Deposit Market Power, Funding Stability and Long-Term Credit*

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ABSTRACT

This paper shows that banks raising deposits in more concentrated markets have more funding stability, which enhances their ability to extend longer-maturity loans. Banks raising deposits in concentrated markets exhibit less pro-cyclical financing costs and profits, which in turn reduces the risk of originating long-term illiquid loans. Banks with deposit HHI one standard deviation above average extend loans with about 20% longer maturity than those with deposit HHI one standard deviation below average. Deposit concentration also allows banks to charge lower maturity premiums. This has real effects: access to banks raising funds in concentrated markets improves growth in non-financial industries traditionally reliant on long-term credit.

*The views expressed in this paper do not necessarily represent those of the Federal Reserve or any institution with which the authors are affiliated.

I. Introduction

Why would banks be willing to extend long-term credit? The traditional literature has focused on how borrower credit risk affects loan maturity and ignored another risk associated with long-term lending – the lender's funding risks. Because business loans are illiquid, they must be held on the originator's balance sheet for the duration of the loan.[1] As such, declines in profits (during cyclical downturns) or increases in funding costs (during upturns) could constrain a long-term lender's ability to make new, profitable loans.[2]

In this paper, we show that market power in deposits increases funding stability to banks, thereby allowing them to extend long-term credit. Banks with more deposit market power make longer maturity loans and charge lower maturity premiums than other banks. This has a real effect: the greater availability of long-term bank credit leads to faster industry growth, particularly for firms in need of long-term debt. Our results imply that deposit market power, by increasing long-term credit supply, helps alleviate credit cycles.

Existing papers exploring bank lending through the business cycle mainly focus on lending quantities rather than lending terms. The financial accelerator models show that variations in bank funding costs and capital amplify business cycles, especially for small firms that are more dependent on bank finance. Macro-economists document that changes in bank funding costs, engineered by central banks, can limit bank credit availability (e.g., Bernanke and Blinder, 1988; Gertler and Gilchrist, 1994). Declines in bank capital and bank failures worsen business conditions because capital-constrained banks tighten credit, thereby exacerbating the initial downturn (e.g.,

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[1] Flannery (1986) and Diamond (1991) argue theoretically and Berger et al. (2005) confirm empirically that riskier borrowers with long-term projects, in anticipation of the higher refinancing risk, will demand more expensive longer maturity loans.

[2] Diamond and Rajan (2001) offer a liquidity version of the lending channel model that emphasizes the risk of funding long-term projects with unstable short-term funds.

Bernanke, 1983; Peek and Rosengren, 2000).[3] These papers, however, are silent on how bank funding affects the supply of *long-term* credit. Our paper bridges this gap.

In our first set of results, we establish that deposit market power contributes to bank funding stability. Numerous studies have shown that banks raising deposits in concentrated markets pay lower rates and earn higher profits than other banks.[4] Drechsler, Savov, and Schnabl (2017) (DSS hereafter) take these findings a step further and show that deposit market power provides banks *flexibility* in controlling their deposit rates in order to balance the tradeoff between rents extracted from depositors against the value of funding profitable lending opportunities.[5] DSS show that *both* the costs of deposits and loan growth are less pro-cyclical for banks raising deposits in concentrated markets (i.e., banks with a high weighted average of county-level deposit HHIs). We extend this idea, first by expanding the measures of cyclicality and second by showing that banks raising funds in concentrated deposit markets also experience less pro-cyclical profitability and, by extension, equity capital. During downturns (when all other funding sources are scarce or even unavailable), banks raising deposits in concentrated markets experience larger deposit inflows and smaller declines in profitability, which collectively stabilizes bank funding sources and costs.

To link deposit market power to loan maturity, we exploit the 1997-2017 *Survey of the Terms of Business Lending* (STBL). These data allow us to study maturity for a large sample of small business loans. The STBL covers a sample of randomly selected banks' new commercial

[3] A large academic literature on bank "capital crunches" has extended the seminal approach pioneered by Peek and Rosengren. See, for example, Ashcraft (2006), Khwaja and Mian (2008), Paravisini (2008), Iyer and Peydro (2011), and others.

[4] See, for example, Berger and Hannan (1989 and 1991).

[5] This is a direct implication of Drechsler, Savov, and Schnabl's model with profitable lending opportunities – see equation (14) from their paper.[6] Unfortunately, the STBL data do not capture information on the borrower's industry or other characteristics such as balance sheet or income statement variable, nor do they allow us to follow the same borrower over time.

and industrial (C&I) loan originations. The data contain loan-level price and non-price terms on all new loans originated by each surveyed bank during a one-week window; the survey occurs four times per year. The STBL also offers some information on borrower heterogeneity, including a measure of borrower credit risk and borrower location (for the 2012-2017 sub-sample).[6] For our analysis, we focus on small business loans – those below $1 million – for a few reasons. First, these are bank dependent borrowers. Second, in contrast to other categories of bank loans these small business loans have essentially zero market liquidity. Funding stability is less relevant for loans that can be sold after origination (e.g., via securitization), such as mortgages, credit cards, student loans, and even large corporate loans.[7]

STBL data allow us to document our core contribution: by reducing the cyclicality of both the costs of deposits and the availability of internal funds (profits), deposit market power reduces funding risk and provides banks with the flexibility to originate long-term loans. We start by showing that banks raising funds in more concentrated deposit markets make longer-maturity business loans. Magnitudes are large: banks with deposit HHI one standard deviation above average extend loans with about 20% longer maturity than banks with HHI one standard deviation below average. Unlike studies focusing on the quantity of lending (e.g., the bank lending channel literature), we find that deposit concentration leads to longer loan maturity in both the boom and bust phases of the business cycle. During booms, banks with less cyclical funding and capital can originate long-term loans because they face less risk of *future* declines in deposits or capital.

[6] Unfortunately, the STBL data do not capture information on the borrower's industry or other characteristics such as balance sheet or income statement variable, nor do they allow us to follow the same borrower over time.

[7] Some measures of loan liquidity capture the presence of market liquidity, such as the depth of securitization markets (Loutskina, 2009). In contrast, Berger and Bouwman (2009) build a bank-wide measure of liquidity which captures maturity of assets, liabilities and off-balance sheet categories but does not account for market liquidity.

Conversely, during busts, these banks have more capital *today* and face less risk of increased financing costs *tomorrow*.

Next, we document that banks raising funds in concentrated deposit markets charge lower maturity premiums. Consistent with prior literature, the direct effect of maturity on the loan rate is strongly positive, capturing the fact that longer-term loans are generally riskier and more profitable for banks. However, the relationship between loan maturity and the interest rate *flattens* for banks raising funds in more concentrated deposit markets. Banks with deposit HHI one standard deviation below average increase loan rates by about 35 basis points more for each one-standard deviation increase in loan maturity; in contrast, for banks with *Bank HHI* one standard deviation above average, maturity has approximately zero effect on interest rates. Deposit market power mitigates banks' funding risk, thus allowing them to charge lower (maturity) risk premiums.

While we advocate a credit-supply interpretation of our empirical evidence, the prior literature shows that loan maturities and interest rates may reflect unobserved heterogeneity in borrower *demand* for long-term credit, which itself may be correlated with credit risk rather than funding risk (Flannery, 1986; Diamond, 1991; Berger et. al., 2005). Firms worried about their ability to roll over short-term debt in the future (e.g., riskier firms that lack collateral) might choose to borrow long term, despite higher loan rates (Diamond, 1991; Hertzberg et al., 2018). We rule out this explanation by explicitly controlling for borrower credit risk ratings and incorporating granular state-year fixed effects in our analysis. Our core findings are independent of borrower credit risk. When estimated separately, the effects persist in every credit risk bin of STBL loans. Moreover, the alternative explanation is inconsistent with deposit market power leading to a lower, rather than higher, maturity premium.

We also find that concentration leads to longer maturity and lower maturity premiums *only* for loans in which lenders plausibly have access to private information (that is, in our sample of "local loans," defined as loans in which the lender owns a branch in the same state as the borrower). For non-local loans made by out-of-state banks, we find no link from deposit market power to maturity. This makes sense because local loans absorb a lender's balance sheet capacity both at origination *and* over the course of the loan. Unlike most of the small business loans in our sample, non-local ones have a degree of market liquidity, as originators sometimes sell (or securitize) them after origination. This differential response is consistent with existing evidence that bank credit origination responds more to their own financial conditions for illiquid loans than liquid ones (Loutskina and Strahan, 2009).

