers to borrowers. While households save through deposits and smooth consumption, banks raise funds through deposits and channel them to productive sectors of the economy. However, efforts to increase financial inclusion in developing countries like India remain challenging.¹ This can hinder households' usage of savings instruments, and limited financial intermediation can further mute households' and firms' access to credit, depressing aggregate productivity (Hsieh and Klenow, 2009).

This paper examines an oft-overlooked reason for low financial intermediation: low interest rates on deposits. Such depressed deposit rates can arise from explicit regulation or banks' market power. While low deposit rates allow banks to raise deposits cheaply, households may look to invest elsewhere, lowering deposit account penetration. Low rates also allow banks to invest in low-yielding government securities while continuing to earn comfortable net interest margins but limiting credit access to firms and households.

This paper examines the impact of the 2011 savings deposit rate deregulation in India in the presence of a concentrated banking system. Up until June 2011, savings deposit rates in India were regulated and set by the Reserve Bank of India (RBI), India's central bank. After deregulation in June 2011, banks could differentially set savings deposit rates. For nearly a decade before the deregulation episode, regulated savings deposit rates were at 3.5%, well below the policy Repo rate, regardless of a bank's market share or ownership status.² Our empirical setting exploits the ex-ante variation in bank market power combined with savings rate deregulation to examine the impact on deposit savings rates, deposit growth, bank balance sheets, and the real sector. A theoretical framework motivates the empirical setup and a parsimonious structural model helps estimate aggregate effects and examine how market power limits gains.

We establish four main findings. First, banks with low market power increase their deposit rates relative to banks with high market power post deregulation. Saving deposits increase for

¹For example, while the percentage of households with bank accounts rose from 59% in 2011 to 99% in 2016 in India (ICE360 Survey 2016), account usage remains low, with many households maintaining zero balance accounts.

²The regulation applied only to savings deposit rates, and banks had the authority to set the rate of other forms of deposits like term deposits, recurring deposits, and current accounts, among others.

low-market power banks. Importantly, deposits increase across the board — namely, term, current, and savings deposits — but with a compositional shift to savings deposits, which are relatively short-term and liquid in nature, indicating a shortening of their funding maturity structure. These banks expand their branch network, facilitating the rise in deposits across deposit types. Second, lending increases for the low-market power banks and is accompanied by a shortening of loan maturity corresponding to the shortening of the maturity structure of deposits. Lending shifts to productive sectors of the economy, such as industry and services, and to the financially constrained small business sector. Loans to the household sector also increase in the form of personal loans. Third, low-market power banks shift away from government securities to loans, plausibly to compensate for the rise in funding costs.

Overall, interest incomes increase to match the increase in interest expense. This arises despite the decline in weighted average lending rates as low-market power banks shift away from low-yielding treasury securities to loans. Fourth, the increase in lending and deposits is also reflected at the household level: districts with high exposure to low-market power banks have higher access to deposits and credit. A parsimonious structural model shows that aggregate deposits increase by 42% post deregulation in a counterfactual world with only low-market power banks; even with deregulation, market power limits the deposit increase.

To guide our empirical exercise, we build a simple partial equilibrium model with heterogeneous banks. The model yields two key insights. First, post deregulation, low-market power banks increase deposit rates more relative to their high market power counterparts. The model also makes several follow-on predictions: low-market power banks increase their deposits and credit-to-deposit ratios, and switch away from government securities to compensate for the higher funding costs. Second, the model also predicts that the increase in deposits, and consequently in credit, will be greater if we move to a low market power banking system. We rely on these two insights to inform our empirical work. The first forms the basis of our empirical strategy: we use the theoretical prediction of differential responses of low- and high-market power banks to generate bank-level heterogeneity in the impact of deregulation. We use the second insight in our structural model and compare the observed aggregate effect to a banking system absent concentrated

market power, allowing us to estimate the gains from decreasing banks' market power.

Our empirical strategy relies on two ingredients: the nationwide deregulation of savings deposit rates and the ex-ante variation in banks' market power. We exploit the heterogeneity in market power across banks and employ a two-way fixed effects model controlling for branch and local variation to examine the impact on the bank's balance sheets. For our baseline analysis, we rely on banks' market concentration as the source of market power. We define bank-HHI as the deposit-weighted Herfindahl–Hirschman index (HHI) across a bank's branches. Low-market power banks have below median bank-HHI. We use regulatory branch-level data provided by the Reserve Bank of India (RBI) on lending and deposits encompassing all districts in India from 2007 to 2016. While we rely on banks' market concentration in the baseline analysis, we confirm our findings through several robustness checks that rely on alternative sources of market power.³

Banks raise three kinds of deposits, namely current, savings, and term deposits. While current and savings deposits can be withdrawn at any time, term deposits have different maturities, and early withdrawal incurs penalties. Deregulation allowed banks to change savings deposit rates. Post deregulation, savings deposit rates increase, more so for low-market power banks compared to high-market power banks. Consequently, savings deposits increase by 16% for low-market power banks compared to high-market power banks. Importantly, deposits increase across the board with a 13.5 pp rise in total deposits. Term deposits increase by 20.1 pp despite no effect on term deposit rates. Current account deposits similarly increase. Overall, deposit composition shifts to savings deposits, indicating a shortening of deposit maturity.

What explains this rise in term and current deposits? Deregulation allowed low-market power banks to increase their deposit market share by increasing savings deposit rates and attracting new depositors. We see that low-market power banks increased their depositor base by increasing their reach through a 33% increase in the number of branches. Similarly, branch-to-deposit ratios measuring how effective each branch is in raising deposits also increase. The surge in savings deposits at low-market power banks on account of the increase in savings deposit rate plausibly allowed banks to raise term and current account deposits as households tend to invest in multiple

³We use market power and market concentration interchangeably, and only make the distinction when important.

products through the same bank due to the transaction costs of opening several bank accounts.

We next examine how the higher cost of funding and the increase in deposit inflows affect the asset side of bank balance sheets. The increase in deposits translates to an increase in lending. Low-market power banks increase lending by 33%, and the credit-to-deposit ratios also increase by 10%. Lending increases across sectors, though there is a compositional shift to productive sectors of the economy, such as services and industry. Credit to the household sector also increases in the form of personal loans. Lending and lending share also increases in the small business sector, which is typically financially constrained. Reflecting the compositional shift to short-maturity savings deposits, loan maturities also shorten for low-market power banks.

Regulated deposit rates allow banks to raise deposits cheaply and earn comfortable interest rate margins by investing in government securities. Post deregulation, low-market power banks decrease their share of government securities and increase their loan portfolio. Statutory requirements, such as the statutory liquidity ratio (SLR), require that banks allocate a certain fraction of their net demand liabilities to government securities. Hence, while the *share* of government securities declines, the stock of government securities increases for low-market power banks. The overall compositional shift away from government securities suggests that before deregulation, low deposit rates allowed banks to earn comfortable margins by simply investing in government securities. As funding costs rise, banks are forced to shift away from low-yielding government securities. Financial repression can occur when government policy forces banks to hold public debt, limiting their ability to lend to the real economy (Chari et al., 2020). We show that regulated deposit rates achieve similar financial repression, and deregulation stimulates lending.

Despite the increase in deposit funding costs, lending rates *decline* for low-market power banks. We hypothesize that banks minimize the hit to their profit margins by increasing lending volume as low-market power banks compete with high-market power banks in the loan markets, forcing them to decrease loan rates to capture market share. To test whether the increase in loan volume can compensate for the decline in prices, we examine aggregate bank-level interest income and interest expense. Low-market power banks increase interest income to match interest expense increases with minimal impact on net interest margins.

We use a parsimonious structural demand estimation model to provide further validation of our empirical strategy and estimate the spread semi-elasticities of low- and high-market power banks. We estimate a random coefficients logit model of household deposit demand across Indian districts and examine banks' savings deposit elasticities. Our model accounts for both rate and non-rate characteristics of banks, with districts serving as distinct markets to capture local customer preferences. Using savings deposit spread (the difference between the policy and savings deposit rate) as our price measure and controlling for bank characteristics (branch networks), we find significant price sensitivity among depositors. Three cost shifters (non-interest payments, share of officers in total employees, and staff expenses) serve as instruments to address potential endogeneity concerns. We estimate a higher demand elasticity for low concentration banks (2.11 in absolute terms) compared to high concentration banks (0.56 in absolute terms). A 1% increase in the savings deposit spread leads to a 2.11% (0.56%) decline in a low-market (high-market) power bank's deposit market share. These estimates serve as an independent confirmation of our reduced form strategy: low market concentration banks cater to markets with elastic deposit demand. Motivated by our theoretical framework which shows that a move to low banking power system increases deposits, we ask a counterfactual question: how much would aggregate deposits increase if low-market power banks' response is similar to high-market power banks? We use the average semi-elasticity and deposit rate estimates for low MP banks and show that deposits would have been 42% higher compared to baseline estimates, highlighting that market power limits gains.

While the empirical setup exploits bank HHI as a measure of market power, which our structural model also validates, the source of deposit market power heterogeneity is not critical. Deposit market power can arise from banks' liquidity services ([d'Avernas et al., 2023](#)), banks' market concentration either due to the industry structure as in our baseline ([Drechsler et al., 2017](#)) or branching regulation ([Oberfield et al., 2024](#)), implicit and explicit support for too-big-to-fail banks or government guarantees, deposit insurance ([Acharya et al., 2023](#); [de Roux and Limodio, 2022](#)) or inelastic depositor demand. Our results are robust to using alternate measures of market power, including measures based on deposit rate sensitivity to policy rate changes (bank- β in [Drechsler](#)

et al. (2017)), HHI measures using only savings deposits, and HHI redefined with more granular markets. To address concerns that some other feature of state-ownership drives our results, we show our results are similar when we restrict to private sector banks. Our results are also robust to alternate explanations based on loan-market power and bank health.

2 Related literature

We primarily contribute to two distinct strands of literature. First, we contribute to the literature on how government debt issuance affects credit access. Government debt issuance can affect lending to corporates (Becker and Ivashina, 2018), corporate debt (Graham et al., 2014), firm leverage (Demirci et al., 2019), short-term debt issued by financial firms (Graham et al., 2014), and the maturity structure of corporate debt (Greenwood and Stein, 2010). Mechanisms include bank lending as in our paper or portfolio investors' reallocation to government debt. Governments can also use explicit and implicit policies to force banks to hold government securities (Chari et al., 2020), eventually limiting credit access. Such financial repression is not just a developing country phenomenon. Advanced economies adopted similar policies for nearly three decades after World War II (Reinhart and Sbrancia, 2015). More recently, Becker and Ivashina (2018) document financial repression in the European sovereign debt crises with banks seeing a two-fold increase in government debt holdings between 2007–2013 that crowded out corporate lending. While these papers focus on the asset side of banks' balance sheets, we link financial repression to the banks' liability side. Mandating low deposit rates is a form of financial repression with similar adverse effects on banks' loan portfolios. A concentrated banking system can also achieve similar depressed deposit rates, making investment in government securities lucrative but subsequently limiting bank credit. Drechsler et al. (2020) study a similar deregulation episode, the repeal of Regulation Q in the late 1970s in the US, that saw deposit rates and quantities increase substantially. In contrast, in our setting, the banking industry's concentrated market structure limits the gains from deregulation.

We also contribute to a broader literature on the impact of market concentration on firm dynamism and welfare (Philippon, 2019; Rossi-Hansberg and Wright, 2007; De Ridder, 2024; Barkai,

2020; Hopenhayn et al., 2022; Autor et al., 2020; De Loecker et al., 2020). An emerging banking literature documents banks' deposit market power (Drechsler et al., 2017; Wang et al., 2022; Hakenes et al., 2015; Jiang et al., 2023; d'Avernas et al., 2023) and its implications for banks' asset side (Drechsler et al., 2021; Li et al., 2023). Philippon (2019) distinguishes between "good" and "bad" market concentration. Good concentration can come from increases in elasticity of substitution or technological change leading to increasing returns to scale. Bad concentration can come from rising barriers to competition that can increase economic rents and reduce innovation. An older literature highlights how banking concentration can depress deposit rates (Berger and Hannan, 1989; Hannan and Berger, 1991; Neumark and Sharpe, 1992; Granja and Paixao, 2021). Similarly we show that market power depresses deposit rates, but then highlight how this has follow on effects on banks' assets, allowing them to invest in government securities but then limiting credit. Banks market power can arise for "good" reasons (such as provision of specific liquidity services by banks) or "bad" reasons (such as regulation that tilts market power to certain banks, implicit and explicit government guarantees, or the lack of a level playing field in the banking industry). While our analysis does not distinguish between the two, we highlight a limited point: a move to a less concentrated banking system can increase deposit penetration and credit access.

Our paper is also tangentially related to papers on banks' deposit rate-setting behavior. A large literature examines the relationship between deposit rates and market interest rates (Diebold and Sharpe, 1990; Drechsler et al., 2017; Begenau and Stafford, 2022; d'Avernas et al., 2023). More recent work studies the factors determining deposit rates (Iyer et al., 2022; Morelli et al., 2024).

While the above discussion places our paper in the broader global and economic context, our paper also has implications for Indian policymaking. Low deposit rates are a persistent feature of Indian banking. Despite deposit rate deregulation of fixed deposits in 1997, savings deposits were deregulated only in 2011. A heavily concentrated banking system similarly depresses deposit rates. Banks' deposit market power has diminished in recent years as households have found better investment avenues.⁴ Banks have responded by increasing their deposit rates.⁵ Diminishing market power may force banks to increase deposit rates and adversely affect their funding costs,

⁴See [here](#) on Indian households' rising stock market participation.

⁵See [here](#) on India's largest bank increasing its deposit rates in May 2024.

but can also be a net positive if households and firms see improvements in credit access.

3 Institutional Details

The Indian banking system is highly concentrated, with the 58 private and public sector banks capturing nearly 95% of the overall bank lending in India. Bank branch penetration has steadily increased with the average number of branches per 100,000 adults increasing two-fold to 16 per cent in 2022 compared to 2004, higher than the global average ([World Bank](#)).

Deposits constitute the primary funding source for banks (around 80% in 2023 as per [RBI](#)). Deposit rates are set at the bank level and uniform across bank branches, though in some cases can vary by the size of the deposit account.⁶ Deposits are of three types, namely current, savings, and term deposits. Savings accounts are mostly held by households and used for both transaction and savings purposes. While savings deposits provide the convenience of easy withdrawals, check encashment, and other payment facilities, they also serve as short-term savings instruments that earn interest. Current accounts are primarily maintained by companies, public enterprises and business firms and are used for day-to-day transaction requirements. Current and savings deposits have no associated maturity and can be withdrawn at any time. Term deposits are for different maturities and early withdrawal incurs penalties. Between 2001–2010, savings deposits grew by 19.4% annually and accounted for nearly 30-40% of aggregate deposits. Savings deposit penetration — measured by per capita savings bank deposits — increased from ₹1,067 in March 1996 to ₹7,767 in March 2009, though growth had slowed leading up to the deregulation episode, possibly highlighting the relative unattractiveness of the low-interest savings deposits.

India pursued financial reforms since the 1990s, deregulation of interest rates forming a key component. By October 1997, most interest rates were deregulated barring savings deposit rates. The issue of savings rate deregulation had been considered previously in 2002–03 and 2006–07, but abandoned citing timing issues as deposits were largely held by rural households and opposition from the Indian Banks' Association (IBA) asking that the status quo be maintained. The IBA, however, contended that “in principle, deregulation of interest rates is essential for product innovation and price discovery in the long run,” (Para 109, Annual Policy Statement, 2006-07). Indicating reg-

⁶See [RBI](#) website on how banks can set deposit rates.

ulatory will to deregulate savings deposit interest rates, in November, 2010, the RBI proposed that a [discussion paper](#) be prepared to examine the pros and cons of deregulation. As the discussion paper notes, deregulation was intended to “strengthen the competitive forces, improve allocative efficiency of resources and strengthen the transmission of monetary policy.” Finally, in October 2011, the RBI deregulated the savings deposit rate. In the period before deregulation, the interest rate on savings bank deposits remained unchanged at 3.5% since March 1, 2003 with banks free to choose savings deposit rates post deregulation. Savings deposit rates are mandated to be uniform across the branches of a bank conditional on deposit size.

On the asset side, banks hold government securities, investments, and loans. Loan rates were largely deregulated by October 1997. In addition, in contrast to uniform deposit rates across bank branches, lending rates can vary across branches. Banks also hold a certain amount of cash with the RBI as reserves on which they earn interest. They are mandated to hold a certain proportion of their net demand and time liabilities in government securities as a part of their statutory liquidity ratio (SLR) requirements but generally hold in excess of these requirements, though this share has declined in the past decade ([MoF Status Paper, 2023](#); [Das et al. \(2024\)](#)).

4 Theoretical framework

Our theoretical framework, based on the canonical [Monti et al. \(1972\)](#) and [Klein \(1971\)](#) setup, examines how variations in market concentration affects bank’s asset composition through deposit funding costs. We model banks operating under monopolistic competition, where they can attract deposits through two channels: deposit interest rates and liquidity services (such as ATM facilities, branch services, and ease of transactions). These liquidity services also capture banks’ inherent characteristics and spatial advantages in their local markets. Banks then allocate these deposits between government securities and loans, with their portfolio decisions being influenced by their funding costs and market concentration. A formal description of the model is provided in the [Appendix A](#). Here we provide a brief intuition of the key findings.

The model generates several key insights on the relationship between market power and bank lending behavior. Banks with lower market power, facing more intense competition post-

deregulation, offer better deposit rates and enhanced services to attract depositors, resulting in higher funding costs. Pre-deregulation banks compete based on their innate characteristics and physical presence, while after deregulation they can also change the deposit rates, leading to a higher inflow of deposits towards low-market power banks. Following deregulation, though the overall level of deposits increased for banks because of higher deposit rates yet banks with high market power see a shift in the marginal deposits to the banks with low market power due to the relatively higher increase in the deposit rates by the latter. To compensate for these elevated costs, these banks channel a larger portion of their funds into risky loans, which yield higher returns compared to government securities. This negative relationship between market power and loan-to-asset ratio persists even during periods of regulated deposit rates, though the effect intensifies after deregulation because deregulation provide banks an additional competitive tool, namely, the ability to set deposit rates, beyond their inherent characteristics and services. Our theoretical predictions thus highlight how market power can function as a source of financial repression by influencing banks' lending decisions through the funding cost channel. Banks with market power tend to offer lower deposit rates than they would in a competitive market. If deposit rates were higher, banks would attract more deposits, which in turn would enable them to disburse more credit. While financial deregulation leads to increases in both deposits and credit, the presence of market power among banks limits gains.