Since our measure of banks' deposit market power might also capture aspects of lending conditions, we re-estimate our core models using *Out-of-state Bank HHI*.[8] This measures funding conditions using the weighted average of a bank's deposit market power across all counties *other* than those counties from the borrower's state. We find our core results are similar using this approach.

Does banks' ability to extend more long-term credit have real effects? To answer this question, we use the *County Business Patterns* (CBP) data, which allow us to measure employment growth and wage growth at the industry-county-year level. For identification, we exploit heterogeneity across industries in their reliance on long-term debt (vs short-term debt), based on the population of *Compustat* firms over the same sample period. The analysis shows that firms in industries traditionally reliant on long-term debt grow more quickly in counties served by banks

[8] For example, consider a small bank operating in just one market. For such a bank, its concentration might be high for both the deposit-taking and lending sides of its business. This example bank would have market power in both businesses, making it hard to know if variation in *Bank HHI* represents variation in funding conditions or variation in lending conditions (or both).

with deposit market power (and more slowly in counties served by banks operating in competitive deposit markets). In this analysis, we directly control for local competition, allowing us to isolate the effect of bank deposit market power in other markets.

Our paper lies at the intersection of three literatures. First, we extend the literature on the determinants of debt maturity, which to date mostly focused on *demand-related* drivers. A wide set of papers explore how borrower heterogeneity along risk, asymmetric information, or opacity dimensions affects loan maturity, both theoretically (Flannery, 1986; Diamond, 1991) and empirically (e.g., Berger et al., 2005; Barclay and Smith, 1995; Stohs and Mauer, 1996). Much of this work concludes that riskier firms, firms that lack collateral, and/or firms characterized by more asymmetric information tend to pursue more expensive longer maturity loans. We augment these studies by offering a supply-side mechanism whereby bank financial conditions affect their willingness and ability to supply long-term debt. Black and Rosen (2016) is the closest study to ours. While not explicitly exploring the supply side of the loan maturity equation, they document that tighter monetary policy leads to shorter-term lending.

Second, we contribute to a large literature on market power's effects on bank services. Numerous studies have documented the costs of less than perfect competition. Prices of bank services – deposit and loan rates – are higher for loans and lower for deposits in more concentrated markets (Berger and Hannan, 1989 and 1991) or those with regulatory barriers to entry (Rice and Strahan, 2010). Removal of restrictions on banks' ability to expand geographically, which reduces bank market power, is associated with better lending quality, more firm creation and dynamism, and higher overall growth (Jayaratne and Strahan, 1996; Black and Strahan, 2002; Kerr and Nanda, 2009; among others). A few papers have found benefits associated with bank market power. Keeley (1990) argues that bank charter value, enhanced by market power, helps mitigate the moral hazard and risk-shifting problems associated with deposit insurance and expectations of bailouts (see Strahan, 2013, for a review). DSS show that deposit market power creates a bank lending channel of monetary policy without the need for reserve requirements. The effect of the deposit market power on the transmission mechanism is comparable in magnitude to that of capital requirements (Wang, Whited, Wu, and Xiao, 2019). Petersen and Rajan (1995) show that small firms in more concentrated lending markets maintain longer-lived relationships with their banks. The authors argue that this expectation allows banks to subsidize credit early in a firm's relationship and thus helps foster business formation. Our study adds to this line of literature by documenting that funding stability, fostered by deposit-market power, contributes to banks' ability to extend long-term credit.

Third, our paper demonstrates a new connection from one side of bank balance sheets (funding stability fostered by deposit-market power) to the other (loan maturity). This is important because one of the overarching themes in the study of banking is the source of the nexus between banks' funding role (deposits) with their credit role (lending). Existing explanations have emphasized information spillovers from deposits to loans (e.g., Fama, 1985), liquidity synergies (e.g. Diamond and Dybvig, 1983; Calomiris and Kahn, 1991; Flannery, 1994; Diamond and Rajan, 2001; Kashyap et al., 2002; and Gatev and Strahan, 2006), or access to core deposits (Berlin and Mester, 1999). We add to this literature by connecting deposit market power to the contractual maturity of bank loans.

II. Methods and Results

In the first portion of this section, we describe our data and variable construction. In Section II.2, we document how deposit concentration affects the cyclical properties of bank outcomes. We extend DSS, who analyze volumes and costs of deposits, by also analyzing bank profit. Sections II.3 and II.4 report our core result, relating deposit concentration to loan maturity and to the maturity premium (that is, to interest rates). In Section II.5-II.6, we summarize our robustness tests, most of which are reported fully in the Internet Appendix. Section II.7 compares our results for local vs. non-local loans. Finally, in section II.8, we document the real economic implications of the maturity effects we document.

II.1 Data

We combine several sources to build our dataset. To capture bank characteristics, we use the quarterly Bank *Call Reports*, as is standard in the literature. Panel A of Table 1 reports the summary statistics of bank characteristics. Overall, the observed sample characteristics are similar to those used in prior studies.

For loan terms, we exploit the Federal Reserve's *Survey of the Terms of Business Lending* (STBL), which contains micro-data on all commercial and industrial (C&I) loans originated by a random sample of banks during one full business week every three months (in February, May, August, and November).[9] The selection of banks is proportional to bank sizes, and as such, leads to a representative sample of C&I loans.

The STBL data provide detailed loan characteristics, including the loan amount (i.e., loan size), interest rate, maturity, whether or not the loan comes with a prepayment penalty, collateral status, the location of the borrower (based on state, available only since 2012), and so on.[10] In addition to these characteristics, since 1997, the STBL has reported the lender's internal risk rating

[9] The loan-level data are proprietary and may only be used within the Federal Reserve, which releases aggregate statistics from the survey to convey the cost and availability of business lending.

[10] The credit lines in the STBL are coded as having a zero maturity. We drop these observations from our analysis.

for each loan. While banks report the risk ratings independently, the Federal Reserve provides instructions on how to make the ratings consistent across institutions. The rating ranges from 1 to 4, with 1 representing loans with the lowest risk and 4 representing those with the highest risk. We exclude distressed loans (risk rating = 5), because these observations in the STBL do not reflect new originations. Capturing loan risk helps rule out alternative explanations stemming from credit risk, so we begin our analysis in 1997 and exclude the unrated loans (risk rating = 0) from consideration. Since we are interested in how the originator's funding conditions affect small C&I lending terms, we drop syndicated loans and loans with commitment amounts above $1 million.

Panel B of Table 1 reports the summary statistics for our final STBL sample of about 1.6 million small C&I loans originated between 1997 and 2017. These loans are characterized by the average loan size of about $119,000, and the average interest rate of 5.7%. On average, these loans have a bit more than one year maturity. We also observe substantial variation in the loan interest rates both in the cross-section (due, for example, to variation in credit risk) as well as in the time-series (due to changes in the level of rates generally, which have trended down over time). Loan maturity, however, is more stable over time, with most of the variation reflecting the cross-section.

We further construct measures of bank deposit concentration using the branch-level *Summary of Deposits* (SOD) data, which are available at the Federal Deposit Insurance Corporation (FDIC) website over the full period of our sample, 1997-2017.[11] The FDIC collects total deposits in the SOD each June, so we merge variables based on these data into the subsequent August, November, February, and May versions of STBL, as well as the following four quarters of the *Call Report*.

[11] See https://www.fdic.gov/regulations/resources/call/sod.html.

We build three measures of deposit concentration at different aggregation levels: branch-level, bank-level, and county-level. All three approaches begin with *Branch HHI,* which varies at the level of the county-year and equals the sum of squared deposit market shares for all bank branches operating in a given county. At this level of aggregation, the variable captures the competitive conditions in the county, but not the aggregate funding conditions of a given bank operating in the county, since most banks have branches in multiple counties and move funds across local markets to accommodate differential lending conditions at the local level (Gilje, Loutskina, and Strahan, 2016).

To capture a given bank's deposit funding condition, we follow DSS and build *Bank HHI* that equals the weighted average of *Branch HHI,* where the weights depend on the fraction of deposits raised in each county in which the bank owns one or more branches. This variable captures a given bank's average market power in raising deposits across all of the markets in which it has branches. As such, two banks operating in the same county will have different levels of *Bank HHI* (representing different funding conditions), since their branch footprints will generally not overlap fully. In the data built at bank-county-year level, the correlation between *Branch HHI* and *Bank HHI* is 0.62, indicating that these two measures do capture different economic forces.

We build *County HHI* that varies at county-year level and captures the exposure of a given county to funding conditions across all banks operating within it. We build this variable by averaging *Bank HHI*, with weights equal to each bank's market share of deposits in a given county. *County HHI* and *Branch HHI* are correlated, as one is a weighted average of another (the correlation coefficient is 0.72).

Panel C of Table 1 reports the summary statistics for *Branch HHI* and *County HHI* that vary at county-year level, while Panel A reports similar statistics for *Bank HHI* that vary at bank-year level. The average *Bank HHI* is 0.19, with a standard deviation of 0.075. Most of the variation in *Bank HHI* reflects cross-bank heterogeneity, as variation over time in banking market concentration in individual counties is minimal. Panels E and F evaluate the correlations between Bank HHI and core bank financials. We find that (i) *Bank HHI* is weakly positively correlated with bank capital and the share of assets funded with deposits; (ii) *Bank HHI* exhibits a higher correlation with bank profits (*ROA*), consistent with lower funding costs from market power; (iii) *Bank HHI* correlates most strongly (and negatively) with bank size (*Log of Bank Assets*). Note that the correlations based on full sample of banks between 1997 and 2017 (reported in Panel E) are economically very similar to those reported in Panel F, which is based on bank-quarter observations matched to STBL data.

Finally, we exploit three measures of business-cycle conditions, two based on interest rates and the other based on output growth. As in prior studies (e.g., DSS), we first use the Fed Funds Rate, which increases during business cycle upswings, and declines during downswings. Since the rate hit the zero lower bound during the Great Recession, we also use the Shadow Fed Funds rate (Wu and Xia, 2016) as a second measure of business conditions. This approach captures the effects of quantitative easing. Third, we use the (seasonally adjusted) quarterly growth of the real GDP. Figure 1 shows the path of these three measures during our sample period, which are highly correlated with each other. To take one example, the Shadow Fed Funds rate increases in the late 1990s (the end of the 1990s dot.com boom), falls in the early 2000s (as the economy moves into recession), increases again leading up to the Financial Crisis (boom), declines into negative territory after the Crisis (bust), and then begins to rise in 2015, as the economy recovers from the Great Recession.

II.2 Cyclical Properties of Bank Outcomes

In this sub-section, we evaluate whether bank market power in raising deposits affects funding cyclicality. We do so by evaluating how bank outcomes vary over the business cycle, as measured by (i) the Federal Funds rate; (ii) the Shadow Fed Funds rate; and (iii) the GDP growth rate. We focus on reduced form models similar to those reported in DSS:

$$Y_{bt} = \alpha_b + \beta_0 Bank\, HHI_{bt-1} + \beta_1 \Delta Z_t + \beta_2 \Delta Z_t * Bank\, HHI_{bt-1} + \varepsilon_{bt} \quad (1a)$$

$$Y_{bt} = \alpha_b + \delta_t + \beta_0 Bank\, HHI_{bt-1} + \beta_2 \Delta Z_t * Bank\, HHI_{bt-1} + \varepsilon_{bt} \quad (1b)$$

where Y_{bt} represents bank-quarter level outcomes for bank b in quarter t, and ΔZ_t represents one of the three business-cycle measures; we report each of these separately (rather than collectively) due to their high correlation to establish robustness. Equation (1a) allows us to learn how the cyclicality of an outcome varies with funding conditions by comparing β_1 with β_2. For example, as we will show, loan growth is higher when interest rates are rising relative to when they are falling (i.e., $\beta_1 > 0$), but this effect is smaller for banks raising deposits in concentrated markets (i.e., $\beta_2 < 0$).

We evaluate five types of bank outcomes related to the liability and asset side of a bank's balance sheet. For liabilities, we consider the growth in total deposits, the (annualized) cost of deposits, and the return on equity (net income/ equity). For assets, we consider the growth in total loans and the growth in C&I loans. Growth rates are constructed using the first difference of the natural log of each outcome. We winsorize all (non-indicator) variables at the 1st and 99th percentiles of their distributions.

DSS focus strictly on interaction effects between bank deposit concentration (*Bank HHI*) and changes in the Federal Funds interest rate, while absorbing the direct effect of rate changes with time effects and cross-bank heterogeneity with bank effects.[12] We follow this approach in some models (to establish the consistency of our results with DSS analysis). We also report models with the direct effect of the business cycle measure (rather than being absorbed by time effects) to illustrate how deposit-market concentration affects the cyclical properties of various outcomes (Equation 1a). Similar to DSS, we aim to illustrate how equilibrium bank outcomes move through the cycle, rather than attempting to separately identify variation from credit supply vs. credit demand.

Table 2 reports the results that use Federal Funds rate (Panel A), shadow Federal Funds rate (Panel B), and GDP growth (Panel C). Panel A suggests that deposit growth is counter-cyclical, increasing during downturns when interest rates decline, and declining during upswings. At the mean of *Bank HHI*, for example, the effect of the Fed Funds interest rate increases is strongly negative (=0.114-1.836 x 0.19 = -0.235). Moreover, consistent with DSS, banks with higher deposit market power (higher *Bank HHI*) exhibit more countercyclical variation in deposits as compared to banks with lower *Bank HHI*. A bank with *Bank HHI* one standard deviation above the mean (0.27) has a stronger negative sensitivity to interest rate changes (=0.114-1.836 x 0.27 = -0.381) than a bank with *Bank HHI* one standard deviation below the mean (=0.114-1.836 x 0.12 = -0.106).

The cost of deposits is strongly pro-cyclical for an average bank, increasing with the level of market interest rates, but this cyclicality is dampened by access to concentrated deposit markets. The cost of deposits for a bank with *Bank HHI* one standard deviation above the mean exhibits

[12] Like DSS, we allow two sets of bank effects, one representing the pre-crisis period and the other representing the post-crisis period. This approach absorbs heterogeneity related to differential effects of the Financial Crisis on banks, depending on many factors such as real estate exposure, exposure to wholesale funding, etc. Moreover, including the bank fixed effects takes out almost all of the useful (cross-sectional) variation in *Bank HHI*, so we do not interpret this coefficient in our discussion of the results.

lower sensitivity to changes in the Fed Funds rate (=0.179-0.08 x 0.27 = 0.157) than a bank with *Bank HHI* one standard deviation below the mean (=0.179-0.08 x 0.12 = 0.17). Again, the effects are similar using either the shadow rate or GDP growth.

Deposit market power provides banks with the *flexibility* not to fully adjust their deposit rates as market interest rates change with the business cycle. Banks with relatively strong loan demand can choose to increase their deposit rates more than banks with similar funding conditions to limit outflows of deposits (and thus help fund lending). In essence, banks may choose to give up some of their deposit rents (by raising rates during booms) to fund a larger balance sheet (when their lending opportunities are unusually strong). As we see in the reduced form model, banks overall raise deposit rates less than one-for-one with market rates, and those with more deposit market power respond less to changes in rates. This pricing behavior contributes to the counter-cyclicality of deposit quantities.

Similar to the cost of deposits, (annualized) return on equity, growth in bank total loans and growth in C&I loans, on average, behave very pro-cyclically (increasing with interest rates and with GDP growth). This pro-cyclicality is lower for banks with competitive advantage in deposit markets. For example, in response to a 1% decline in Federal Funds rate, a bank with *Bank HHI* one standard deviation above the mean would experience a 1.7 percentage point decline in ROE (=2.419-2.644 x 0.27); in contrast, a bank with *Bank HHI* one standard deviation below the mean would experience a 2.1 percentage point decline in ROE (=2.419-2.644 x 0.12). Notably, in all of the outcomes analyzed in Table 2, inclusion of the time fixed effects does not significantly affect either the magnitude or the statistical significance of β_2 estimates.