5 Data and Descriptive Statistics

5.1 Data

Our primary dataset is the regulatory Bank Statistical Return (BSR) data provided by RBI. This dataset provides annual branch-level information on deposit and credit at the annual frequency. Importantly, for our purposes, we have information on the type of deposits: savings, current, and term deposits. We can also observe sectoral allocation of credit, including credit to micro, small and medium enterprises (MSME). Weighted average lending rate is also at the branch-level. In supplementary tests, we also use granular markets using information on classification of a branch as catering to metro, urban, semi-urban, or rural markets within a district. We also supplement

our analysis with publicly available bank-level data from the RBI’s Database of Indian Economy (DBIE), which gives information on balance sheet and income statement variables. Data on the policy Repo rate is from the CEIC database. We focus our analysis on the public and private sector banks, which account for nearly 95% of overall bank lending.⁷ Our baseline dataset is for the universe of 58 banks public and private scheduled commercial banks.

We hand-collect data on savings deposit rates at the bank level. Deposit rates are uniform across bank branches. Prior to 2011, savings deposit rate were regulated by the RBI and this deposit rate data is from CEIC. Post deregulation, banks were free to set their savings deposit rates. We construct this data via snapshots of individual bank websites⁸. We collate bank-year time series data of savings deposit rates for 35 public and private sector banks, while we have data for 58 banks in the regulated period. We collect savings deposit rates data most widely applicable, and ignore the data for larger-sized deposits in our baseline analysis.

In supplementary analysis, we use household survey data from the National Sample Survey Organization’s (NSSO) survey of All India Debt and Investment Survey (AIDIS). This is a cross-sectional survey of Indian Households and documents their holdings of types of assets and liabilities. This pan-India survey is comprehensive and is representative at the district level. We use two 2003 and 2013 survey encompassing the deregulation episode. We aggregate the deposit and credit variables of interest to the district level using the household weights assigned to each household, creating representative district-level aggregates.

Measurement of market power Our primary measure of market power is the branch-level Herfindahl index (HHI) aggregated to the bank-level. This measure captures whether a bank is operating in districts where it has a large share of the market. Branch-level HHI is:

$$\text{Branch HHI}_{i,t} = \sum_{b=1}^B (\text{Deposit Market Share}_{b,i,t})^2 \quad (1)$$

for district i in year t with Deposit Market Share $_{b,i,t}$ as the bank’s market share in a given district.

⁷Foreign and regional rural banks account for the remaining 5%.

⁸Specifically, we use [Archive.org](#).

The bank-level HHI is the weighted average of the Branch-HHI, defined as:

$$\text{Bank HHI}_{b,t} = \sum_{i=1}^N \omega_{bit} \times \text{Branch HHI}_{i,t} \quad (2)$$

where ω_{bit} is the deposit share for bank b that it raised in each market i in year t . N is the total number of districts (markets) a bank b is operational. Bank HHI $_b$ captures a bank's average market power across all markets in which it has branches. In robustness results, we also compute Bank HHI using only savings deposits and using more granular markets within districts.

In our analysis, Bank-HHI is the key metric used to quantify the extent of any individual bank's market power. We classify banks with below median average Bank-HHI between 2007–2011 as low-market power banks (Low HHI $_{bank}$).

Our empirical strategy relies on one source of heterogeneity in market power, namely, banks' deposit concentration following similar strategy in [Drechsler et al. \(2017\)](#) and [Li et al. \(2023\)](#). However, more recent work by [d'Avernas et al. \(2023\)](#) find that bank HHI may simply capture large banks that offer superior financial services and hence offer lower rates. We contend that low Bank-HHI can be observationally correlated with other bank features that confer banks higher deposit market power.⁹ For our purposes, we simply need ex-ante variation in bank market power that induces a differential response post-deregulation and allows us to estimate reduced form effects. In Section 8, we use a structural model to confirm that customers of low-HHI banks indeed exhibit higher rate elasticities. We also show robustness using alternate measures of deposit market power. Concerns arise only if some alternate non-deposit sources of market power or alternative bank characteristics drive results, which we show is not the case (Section 9). Given this discussion, we use bank concentration and market power interchangeably in the paper and make the distinction only if necessary.

5.2 Empirical strategy

Our primary empirical strategy exploits granular branch level data with two-way fixed effects to study the impact of savings rate deregulation on low-market power banks vis-à-vis high-market

⁹Table A4 shows the correlates of low HHI.

power banks. The granular data allow us to saturate the specification with fixed effects and control finely for confounding factors. We also examine several outcome variables — such as holdings of government securities and bank-level profitability — at the bank level as this is the appropriate unit of interest for outcomes (government bond holdings, investments) decided at the bank level.

Branch-level regressions We use the following specification using branch-level data to examine the impact on deposit and credit outcomes:

$$y_{jbit} = \alpha_j + \delta_t + \varphi_{it} + \beta \times \text{Post}_t \times \text{Low HHI}_b + \epsilon_{jbit} \quad (3)$$

for branch j of bank b in district i in year t . y_{jbit} is the dependent variable and outcome of interest namely logged deposits, logged credit, credit-to-deposit ratio, and the weighted average lending rate (WALR). Low HHI_b is 1 for banks with below median average deposit market concentration in the pre-period between 2007–2011. Post_t is 1 for year 2012 and later. Year is fiscal year as of March 31st. The sample period is from 2007 to 2016. α_j is the branch fixed effect and controls for factors invariant across time at the branch level. The time fixed effect, δ_t , controls for time-varying factors at the aggregate level. The district-year fixed effects, φ_{it} , controls for time-varying factors in the district in which the bank branch is located. The empirical strategy relies on granular branch-level data, where we compare two branches with different market power within the same district. The coefficient of interest, β , estimates the impact on the outcome variable for low-market power banks relative to the high-market power banks, after controlling for local demand factors.

We examine temporal dynamics using the specification:

$$y_{jbit} = \phi_j + \delta_t + \gamma_{it} + \sum_{l=-k}^m \beta_l \times \text{Low HHI}_b \times \mathbb{1}\{t = 2011 + l\} + \epsilon_{jbit} \quad (4)$$

for branch j belonging b in district i at time t . $k > 0$ and $m > 0$, and t ranges from 2006 to 2016. ϕ_j , δ_t , and γ_{it} refer to branch, time and district-time fixed effects. Event study plots show the estimates for β_l and allow us to examine how the outcome variable evolves over time. Importantly, these event study plots also allow us to examine violation of the pre-trend assumption.

To study compositional changes in deposit and credit, we use the following specification:

$$y_{jbit} = \alpha_j + \delta_t + \varphi_{it} + \beta \times \text{Post}_t \times \text{Low HHI}_b + \gamma \times \text{Post}_t \times \text{Low HHI}_b \times \mathbf{X} + \epsilon_{jbit} \quad (5)$$

the dependent variable, y_{jbit} is the share of different categories. \mathbf{X} is a vector of indicators for each category excluding a base category. β captures the change in share post-deregulation for the base category. The coefficient vector γ capture change in share relative to the base category.

Bank-level regressions To examine the impact on bank-level outcomes, we use the following specification:

$$y_{bt} = \eta_b + \delta_t + v \times \text{Post}_t \times \text{Low HHI}_b + \epsilon_{bt} \quad (6)$$

for bank b in year t . y_{bt} is the dependent variable and outcome of interest. Low HHI_b is 1 for banks with below median average deposit market concentration in the pre-period between 2007–2011. Post_t is 1 for year 2012 and later. Year is fiscal year as of March 31st. η_b is the bank fixed effect and controls for factors invariant across time at the bank level. The time fixed effect, δ_t , controls for time-varying factors at the aggregate level. The coefficient of interest, v , captures the impact on the outcome variable for low-market power banks relative to high-market power banks.

5.3 Descriptive Statistics

Figures 1 presents the map of branch-HHI across India. A lower number indicates lower concentration and higher competition. There is substantial variation across districts, with Jammu and Kashmir in the north and the northeastern states exhibiting higher market concentration.

Table 1 presents the descriptive statistics for key variables at both the bank-level and branch-level for 2007–2016. Panel A shows the mean and standard deviation overall and for low- and high-market power banks. Panel B reports the mean and standard deviation (columns 1 and 2) of bank- and branch-level variables for approximately 55 banks from fiscal years 2007 to 2016. Our empirical exercise focuses on the relative effect of low-market power banks compared to high-market power banks over the deregulation period. Columns 3 and 4 capture the average and

standard deviation of different variables at bank and branch level for low market powered banks whereas columns 5 and 6 captures the average and standard deviation for high market powered banks. We find that saving deposit rates were lower on average for high market powered banks and spreads higher compared to lower market powered banks. We also find that, on average, banks with high market power were larger in size with respect to credit and deposit in comparison to low market powered banks, though their net interest margins were similar.

The Internet Appendix Table A3 captures the differences in mean values of variables at bank and branch level for high and low market powered banks before and after deregulation. Columns 1 and 2 show the average values of variables before and after deregulation for banks with low-market power, while columns 4 and 5 display these values for banks with high-market power. Column 3 details the differential effect of deregulation on the average values for low-market power banks, and column 6 provides this information for high-market power banks. Column 7 shows the difference in the estimates for post- versus pre-deregulation between low- and high-market power banks. For branch-level statistics, we use the residual from a branch fixed effect regression.¹⁰

The summary statistics indicate a smaller increase in savings deposit rates for high market banks, accompanied by a higher spread between the Repo rate and the savings deposit rate set by these banks. Conversely, low-market power banks, plausibly aiming to attract more deposits, set higher deposit rates post-deregulation, resulting in a lower spread. Post-deregulation low-market power banks significantly increased savings rates compared to high-market power banks. Logged assets as well as logged deposits increased for both types of banks post-deregulation, but the degree with which the low market-powered bank increased was higher than that of higher market-powered banks. Additionally, the credit-to-asset ratio increased more for low-market power banks compared to banks with high market power, plausibly to offset the higher deposits costs. Government securities increase in low-market power banks compared to high-market power banks, with no significant differences in the share of assets in the aggregate.

Interest expenses and income (measured relative to total assets) is higher for banks with lower

¹⁰Residuals are from the branch-level regression:

$$y_{bdt} = \alpha_b + \epsilon_{bdt}, \quad (7)$$

where $\hat{\epsilon}_{bit}$ gives the residualized values.

market concentration. However, net interest margins (NIM) are not significantly different between these two sets of banks indicating a one-to-one matching (Drechsler et al., 2021). Net interest margins are marginally lower for low market-powered banks. Short- and long-term investments are not significantly different. Credit-to-asset ratios are higher for low-market power banks.

Trends are similar at the branch level. Deposits increase post-deregulation, with low-market-power banks exhibiting greater increases, barring current accounts. Similarly, residualized credit shows similar trends. These trends provide first evidence of our baseline hypothesis: low-market power banks raise deposits by increasing savings deposit rates, that translate to higher credit.

6 Bank funding, assets, and liabilities

This section examines the impact of deregulation on deposit rates and deposits, and the implications for bank assets and profitability.

6.1 Deposits

Deposit Rates Prior to deregulation, savings deposit rates were held constant at 3.5% from March 2003 to October 2011 (Panel A, Figure 2), despite significant variation in Repo rates (Panel B, Figure 2). Average savings rates increased after deregulation and ranged between 3.5–4.5%, well below the Repo rate with positive spreads (Repo rate - savings deposit rate) throughout 2011–2016 (Panel B). Impact is heterogeneous with low-market power banks increasing savings deposit rates more than high-market power banks (Figure 3, Panel A), but below Repo rates (Figure 3, Panel B).

We use the bank-level specification in Equation 6 (since deposit rates are set at this level) to examine the impact of deregulation on savings deposit rates. Low-market power banks increased their savings deposit rates by an average of 37 bps relative to high-market power banks (Table 2, column 1). Relative to the pre-period rate of 3.5%, this represents a 10% increase. In contrast, low-market power banks do not increase term deposit rates relative to high-market power banks, as banks were free to choose term deposit rates prior to the 2011 deregulation (column 2).

Savings deposits How do deposits respond? It is not necessary that the savings deposit rate increases translate to deposit flows. It is plausible that despite the rate increases, low-market power

banks are unable to attract depositors if there is no unmet latent demand. Table 3 shows the estimates from the branch-level regression using the specifications with log in Equation 3 (Panel A) and deposit shares in Equation 5 (Panel B). Both specifications are saturated with a number of fixed effects. Branch fixed effects capture branch-level unobserved heterogeneity. Year fixed effects account for time-variant aggregate factors. District \times year fixed effects control for unobserved heterogeneity within districts over time and hence account for local unobservable factors driving deposit demand. Our specification compares banks with varying market power within the same local market. Panel A reports the results for levels of deposits and savings deposits, both expressed in logs. Columns 1–2 show that low-market power banks increased savings deposits consistent with the increase in savings deposit rates in Table 2. The preferred specification in column 2 indicates that low-market power banks increase their savings deposits by 16 pp.

Figure 8 shows the temporal dynamics of savings deposits. Panel A shows descriptive trends for low- and high-market power banks with the log of aggregate savings deposits normalized to 2010 values. Pre-deregulation, savings deposits exhibit similar trends, but post deregulation the trends for low HHI banks outpace high HHI banks. We examine the temporal dynamics more formally in Panel B. The point estimates for β_l using Equation 4 are shown with the dependent variable logged savings deposits. The vertical red lines indicate the 95% confidence intervals for each point estimate ranging 5 years pre-deregulation to 4 years post-deregulation for 2007–2016. $t = 0$ corresponds to 2011. There is sharp increase in savings deposits after deregulation. While low and high HHI banks seem to be on similar trends prior to deregulation, there is a significant difference between the two in $t = -4$. Thus, one concern is that the parallel trends assumption is potentially violated. Note, however, low HHI banks branches were on a negative growth trend relative to branches of high HHI banks, indicating that if anything the point estimates are biased downwards and our observed estimates should be considered as a lower bound. [Rambachan and Roth \(2023\)](#) provide a way to more formally assess violations in the pre-trends assumption. Panel C shows the results from the sensitivity analysis relaxing the restriction that the counterfactual trends cannot vary with respect to any existing pre-trend. Using the sensitivity analysis, we show that to rule out the efficacy of the treatment effect (deregulation), the threshold variation needed

for the post period trend to diverge (w.r.t. pre-period trends) is at least as big or bigger (known as the breakdown indicator \overline{M} in [Rambachan and Roth \(2023\)](#)). The large violations in pre-trends required to find a null effect assuages concerns that our point estimates are spurious.

Term and current deposits Interestingly, we find that both term and current deposits grow by 20% and 18% respectively for low-market power banks. This is despite no change in term deposit rates. We hypothesize that the increase in savings deposit rates allows low-market power banks to attract depositors, which they are then able to leverage to increase term and current deposits. The growth across deposit types is reflected in the aggregate deposits (columns 7–8), which also increase. The preferred specification in column 4 indicates that deposits of low-market power banks increase by 13.5 pp compared to high-market power banks post deregulation.

Despite the increase across deposit types, we see a shift in deposit composition (Panel B). The share of savings deposits increases by 3.27% post deregulation for low-market power banks and term deposits declines by -3.60% (=3.27%-6.87%). Current deposits increases by a minuscule 0.32% (=3.27%-2.95%). Thus, deposit maturity shortens as both savings and current deposits increase. Overall, low-market power banks face elevated funding costs owing to higher savings deposit rates but also relatively unstable deposits, given their lower market power.

Branch expansion To further establish the mechanism through which low-market power banks increase their deposit base, we turn to the impact on number of branches in Panel A, Table 4 using the specification in Equation 6. Low-market power banks increased branches by 33% (column 1). Column 2 repeats the specification using number of branches normalized by deposits. The branch-to-deposit ratio increases 25%. Thus, low-market power banks dedicated more resources to mobilize deposits, explaining the rise in term and current deposits. However, deposit composition tilted towards savings deposits consistent with the hypothesis that the primary increase was in savings with spillovers to term and current deposits. One implication of new branches opening is the increase in alternatives available to depositors. Households typically invest in various deposit products (savings, term deposits, and fixed deposits) at the same bank, and hence it is unsurprising we see effects across the board.

Branch openings did not change the deposit market concentration post deregulation. Figure 5 plots the yearly HHI for low and high HHI. We see no changes in the aggregate trends. More formal regressions show similar muted effects on bank HHI (column 3, Panel A, Table 4). Instead low HHI banks expand into newer markets (Panel B). The dependent variable is whether a new branch was established in a district-market, where granular markets are defined within districts (metro, urban, semi-urban, and rural). We examine whether a low-HHI bank was more or less likely to set up a branch in a market it was already present in. Column 3 suggests that low HHI banks were 4.1 pp less likely to set up a branch in a market it was already present in. If anything, low-HHI banks were diversifying post deregulation. [Morelli et al. \(2024\)](#) argue that diversification allows banks to diversify idiosyncratic deposit demand shocks, reduce risk premiums and increase deposit rates. Potentially, low-HHI banks enter newer markets to diversify and can raise deposit rates through the lowering of aggregate deposit risk premiums.

6.2 Credit

The increased cost of funding due to deregulation, along with the higher flow of funds, has implications for the asset side composition of bank balance sheets. In the aggregate, credit-to-deposit ratios of low-market power banks outpace that of high-market power banks (Figure 4). To assess the impact of deregulation and analyze the asset portfolios of banks, we run a branch-level specification similar to Equations 3 and 5, focusing on both total credit and credit composition. The granularity of our dataset allows us to track the type of borrower for each loan from a specific bank branch, enabling us to classify the sectors to which loans are directed and highlight shifts in banks' portfolios. Table 5 reports the estimates on credit. Lending increased 33 pp for low-market power banks post deregulation (columns 1–2). Credit-to-deposit ratios also increase by 10% showing the mobilization of deposit inflows to credit and underscoring the shift to lending.

Table 6 shows the sectoral allocation of credit. The point estimates reported in Panel A are from the specification in Equation 3 using the dependent variable, logged credit for each of the following sectors (i) agriculture, (ii) industry, (iii) personal loans (such as housing, durable goods, and credit card loans), and (iv) services (professional and non-professional). Low-market power banks increase lending across the board. In Panel B, we examine the compositional shifts using

the specification in Equation 5. The dependent variable is the share of each loan category and the base category is personal loans. We see a compositional shift towards personal loans. Personal loan share increases by 3.734%. Industry and services shares also increase by 0.948% (=3.734%-2.786%) and 2.224% (=3.734%-1.51%), respectively. The largest shift is towards the personal loan and services sector, which are in the small loan ticket-size category. Low-market power banks potentially picked up latent demand in both the services and personal loans segment. On the other hand, industry loans rely on relationship lending and are a more difficult market to capture.¹¹ In Panel C, we look at lending to Micro, Small, and Medium Enterprises (MSMEs).¹² Given the perceived riskiness of lending to MSMEs, which constitutes small businesses, the sector is typically financially constrained. Lending to MSMEs increases by 81%, driven by a low base effect in the pre-period. MSME loan share increases by 6.38%, indicating that the low-market power banks cater to smaller and more financially constrained borrowers post deregulation.

Loan maturity Maturity transformation is a key feature of modern banking: banks borrow short-term and lend long-term (Diamond and Dybvig, 1983). To examine the impact on loan maturity structure, we run the specification in Equation 5 on the share of credit allocated to medium-term and long-term lending with the base category, short-term loans. The estimates in Table 7 suggest that low-market power banks increased the share of short-term loans (and medium term) loans and decreased their share of long-term loans post deregulation. This result aligns with the shortening of deposit maturity due to the shift to savings deposits by low-market power banks.

6.3 Government securities and investments

Regulating deposit rates to be low allows banks to raise cheap deposits. This also allows banks to invest in safe but low-yielding government securities while continuing to earn comfortable margins. Deregulation resulted in low-market power banks raising deposit rates that increased their

¹¹Bank-borrower relationships are generally sticky in nature. Borrowers are often best served by a small, close-knit circle of relationship banks and not by a perfectly competitive mass of investors (Murfin, 2012). Petersen and Rajan (1994) and Petersen and Rajan (2002) shows that smaller banking groups create an environment where lenders have a greater incentive to invest in building long-term relationships with borrowers. See Bharath et al. (2011) and the references therein for further details on bank-borrower lending relationships.

¹²MSMEs contribute nearly 37% of the total manufacturing output in India and therefore account for a significant proportion of overall firms (MSME Ministry Annual Report).

funding costs. Does this force banks to switch out of low-yielding government securities? To examine this, we use the specification in Equation 6. Low-market power banks increased government security holdings (Column 1, Table 8). We also look at the impact on investments (column 2), which increases. Low-market power banks see an increase in both savings and overall deposits and hence the increase in government securities is not surprising as banks need to maintain a minimum percentage of their deposits in safe assets as part of their SLR requirements.

More importantly, we examine how the asset-side composition changes post deregulation using the specification in Equation 5 but at the bank level, with share of credit as the base category and the share of government securities and investments as the heterogeneity variables. While credit share increases by 0.218%, the share of government securities declines by 0.137% ($=0.218\%-0.355\%$) for low-market power banks (Panel B). Investment share, too, decreases by 0.083% ($=0.218\%-0.301\%$). The increase in credit share is also consistent with the high credit-to-deposit ratios documented in Section 6.1. This shift away from government securities is striking as deregulation indeed increased credit allocation to productive sectors of the economy. Government policies that force banks to hold sovereign debt can limit their ability to invest in the real economy and are a form of financial repression (Chari et al., 2020). In our case, deposit rate regulation results in banks holding government securities voluntarily, but deregulation makes banks offload government securities and shift to credit. While we argue that deregulation reduced financial repression, one should be careful in extrapolating to welfare effects. It is entirely plausible that government borrowing is directed to investments that may be more beneficial to the economy as opposed to lending by banks. Thus, welfare implications of such a shift are not clear as a large literature documents both crowding out and crowding in effects of government debt (see Demirci et al. (2019) and references therein).

6.4 Interest income and interest expense

Our analysis of banks' asset portfolios in relation to their market power centers on the effects of savings rate deregulation. This policy change increased banks' funding costs due to higher savings deposit rates offered to attract depositors. We conjecture that, in response, banks expanded credit portfolios to insulate their profits from the rising funding costs. Figure 6 illustrates the evolution

of weighted average interest income to deposit ratio (Panel A) and interest expense to deposit ratio (Panel B) for banks with low-market power (solid lines) and high-market power (dashed lines). Both ratios are weighted by banks' deposits. The gap in interest expenses and income increased over time but the increase was much higher for low- compared to high-market power banks. The increase in interest expense is consistent with the rise in funding costs of low-market power banks.

Where did the rise in interest income come from? We observed in Section 6.3 that low-market power banks shifted away from low-yielding government securities to high-yielding loans. Thus, the increase in interest income can be explained by this shift. Potentially, lending rates could also have increased. We examine the impact of deregulation on weighted average lending rates (WALR) in Table 9 using the specification in Equation 3. We focus on the branch-level regressions as this allows us to more finely control for local economic conditions using district-time fixed effects. Also, since loan rates can vary across branches, this is the more appropriate unit of variation. We find that the weighted average lending rate *decreased*. Thus the rise in interest income is from the expansion in their credit offerings with banks prioritizing the "quantity" effect over the "price" effect when increasing revenue by reducing lending rates. Plausibly, low-market power banks compete with high-market power banks on the loan side too and cannot increase lending rates easily. In a bid to gain loan market share, low-market power banks decrease lending rates.

More formal regressions examine the impact on interest income and expenses using the bank-level specification of Equation 6 on interest income and expense. Since profitability is measured at the bank level, this the appropriate level of aggregation. The results are reported in Panel B, Table 9. Column 1 shows a 21% increase in interest expense earned with a similar increase of 19% in interest income by low-market power banks post deregulation. This is also reflected in muted changes in net interest margin (NIM) — defined as the difference between interest income-to-asset ratio and interest expense-to-asset ratio. Banks closely match their interest expense and interest incomes to smooth profits, as documented previously (Drechsler et al., 2021).

7 Household access to deposits and credit

We showed that the level of financial intermediation increased post deregulation with both deposits increasing on banks' liability side and credit increasing on banks asset side for low-market power banks. We now examine household-level access to deposits and credit. We define high- and low-concentration districts, following [Drechsler et al. \(2017\)](#). The district level HHI is:

$$\text{District HHI}_{i,t} = \sum_b \text{Bank Deposit Share}_{b,i,t} \times \text{Bank HHI}_{b,t} \quad (8)$$

where $\text{Bank Deposit Share}_{b,i,t}$ is the deposit share of bank b operating in district i in time t' and $\text{Bank HHI}_{b,t}$ is bank-level HHI calculated as earlier. $\text{Low HHI}_{\text{district}}$ is 1 for below median values of average district-level HHI in the pre-period between 2007–2011.

To examine household deposit and credit we use the following specification:

$$y_{i,t} = \delta_s(i) + \beta \times \text{Low HHI}_{\text{district}} + \gamma \times y_{i,t-1} + \phi X_i + \epsilon_{i,t} \quad (9)$$

where $y_{i,t}$ is the district-level dependent variable of interest: logged deposit and credit. We control for the lagged variables in $y_{i,t-1}$ and use district level controls X_i (district population and share of female population interacted with time trends). δ_s is the state-level fixed effect. β captures the effect on the outcome variable for households in districts catered to by low-market power banks.

Table 10 shows that household deposit increased by 28% (column 2) in districts exposed to low-HHI banks post deregulation. Credit also increases by 29%. Panel B examines the impact on composition of household assets along two dimensions. In columns 1–2 in Panel B, we examine the compositional shift between financial assets (stocks and deposits)¹³ and physical assets (gold and real estate) using the specification in Equation 5. Though deregulation had no effect on the overall composition of physical and financial assets (columns 1–2) there is a compositional shift within financial assets to deposits (columns 3–4). Average household deposit share increases by 3.97% in low-HHI districts vis à vis high-HHI districts.

¹³The 2012 AIDIS dataset does not contain cash in hand and hence we exclude it.

8 A Parsimonious Structural Demand Estimation Model

We examine the heterogeneity across low-HHI and high-HHI banks in the rate semi-elasticities — defined as the percentage change in deposit demand due to a change in the interest rates by the banks. These semi-elasticities reflect demand characteristics of markets in which banks operate and indicate the extent to which banks can adjust prices. To this end, we build a parsimonious demand estimation model based on recent work in corporate finance and financial intermediation [Egan et al. \(2017\)](#), [Wang et al. \(2022\)](#), and [d’Avernas et al. \(2023\)](#).

We use a parsimonious structural demand estimation model for two purposes. First, it serves as an independent test of the underlying assumption for our reduced form analysis: low-HHI banks cater to depositors that exhibit higher rate elasticities. Second, the model allows us to conduct a counterfactual exercise and estimate how aggregate savings deposits would have responded in a market with lower HHI (more competition or lower market power).

Following [Wang et al. \(2022\)](#), we assume that at time t , the economy consists of mass 1 of households, indexed by $i \in 1, 2, \dots, n$, in each market, each endowed with one Rupee to invest. Households make a discrete choice of investing their endowment as savings deposits in one of the J banks or hold as cash (outside option).¹⁴ Therefore, the portfolio or the choice set for the household is given by $C^h = \{1, 2, \dots, J, J + 1\}$, where the first $1, 2, \dots, J$ options represent the savings deposits in each bank and the option $J + 1$ denotes cash holding. We define a district d in year t as a market d, t to capture the local sensitivity and dynamics. This exercise yields 6500 markets for our full sample for 2007–2016. We aggregate to the bank level in each market.

Each bank deposit option is a different product available to the household and the price of each product is characterized by its deposit spread $s_{j,d,t}$, defined as the difference between the policy short-term rate f_t (Repo rate) and the bank’s savings deposit rate $r_{j,d,t}$, and is a measure of the opportunity cost of holding savings deposits. Higher the value of spread for bank j , higher is the opportunity cost of holding savings deposits in that bank.¹⁵ Banks are also characterized

¹⁴Since public holding of bonds in India is limited, only 5% ([Das et al., 2024](#)), we abstract away from bond holdings in the household’s portfolio, which is a common assumption for the US markets ([Wang et al., 2022](#); [d’Avernas et al., 2023](#)).

¹⁵We use the spread on deposits rather than deposit rate since it is a more natural interpretation of the price of savings deposits.

by a vector of product characteristics $\mathbb{X}_{j,d,t}$ including the number of branches and the number of employees per branch that captures the non-rate utility of each option for the household. The yield on cash holding is assumed to be zero. The household chooses its allocation to cash and saving deposit to maximize its indirect utility:

$$\max_{j \in \mathcal{C}^d} U_{i,j,d,t} = \alpha_i s_{j,d,t} + \beta \mathbb{X}_{j,d,t} + \zeta_{j,d,t} + \varepsilon_{i,j,d,t} \quad (10)$$

where $\zeta_{j,d,t}$ denotes the fixed effects, $\zeta_{j,d,t} = \zeta_j + \zeta_{d,t} + \Delta\zeta_{j,d,t}$, consisting of bank fixed effects (ζ_j), market fixed effects ($\zeta_{d,t}$), and unobserved bank characteristics ($\Delta\zeta_{j,d,t}$). The coefficient β capture the sensitivities to the non-rate product characteristics. We allow households to have differential rate sensitivities to capture the fact that depositors perceive different banks differently in terms of the rates they offer with $\alpha_i = \alpha + \sigma v_i$, where $v_i \sim N(0,1)$ and σ captures the size of the dispersion. α denotes the mean rate preferences that is common across all the households. Plugging the value of α_i in Equation 10 and combining terms that vary across households and terms that vary across bank products in a market, the indirect utility can be rewritten as:

$$U_{i,j,d,t} = \delta_{j,d,t} + \sigma v_i s_{j,d,t} + \varepsilon_{i,j,d,t}, \quad (11)$$

where $\delta_{j,d,t} = \alpha s_{j,d,t} + \beta \mathbb{X}_{j,d,t} + \zeta_{j,d,t}$ is the mean utility from product j across all the households in the market d, t ; $\varepsilon_{i,j,d,t}$ refers to the idiosyncratic error term for household i and follows a Type 1 extreme value distribution ($F(x) = \exp(-\exp(-x))$). Household i will choose product j if the utility from product j is higher than that of other alternatives and is denoted by the following indicator function

$$\mathbb{1}_{i,j,d,t} = \begin{cases} 1, & \text{if } U_{i,j,d,t} \geq U_{i,k,d,t} \quad \forall k \neq j \in \mathcal{C}^d \\ 0 & \text{otherwise} \end{cases}$$

Given our assumption on the idiosyncratic error term distribution, the standard choice probability

that household i prefers product j in market d, t is:

$$\begin{aligned} d_{i,j,d,t}^m &= \int \mathbb{1}_{i,j,d,t} dF(\varepsilon) \\ &= \frac{\exp(\delta_{j,d,t} + \sigma v_i s_{j,d,t})}{1 + \sum_{k=1}^J \exp(\delta_{k,d,t} + \sigma v_i s_{k,d,t})} \end{aligned} \quad (12)$$

where the outside utility is normalized to 1. The numerator represents the utility from holdings deposits at bank product j . Integrating across individuals, we arrive at the market share for product j in market d, t :

$$\begin{aligned} d_{j,d,t}^m(\mathbb{X}_{j,d,t}, s_{j,d,t}; \alpha, \beta, \sigma) &= \int d_{i,j,d,t}^m dF_v(v) \\ &= \frac{1}{N} \sum_{i=1}^N \frac{\exp(\delta_{j,d,t} + \sigma v_i s_{j,d,t})}{1 + \sum_{k=1}^J \exp(\delta_{k,d,t} + \sigma v_i s_{k,d,t})} \end{aligned} \quad (13)$$

where $F(v)$ stands for the distribution of the unobserved heterogeneous spread sensitivities v_i . Since, standard integrating procedure cannot be used to integrate across individuals, we approximate the distribution with Monte Carlo integration for each market.

A standard challenge in identifying demand elasticities is the endogeneity of the savings deposit spread (price) with any unobservable demand shock that move the error term $\Delta \varepsilon_{j,d,t}$. To overcome this challenge, we follow [Wang et al. \(2022\)](#) and introduce cost shifters as instruments for savings deposit spreads, since these costs are unobserved by the households, while they are important for the banks in their pricing decisions, using these cost-shifters as instruments support the orthogonality assumption between the instruments and the error term. Specifically, we use the total non-interest payments, salaries to staff, and the ratio of officer level employees to total employees as the set of instruments.

Estimation We estimate the demand elasticities using the savings deposit rate data from individual banks to compute the savings deposit spread for 2007–2016. Banks in India apply uniform savings deposit rates across branches due to regulatory mandates, and therefore, in our setup we

set $s_{j,d} = s_j$.¹⁶ We use macro aggregates from RBI to proxy for overall cash holdings and savings deposits in the household’s portfolio. In order to allocate the aggregate cash holding to the different markets, we use district-level incomes. We measure district level income using night-time lights data from the Socioeconomic High-resolution Rural-Urban Geographic Dataset on India (SHRUG), and compute district weights based on the economic activity in that particular district relative to the overall economic activity in all districts.¹⁷ Using these district weights we allocate the aggregate cash holdings across districts. The bank characteristics $\mathbb{X}_{j,d,t}$, the set of instruments, and the total savings deposits for each bank are from the BSR dataset. For each market d, t , we draw 50 households from a standard normal distribution to capture the unobserved rate sensitivities v_i .

We use the methods of [Berry et al. \(1993\)](#) and [Conlon and Gortmaker \(2020\)](#) and estimate the parameter set $\theta \equiv \{\alpha, \beta, \sigma\}$ using a linear IV GMM regression method. To calculate the semi-elasticity, we follow [d’Avernas et al. \(2023\)](#) and define the spread semi-elasticity of bank j in market d, t as:

$$\eta_{j,d,t}^s = \frac{\% \Delta d_{j,d,t}^m}{\Delta s_{j,d,t}} = \frac{\partial d_{j,d,t}^m}{\partial s_{j,d,t}} \frac{1}{d_{j,k,t}^m} \quad (14)$$

Estimation Results The estimation results of our demand system is reported in Table 11. Panel A reports the coefficients of our parameters from the demand estimation. The result shows an average spread sensitivity of -1.90 indicating that a 1% increase in the savings deposit spread leads to a 1.90% decline in the deposit market share for bank j in a market, *ceteris paribus*. The positive coefficient on the number of branch locations indicates that increasing a bank’s branch network leads to a higher market share, highlighting the importance of non-rate characteristics in household banking decisions, consistent with the assumption in our simple theoretical model in Section 4 on the importance of provision of non-rate characteristics as an important factor in deposit supply by households and as a source of market power. Using these estimates of rate sensitivities, we compute the spread semi-elasticity using Equation 14. The spread semi-elasticity

¹⁶Though banks in India are mandated to keep savings deposit rates fixed across branches, a large empirical literature documents that banks often set uniform rates across multiple markets even in the US where they are allowed to set rates differentially ([Heitfield and Prager, 2004](#); [Granja and Paixao, 2021](#); [Begenau and Stafford, 2022](#)).

¹⁷Researchers have used night lights as a proxy for GDP growth, and cross-sectional GDP among other variables ([Hodler and Raschky, 2014](#)).

captures the impact of a change in the savings deposit spread on the quantity of savings deposits. Panel B of Table 11 reports the results. The mean spread semi-elasticity of -1.23 indicates that a 1% increase in the savings deposit spreads leads to a 1.23% decrease in deposit quantity, on average, demonstrating a more than one-to-one impact of spread changes on total deposit quantity.¹⁸

The average spread semi-elasticity masks important differences across banks with differing market power. Panel B reports the spread semi-elasticities for low-HHI and high-HHI banks, where we define low HHI banks based on whether the pre-sample period HHI value of a bank is below median and high HHI, otherwise. High-market power banks operate in relatively inelastic markets, with an average spread semi-elasticity of 0.56 (in absolute terms), while low-market power banks operate in relatively elastic markets, exhibiting a higher elasticity of 2.11 (in absolute terms). These estimates serve as an independent confirmation of the identifying assumption in our reduced form analysis: low-HHI (high-HHI) banks cater to markets with elastic (inelastic) demand. High-HHI banks, operating in relatively inelastic markets, have a sticky depositor base, which limits the decrease in deposits when they raise their spreads. In contrast, Low-HHI banks face highly elastic markets, where a 1% increase in their spread results in a more than proportional decrease in deposits. This contrast has significant implications: high-HHI banks can sustain their spreads with minimal impact on deposits, potentially reducing their funding costs and lessening the pressure to expand lending. Conversely, Low-HHI banks, which experience a 2.1% increase in deposits for every 1% reduction in spreads, see escalated funding inflows and associated costs. To maintain profitability, these banks respond by increasing their share of overall lending as the reduced form analysis showed.