We find similar effects using the Shadow Fed Funds rate or GDP growth. Overall, the analysis presented in Table 2 is consistent with DSS and shows that banks with access to concentrated deposit markets have better control over their funding. During economic downturns, when other sources of funds (e.g., capital markets) are scarce, these banks experience larger deposit inflows and smaller declines in the availability of internal funds (ROE). The latter effect is critically important for regulated banks because it limits the risk of facing a binding capital requirement during downturns. DSS show that deposit market power allows banks to extend relatively more credit in downturns and relatively fewer loans in booms. Next, we extend these findings further and explore how deposit market power affects the terms of bank loans, and by extension, the real economy.

II.3 Deposit-Market Power and Loan Maturity

How does deposit market power affect bank lending terms, including maturity and interest rates? From one perspective, long-term lending is attractive to banks because it commands higher returns. However, originating long-term loans exposes banks to more credit risks, as that risk accumulates over a longer period of time. More importantly in our setting, long-terms loans expose banks to more funding risks than shorter ones because business loans are illiquid and thus must be held on the originator's balance sheet for the duration of the loan. Declines in profits (during busts) or deposits (during booms) could thereby constrain a long-term lender's ability to make future loans and thus forgo potentially profitable investments. Deposit market power (i.e., concentration) mitigates these funding effects by allowing banks to stabilize their funding throughout the business cycle.

To test these ideas, we estimate our core models, which link *Bank HHI* to C&I loan maturity. In particular, we report the results from the following regressions:

$$Log(Maturity)_{jbt} = \alpha_t + \beta_1 Bank\,HHI_{bt-1} + Bank\,Controls_{bt-1} + Loan\,Controls_j + \varepsilon_{jbt} \qquad (2)$$

The level of analysis is the loan (j), originated by a bank (b) during quarter (t). Our main variable of interest (*Bank HHI*) varies at the level of the bank-year (*bt-1*) and is measured as of the last June prior to the loan origination quarter. Since most of the variation in *Bank HHI* represents the cross-section (see discussion above), we do not include bank-level fixed effects in the model. We argue that banks with access to concentrated deposit markets have more stable funding conditions (over the business cycle) and face less risk in funding longer-maturity loans. Consequently, we expect loan maturity to increase with *Bank HHI* (i.e., $\beta_1 > 0$).

We eliminate a number of alternative explanations by controlling for observed heterogeneity. On the loan side, we control for the (log of) loan size; the bank's assessment of borrower risk, which varies from 1 to 4 (with 4 being the highest risk category); an indicator for loans with prepayment penalties; and an indicator for secured loans. The ability to control for loan risk is crucial in this analysis because it helps eliminate alternative explanations stemming from bank risk preferences.[13]

On the bank side, we control for the log of bank assets (and its square to address the non-linearity of the effect), non-performing loans/assets, the return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, equity/assets, and deposits/assets.[14] All bank controls vary by quarter and are measured as of the last quarter prior to the loan origination quarter. We capture the effect of macro-economic conditions via time fixed effects (α_t). Given that we have many loans per bank, we

[13] STBL also does not include a borrower-specific identifier, so we are not able to incorporate borrower-level fixed effects in our models. The reason is that STBL only samples loans made during a single week, and the set of banks in the survey changes over time.

[14] Internet Appendix Table A3 illustrates that our core findings, however, are not sensitive to whether or not we include bank-level control variables (other than bank size).

cluster standard errors at the level of primary variation for our key explanatory variable – that is, at the bank level.

Panel A of Table 3 reports the baseline result, using the 1997-2017 sample of loans. Consistent with our hypothesis, we find that banks with more deposit market power extend longer-maturity loans: $\beta_1 > 0$. The effects is both economically and statistically significant. The coefficient from the simplest specification (column 1) suggests that a bank with deposit concentration one standard deviation above average would extend loans with about 20% longer maturity than a bank one standard deviation below average (= 2*0.075*1.35).[15]

STBL provides no borrower-specific information beyond the risk rating, yet for loans originated after 2012 it offers the state of the borrower. This allows us to introduce the state-quarter fixed effects, and hence control for variation in (state-specific) local economic conditions, including local loan demand. It also allows us to control for a bank's proximity to the borrower using an indicator variable (*Local Lender*) equal to one for loans originated by lenders with a branch in the same state as the borrower (Cortes et al., 2019).[16]

Panels B and C of Table 3 report these results. First, we repeat the original analysis using the 2012-2017 sample (Panel B) and then incorporate the state-year-level controls (Panel C). Consistent with Panel A, we find a positive and statistically significant effect of *Bank HHI* on loan maturity. The coefficient magnitude increases during the post-2012 period, which may reflect the greater importance of deposits in funding to banks after the end of the Financial Crisis (although

[15] Based on quantile regressions (not reported), these magnitudes are large across the entire maturity distribution. At the low end (10^{th} percentile), a two-sigma increase in *Bank HHI* leads to 25% longer maturity; at the high end (90^{th} percentile), the magnitude falls to 15%.

[16] A large literature has argued that small business lending often relies on soft information, which requires lenders to know and develop long-lasting relationships with their borrowers. We follow a number of papers in this literature in using distance (whether or not a bank owns a branch near the borrower) to proxy access for local information (e.g., Berger et al., 2005).

we have no specific test for this claim). More importantly, the magnitude of the effect is not sensitive to increasing the granularity of the fixed effects and/or adding the *Local Lender* indicator (compare columns 3 and 5).

Finally, we find that the effect of deposit market power on loan maturity does not vary with business cycle conditions. Throughout all the Panels, the coefficient on the interaction term ($\Delta FF_t \times Bank\ HHI_{bt-1}$) is statistically close to zero and exhibits unstable magnitudes across samples (see the even-numbered columns of Table 3). This is consistent with our arguments: during booms, banks with less cyclical funding can originate long-term loans because they face less risk of *future* declines in external (deposits) and internal (ROE) funding. Conversely, during busts, these banks face less risk of increased funding costs in the future (i.e., when the economy moves out of recession).

II.4 Deposit Market Power and Loan Interest Rates

As we have shown, banks facing less competition in deposit markets originate longer-maturity loans. We argue that this is due to deposit market power mitigating banks' funding risk associated with long-term loans. If this is the case, deposit market power should also affect loan pricing: lower funding risks should lead to lower maturity premiums. To test this idea, we regress the C&I loan interest rates on measures of borrower credit risk, loan maturity, and *Bank HHI* using the following regression specification:

$$Loan\ Rate_{jbt} = \alpha_t + \beta_1 Bank\ HHI_{bt-1} + \beta_2 Log(Maturity)_{jbt} + \beta_3 Bank\ HHI_{bt-1} \times Log(Maturity)_{jbt} + Bank\ Controls_b + Loan\ Controls_j + \varepsilon_{jbt} \quad (3)$$

As in Equation (2), the unit of analysis is the loan (j), originated by a bank (b) during quarter (t). Since longer-maturity loans are riskier than shorter-maturity ones, we expect them to command higher premiums ($\beta_2 > 0$). According to our argument, banks with deposit market power (higher *Bank HHI*) face less funding risk and hence can charge lower maturity premium ($\beta_3 < 0$).

Table 4 reports these results, with three separate panels. Similar to Table 3, we report results based on loans originated between 1997 and 2017 (Panel A), as well as similar models using the 2012-2017 sample (Panel B), which allow us to capture both state-time fixed effects as well as the *Local Lender* indicator (Panel C).

We find a positive relationship between loan maturity and the interest rate across all of the specifications. The results also suggest that banks facing less competition in deposit markets (those with higher *Bank HHI*) charge lower maturity premiums: the coefficient β_3 is negative and economically and statistically significant across all three sets of models. For example, in the most complete model (column 6), a bank with *Bank HHI* one standard-deviation below the mean (0.12) would increase loan rates by about 35 basis points for each one-standard deviation increase in log loan maturity (=1.16x(0.553-2.109x0.12)). In contrast, a bank with *Bank HHI* one standard deviation above average (*Bank HHI* =0.27), maturity has approximately zero effect on interest rates (=1.16 x (0.553 - 2.109 x 0.27)).