We use these elasticity estimates to calculate how much a ₹1 of saving deposit in the pre-deregulation period will increase post-deregulation. We also conduct a counterfactual exercise: what is the impact on deposits if the banking system is homogeneous with low market power? We use the deposit rate semi-elasticity, which is the negative of the spread semi-elasticity to abstract

¹⁸Even though these results are based on the total deposit shares, all results flow through with similar signs and magnitudes when we use banks' savings deposit share instead.

away from contemporaneous changes in the policy rate.¹⁹

₹1 of savings deposit pre-deregulation comprises of ₹0.45 from low market-power banks and the remaining ₹0.55 from high-market power banks.²⁰ We use $\Delta d = ₹1 \times \eta \times \Delta r$, where Δd is the change in the deposit value, η is the rate semi-elasticity estimate, and Δr is the change in the average savings deposit rates, to estimate the change in deposits between the two periods. The change in deposit value using the different semi-elasticities for the two sets of banks, $\Delta d^{het} = ₹0.87$ ($₹0.45 \times 2.11 \times 0.79 + ₹0.55 \times 0.56 \times 0.41$).²¹ In the counterfactual exercise, we set the market elasticity of high-market power banks to be the same as that of low-market power banks, with a similar deposit rate response. This yields $\Delta d^{cf} = ₹1.67$ ($₹0.45 \times 2.11 \times 0.79 + ₹0.55 \times 2.11 \times 0.79$) denoting a change in the value of savings deposit by ₹1.67 for every ₹1 of savings deposit pre-deregulation, with an aggregate of: $d_{post}^{cf} = ₹2.67$. Comparing the counterfactual value to the baseline value, yields a gap of ₹0.8 (₹ 2.67- ₹1.87). In the absence of any market power, savings deposits would have been ₹0.8 or 42% higher. Thus, we contend that a concentrated banking system limits the gains from deregulation.

9 Robustness and alternative hypotheses

Our baseline results are robust to using an alternative sample period ± 3 years (Internet Appendix Table A5), using an HHI measure based on savings deposits instead of total deposits (Internet Appendix Table A6), and defining more granular markets based on metro, urban, semi-urban, and rural sub-divisions within districts (Internet Appendix Table A8).

¹⁹To see the equivalence of semi-elasticities, notice that

$$\begin{aligned} \eta_{j,d,t}^s &= \frac{\Delta d_{j,d,t}^m}{\Delta s_{j,d,t}} \frac{1}{d_{j,d,t}^m} = \frac{\Delta d_{j,d,t}^m}{\Delta(f_t - r_{j,d,t})} \frac{1}{d_{j,d,t}^m} = \frac{\Delta d_{j,d,t}^m}{\Delta s_{j,d,t}} \frac{1}{d_{j,d,t}^m} = \frac{\Delta d_{j,d,t}^m}{(f_t - r'_{j,d,t} - f_t + r_{j,d,t})} \frac{1}{d_{j,d,t}^m} \\ &\implies \eta_{j,d,t}^s = \frac{-\Delta d_{j,d,t}^m}{(r'_{j,d,t} - r_{j,d,t})} \frac{1}{d_{j,d,t}^m} = -\eta_{j,d,t}^d \end{aligned}$$

where $\eta_{j,d,t}^s$ and $\eta_{j,d,t}^d$ denotes the spread and rate semi-elasticity respectively. [d'Avernas et al. \(2023\)](#) use a similar measure in their analysis.

²⁰45% of deposits are from low-market power banks and the remaining 55% is from high-market power banks.

²¹To see this,

$$\Delta d^{het} = \left[\underbrace{₹0.45 \times \eta_{low} \times \Delta r_{low}}_{\text{low MP}} + \underbrace{₹0.55 \times \eta_{high} \times \Delta r_{high}}_{\text{high MP}} \right] = 0.87$$

One concern might be that low-HHI is a proxy for some variation unrelated to deposit market power. Table A4 shows that low-HHI banks cater to urban markets, are less likely to be state-owned banks, have more skilled officers, and have higher NPAs (column 9). Even if low-HHI captures other sources of *deposit* market power, our results hold. Market power can arise from other factors such as better provision of liquidity services, explicit or implicit guarantees of deposits, regulation limiting free entry of banks, or by catering to markets with inelastic demand. While the baseline estimates rely on deposit market HHI, our structural estimation exercise (Section 8) confirmed that low-HHI banks cater to markets with elastic demand. We show robustness with several alternative sources of deposit market power. Concerns arise only if some alternate *non-deposit* source of market power or alternative bank characteristics drive results. We show robustness to alternative non-deposit related hypotheses.

9.1 Deposit- β

We define an alternate measure of market power, deposit- β , more closely tied to the banks' market power in pricing of deposits. We define deposit- β as the extent of pass-through of the monetary policy rate to the deposit rates for banks as in Drechsler et al. (2021). If f is the repo rate and r^d denotes the deposit rate with $r^d = \beta f$, then the "spread" s is defined as

$$s = (1 - \beta)f$$

lower the β , lower is the sensitivity of deposit rate to the Repo rate (policy rate), higher is the spread and therefore higher the bank's market power. Given that in India, deposit rates are set at the bank level and not at the branch level, we calculate this sensitivity at the bank-level and relate a bank's interest expense to the change in the Repo rates. We extract the β from the following time-series regression for each bank b

$$\Delta \text{Interest Expense Rate}_{b,t} = \psi_b + \eta_t + \sum_{\tau=0}^3 \beta_{b,\tau} \Delta \text{Repo Rate}_{t-\tau} + \epsilon_{b,t} \quad (15)$$

where $\Delta \text{Interest Expense Rate}_{b,t}$ is the change in bank b 's interest expense rate from t to $t + 1$ which is calculated as the total quarterly interest expense divided by quarterly average assets and then

annualized. $\Delta\text{Repo Rate}_t$ is the change in the repo rate from t to $t + 1$, ψ_b are bank fixed effects, and η_t are time fixed effects. Time is at quarterly frequency. We incorporate three lags of the Repo rate changes to account for the cumulative impact of Repo rate adjustments over a span of one year. Our estimate of bank b 's overall expense beta is the sum of the coefficients in Equation 15

$$\hat{\beta}_{bank} = \sum_{\tau=0}^3 \beta_{b,\tau} \quad (16)$$

where b is replaced with $bank$. $\hat{\beta}_{bank}$ measures the extent to which the interest expenses of the bank (that includes the deposit interest expenses) changes due to the change in the Repo rate. A higher value of $\hat{\beta}_{bank}$ indicates lower market power.

Table A4 shows a high correlation between our baseline low-HHI and deposit- β . We use the specification in Equation 3 and replace Low HHI with deposit- β . Based on the baseline results, we expect the coefficient on the interaction coefficient to be positive as this implies that lower market power increased deposits and credit after deregulation. Table A9 reports the results. Low-market power banks indeed see an increase in deposits, credit, and credit-to-deposit ratios post-deregulation, in line with the baseline results.

9.2 The role of state-ownership of banks

State-owned banks may not have purely profit-maximizing incentives. State-ownership may determine bank performance (Sapienza, 2004; Dinç, 2005), lending decisions (Bertay et al., 2015), political influence (Dinç, 2005), and regulatory mandates (Burgess and Pande, 2005). To assuage concerns that other aspects of state-ownership drive our results, we confirm that all our results are similar when we restrict to private sector banks (Internet Appendix Table A10).

However, state ownership itself can be a source of *deposit* market power for banks. State-owned public sector banks enjoy explicit and implicit government guarantees, which is valuable since deposits insurance is limited (Acharya et al., 2023). Government backing also allows them to exert considerable market influence and undertake strategic initiatives. Branching mandates ensure that they cater to a broader geographies potentially with a captive depositor base. Further, not all households can access private sector bank services due to high switching costs for

poorer households. Households may also be required to open and maintain savings accounts with government banks to receive government transfers and salaries. In sum, state-ownership is an important dimension of deposit market power in India and is correlated with the baseline HHI measure (Table A4). We use the specification in Equation 3 and replace Low HHI with an indicator for private sector bank. Table A10 reports the results. Following deregulation, private sector banks increased their savings deposit rate by 0.14 pp, which led to 53% increased in deposits compared to public sector banks.

9.3 Alternate hypothesis: Loan market concentration

One counterargument could be that loan market concentration drives the post-deregulation effects (Maingi, 2023). While there is no direct link between savings rate deregulation and loan-market concentration, one could argue that some other demand factors or broader trends drive credit allocation forcing banks to raise deposits by increasing deposit rates. Indeed, deposit-HHI and an analogously defined loan-HHI²² are highly correlated (Table A4) making it difficult to disentangle the two channels. Two tests support the deposit market power hypothesis. First, a credit-demand hypothesis predicts an increase in loan rates. In contrast, loan rates decline after deregulation (Table 9). In a second test, we define local district-level Loan Branch-HHI by replacing deposit shares with loan shares in Equations 1. In our baseline we needed to rely on bank-level HHI variation since regulation doesn't allow deposit rates to vary across branches of a bank. Loan rates need not be uniform across branches and banks can compete for loans by differentially setting loan rates across branches (districts). As a result, local loan-market power should determine rates and loan quantities. Internet Appendix Table A11 shows that the baseline results flow through even after controlling for local loan branch-HHI. If anything, the coefficient on Branch-HHI^{Credit} is negative suggesting that internal capital markets are at play.

9.4 Alternate hypothesis: Bank distress

After the 2009 Global Financial Crisis, Indian banks were saddled with non-performing loans and the Indian government implemented several policies in the aftermath to clean up bank balance

²²Defined using loan shares instead of deposit shares in Equations 1-2.

sheets (Chopra et al., 2020). To examine effects from banks' non-performing assets during the period, we look at the interaction between bank distress (defined as the non-performing share of assets in 2011) and low HHI in Table A12. The baseline interaction (Low HHI×Post) remains significant throughout. There is heterogeneity across banks with 18.2% higher growth (=20.6%-2.4%) at low-HHI distressed banks compared to 20.6% growth at non-distressed low-HHI banks (column 2). This pattern is also reflected in credit growth (columns 9–10). These results are to be expected as distressed banks may be more restrained in expanding their deposit and credit base. Overall, low-HHI banks increased their deposits, even after accounting for bank distress.

10 Conclusion

This paper examines the impact of India's 2011 saving deposit rate deregulation on financial intermediation. We show that banks with low market power increased deposit rates more, leading to higher deposits. Lending increased, especially to underserved sectors such as retail loans and small businesses. Low-market power banks shifted from government securities to credit to offset higher funding costs. This paper demonstrates how deposit rate regulation can constrain credit availability and financial intermediation. Deregulation can stimulate lending but banks' market power mutes gains.

Although regulation has kept deposit rates low for long, fixed deposit rates were deregulated in 1997 and savings deposit deregulated only a decade later in 2011. Though monetary policy transmission to lending rates receives much regulatory attention, deposit rate transmission doesn't receive similar scrutiny. One plausible reason is fiscal dominance: depressed deposit rates allow banks to raise deposits cheaply while earning comfortable margins by simply investing in government securities. Importantly, a concentrated banking system achieves similar depressed rates that can be channeled to government treasuries. Due to fiscal dominance, the sovereign may similarly have incentives to keep the banking system concentrated.

Such depressed deposit rates are possible only until banks enjoy market power. As markets mature, savers can access alternate investment avenues, diminishing banks' market power. A case in point is the recent outflow of bank deposits as households look to invest in a booming

stock market. However, this has also been accompanied by warnings from the regulator²³ and government²⁴ on banks' dwindling deposits and rising credit-to-deposit ratios. Banks, in turn, have responded by increasing deposit rates. This paper highlights that rising deposit rates may adversely affect banks' funding costs, but can also improve household and firm credit access, potentially improving aggregate activity.

²³See [here](#) for RBI Governor's warning regarding the recent outflow of bank deposits in August 2024.

²⁴See the Finance Minister using banks to boost deposits [here](#).

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Figure 1
Deposit concentration across districts

This figure shows the heat map for district-level bank market concentration in India. Market concentration is district-level Herfindahl-Hirschman Index (HHI) calculated as the sum of the squared share of total deposits each bank operating in a district. Average market concentration as of 2011 is shown. All private and public sector banks are included in the analysis. Underlying branch-level data is from the Reserve Bank of India.

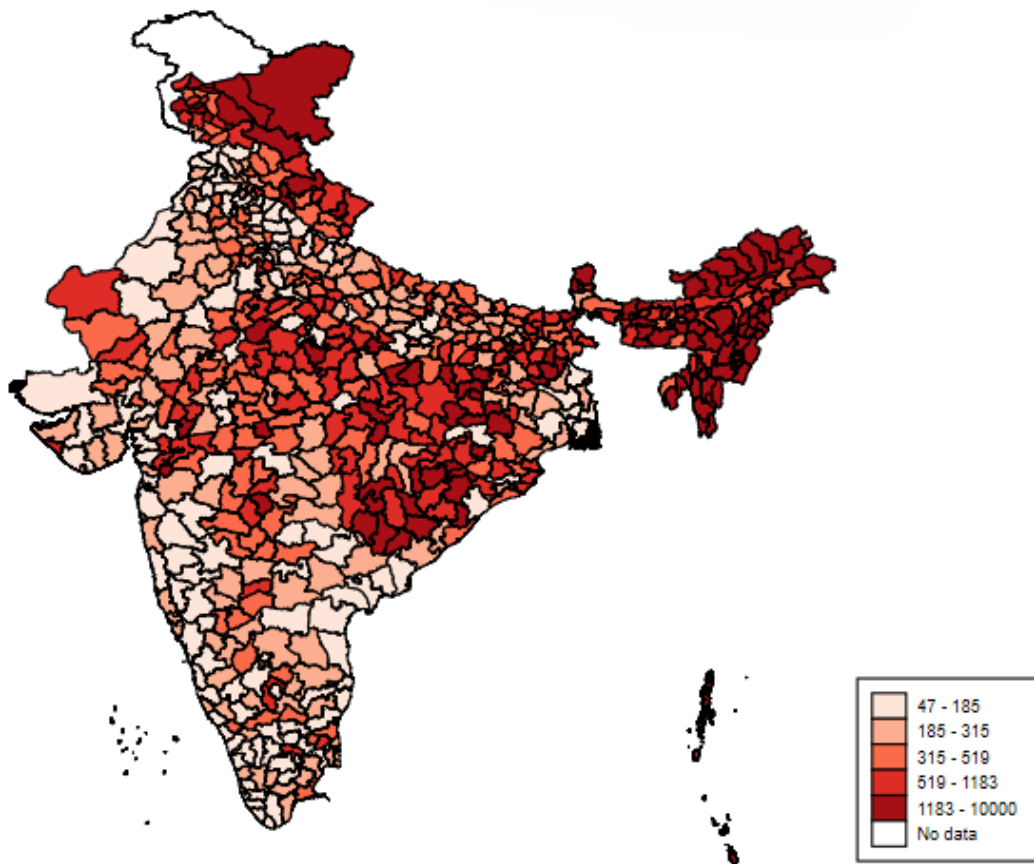
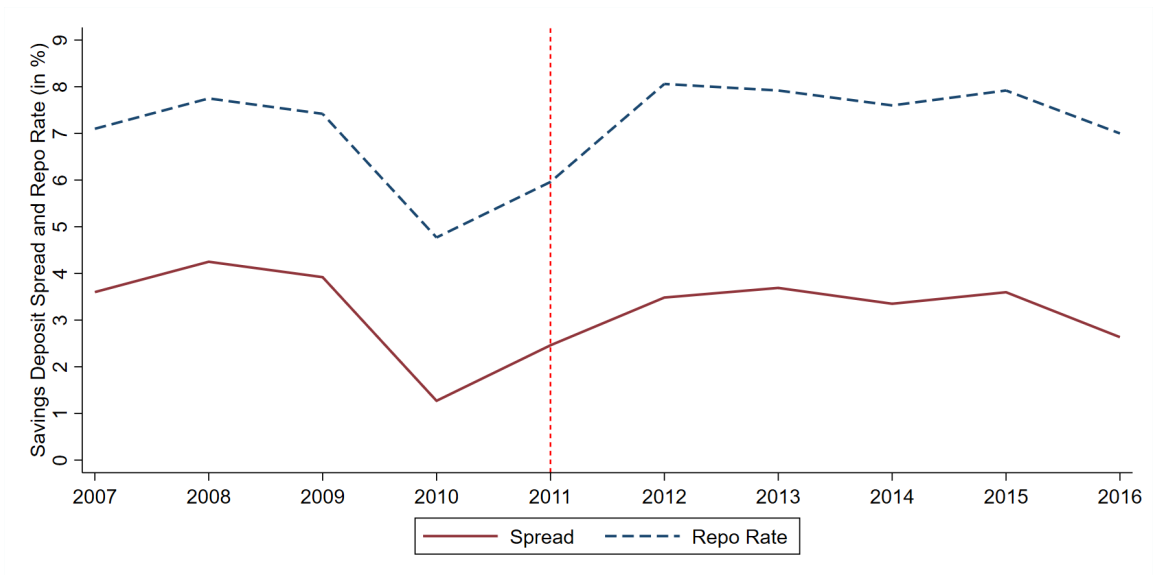


Figure 2 Savings deposit rates

This figure shows the savings deposit rate, spread, and repo rate from 2007 to 2016. Panel A shows the average savings deposit rate in India. Panel B shows the average spread defined as the repo rate minus the savings deposit rates. Years are the fiscal year as of March 31st. The vertical dotted red line denotes the year of deregulation, 2011. All private and public sector banks are included in the analysis. Repo rate is from CEIC. Savings deposit rate are hand-collected from bank websites.



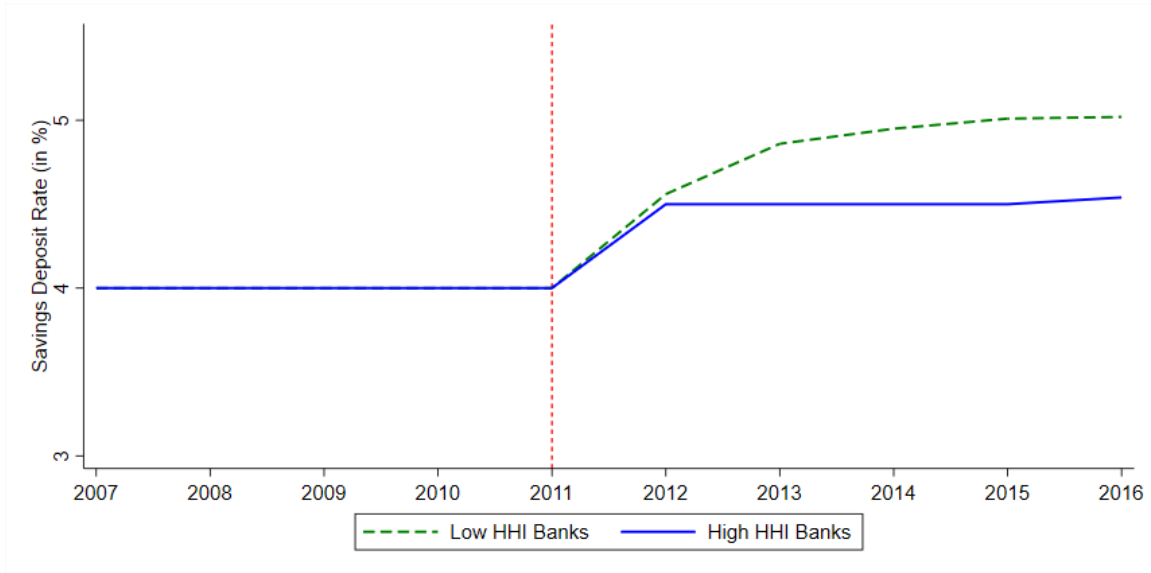
(A) Savings deposit rate



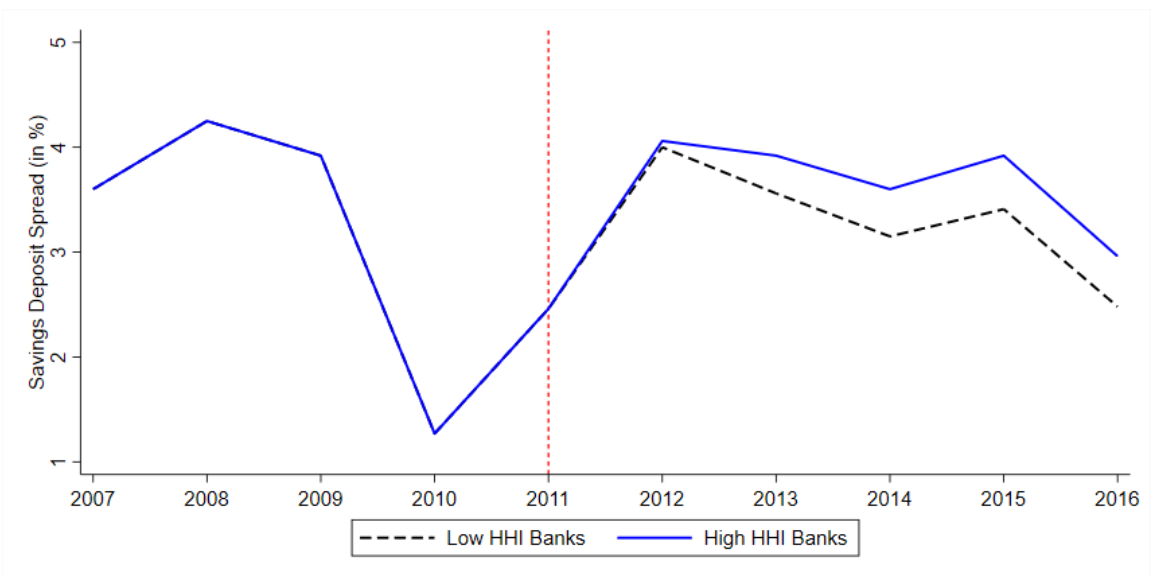
(B) Spread and repo rate

Figure 3
Savings deposit rates: Heterogeneity by deposit market concentration

This figure shows the savings deposit rate and spread by bank market power from 2007 to 2016. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. Panel A shows the average savings deposit rate for low and high HHI banks. Panel B shows the average spread defined as the repo rate minus the savings deposit rates for low and high HHI banks. Years are the fiscal year as of March 31st. The vertical dotted red line denotes the year of deregulation, 2011. All private and public sector banks are included in the analysis. Repo rate is from CEIC. Savings deposit rate are hand-collected from bank websites. Underlying branch-level data is from the Reserve Bank of India.



(A) Savings deposit rates: Low HHI vs High HHI banks



(B) Savings deposit spread: Low HHI vs High HHI banks

Figure 4
Credit to deposit ratio

This figure shows the credit-to-deposit ratio by bank market power from 2007 to 2016. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. This figure shows the average credit-to-deposit ratio for low and high HHI banks. Years are the fiscal year as of March 31st. The vertical dotted red line denotes the year of deregulation, 2011. All private and public sector banks are included in the analysis. Data is from the Reserve Bank of India.

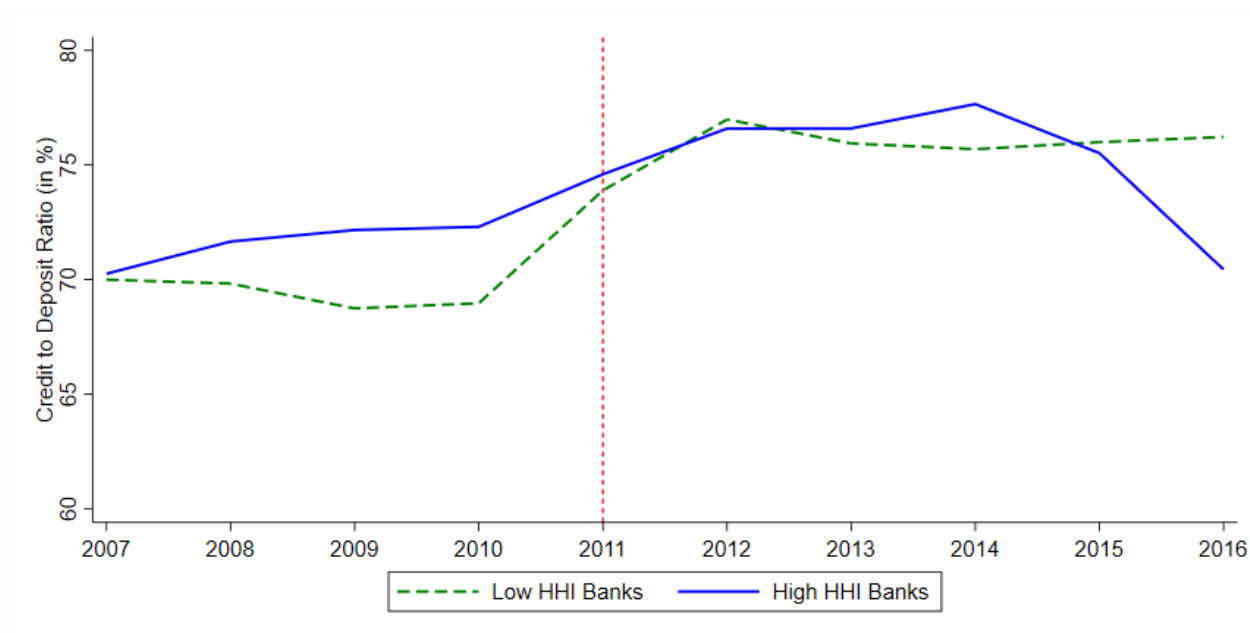


Figure 5
Trends in market power

This figure shows the evolution of Bank HHI from 2006 to 2016. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI in a given year. The figure captures the average market power for low and high HHI banks over year. Years are the fiscal year as of March 31st. The vertical dotted red line denotes the year of deregulation, 2011. All private and public sector banks are included in the analysis.

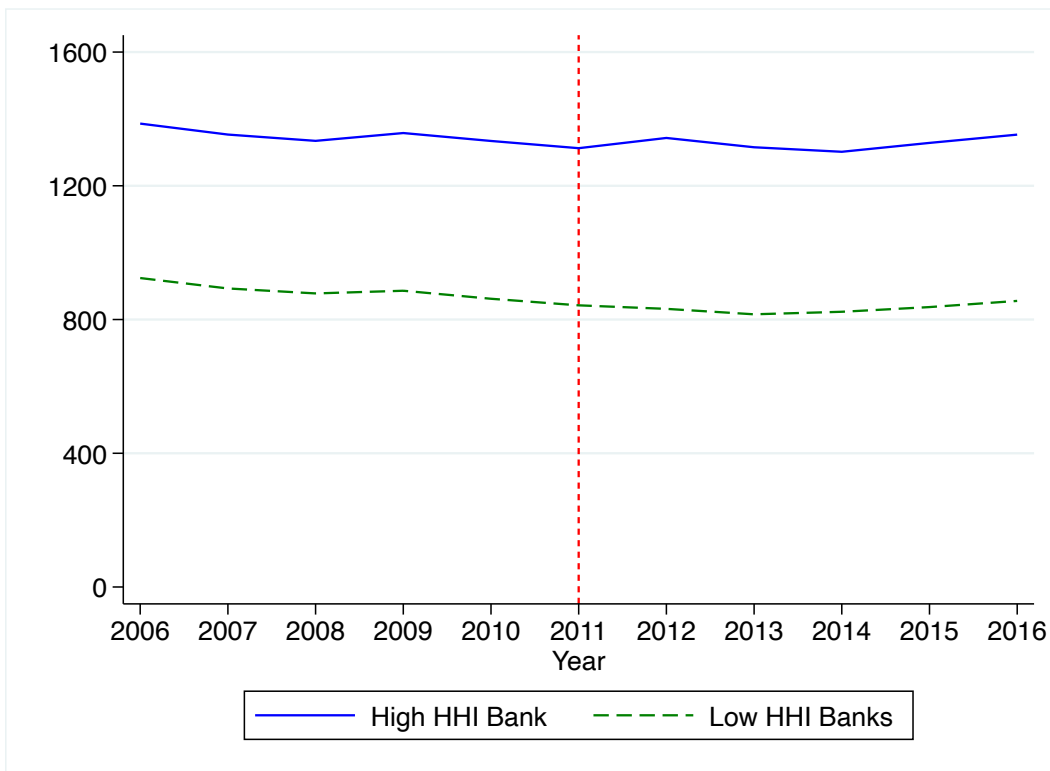


Figure 6
Interest income and interest expenses

This figure shows the interest expense to assets (panel A) and interest income to assets (panel B) by bank market power from 2006 to 2016. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. Years are the fiscal year as of March 31st. The vertical dotted line denotes the year of deregulation, 2011. All private and public sector banks are included in the analysis. Data is from the Reserve Bank of India.

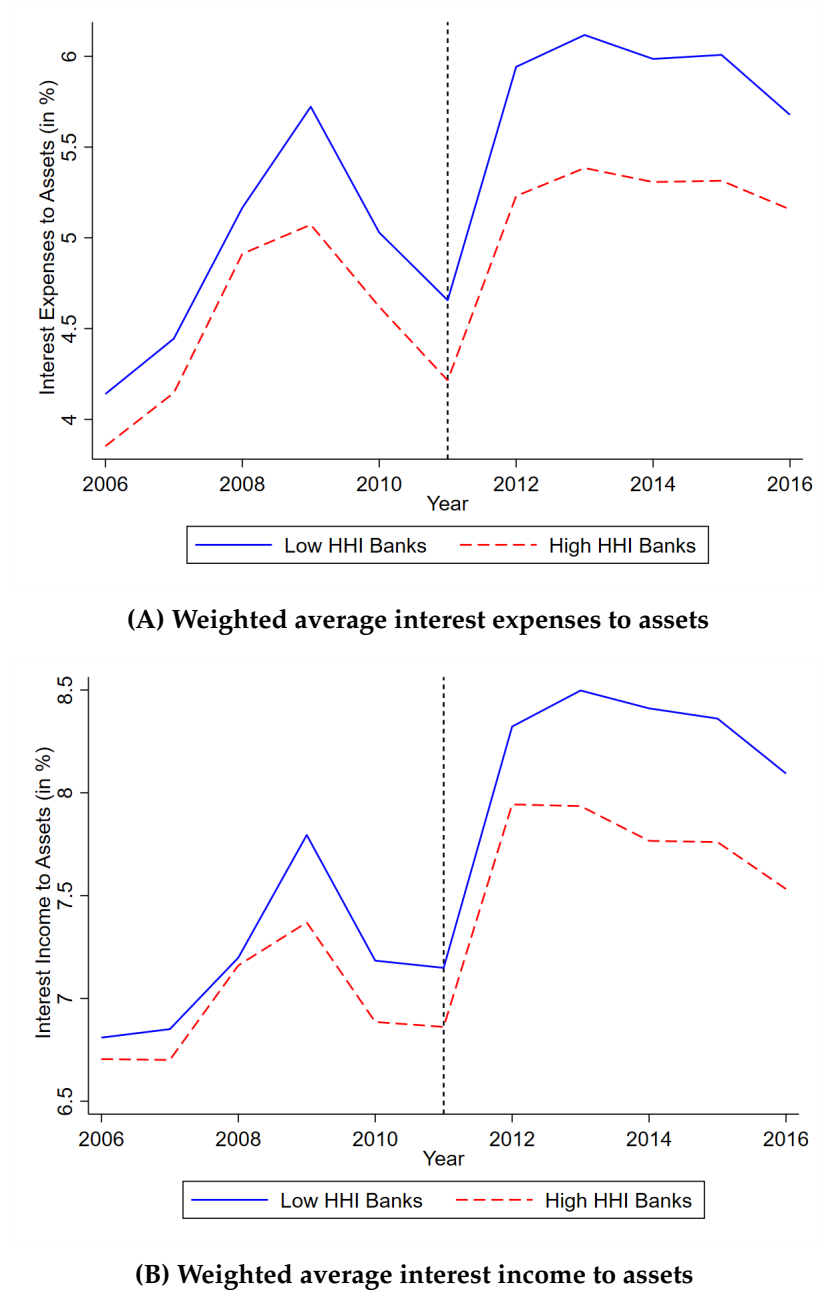
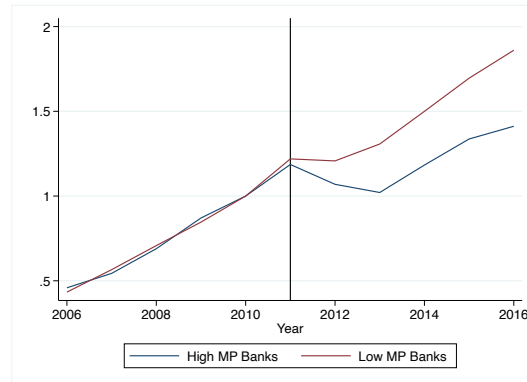
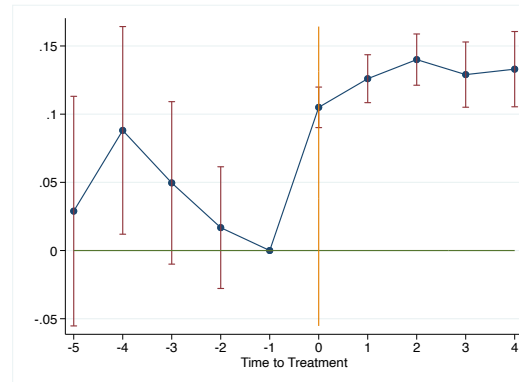


Figure 7 Pre-trend analysis for total deposits

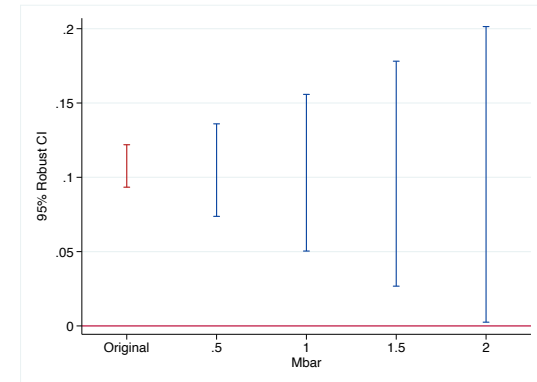
The plots below show temporal dynamics of deposits by bank market power for the period 2007 to 2016. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. Years are the fiscal year as of March 31st. The vertical line denotes the year of deregulation, 2011. In panel A, deposit is normalized to 2010. The aggregate deposits for low- and high-HHI banks are shown. Panel B shows the point estimates from an event study analysis. The vertical red lines show the 5% confidence interval for the point estimates. Panel C shows the sensitivity analysis using [Rambachan and Roth, 2023](#). In Panel B and C, 2011 is the reference year. All regressions are at the branch level, with standard error clustered at the branch level. Data is from Reserve Bank of India.



(A) Trend of normalized deposits



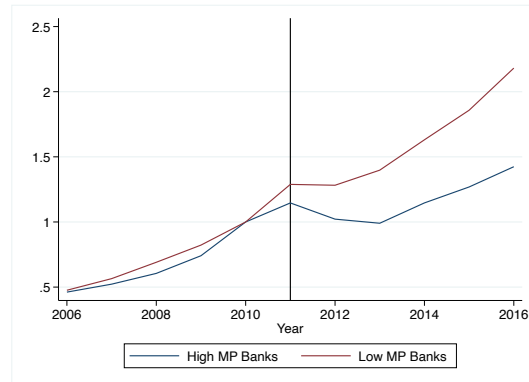
(B) Event study plot



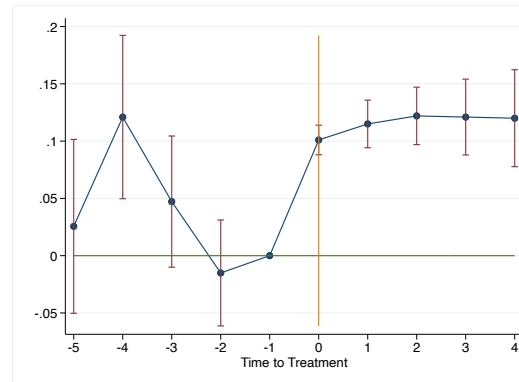
(C) Sensitivity analysis

Figure 8 Pre-trend analysis for savings deposit

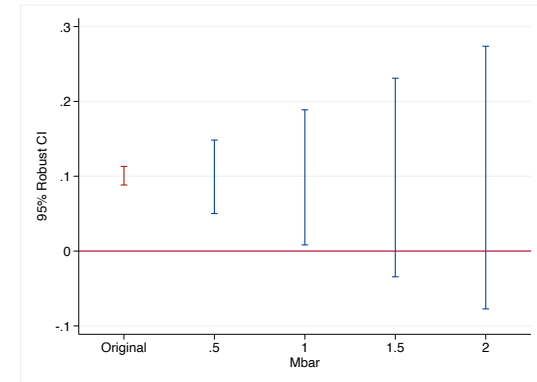
The plots below show temporal dynamics of savings deposits by bank market power for the period 2007 to 2016. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. Years are the fiscal year as of March 31st. The vertical line denotes the year of deregulation, 2011. In panel A, savings deposit is normalized to 2011. The aggregate deposits for low- and high-HHI banks are shown. Panel B shows the point estimates from an event study analysis. The vertical red lines show the 5% confidence interval for the point estimates. Panel C shows the sensitivity analysis using [Rambachan and Roth, 2023](#). In Panel B and C, 2011 is the reference year. All regressions are at the branch level, with standard error clustered at the branch level. Data is from Reserve Bank of India.