Combined, the results presented in Tables 2 through 4 suggest that deposit market power provides banks with the flexibility to mitigate funding risk. This competitive advantage enables them to originate more long-terms loans and charge a lower maturity premium.

II.5 Alternative Explanations: Credit Risk and Demand for Long-Term Loans

Prior literature shows that the relationship between loan maturity and the interest rate may reflect unobserved heterogeneity in borrower demand for long-term credit, which itself may be correlated with credit risk (rather than funding). One mechanism that could generate this effect is sorting, whereby firms worried about their ability to roll over short-term debt in the future (e.g., riskier firms that lack collateral) choose to borrow long term, despite higher loan rates (Diamond, 1991; Hertzberg et al., 2018). Borrower credit risk composition also may affect banks' market entry incentives (*Branch HHI*). Since *Bank HHI* is a weighted average of *Branch HHIs,* one can argue that it is the credit risk composition and related heterogeneity in demand for long-term loans, rather than deposit market power, that explain our results. We partially mitigate this alternative explanation by explicitly controlling for borrowers' credit risk ratings and incorporating state-year fixed effects in our analysis.

To further rule out this demand-driven explanation, we conduct our analysis by credit-risk-rating bin. If our core results are indeed driven by refinancing risk that is higher for firms with higher credit risk, then we should observe our effect to be weak or non-existent among low credit risk borrowers (who face low refinancing risk) and stronger among high credit risk borrowers. In contrast, we have argued that long maturity lending creates potential funding risks: banks may face constraints on future lending as a consequence of having to hold a loan originated today *irrespective of the borrower's credit risk*.

Table 5 reports the analysis of loan maturity (Panels A and B) and interest rates (Panels C and D) within sub-samples of loans with risk ratings equal to 1 or 2 (the least risky loans, columns 1 and 2), risk ratings equal to 3 (columns 3 and 4), and risk ratings equal to 4 (the most risky loans, columns 5 and 6). The results show that banks with higher *Bank HHI* originate loans with longer maturity, irrespective of the credit risk of the borrower and irrespective of the sample period. If anything, the effect is economically stronger (in Panel A) for borrowers in the lowest rather than highest credit risk category.

We also observe that banks facing less competition in deposit markets (higher *Bank HHI*) charge lower maturity premiums, again irrespective of the credit risk category. The evidence undermines the alternative hypothesis stemming from credit risk heterogeneity and is consistent with our funding risk explanation. Maturity increases funding risk to lenders, irrespective of credit quality. By mitigating funding risk, deposit market power allows banks to fund more, and cheaper, long-term loans.

II.6 Alternative Explanations: Deposit Market Power vs Lending Market Power

Another possible concern is that *Branch HHI* (and hence *Bank HHI*) may capture aspects not only of funding markets but also of lending markets. For example, consider a small bank operating in just one market. For such a bank, its concentration might be high for both the deposit-taking and lending sides of its business. This example bank would have market power in both businesses, making it hard to know if variation in *Bank HHI* represents variation in funding conditions or variation in lending conditions (or both).

To rule out this concern, we re-estimate our core models using *Out-of-state Bank HHI*. This measure of bank funding conditions varies at bank-state-year level and is computed as a weighted average of *Branch HHI* across all counties where a bank operates *other than* counties located in the state where the business loan is originated. With this revised measure, lending to borrowers of bank *b* located in state *s*, for example, would depend only on bank *b*'s funding conditions in all states other than state *s*. Effectively, this revised measure leaves out the variation in *Bank HHI* from the borrower's state. We can implement this approach only for banks that raise deposits in two or more states. The necessity to know the geographic location of the borrower also limits the analysis to the 2012-2017 sample.

Table 6 reports these results for the full sample, as well as for risk-rating sub-samples. Panel A reports the maturity analysis, while Panel B reports the interest rate analysis. The results show that even after we leave out the local heterogeneity in *Branch HHI* in computing *Bank HHI*, we still observe that (out-of-state) deposit market power allows banks to extend longer-maturity loans and charge lower maturity premiums. Moreover, the economic magnitudes of the documented effects are similar to those reported in Tables 3, 4, and 5. These results thus rule out the concern that the results are driven by local lending market power.

II.7 Deposit Market Power and Soft Information Production

A large literature has argued that small business lending relies on soft information, requiring lenders to know and develop long-lasting relationships with their borrowers. Beyond directly affecting loan maturity and pricing, banks' ability to process local (soft) information matters in our setting because it mediates how funding costs interact with loan risk. Small business loans underwritten with credit-scoring technology – that is, loans banks make over long distances and without a relationship with the borrower – likely embody little or no soft information and thus offer originators the option to sell or securitize them (since potential buyers would be symmetrically informed). As such, their risk ought not to reflect the lender's financing capacity or potential changes in that financing capacity over the life of the loan. Hence, our argument suggests that access to concentrated deposit markets should affect maturity only for the sample of local loans.

To test this hypothesis, we implement the maturity and interest rate analysis separately for the subsamples of loans originated within and outside of each bank's branch domain. That is, we split the sample based on the indicator variable *Local Lender*. Table 7 reports the results for loan maturity (Panel A) and loan interest rates (Panel B). This analysis is limited to the post-2012 sample because the location of the borrower is not available during the earlier survey years.

The results are consistent with our argument: loan maturity increases with *Bank HHI* only for the set of local loans. The effect becomes negative and weakly significant within the subset of loans originated in markets where banks do not have brick-and-mortar locations. Furthermore, bank deposit concentration affects loan maturity premium only within the sample of local loans. Overall, the results support the notion that funding stability, fostered by deposit market power, helps banks supply long-term loans, but only for those that require the originator's funding capacity over the life of the loan.

In the Internet Appendix tables, we provide several additional robustness tests on our core result. We show that the positive link from *Bank HHI* to loan maturity is consistent across loans of differing sizes. We show that the effect, both in terms of statistical as well as economic significance, is not dependent on bank asset shares in different loan categories; nor is it dependent on a bank's liability mix; nor is it dependent on bank size – both large and small banks exhibit a strong positive link from *Bank HHI* to loan maturity. Finally, we show that the result is strong in both the pre-crisis and post-crisis samples, with magnitudes somewhat larger in the post-crisis period.

II.8 Real Effects

Do borrowers benefit from proximity to banks that have deposit market power? To test this idea, we evaluate how industry growth varies with local banks' access to concentrated deposit markets. In implementing this analysis, we face a number of empirical challenges. First, bank funding availability locally ought not to affect large companies with access to public capital (e.g., *Compustat* firms). Hence, we confine our analysis to small businesses. Second, we cannot observe borrowers' capital structures or the maturity breakdowns of debt, given our focus on smaller firms.

To address these concerns, we exploit the *County Business Patterns (CBP)* data to construct the growth in employment and in total wages, as well as the size of local establishments with high geographic (county) and industry (NAICS3) granularity. We then use the SOD data to match the county-year measures of local economic growth to characteristics of local banks. Since the vast majority of small C&I loans are originated within the lender's branch domain (recall the sample sizes in Table 7), this approach allows us to map borrowers to lenders with reasonable precision. Following DSS, we then build *County HHI* to capture the exposure of a given county to funding risk conditions based on the average across all of the banks operating in the county.

To capture the variation in borrower-level demand for long-term debt, we exploit heterogeneity among *Compustat* firms in their dependence on long-term debt. Specifically, we compute time-invariant median *Long-term debt/assets* (*LTD*) ratio within 3-digit NAICS industries using annual *Compustat* data from 1994 to 2017. Following the approach pioneered by Rajan and Zingales (1998), we argue that *Compustat* firms face the least supply-side constraints on their capital structure decisions, so their *LTD* will provide the best measure of the demand for long maturity debt at the industry level. Appendix Table A1 reports the *LTD* measure for the top 10 and bottom 10 NAICS 3-digit industries.