(A) Trend of normalized savings deposits



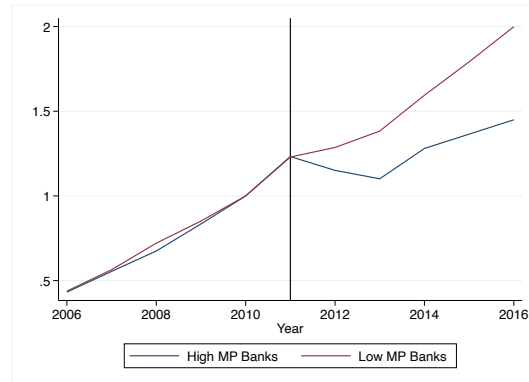
(B) Event study plot



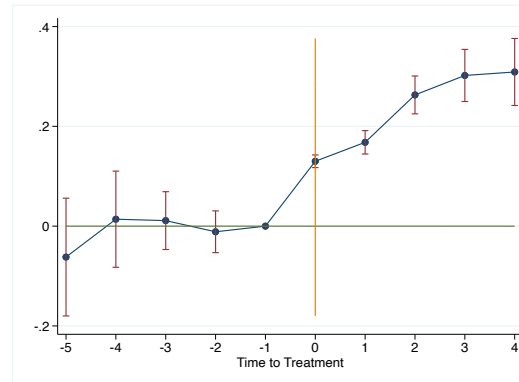
(C) Sensitivity analysis

Figure 9 Pre-trend analysis for credit

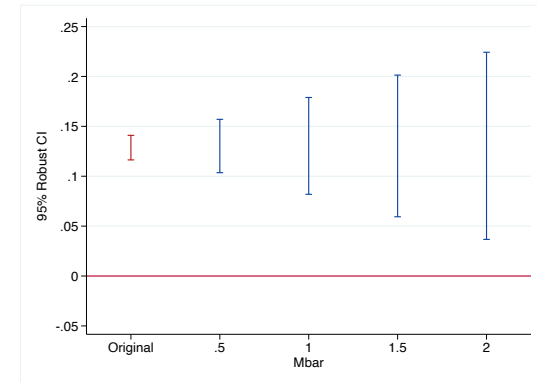
The plots below show the temporal dynamics of credit by bank market power for the period 2007 to 2016. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. Years are the fiscal year as of March 31st. The vertical line denotes the year of deregulation, 2011. In panel A, savings deposit is normalized to 2011. The aggregate credit for low- and high-HHI banks are shown. Panel B shows the point estimates from an event study analysis. The vertical red lines show the 5% confidence interval for the point estimates. Panel C shows the sensitivity analysis using [Rambachan and Roth, 2023](#). In Panel B and C, 2011 is the reference year. All regressions are at the branch level, with standard error clustered at the branch level. Data is from Reserve Bank of India.



(A) Trend of normalized credit



(B) Event study plot

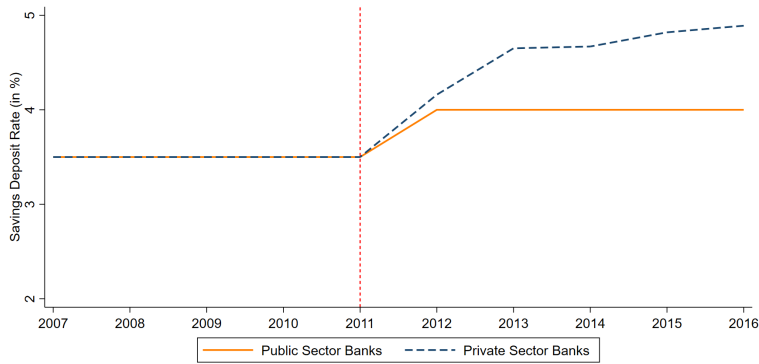


(C) Sensitivity analysis

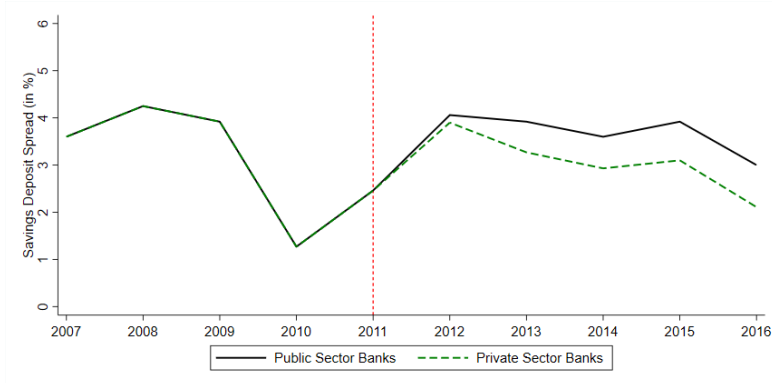
Figure 10

Heterogeneity by bank ownership: Savings deposit rates and credit-to-deposit ratio

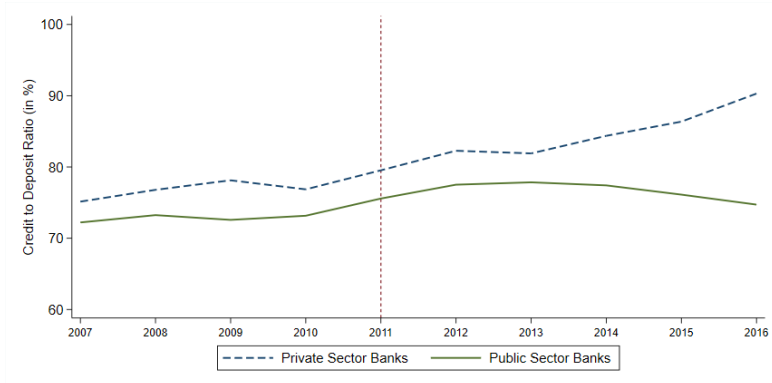
This figure shows the credit-to-deposit ratio by bank ownership (public and private sector banks) for 2007 to 2016. Panel A shows the average savings deposit rate for private and public sector banks. Panel B shows the average spread defined as the repo rate minus the savings deposit rates for private and public banks. Panel C shows the average savings deposit rate for private and public sector banks. Years are the fiscal year as of March 31st. The vertical dotted red line denotes the year of deregulation, 2011. All private and public sector banks are included in the analysis. Data is from the Reserve Bank of India.



(A) Savings deposit rates



(B) Savings deposit spread



(C) Credit-to-Deposit

Table 1
Descriptive statistics

Variables	All		Low HHI		High HHI	
	Mean (1)	SD (2)	Mean (3)	SD (4)	Mean (5)	SD (6)
Bank-level statistics						
Savings Deposit Rate (in %)	3.8	0.6	3.87	0.76	3.74	0.26
Spread (in %)	3.29	1.0	3.20	1.08	3.38	0.89
Assets (₹ billions)	1553	2414	723	901	2380	3078
Deposits (₹ billions)	1238	1851	570	681	1904	2346
Savings Deposits (₹ billions)	299	584	103	150	495	763
Term Deposits (₹ billions)	822	1124	407	463	1236	1404
Credit (₹ billions)	854	1514	438	549	1470	1941
G-sec Investments (₹ billions)	317	456	156	188	478	574
Credit to Deposit (in %)	74.62	24.11	73.03	5.93	76.23	32.1
Credit to Assets (in %)	59.78	6.17	58.71	5.93	60.86	6.24
G-sec to Assets (in %)	21.72	2.77	22.05	2.71	21.4	2.81
Short Inv to Assets (in %)	7.59	6.18	9.32	6.67	5.87	5.12
Long Inv to Assets (in %)	20.15	7.19	19.12	6.7	21.18	4.77
Short Credit to Assets (in %)	21.90	7.88	22.67	8.26	21.26	7.43
Long Credit to Assets (in %)	37.07	8.74	36.06	8.94	39.33	8.24
Interest Expenses to Assets (in %)	5.35	0.96	5.57	0.98	5.14	0.89
Interest Income to Assets (in %)	7.83	0.96	8.05	1.03	7.62	0.86
NIM (in %)	2.48	0.63	2.48	0.69	2.48	0.57
Observations	481		241		240	
Number of Banks	55		27		28	
Branch-level statistics						
Deposits (₹ millions)	667	4180	740	5226	596	2793
Saving Deposits (₹ millions)	179	549	172	529	185	568
Term Deposits (₹ millions)	420	3553	489	4550	352	2166
Current Account (₹ millions)	69	1233	79	1212	59	1252
Credit (₹ Million)	524	8852	589	11200	460	5623
Agriculture Credit (₹ Million)	71	389	83	482	63	312
Industry Credit (₹ Million)	245	4256	284	4302	216	4221
Personal Credit (₹ Million)	87	2877	105	4428	75	616
Services Credit (₹ Million)	131	2332	174	2899	100	1807
MSME Credit (₹ Million)	116	1964	153	2763	88	1003
Long Term Credit (₹ Million)	215	5841	300	8526	158	2870
Medium Term Credit (₹ Million)	79	1471	99	1566	64	1397
Short Term Credit (₹ Million)	188	1983	213	2243	169	1757
Agriculture Credit Share (in %)	35.6	29.9	31.6	29.2	38.3	30.1
Industry Credit Share (in %)	11.5	17.3	14.13	19.4	9.8	15.5
Personal Credit Share (in %)	28.2	21.9	27.4	20.9	28.8	22.5
Services Credit Share (in %)	18.1	16.1	19.2	17.3	17.4	15.1
Long Term Credit Share (in %)	46.4	25.1	42.6	25.0	50.0	24.6
Medium Term Credit Share (in %)	11.5	15.3	13.5	17.1	9.5	15.2
Short Term Credit Share (in %)	42.1	24.6	43.8	25.1	40.4	23.9
Observations	707,161		350,174		356,987	

This table presents summary statistics for key bank- and branch-level variables in our analysis. Bank and branch-level mean and standard deviation for different variables for all, low HHI and high HHI banks. Variables are as defined in the Internet Appendix Table A1.

Table 2
Deposit rate

	Saving Deposit Rate	Term Deposit Rate
	(1)	(2)
Post \times Low HHI _{bank}	0.37** (0.16)	0.112 (0.262)
Bank Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Observations	440	448
R ²	0.671	0.621

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on savings and term deposit rates. The dependent variable is the saving deposit rate in column 1 and the weighted average deposit rate (WADR) for term deposits in column 2. Observations are at the bank-level in columns 1 and 2. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. Fixed effects are indicated. Standard errors are clustered at the bank level. All private and public sector banks from 2007 to 2016 are included. Data on savings deposit rates is from bank websites.

Table 3
Deposits

Panel A: Levels and types of deposit

	Log(Saving Deposit)		Log (Term Deposits)		Log (Current Account)		Log (Deposit)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post \times Low HHI _{bank}	0.103*** (0.006)	0.160*** (0.007)	0.148*** (0.007)	0.201*** (0.009)	0.140*** (0.009)	0.183*** (0.010)	0.086*** (0.006)	0.135*** (0.007)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District \times Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	650019	649920	627658	627557	650019	649920	650019	649920
R ²	0.850	0.855	0.833	0.838	0.804	0.810	0.859	0.863

Panel B: Share of deposit

	Share of Deposit	
	(1)	(2)
Post \times Low HHI _{bank}	3.274*** (0.115)	3.274*** (0.115)
Post \times Low HHI _{bank} \times Term Deposit	-6.872*** (0.222)	-6.872*** (0.223)
Post \times Low HHI _{bank} \times Current Account	-2.950*** (0.154)	-2.950*** (0.155)
Branch Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
District \times Year Fixed Effects	No	Yes
Observations	1962186	1962185
R ²	0.515	0.514

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on deposits. Panel A shows the results for the deposits and panel B shows the results for deposit share. The dependent variable in Panel A is the logged value of savings, term, current, and total deposits. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median in the pre deregulation period. Bank-HHI. Fixed effects are indicated. Standard errors are clustered at the branch level. Observations are at the branch-year level. All private and public sector banks from 2007 to 2016 are included. Branch-level data is from the Reserve Bank of India.

Table 4
Branch, Bank Concentration, and Markets Diversification

Panel A: Number of Branches and Bank Concentration

	Log (# Branches)	Log $\left(\frac{\# \text{ Branches}}{\text{Deposits}}\right)$	Log(Bank HHI)
Post \times Low HHI _{bank}	0.33*** (0.12)	0.25** (0.097)	0.024 (0.026)
Bank Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	398	398	398
R ²	0.977	0.879	0.972

Panel B: Entry to New Markets

	Entry to New Market		
	(1)	(2)	(3)
Pre Existing Market Dummy \times Low HHI _{bank}	-0.051*** (0.017)	-0.037** (0.018)	-0.041** (0.019)
Market Fixed Effects	Yes	No	Yes
Bank Fixed Effects	No	Yes	Yes
N	178200	178200	178200
R-Squared	0.649	0.633	0.683

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on the number of branches. The dependent variable in column 1 is the log number of branches and log number of branches to deposits in column 2, column 3 shows the log of Bank HHI. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. The table provides estimates of an identification regression to assess the relevance of deregulation of savings interest rates for banks with high market power vis à vis low market power. The dependent variable represents different variables as mentioned earlier. It is regressed against $\text{Post} \times \mathbb{1}\{\text{Low HHI}_{\text{bank}}\}$ that is set up in equation 6 and $\mathbb{1}\{\text{Low HHI}_{\text{bank}}\}$ takes the value 1 if banks belong to below median as per market concentration averaged till 2011. Fixed effects are indicated. Standard errors are clustered at the branch level. Observations are at the branch-year level. All private and public sector banks from 2007 to 2016 are included. Branch-level data is from the Reserve Bank of India.

Table 5
Credit

	Log (Total Credit)		Credit to Deposit	
	(1)	(2)	(3)	(4)
Post \times Low HHI _{bank}	0.285*** (0.008)	0.323*** (0.009)	10.750*** (0.485)	9.295*** (0.540)
Branch Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
District \times Year Fixed Effects	No	Yes	No	Yes
Observations	632527	632426	629940	629839
R ²	0.819	0.825	0.825	0.833

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on credit. The dependent variable in columns 1-2 is the logged credit and credit-to-deposit in columns 3-4. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median pre deregulation Bank-HHI. Fixed effects are indicated. Standard errors are clustered at the branch level. Observations are at the branch-year level. All private and public sector banks from 2007 to 2016 are included. Branch-level data is from the Reserve Bank of India.

Table 6
Sectoral allocation of credit

Panel A: Sectoral allocation of credit

	Log (Agriculture Credit)		Log (Industry Credit)		Log (Personal Credit)		Log (Services Credit)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post \times Low HHI_{bank}	0.076*** (0.009)	0.123*** (0.011)	0.394*** (0.011)	0.381*** (0.012)	0.074*** (0.007)	0.020*** (0.007)	0.814*** (0.013)	0.734*** (0.014)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District \times Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	783945	783880	736050	735980	885166	885116	936860	936812
R^2	0.777	0.787	0.803	0.809	0.817	0.825	0.696	0.717

Panel B: Change in sectoral composition

	Share of Credit	
	(1)	(2)
Post \times Low HHI_{bank}	3.734*** (0.175)	3.734*** (0.175)
Post \times Low $HHI_{bank} \times$ Agriculture	-5.366*** (0.355)	-5.366*** (0.355)
Post \times Low $HHI_{bank} \times$ Industry	-2.786*** (0.243)	-2.786*** (0.243)
Post \times Low $HHI_{bank} \times$ Services	-1.510*** (0.227)	-1.510*** (0.227)
Post \times Low $HHI_{bank} \times$ All Others	-9.01*** (0.21)	-9.01*** (0.208)
Branch Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
District \times Year Fixed Effects	No	Yes
Observations	2009160	2009160
R^2	0.247	0.248

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Panel C: Credit allocation to small business

	Log (MSME Loans)		MSME Loan Share	
	(1)	(2)	(3)	(4)
Post \times Low HHI _{bank}	0.665*** (0.011)	0.812*** (0.012)	6.261*** (0.170)	6.380*** (0.184)
Branch Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
District*Year Fixed Effects	No	Yes	No	Yes
Observations	545953	545837	545552	545436
R ²	0.760	0.773	0.753	0.769

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on the sectoral allocation of credit. The dependent variables in Panel A in columns 1–2, 3–4, 5–6, and 7–8, are the logged credit to agriculture, industry, personal loans, and services. The dependent variables in Panel B are share of credit to agriculture, industry, personal loans, services, and other. The dependent variable in Panel C in column 1–2 is log of credit to the Micro, Small, and Medium Enterprises (MSME) and the the dependent variable in columns 3–4 is the share of the MSME sector. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median pre deregulation Bank-HHI. Fixed effects are indicated. Standard errors are clustered at the branch level. Observations are at the branch-year level. All private and public sector banks from 2007 to 2016 are included. Branch-level data is from the Reserve Bank of India.

Table 7
Loan maturity

	Share of Credit	
	(1)	(2)
Post \times Low HHI_{bank}	0.50** (0.208)	0.50** (0.209)
Post \times Low $HHI_{bank} \times$ Medium Term Share	4.84 (0.281)	4.84 (0.282)
Post \times Low $HHI_{bank} \times$ Long Term Share	-6.34*** (0.389)	-6.34*** (0.391)
Branch Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
District*Year Fixed Effects	No	Yes
Observations	1461402	1461402
R^2	0.367	0.368

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on loan maturity. The dependent variable is the share of credit to short, medium, or long-term loans. The base category is short-term loans. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median pre deregulation Bank-HHI. Fixed effects are indicated. Standard errors are clustered at the branch level. Observations are at the branch-year level. All private and public sector banks from 2007 to 2016 are included. Branch-level data is from the Reserve Bank of India.

Table 8
Government securities and investments

Panel A: Impact on Government Securities and Investments		
	Log (Gsec) (1)	Log (Investments) (2)
Post \times Low HHI _{bank}	0.21** (0.097)	0.22** (0.099)
Bank Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Observations	478	478
R ²	0.978	0.981

Panel B: Impact on Share of Assets	
	Share of Total (1)
Post \times Low HHI _{bank}	0.218*** (0.015)
Post \times Low HHI _{bank} \times G-Sec Share	-0.355*** (0.004)
Post \times Low HHI _{bank} \times Investments Share	-0.301*** (0.005)
Bank Fixed Effects	Yes
Year Fixed Effects	Yes
Observations	1443
R ²	0.227

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on government securities and investments. The dependent variable in Panel A is the log of government security holdings in column 1 and the log of investments in column 2. The dependent variable in Panel B is the share of assets in government securities, investments and loans. The base category in panel B is loan share. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median pre deregulation Bank-HHI. Fixed effects are indicated. Standard errors are clustered at the bank level. Observations are at the bank-year level. All private and public sector banks from 2007 to 2016 are included. Data is from the Reserve Bank of India.