Finally, many prior studies indicate that small firms rely more on local credit conditions than large ones, which implies that funding conditions of local banks ought to matter in driving real outcomes most for the smallest enterprises (e.g., Cetorelli and Strahan, 2006). Thus we split our county-industry-year sample into two subsamples, based on the average county-industry-year establishment size relative to the median establishment size across all counties within the same year.[17]

Armed with these data, we implement regressions with the following structure:

[17] Our results are robust to alternative splits of the sample. For example, we split the sample into county-industry-year observations with above (below) global median establishment size and found qualitatively and quantitatively similar results. Using annual benchmarks for sample split allows for a balanced over sample period panel of observations in both above-median and below-median subsamples.

$$Economic\ Growth_{ict} = \alpha_{it} + \alpha_c + \epsilon_{ict} + \qquad \textbf{(4)}$$

$$\beta_1 County\ HHI_{ct-1} + \beta_2 County\ HHI_{ct-1} \times \Delta FF_t + \beta_3 County\ HHI_{ct-1} \times LTD_i +$$

$$\gamma_1 Branch\ HHI_{ct-1} + \gamma_2 Branch\ HHI_{ct-1} \times \Delta FF_t + \gamma_3 Branch\ HHI_{ct-1} \times LTD_i$$

The level of analysis is industry i, county c, and year t. The dependent variable is either employment growth or growth in total wages. As defined above, *County HHI*$_{ct-1}$ equals the average deposit market concentration ($Bank\ HHI_{bt-1}$) across all banks b operating in county c in year $t-1$. This measure gets most of its variation from concentration in other counties, because most banks draw funds from multiple localities. ΔFF is the change in the Fed Funds rate.

One clear advantage of this approach, relative to what was possible using the STBL data, is our ability to control separately for the funding effects of deposit market concentration (measured by *County HHI*) and for the effects of local banking competition (measured by *Branch HHI*). By incorporating $Branch\ HHI_{ct-1}$ and all related interaction terms, alongside $County\ HHI_{ct-1}$, we can confirm the effect of deposit market power and related funding stability even after we control for local banking competition characteristics.

We further include the interaction terms between *ΔFF* and both *County HHI* and *Branch HHI*. We do so because DSS (and our earlier results) suggest that lending by banks with deposit market power varies less cyclically. Finally, as compared to STBL-based analysis, the granularity of the CBP data allows us to absorb many more sources of unobserved heterogeneity. We capture common industry shocks by including industry-year fixed effects (α_{it}). These absorb the direct effect of *LTD.* In some specification, we also incorporate county-year fixed effects to absorb local economic shocks.

Our identification relies on the heterogeneity of the effect of bank funding stability across industries that rely more (less) on long-term debt. We argue that industries dependent on long-term debt in their capital structure ought to benefit most from close proximity to banks with access to concentrated deposit markets. Hence, we expect $\beta_3 > 0$. Notably, this expectation follows if the positive effect of *Bank HHI* on maturity, documented above, in fact reflects credit supply. We have argued that the micro-evidence is hard to explain otherwise, but this last test helps bolster that interpretation.

We report models with just the *County HHI* (and interactions), just the *Branch HHI* (and interactions), and both sets of variables. Finally, since our identification stems from heterogeneity captured by LTD_i and related interaction terms, we saturate some models with county-year fixed effects to capture unobserved heterogeneity at the county-year level, including local economic conditions and local loan demand. The latter helps justify the credit supply interpretation of our results.

One problem with interpreting the effects of *Branch HHI* is reverse causality – markets that are growing fast will experience faster growth in deposits. Growth in deposits will, in turn, feedback to *Branch HHI*. This concern is much less important for *County HHI*, which is our focus, because it depends mainly on deposits raised in other markets. Given this difference, we do not attempt to interpret the effects of *Branch HHI*; instead, we use it to demonstrate the robustness of our key variable. In addition, we report the models with and without the most granular set of fixed effects, again to help establish the robustness of our main finding.

Tables 8 and 9 report the results for the full sample of county-industry-year observations (Panel A) as well as for subsamples of county-industry-years characterized by size (below the median in Panel B and above the median in Panel C). Table 8 reports employment growth analysis and Table 9 reports growth in total wages analysis.

First, and consistent with DSS, columns (1) and (3) of Table 8 show that counties exposed to banks with more deposit market power (higher *County HHI*) experience less pro-cyclical economic growth.[18] Second, the positive effect of *County HHI* on employment growth increases with the demand for long-term credit (LTD_i), but only within the subsample dominated by smaller industry establishments (Panel B). Consistent with larger firms being less dependent on local finance, we do not find that county exposure to banks with deposit market power affects large firms' employment growth (Panel C). These conclusions persist even after we saturate our models with county-year fixed effects that fully absorb the effects of local economic conditions.

To understand magnitudes, consider the effect of *County HHI* on small establishments during the midpoint of the business cycle (i.e., setting $\Delta FF = 0$). For an industry with the mean level of *LTD* (=0.22), the marginal effect of *County HHI* equals -0.005 + 0.086 x 0.22 = 0.014 (Table 8, Panel B, column 7). This implies that employment growth would be 0.21% faster for industries located in counties with *County HHI* one standard deviation above average, compared to those one standard deviation below. The growth effect rises to 0.34% for industries that are one-standard deviation above average in their use of long-term debt. These growth effects are substantial relative to the mean level of employment growth (=0.5%, see Table 1). Notably, the robustness tests focused on wage growth and presented in Table 9 yield similar conclusions.

III. Conclusions

In this paper, we document a new channel linking deposits to bank credit supply. We argue that banks facing lower competition in deposit markets can stabilize their funding over the business

[18] Despite DSS implementing their analysis at county-year level and us implementing the analysis at the county-industry-year level, the economic magnitudes of the coefficient on the interaction term $County\ HHI_{ct-1} \times \Delta FF_t$ are comparable across. This further validates our empirical approach.

cycle, which in turn reduces the risk of originating long-term illiquid business loans. Without such funding stability, long-term lending today risks constraining profitable lending tomorrow. We further argue that such funding stability benefits sectors of the economy that are more dependent on long-term credit.

As evidence, we provide three new results: First, we show that banks raising deposits in more concentrated markets originate longer-maturity loans. Second, we show that banks with access to concentrated deposit markets charge lower maturity premiums, consistent with deposit market power mitigating the funding risks associated with long-term loans. Third, we show that non-financial firms located near banks raising deposits in concentrated markets grow faster, especially for industries with high demand for long-term debt. Our results suggest a new benefit of concentration in banking more generally, although this benefit comes with other costs as well, such as less competition in lending markets.

In the traditional framework, liquid deposits used to finance illiquid loans creates value but also lead to run-risk for banks, a la Diamond and Dybvig (1983). Hence, deposit-taking contributes to bank fragility. This liquidity transformation problem, we learned in 2008, now resides outside of bank deposits. Deposits were a source of funding inflows during the Financial Crisis and helped banks continue to lend (Cornett et al., 2011). Our paper offers another means by which deposits help banks mitigate the risk of originating and holding long-term illiquid loans.

REFERENCES

Ashcraft, Adam, 2006, "New Evidence on the Lending Channel," Journal of Money, Credit, and Banking 38, 751-776.

Barclay, Michael J. and Clifford W. Smith, Jr., 1995, "The Maturity Structure of Corporate Debt," Journal of Finance 50(2), 609-631.

Berlin, Mitchell and Loretta J. Mester, 1999, "Deposits and Relationship Lending," The Review of Financial Studies 12(3), 579-607.

Bernanke, Ben S., 1983, "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," American Economic Review 73(3), 257-276.

Bernanke, Ben S. and Alan S. Blinder, 1988, "Credit, Money, and Aggregate Demand," American Economic Review 78, 435-439.

Berger, Allen N. and Christa H.S. Bouwman, 2009, "Bank Liquidity Creation," Review of Financial Studies 22(9), 3779-3837.

Berger, Allen N. and Timothy H. Hannan, 1989, "The Price-Concentration Relationship in Banking," Review of Economics and Statistics 71, 291-299.

Berger, Allen N. and Timothy H. Hannan, 1991, "The Rigidity of Prices," American Economic Review 81, 938-945.

Berger, A. N., Marco Espinosa-Vega, W. Scott Frame and Nathan H. Miller, 2005, "Debt Maturity, Risk, and Asymmetric Information," Journal of Finance 60(6), 2895-2923.

Berger, A. N., Miller, N. H., Petersen, M. A., Rajan, R. G., Stein, J. C., 2005, "Does Function Follow Organizational For? Evidence from the Lending Practices of Large and Small Banks," Journal of Financial Economics 76, 237-269.