Table 9
Lending rates, interest income and interest expense

Panel A: Lending Rates

	Lending Rates	
	(1)	(2)
Post \times Low HHI_{bank}	-0.065*** (0.010)	-0.082*** (0.011)
Branch Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
District \times Year Fixed Effects	No	Yes
Observations	632527	632426
R^2	0.606	0.631

Panel B: Bank profitability

	Log (Interest	Log (Interest	NIM
	Expenses)	Income)	
	(1)	(2)	(3)
Post \times Low HHI_{bank}	0.21** (0.079)	0.19** (0.089)	-0.05 (0.128)
Bank Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	478	478	478
R^2	0.987	0.973	0.719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on lending rates, interest income, and interest expense. The dependent variable in Panel A is the weighted average lending rates (WALR). Observations in Panel A are at the branch-year level. Standard errors are clustered at the branch level. The dependent variable in Panel B is the log of interest expense (column 1), interest income (column 2), and net interest margin (NIM) in column 3. NIM is calculated as the interest income to total assets minus the interest expense to total assets. Standard errors are clustered at the bank level in Panel B. Observations are at the bank-year level in Panel B. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median pre deregulation Bank-HHI. Fixed effects are indicated. All private and public sector banks from 2007 to 2016 are included. Data is from the Reserve Bank of India.

Table 10
Households access to deposits and credit

Panel A: Deposit and Credit

	Log Deposits		Log Credit	
	(1)	(2)	(3)	(4)
Low HHI District	0.413*** (0.119)	0.275** (0.115)	0.445*** (0.103)	0.289*** (0.101)
State Fixed Effects	Yes	Yes	Yes	Yes
District Controls	No	Yes	No	Yes
Observations	546	545	546	545
R ²	0.530	0.597	0.614	0.698

Panel B: Impact on Share of Assets

	Δ Share			
	(1)	(2)	(3)	(4)
Low HHI District	0.483 (0.352)	0.483 (0.352)	-3.963*** (1.371)	-3.969*** (1.374)
Low HHI District × Financial Assets	-0.967 (0.704)	-0.965 (0.705)		
Low HHI District × Deposits			7.926*** (2.743)	7.938*** (2.748)
State Fixed Effects	Yes	Yes	Yes	Yes
District Controls	No	Yes	No	Yes
Observations	1100	1098	1086	1084
R ²	0.020	0.020	0.096	0.096

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on household holdings of deposits and access to credit. In Panel A, the dependent variables are log deposits (columns 1–2) and log credit (columns 3–4) as of 2013. District controls included the lagged values of the dependent variable as of 2003. District-level Herfindahl-Hirschman Index (HHI) is calculated using Equation 8. Whereas, in Panel B, we capture the effect on the change of share of different types of household assets in low HHI districts. Low HHI (High HHI) Districts have below (above) median pre deregulation District-HHI. The dependent variable in Panel B is the share of financial and physical assets (columns 1–2) and the share of deposits and stocks (columns 3–4). Physical assets consist of gold and real estate and financial assets consist of stocks and deposits. Data is from the 2003 and 2013 NSSO AIDIS survey. Standard errors are clustered at the district level. Observations are at the district level.

Table 11
Demand Estimation

Panel A: BLP Estimation

Parameter	Coefficients
Deposit rate (α)	-1.90***
Log(Branch) (β_1)	0.84***
<i>Heterogeneous Sensitivity:</i>	
Rate Sensitivity (σ)	1.01***
No. of Individual Draws	50
Observations	100528

Panel B: Spread Semi Elasticities

	Observations	Mean	Std	25%	Median	75%
	(1)	(2)	(3)	(4)	(5)	(6)
All Sample	100528	-1.23	0.29	-1.43	-1.25	-1.08
High MP Banks	51945	-0.56	0.36	-0.81	-0.59	-0.34
Low MP Banks	48515	-2.11	0.17	-2.22	-2.12	-2.02

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports the estimates of the demand estimation model. Panel A reports the parameter estimates. The dependent variable is the share of a bank savings deposit product in a given district-year. 50 households are drawn from a standard normal distribution to measure heterogeneous sensitivities. Panel B reports the summary statistics for the spread semi elasticities, defined as the percentage change in the savings deposits due to change in the savings deposit spread. High MP banks refers to banks with higher than the median value of the Herfindahl-Hirschman Index (HHI) in the pre-sample period. Low MP banks refer to those which have a lower than the median value of the Herfindahl-Hirschman Index (HHI) in the pre-sample period. The sample consists of all private and public sector banks in India from 2007 till 2016. Data on savings deposit rates is from the individual banks' websites. Branch-level data is from the Reserve Bank of India.

Financial Repression, Deposit Rate Deregulation, and Bank Market Power

Online Appendix

A A Simple Model of Bank Competition Under Regulation

We build a simple model of heterogeneous banks based on the canonical framework of [Monti et al. \(1972\)](#) and [Klein \(1971\)](#). In our framework, banks primarily acquire funds through deposits from households, which they subsequently allocate to investments in government securities or lend them out. We simplify our analysis by assuming that banks are not subject to any capital ratio constraints. The economy consists of different markets and we study the business model of banks under this setup. Banks operate under monopolistic competition, taking the local market conditions into account. Our model rationalizes how deregulation changes bank's funding costs and impacts bank's balance sheets.

Banks in a given market are indexed by i and there exist a continuum of heterogeneous banks of unit mass, where $i \in (0,1)$. Banks demand deposits D_i from households (their only source of funds) and use the funds to originate loans L_i and invest in government bonds G_i . Following [Gerali et al. \(2010\)](#), banks have market power in both the lending and the deposit markets which are characterized by the elasticity parameters, e^l and e^d respectively with $e^d < -1$ and $e^l > 1$. Higher elasticity means lower market power and vice-versa. Banks enjoy market power from two sources, namely the ability to price their products over and above their marginal costs, and by providing liquidity services (e-banking facilities, ATMs, more employee per customer etc.) to customers like in ([d'Avernas et al., 2023](#)). We denote the liquidity services that bank provides by l_i . Banks choose lending rates, r_i^l , and the deposit rates, r_i^d given the market concentration and the demand for loans and their supply of deposits. For simplicity, we assume that government bonds yield returns equivalent to the policy rate f . The balance sheet of bank i is given below.

Balance sheet of bank i

<i>Assets</i>		<i>Liabilities</i>	
<i>Loans</i>	L_i	<i>Deposits</i>	D_i
<i>Govt. Securities</i>	G_i		

Demand and Supply We assume a representative household that consists of both borrowers and depositors, both of them are independent of each other in the sense that the depositors do not borrow and vice-versa. Since we focus on a partial equilibrium setup, we refrain from detailing the consumption decision behavior of the household. We assume that each bank's products (loans and deposits) are a differentiated good for the households and have market power following the standard Dixit-Stiglitz structure. Specifically, we posit that the loan and deposit contracts acquired by households constitute a bundle of financial products with different qualities with a constant elasticity of substitution as mentioned above. These products, each with slight variations, are offered by different banks in the given market.

First, we derive the borrower's demand for loans obtained by minimizing their total repayment subject to the availability of loans above the aggregate loan demand. Borrower's demand

for loans, given the lending rate is:

$$\min_{L_i} \int_0^1 r_i^l L_i di$$

subject to

$$\left[\int_0^1 (L_i) \frac{e^l - 1}{e^l} di \right] \frac{e^l}{e^l - 1} \geq \bar{L}$$

where \bar{L} is the aggregate loan demand. Solving the above problem and aggregating over symmetric borrowers yields the loan demand schedule as

$$L_i = \left(\frac{r_i^l}{\bar{r}^l} \right)^{-e^l} \bar{L} \quad (17)$$

\bar{r}^l is the overall lending rate index in the economy given by $\bar{r}^l = \left[\int_0^1 (r_i^l)^{1-e^l} di \right] \frac{1}{1-e^l}$. Equation 17 gives us the downward sloping loan demand schedule for bank i .

Next, we derive the supply schedule of deposits for bank i , taking into account that the fact that depositors maximize returns they earn on their deposit holdings:

$$\max_{D_i} \int_0^1 R_i^d D_i di$$

subject to

$$\left[\int_0^1 (D_i) \frac{e^d - 1}{e^d} di \right] \frac{e^d}{e^d - 1} \leq \bar{D}$$

where $R_i^d = (r_i^d + l_i)$ is the total return accrued to the depositors from the deposit rate as well as the liquidity services, and \bar{D} is the economy wide aggregate deposit. The supply schedule of deposits for bank i

$$D_i = \left(\frac{r_i^d + l_i}{\bar{R}^d} \right)^{-e^d} \bar{D} \quad (18)$$

where \bar{R}^d is the overall return index in the economy given by $\bar{R}^d = \left[\int_0^1 (R_i^d)^{1-e^d} di \right] \frac{1}{1-e^d}$. The deposit supply schedule in Equation 18 shows that deposits ($D_i(r_i^d, l_i)$) are a function of two factors: deposit rates and liquidity services.

Bank Profits Banks maximize profits taking into account the loan demand (Equation 17) and the deposit supply (Equation 18) schedule along with their balance sheet constraint. We also assume that banks need to incur quadratic adjustment costs for providing liquidity services, $\frac{\phi}{2}(l_i)^2$, where

ϕ is the adjustment parameter.²⁵ The profit function for bank i is:

$$\pi_i = r_i^l L_i + f G_i - (r_i^d + l_i) D_i - \frac{\phi}{2} (l_i)^2 \quad (19)$$

Bank i maximizes Equation 19 subject to the loan demand (17) and the deposit supply (18) schedules, together with the balance sheet constraint, $L_i + G_i = D_i$. The choice variables for the bank are r_i^d , r_i^l and l_i . The F.O.C. for the above problem gives us the following conditions linking deposit rates, lending rates and the liquidity services to the bank's market power and the policy rate:

$$r_i^l = \underbrace{\frac{e^l}{(e^l - 1)}}_{\text{markup}} f \quad (20)$$

$$r_i^d = \underbrace{\frac{e^d}{(e^d - 1)}}_{\text{markdown}} f - l_i \quad (21)$$

$$l_i = (f - r_i^d) - (D_i + \phi l_i) \left(\frac{\partial D_i}{\partial l_i} \right)^{-1} \quad (22)$$

where

$$\frac{\partial D_i}{\partial l_i} = -\bar{D} \frac{e^d}{\bar{R}^d} \left(\frac{r_i^d + l_i}{\bar{R}^d} \right)^{-e^d - 1} > 0$$

Equations 20 and 21 illustrate that the bank's lending and deposit rates are determined as markups and markdowns over the policy rate f , respectively. These markups and markdowns are contingent on the loan demand elasticity, e^l , and deposit supply elasticity e^d , reflecting the influence of market power. As elasticity decreases, markup rise while the markdowns decrease, signaling increasing market concentration. Equation 21 shows that to provide higher liquidity services, banks need to cut deposit rates, to lower costs. We look at some comparative statics on the impact of the savings rate deregulation. Given r_i^d , Equation 22 shows the effect of deposit market concentration on the decision on how much liquidity services to provide. One can solve for r_i^d and l_i by implicitly solving Equations 21 and 22 to get the following two system of equations in two unknowns. The last condition shows that the marginal effect of providing liquidity services on deposits is positive.

First, we try to ascertain the role of market power on the flow of deposits in a regulated period vs a deregulated period. We start with a regulated economy where banks are not allowed to set their deposit rates and the deposit rate is fixed at \bar{r}^d . Then the only source of heterogeneity among banks is due to the liquidity services provided by them,

$$l_i = \frac{(f - \bar{r}^d) - D_i \left(\frac{\partial D_i}{\partial l_i} \right)^{-1}}{1 + \phi \left(\frac{\partial D_i}{\partial l_i} \right)^{-1}} \quad (23)$$

²⁵These could be adjustment costs to open new ATMs or hiring additional branch personnel to improve services.

with

$$D_i = \left(\frac{r_i^d + l_i}{\bar{R}^d} \right)^{-e^d} \bar{D}$$

To see the effect of how does deposits vary with market power, we have to find

$$\frac{\partial D_i}{\partial e^d} = -e^d \bar{D} \left(\frac{r_i^d + l_i}{\bar{R}^d} \right)^{-e^d - 1} \frac{1}{\bar{R}^d} \left[\frac{\partial l_i}{\partial e^d} \right]$$

with $e^d < 1$, it can be shown that

$$\left. \frac{\partial D_i}{\partial e^d} \right|_{pre} > 0$$

which means that in the regulated period, banks operating in a less elastic market will see a larger flow of deposits.²⁶ The intuition for this result is: during the regulated period, deposit rates are same across banks and the only way one bank can earn higher deposits is due to their locational advantage or some for of their innate characteristics. However, $\left. \frac{\partial l_i}{\partial e^d} \right|_{pre} < 0$, which implies that banks operating in a more concentrated market do not invest enough in providing liquidity services at the margin because of their already higher market presence. But the if these banks decide to provide higher liquidity services, then they see larger deposit inflow, as $\frac{\partial^2 D_i}{\partial l_i \partial e^d} > 0$.

For the deregulated period, deposit rates (r_i^d) enter the bank's optimization problem as a choice variable. It can be shown that

$$\left. \frac{\partial D_i}{\partial e^d} \right|_{post} < 0$$

which means that banks with lower concentration see a higher marginal deposit inflow. This happens due to the larger change of their deposit rates $\left(\frac{\partial r_i^d}{\partial e^d} < 0 \right)$ to attract more depositors and therefore leads to higher deposits inflows at the margin. Therefore, we show that how the change in the market concentration affects the deposit inflow for banks depending on whether they are allowed to choose their deposit rates or not under regulation.

Next, we analyze what happens to the asset side of bank balance sheet when market power changes in the regulated period as against the deregulated period. Let us define γ_i to be the loan-asset ratio of the bank

$$\gamma_i = \frac{L_i}{D_i} = \frac{\left(\frac{r_i^l}{\bar{r}^l} \right)^{-e^l} \bar{L}}{\left(\frac{r_i^d + l_i}{\bar{R}^d} \right)^{-e^d} \bar{D}} \quad (24)$$

We examine how banks' lending is influenced by their market power in the deposit market in the baseline scenario, where they can adjust deposit rates. We focus on the deposit market channel as it pertains to changes in banks' funding costs and their asset portfolio composition.²⁷ It can be

²⁶Note that since by assumption $e^d < -1$, thus an increase in the value of e^d is equivalent to the absolute value of elasticity to go down which implies more concentration.

²⁷Although lending market power can also plays a role, we primarily investigate the impact of changes in deposit

shown that $\frac{\partial \gamma_i}{\partial e^d} < 0$ which implies that banks with high concentration see a decline in their loan to deposit ratio. This result stems from the fact that since more concentrated banks are able to provide lower deposit rates, as per Equation 21, their marginal funding cost is lower as compared to a low concentration bank. This reduced cost of funds allows banks to channelize their funds away from lendings, resulting in a decline in their loan-to-asset ratio.

Regulation vs Deregulation To see the impact of regulation on the savings deposit rates that mandates a flat rate across all the banks, consider that banks provide a fixed deposit rate of $r_i^d = \bar{r}^d \forall i$. Depositors maximize total return on deposits, but these returns solely reflect liquidity of deposits. This is important. If all banks provide the same deposit rate to depositors, then it leads to the same flow of deposits to banks, because essentially market power (in terms of deposit elasticity) does not play a role, given that all banks are similar. Heterogeneity among banks in such a regulated regime is because of the innate characteristics which the bank possesses. We show that in the regulated regime, liquidity services play an important role in the flow of deposits towards bank which has further implications on the investment decisions of the bank.

Next, we examine how banks allocate their funds under a regulated interest rate regime vs when they are allowed to choose their deposit rates. We compare a bank before and after deregulation, and examine loan-to-asset ratios. We compare

$$\left. \frac{\partial \gamma_i}{\partial e^d} \right|_{pre} \quad \text{against} \quad \left. \frac{\partial \gamma_i}{\partial e^d} \right|_{post}$$

Given our assumption on the sign of e^d and that $r_i^d = \bar{r}^d \forall i$, it can be shown that

$$\left. \frac{\partial \gamma_i}{\partial e^d} \right|_{pre} < \left. \frac{\partial \gamma_i}{\partial e^d} \right|_{post} \quad (25)$$

Equation 25 shows that the effect of market power on the loan-to-asset ratio is higher post-deregulation as banks can increase deposit rates to attract deposits. We call this the *rate effect* of market power.

Note that we still have $\frac{\partial \gamma_i}{\partial e^d} < 0$ irrespective of regulation, so that our initial result that banks with lower market power will have a higher loan to asset ratio still holds true. Equation 25 is simply saying that this effect will be higher in the deregulation period relative to the regulation period.

What is the effect on overall credit? Using Equation 25 and the effect of market concentration on the deposit inflows is given by $\frac{\partial D_i}{\partial e^d}$. Given that $\left. \frac{\partial \gamma_i}{\partial e^d} \right|_{post} < 0$ which along with $\left. \frac{\partial D_i}{\partial e^d} \right|_{post} < 0$ implies that the lending increases more for banks with lower market power for credit-to-deposit to go up. Post-deregulation, banks with low market concentration raise deposit rates, which attracts more deposits but increases costs. To offset these costs and maintain profitability, banks respond by increasing their lending share.

Our simple model illustrates how banks' lending behavior adjusts in response to their market power after deregulation. The key insight is that banks with low market power strive to attract depositors by offering higher deposit rates thereby increasing their costs. To offset these costs, banks allocate more funds to risky loans, which offer higher returns compared to government securities (Equation 20), resulting in an uptick in loan-to-asset ratios.

market power in line with our empirical setup and findings.

Table A1
Variable definitions

Variable	Definition and Source
Credit and Deposits	Credit data is obtained from the bank's balance sheet on the RBI website. The data is available for all schedule commercial banks segregated for public sector, private sector, and foreign banks. We omit foreign banks for our analysis and only use the data for public and private sector banks. Deposits data is also obtained from the balance sheet of the banks, and it comprises savings deposit and term deposits.
Savings Deposit Rate	Savings deposit rate is the average deposit rates that banks provide on the savings deposit accounts. It is obtained from each individual bank's website and statements. The data is available for almost all the public sector banks and around 80% of the private sector banks.
Spread	Spread is the gap between the repo rate and the savings deposit rate. Repo rate is obtained from the RBI statements. Higher the spread, lower is the pass-through from repo rate to the deposit rates that banks provide to depositors. Higher spread therefore indicates a higher market power for banks.
Bank beta	Bank beta is computed as the coefficient of pass-through from the change in repo rate to the change in interest expense for the banks. Data for the total interest expense is computed from the BSR banking statistics data for each branch of a bank. This is one of our measures of market power.
Branch HHI	Our second measure of market power, branch HHI is computed using the total deposits data at the branch level from BSR. We use the squared share of total deposits at branch i of bank b in district d and use the method in Drechsler et al. (2017) to compute the HHI measure. We also used, as another measure, savings deposit share in computing HHI using the same method.
Post	Indicator variable taking the value of 1 if the time period is above 2012, the financial year when deregulation took place, and 0 otherwise.
G-Sec Investment	Investment in both central and state government bonds by banks in any given financial year. We obtain this data from the balance sheet of individual banks.
NIM	Net Interest Margin is computed as the difference between total interest income and total interest expense for an individual bank. We obtain this data from the profit and loss statement of each bank at an annual frequency. Data is calculated at the bank-level.