Black, Lamont and Richard Rosen, 2016, "Monetary Policy, Loan Maturity, and Credit Availability," Journal of Central Banking.

Black, Sandra E., Philip E. Strahan, 2002, "Entrepreneurship and Bank Credit Availability," Journal of Finance 57, 2807-2833.

Calomiris, Charles W. and Charles M. Kahn, 1991, "The Role of Demandable Debt in Structuring Optimal Banking Arrangements," The American Economic Review 81(3), 497-513.

Cetorelli, Nicola and Philip E. Strahan, 2006, "Finance as a Barrier to Entry: Bank Competition and Industry Structure in Local U.S. Markets," Journal of Finance 61, 437-461.

Cornett, Marcia Millon, Jamie McNutt, Philip E. Strahan and Hassan Tehranian, 2011, "Liquidity Risk Management and Credit Supply in the Financial Crisis," Journal of Financial Economics 101(2), 297-312.

Cortes, Kristle R., Yuliya Demyanyk, Lei Li, Elena Loutskina and Philip E. Strahan, 2019, "Stress Tests and Small Business Lending," Journal of Financial Economics (forthcoming).

Diamond, Douglas W., 1991, "Debt Maturity Structure and Liquidity Risk," Quarterly Journal of Economics 106, 709–738

Diamond, Douglas W. and Philip Dybvig, 1983, "Bank Runs, Deposit Insurance, and Liquidity," The Journal of Political Economy 91(3), 401-419.

Diamond, Douglas W. and Raghuram G. Rajan, 2001, "Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking," Journal of Political Economy 109(2), 287-327.

Drechsler, Itamar, Alexi Savov and Philipp Schnabl, 2017, "The Deposit Channel of Monetary Policy," Quarterly Journal of Economics 132(4), 1819-1876.

Drechsler, Itamar, Alexi Savov and Philipp Schnabl, 2019, "How Monetary Policy Shaped the Housing Boom," Working Paper.

Fama, Eugene, 1985, "What's Special about Banks," Journal of Monetary Economics.

Flannery, Mark J., 1986, "Asymmetric Information and Risky Debt Maturity Choice," Journal of Finance 41, 19–37

Flannery, Mark J., 1994, "Debt Maturity and the Deadweight Cost of Leverage: Optimally Financing Banking Firms," American Economic Review 84(1) 320-331.

Gatev, Evan and Philip E. Strahan, 2006, "Bank Advantage in Supplying Liquidity: Theory and Evidence from the Commercial Paper Market, Journal of Finance 61(2), 867-892.

Gilje, Erik, Elena Loutskina and Philip E. Strahan, 2016, "Exporting Liquidity: Branch Banking and Financial Integration," Journal of Finance 71(3) 1159-84.

Gertler, Mark, Simon Gilchrist, 1994, "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms," Quarterly Journal of Economics 109, 309-340.

Hertzberg, Andrew, Andres Liberman and Danial Paravisini, 2018, "Screening on Loan Terms: Evidence from Maturity Choice in Consumer Credit," Review of Financial Studies 31(9), 532–3567.

Iyer, Raj and Peydro, J., 2011, "Interbank Contagion at Work: Evidence from a Natural Experiment," Review of Financial Studies 24, 1337-1377.

Jayaratne, Jith, Philp E. Strahan, 1996, "The Finance-Growth Nexus: Evidence from Bank Branch Deregulation," Quarterly Journal of Economics 111, 639-670.

Kashyap, Anil K, Raghuram G. Rajan, and Jeremy Stein, 2002, "Banks as Liquidity Providers: An Explanation for the Coexistence of Lending and Deposit-Taking," Journal of Finance 57, 33-73.

Keeley, Michael, 1990, "Deposit Insurance, Risk, and Market Power in Banking," American Economic Review 80 (5), 1183-200.

Kerr, William R. and Ramana Nanda, 2009, "Democratizing entry: Banking Deregulations, Financing Constraints and Entrepreneurship," Journal of Financial Economics 94, 124-149.

Khwaja, A. I. and Atif Mian, 2008, "Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market," American Economic Review 98, 1413-1442.

Loutskina, Elena, and Philip E. Strahan, 2009, "Securitization and the Declining Impact of Bank Finance on Loan Supply: Evidence from Mortgage Acceptance Rates," Journal of Finance 64, 861-889.

Paravisini, Daniel, 2008, "Local Bank Financial Constraints and Firm Access to External Finance," Journal of Finance 63, 2161-2193.

Peek, Joe and Eric Rosengren, 2000, "Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States," American Economic Review, 90(1), 30-45.

Petersen, Mitchell A. and Raghuram G. Rajan, 1995, "The Effect of Credit Market Competition on Lending Relationships," The Quarterly Journal of Economics 110(2), 407-443.

Rajan, Raghuram G. and Luigi Zingales, 1998, "Financial Dependence and Growth," The American Economic Review 88(3), 559-586.

Rice, Tara and Philip E. Strahan, 2010, "Does Credit Competition Affect Small-Firm Finance," Journal of Finance 65, 861-889.

Stohs, Mark Hoven and David C Mauer, 1996, "The Determinants of Corporate Debt Maturity Structure," The Journal of Business 69(3), 279-312.

Strahan, Philip E., 2013, "Too Big to Fail: Causes, Consequences and Policy Responses," Annual Review of Financial Economics.

Wu, Jing Cynthia and Fan Dora Xia, 2016, "Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound", Journal of Money, Credit, and Banking 48(2-3), 253-291.

Wang, Yifei, Tony Whited, Yufeng Wu, and Kairong Xiao, 2019, "Bank Market Power and Monetary Policy Transmission: Evidence from a Structural Estimation," Working Paper.

Figure 1: Federal Funds Rate

This figure shows the path of the Fed Funds target rate, the shadow Fed Funds rate (Wu and Xia, 2016), and the four-quarter moving average of real GDP growth rates between 1997 and 2017. After 2008, the Fed Funds target is defined as the midpoint of the Fed Funds target range. The left-scale applies to the two interest rate series, and the right-scale applies to GDP growth.

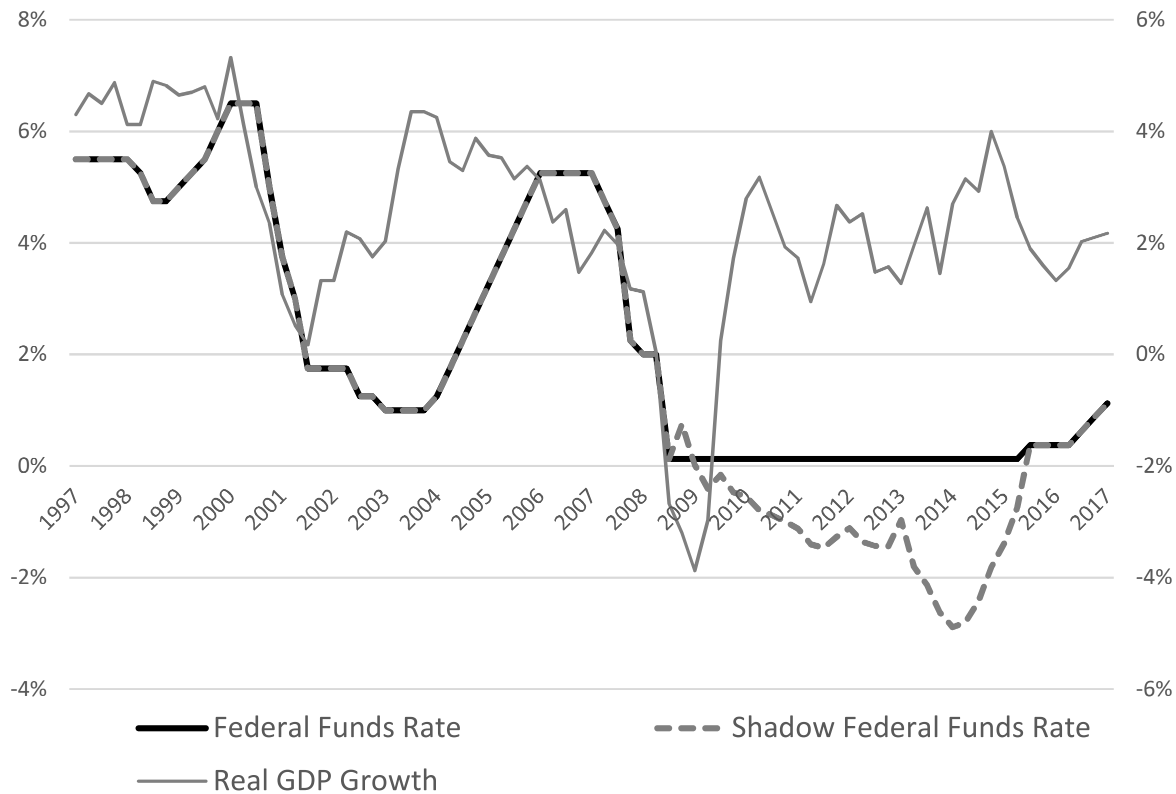

Table 1: Summary Statistics

This table reports summary statistics for bank characteristics, small business lending loan terms, county economic characteristics, and industry long-term-debt dependence. Data sources are Consolidated Report of Condition and Income (call reports), Survey of Terms of Business Lending (STBL), Summary of Deposits (SOD), County Business Patterns (CBP), and Compustat.