Variable	Definition and Source
Term Credit	Term credit indicates loans which have a maturity structure of more than one year. Data for term loans is obtained at the bank-level from the bank's balance sheets.
Short-term and Long-term Credit	Short-term Credit refers to credit disbursed by banks which are less than one year. These include consumption credit, working capital credit among others. Any credit disbursed that has a maturity term of more than a year is deemed to be long-term credit. Data for short-term and long-term credit is from the maturity disaggregated decomposition of banks' balance sheet data from RBI.
Short-term and Long-term Investments	Short-term investments refer to the investments made by banks that have a maturity period of less than one year. These majorly refer to government securities, Treasury bills, and certificates of deposits among others. Long-term investments refer to investments having a maturity period of more than one year. Data is from the maturity disaggregated decomposition of banks' balance sheet data from RBI.
Low median and High median HHI Bank	Low median HHI bank refers to a bank whose HHI is less than the median HHI among the distribution of banks' HHI. It is an indicator variable and takes the value 1 if a particular bank has an HHI lower than that of the median value. Analogously, high HHI bank is an indicator variable that takes the value 1 if the bank has a value of HHI higher than the median.

Table A3
Descriptive Statistics

Panel A: Bank-level statistics

Variables	Low HHI			High HHI			Diff-in-diff (3-6) (7)
	Pre (1)	Post (2)	Diff. (3)	Pre (4)	Post (5)	Diff. (6)	
Savings Deposit Rate (in %)	3.50	4.30	0.8***	3.50	3.91	0.41***	0.40***
Spread (in %)	2.96	2.69	-0.27**	2.96	3.09	0.13	-0.40**
Log (Assets)	9.88	10.98	1.10***	11.51	12.17	0.66***	0.44**
Log (Deposits)	9.67	10.76	1.08***	11.32	11.92	0.60***	0.48***
Log (Credit)	9.30	10.48	1.18***	10.99	11.67	0.68***	0.50***
Log (G-sec Investments)	8.36	9.45	1.08***	9.99	10.58	0.59***	0.99**
Credit to Deposit (in %)	70.24	76.16	5.92***	69.35	76.23	6.88***	-0.96
Credit to Assets (in %)	56.81	60.83	4.02***	57.63	59.46	1.83***	2.19**
G-sec to Assets (in %)	22.30	21.77	-0.53***	23.94	21.35	-2.58***	2.05
Short Inv to Assets (in %)	9.01	9.66	0.65***	5.59	6.85	1.25	-0.60
Long Inv to Assets (in %)	19.69	18.48	-1.21***	23.82	19.94	-3.87*	2.66
Short Credit to Assets (in %)	22.86	22.45	-0.40	21.95	20.56	-1.38	0.98
Long Credit to Assets (in %)	33.82	38.57	4.74***	37.77	40.90	3.13 **	1.06*
Interest Expenses to Assets (in %)	5.02	6.18	1.15***	4.49	4.99	0.50***	0.65***
Interest Income to Assets (in %)	7.48	8.70	1.21***	7.03	7.60	0.57***	0.64**
NIM (in %)	2.45	2.51	0.06	2.57	2.61	0.03	-0.03
Observations		241			240		481
Number of Banks		27			28		55

Panel B: Branch-level statistics

Variables	Low HHI			High HHI			Diff-in-diff (3-6) (7)
	Pre (1)	Post (2)	Diff. (3)	Pre (4)	Post (5)	Diff. (6)	
Residualized Deposit (₹ Million)	-234	174	409***	-148	162	311***	97***
Residualized Savings Deposit (₹ Million)	-57	46	103***	-49	50	99***	4**
Residualized (₹ Million)	-165	122	287***	-91	99	190***	97***
Residualized Current Account (₹ Million)	-13.4	9.9	23.3***	-8.9	9.7	18.6***	4.7
Residualized Credit (₹ Million)	-195	146	341***	-118	130	249***	92***
Residualized Agriculture Credit (₹ Million)	-333	191	524***	-205	159	364***	160***
Residualized Industry Credit (₹ Million)	-108	72	180***	-73	58	132***	48***
Residualized Personal Credit (₹ Million)	-32	21	53***	-21	17	38***	15***
Residualized Services Credit (₹ Million)	-74	46	120***	-28	22	50***	70***
Residualized MSME Credit (₹ Million)	-19.8	11.4	31.2***	-1.1	0.75	1.85	29.3***
Residualized Long Term Credit (₹ Million)	-129	82	211***	-51	38	89***	122***
Residualized Medium Credit (₹ Million)	-18.3	12.2	30.5***	-18.4	14.4	32.8	-2.3
Residualized Short Credit (₹ Million)	-109	63	172***	-78	50	128	44***
Observations	350174			356987			707161

Standard errors in parentheses
 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table presents summary statistics for key bank- and branch-level variables in our analysis. Panel A shows the bank and branch-level mean and standard deviation for different variables for all, low HHI and high HHI banks. Variables are as defined in Table A1. Panel B shows the mean and standard deviation in the pre and post period for low and high HHI banks. Post is an indicator variable for post deregulation of savings deposit rate. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low HHI (High HHI) Banks have below (above) median Bank-HHI. Branch-level statistics in Panel B is residualized with branch fixed effects as specified in Equation 7.

Table A4
Correlation of various Bank level determinants

	Low Market Power Bank Dummy								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Share of Rural Deposit	-0.0620*** (0.0147)								-0.0216 (0.25)
Share of Rural Credit		-0.068*** (0.020)							-0.0075 (0.036)
Deposit Beta (β)			1.20*** (0.412)						0.715* (0.416)
Public Sector Bank Dummy				-0.266* (0.141)					0.098 (0.200)
Share of NPA					0.005 (0.061)				0.177*** (0.056)
Low Market Power Bank by Credit						0.428*** (0.132)			0.394*** (0.138)
Log(Number of Branches)							-0.180** (0.075)		-0.063 (0.084)
Share of Officers								0.008** (0.003)	0.002 (0.004)
Observations	49	49	49	49	49	49	49	49	49
R^2	0.312	0.228	0.182	0.07	0.001	0.184	0.132	0.131	0.572

This table reports the correlation between low market power dummy (below median bank level HHI) for the year 2010 and other bank level determinants for the year of 2010. Column 1 through 8 has the individual correlation of these variables with low market power dummy variable, while column 9 reports the combined correlation of all variables with our dependent variable, low market power dummy. The sample consists of all private and public sector banks in India for the year 2010. Data on various bank indicators along with bank market power are aggregated from the branch-level data. Branch level data is from the Reserve Bank of India.

Table A5
Robustness using alternate sample period

	Log (Deposit)		Log (Savings Deposit)		Log (Credit)	
	(1)	(2)	(3)	(4)	(5)	(6)
Post \times Low HHI _{bank}	0.116*** (0.006)	0.163*** (0.007)	0.128*** (0.006)	0.177*** (0.007)	0.276*** (0.008)	0.315*** (0.010)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
District \times Year Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	459356	459291	459356	459291	445493	445424
R ²	0.880	0.883	0.877	0.880	0.842	0.847

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The table below provides estimates of an identification regression to assess the relevance of deregulation of savings interest rates for banks with high market power vis à vis low market power. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. The dependent variables are various indicators of credit and deposit that each branch disburses or receives at level terms. It is regressed against Post \times Low HHI_{bank} that is set up in equation 3 and Low HHI_{bank} takes the value 1 if banks belong to below median as per market concentration. This is a baseline regression with no controls. The analysis is at branch level and is annual and covers all Indian scheduled commercial banks and truncated for ± 3 years from the year of savings rate deregulation (i.e. FY 2012) in an unbalanced panel. Standard errors are clustered at branch level.

Table A6
Robustness with Alternate HHI

Panel A: Full Sample (All Years)

	Log (Deposit)		Log (Savings Deposit)		Log (Credit)	
	(1)	(2)	(3)	(4)	(5)	(6)
Post \times Low HHI _{bank}	0.090*** (0.006)	0.146*** (0.007)	0.103*** (0.006)	0.180*** (0.008)	0.268*** (0.008)	0.323*** (0.010)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
District \times Year Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	650019	649920	650019	649920	632527	632426
R ²	0.859	0.863	0.850	0.855	0.819	0.825

Panel B: Truncated Sample (FY 2012 \pm 3 Years)

	Log (Deposit)		Log (Savings Deposit)		Log (Credit)	
	(1)	(2)	(3)	(4)	(5)	(6)
Post \times Low HHI _{bank}	0.119*** (0.006)	0.170*** (0.007)	0.126*** (0.006)	0.186*** (0.008)	0.271*** (0.008)	0.321*** (0.010)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
District \times Year Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	459356	459291	459356	459291	445493	445424
R ²	0.880	0.883	0.877	0.880	0.842	0.847

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The table below provides estimates of an identification regression to assess the relevance of deregulation of savings interest rates for banks with high market power vis à vis low market power. The dependent variables are various indicators of credit and deposit that each branch disburses or receives at level terms. It is regressed against Post \times Low HHI_{bank} that is set up in equation 3. Panel A uses an alternate definition of HHI, and Low HHI_{bank} takes the value 1 if banks belong to below median as per market concentration (with respect to savings deposits). Whereas, Panel B uses the old definition of HHI and is regressed on a truncated dataset of \pm 3 years from year of deregulation. This is a baseline regression with no controls. The analysis is at the branch level, is annual, and covers all Indian scheduled commercial banks in an unbalanced panel. Standard errors are clustered at branch level.

Table A7
Robustness to alternate market power bank level deposits and credit

	Log (Deposits)	Log (Credit)	$\frac{\text{Credit}}{\text{Deposit}}$
	(1)	(2)	(3)
Post $\times \hat{\beta}_{Bank}$	0.76*** (0.432)	0.96** (0.430)	19.88** (11.8)
Bank Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	623	623	623
R^2	0.967	0.965	0.393

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on the bank level credit and deposits. The dependant variables are log of deposit and credit in columns 1 and 2 respectively, while it is the ratio of credit to deposits (in percentage) in column 3. Post is an indicator variable for post deregulation of savings deposit rate and $\hat{\beta}_{Bank}$ market power based on the sensitivity of bank deposit rates to repo rates. Fixed effects are indicated. Standard errors are clustered at the bank level. The analysis is conducted at bank level and are annual and cover all Indian schedule commercial banks from 2006 to 2020 in an unbalanced panel.

Table A8
Robustness: Alternate market definitions for market power

	Log (Deposit)		Log (Savings Deposit)		Log (Term Deposit)		Log (Credit)		Credit Deposit	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post \times Low HHI _{bank}	0.086*** (0.006)	0.130*** (0.007)	0.103*** (0.006)	0.161*** (0.008)	0.170*** (0.008)	0.185*** (0.009)	0.285*** (0.008)	0.315*** (0.009)	10.750*** (0.485)	9.602*** (0.549)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market*Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	650019	649683	650019	649683	652363	651548	632527	631719	629940	629592
R ²	0.859	0.866	0.850	0.858	0.832	0.851	0.819	0.831	0.825	0.838

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on various indicators of deposit and credit. We use an alternate definition of bank market power using Equation 2 but now we are calculating market power at district-population center level instead of district level. Population center is divided into rural, semi-urban, urban, and metro areas. Post takes the value 1 if year ≥ 2012 and 0 otherwise. Whereas Low MP Bank takes the value 1 if below median Bank-HHI for pre deregulation period in terms of bank credit. The observations are at the branch-year level covering from 2007 to 2016 in an unbalanced panel for Indian scheduled commercial banks. Fixed effect are mentioned in the table. Standard errors are clustered at the branch level. In the table *Market* stands for a pair of district-population center.

Table A9
Robustness to alternate market power measure: Bank β

	Log (Deposit)		Log (Savings Deposit)		Log (Term Deposit)		Log (Credit)		Credit Deposit		Saving Deposit Rate	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post $\times \hat{\beta}_{bank}$	0.630*** (0.026)	0.768*** (0.028)	0.809*** (0.031)	0.990*** (0.033)	1.166*** (0.037)	1.272*** (0.039)	1.366*** (0.037)	1.594*** (0.041)	33.595*** (1.915)	39.132*** (2.124)	0.283*** (0.015)	0.305*** (0.016)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District*Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	650058	649961	650058	649961	652441	652344	632566	632465	629940	629839	652441	652344
R ²	0.860	0.863	0.851	0.855	0.832	0.838	0.820	0.826	0.824	0.833	0.919	0.921

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on deposits using bank β as the measure of market power. The dependent variables are log deposits (columns 1–2), log savings deposit (columns 3–4), log credit (columns 5–6), and credit-to-deposit (columns 7–8). Post is an indicator variable for post deregulation of savings deposit rate. $\hat{\beta}_{bank}$ is the measure of market power based on the sensitivity of bank deposit rates to repo rates. Fixed effects are indicated. Standard errors are clustered at the bank level. Observations are at the branch-year level. All private and public sector banks from 2007 to 2016 are included. Branch-level data is from the Reserve Bank of India.

Table A10
Heterogeneity by bank ownership

	Log(Deposit)		Log(Savings Deposit)		Log(Term Deposit)		Log(Credit)		Credit Deposit		Saving Deposit Rate	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post × Private	0.493*** (0.011)	0.533*** (0.011)	0.597*** (0.013)	0.663*** (0.013)	0.638*** (0.014)	0.674*** (0.015)	0.988*** (0.019)	1.054*** (0.020)	15.043*** (0.805)	16.545*** (0.837)	0.135*** (0.005)	0.136*** (0.005)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District*Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	650019	649920	650019	649920	652363	652264	632527	632426	629940	629839	652363	652264
R ²	0.861	0.865	0.853	0.857	0.834	0.839	0.825	0.831	0.824	0.834	0.920	0.921

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The table examines the impact of deregulation on deposit and credit. The dependent variables are log deposits (column 1 and 2), log saving deposits (column 3 and 4), log of term deposit (column 5 and 6), log credit (column 7 and 8), credit to deposit (column 9 and 10), savings deposit rate (column 11 and 12). Post is an indicator variable for post deregulation of savings deposit rate, taking value 1 for year ≥ 2012 and 0 otherwise. Private is an indicator variable with value 1 for private sector banks and 0 otherwise. Observations are at the branch level. Fixed effects are indicated. Standard errors are clustered at the branch level. All private and public sector banks from 2007 to 2016 are included. Data on savings deposit rates is from bank websites. Branch-level data is from the Reserve Bank of India.

Table A11
Market power based on deposits versus loans

	Log (Deposit)	Log (Savings Deposit)	Log (Term Deposit)	Log (Current Deposit)	Log (Credit)	$\frac{\text{Credit}}{\text{Deposit}}$
	(1)	(2)	(3)	(4)	(5)	(6)
Low $\text{HHI}_{bank} \times \text{Post}$	0.092*** (0.006)	0.121*** (0.006)	0.169*** (0.008)	0.166*** (0.009)	0.297*** (0.008)	11.608*** (0.492)
Branch- $\text{HHI}^{Credit} \times \text{Post}$	-0.036*** (0.006)	-0.106*** (0.006)	0.002 (0.008)	-0.055*** (0.009)	-0.069*** (0.008)	-4.930*** (0.490)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	650019	650019	652363	652363	632527	629940
R^2	0.859	0.851	0.832	0.804	0.820	0.825

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on various indicators of deposit and credit. It explores the interaction of market power based on credit and deposit simultaneously and captures their effect post deregulation. We use an alternate definition of branch market power using Equation 1, calculating market power concerning bank credit. Bank market power is calculated as before. Post takes the value 1 if year ≥ 2012 and 0 otherwise. Low MP Bank takes the value 1 if below median Bank-HHI for the pre-deregulation period in terms of bank deposit, and Branch- HHI^{Credit} takes the value 1 if below median Branch-HHI for the pre-deregulation period in terms of credit share in Equation 1. Observations are at the branch-year level covering 2007–2016 in an unbalanced panel for Indian scheduled commercial banks. Fixed effects are mentioned in the table. Standard errors are clustered at the branch level. Branch-level data is from the Reserve Bank of India.

Table A12
Robustness to alternate channels: Distressed Banks

	Log (Deposit)		Log (Savings Deposit)		Log (Term Deposit)		Log (Current Deposit)		Log (Credit)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Low $HHI_{bank} \times Post$	0.186*** (0.011)	0.206*** (0.012)	0.250*** (0.012)	0.297*** (0.013)	0.204*** (0.015)	0.213*** (0.017)	0.091*** (0.018)	0.110*** (0.020)	0.227*** (0.012)	0.273*** (0.014)
Post \times NPA Share	-0.001 (0.003)	-0.010** (0.004)	0.015*** (0.004)	0.012*** (0.004)	-0.044*** (0.005)	-0.053*** (0.006)	-0.012* (0.006)	-0.023*** (0.007)	-0.038*** (0.003)	-0.034*** (0.004)
Low $HHI_{bank} \times Post \times NPA$ Share	-0.031*** (0.003)	-0.024*** (0.004)	-0.053*** (0.004)	-0.053*** (0.004)	0.004 (0.005)	0.011** (0.006)	-0.010 (0.006)	-0.003 (0.007)	-0.002 (0.004)	-0.011*** (0.004)
Branch Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District*Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	650019	649920	650019	649920	652363	652264	652363	652264	632527	632426
R^2	0.860	0.863	0.851	0.855	0.833	0.838	0.805	0.811	0.821	0.826

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table examines the impact of deregulation on different indicators of credit and deposits that each branch disburses or receives at level terms for banks with varied level of distress. We regress using the setup defined in Equation 3 and an extra level of interaction capturing the level of distress of bank, the variable used is share of non-performing asset at the bank level. Post takes the value 1 if year ≥ 2012 and 0 otherwise. Branch-level Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squared share of total deposits of each bank operating in a district. Bank HHI is the deposit weighted average of branch-level HHI across all districts. Low MP Bank takes the value 1 if below median Bank-HHI for pre deregulation period in terms of bank deposit. NPA share is non performing asset as a share of total asset at the bank level. The observations are at the branch-year level covering from 2007 to 2016 in an unbalanced panel for Indian scheduled commercial banks. Fixed effect are mentioned in the table. Standard errors are clustered at the branch level. Branch-level data is from the Reserve Bank of India.