	Number of Observations	Mean	Median	Standard Deviation
Panel A: Bank Characteristics (1997Q1-2017Q1)				
Bank HHI	15,292	0.192	0.183	0.075
Log of Bank Assets	15,292	14.37	14.18	2.24
Equity/Assets	15,292	0.100	0.093	0.029
Deposits / Assets	15,292	0.790	0.807	0.090
NPL / Assets	15,292	0.014	0.005	0.030
ROA	15,292	0.003	0.003	0.002
C&I Loans / Assets	15,292	0.134	0.118	0.077
Cash + Securities / Assets	15,292	0.276	0.254	0.129
Consumer Loans / Assets	15,292	0.056	0.037	0.056
Mortgage Loans / Assets	15,292	0.395	0.405	0.156
Trading Assets / Assets	15,292	0.001	0.000	0.001
Panel B: STBL Loan Terms (1997Q2-2017Q2)				
Loan Rate (percentage points)	1,618,261	5.70	5.25	2.51
Log of Loan Size	1,618,261	10.759	10.700	1.431
Loan Size ($)	1,618,261	118,618	44,334	177,229
Maturity (months)	1,618,261	14.89	9.10	17.53
Log(Days to Maturity)	1,618,261	5.515	5.613	1.155
Rating (1=safest; 4=riskiest)	1,618,261	3.285	3.000	0.702
Local Bank? (available since 2012)	467,832	0.798		
Loan is Secured?	1,618,261	0.831		
Prepayment Penalty?	1,618,261	0.088		
Panel C: County Economic Characteristics (1997-2017)				
Branch Deposit HHI	1,920,723	0.231	0.196	0.128
County Deposit HHI	1,920,723	0.221	0.205	0.074
Δ log (Employment)	1,920,723	0.005	0.005	0.171
Δ log (Wages)	1,920,723	0.033	0.034	0.199
Panel D: Industry Long-Term-Debt Dependence				
Long-Term Debt/Assets	84	0.215	0.216	0.109

Table 1 (Cont.)

Panel E: Correlation Matrix for All Banks (144,373 bank-quarter observations, 1997-2017)

	Bank HHI	Log of Bank Assets	Equity/Assets	Deposits/Assets	NPL/Assets	ROA
Bank HHI	1.0					
Log of Bank Assets	-0.114	1.0				
Equity/Assets	0.065	-0.164	1.0			
Deposits/Assets	0.029	-0.306	-0.371	1.0		
NPL/Assets	-0.019	0.002	-0.065	0.006	1.0	
ROA	0.062	0.090	0.014	-0.027	-0.176	1.0

Panel F: Correlation Matrix for Banks Covered by STBL Data (15,308 bank-quarter observations, 1997-2017)

	Bank HHI	Log of Bank Assets	Equity/Assets	Deposits/Assets	NPL/Assets	ROA
Bank HHI	1.0					
Log of Bank Assets	-0.165	1.0				
Equity/Assets	0.064	0.015	1.0			
Deposits/Assets	0.084	-0.542	-0.110	1.0		
NPL/Assets	-0.010	0.017	-0.047	-0.049	1.0	
ROA	0.092	-0.026	0.067	-0.025	-0.122	1.0

Table 2: Deposit Concentration, Bank Liabilities, and Lending: Bank-Level Analysis

This table reports the results of the OLS analysis following regression equation (1). The level of analysis is bank-quarter.*Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Panel A uses change in the Fed Funds target rate as the business cycle measure. Panel B uses change in the shadow Fed Funds rate as the business cycle measure. Panel C uses the (seasonablly adjusted) real GDP growth rate as the business cycle measure. The sample covers the period between 1997 and 2017. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	Δ log Total Deposits		*Δ Cost of Deposits*		*ROE*		*Δ log Total Loans*		*Δ log C&I Loans*	
Panel A: Federal Funds Rate										
ΔFF Ratet	0.114***		0.179***		2.419***		0.796***		0.810***	
	(2.72)		(98.94)		(33.52)		(19.07)		(9.01)	
Bank HHIt-1	-0.002	0.001	0.001***	-0.0002**	0.006	-0.012	0.018***	0.012**	0.033***	0.026***
	(0.28)	(0.15)	(3.61)	(2.30)	(0.65)	(1.30)	(3.50)	(2.41)	(4.23)	(3.35)
ΔFF Ratet x Bank HHIt-1	-1.836***	-1.862***	-0.080***	-0.083***	-2.644***	-2.744***	-0.535***	-0.594***	-0.811**	-0.934**
	(11.62)	(11.82)	(11.46)	(12.22)	(9.70)	(10.10)	(3.29)	(3.67)	(2.16)	(2.50)
Bank*Post-2008 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes
Observations	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374
R2	13.9%	16.5%	12.0%	40.5%	46.2%	48.6%	19.8%	23.0%	5.5%	6.1%
Panel B: Shadow Federal Funds Rate										
ΔShadow FF Rate$_t$	0.122***		0.149***		2.310***		0.736***		0.752***	
	(3.40)		(95.49)		(34.54)		(20.73)		(9.48)	
Bank HHI$_{t-1}$	-0.001	0.001	0.0004***	-0.0002**	0.004	-0.012	0.0167***	0.0115**	0.0325***	0.0256***
	(0.23)	(0.21)	(2.75)	(2.25)	(0.41)	(1.32)	(3.36)	(2.40)	(4.14)	(3.36)
ΔShadow FF Rate$_t$ x Bank HHI$_{t-1}$	-1.358***	-1.379***	-0.077***	-0.073***	-2.979***	-3.006***	-0.649***	-0.707***	-0.657**	-0.764**
	(10.12)	(10.35)	(13.03)	(13.30)	(11.83)	(12.01)	(4.78)	(5.22)	(1.99)	(2.32)
Bank*Post-2008 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes
Observations	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374
R^2	13.9%	16.5%	10.4%	40.5%	46.2%	48.6%	19.8%	23.0%	5.5%	6.1%
Panel C: Real GDP Growth										
Real GDP Growth$_t$	0.038***		0.016***		0.416***		0.208***		0.254***	
	(5.25)		(63.72)		(27.22)		(27.23)		(15.47)	
Bank HHI$_{t-1}$	0.005	0.008*	0.001***	0	0.025***	0.007	0.023***	0.018***	0.041***	0.035***
	(1.11)	(1.84)	(5.43)	(0.93)	(2.60)	(0.72)	(4.54)	(3.69)	(5.14)	(4.46)
Real GDP Growth$_t$ x Bank HHI$_{t-1}$	-0.211***	-0.232***	-0.004***	-0.002***	-0.630***	-0.638***	-0.206***	-0.229***	-0.320***	-0.341***
	(7.77)	(8.55)	(4.25)	(2.61)	(10.83)	(11.14)	(6.94)	(7.64)	(4.68)	(4.99)
Bank*Post-2008 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes
Observations	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374	585,374
R^2	13.8%	16.5%	4.6%	40.5%	46.0%	48.6%	19.9%	23.0%	5.5%	6.1%

Table 3: Bank Deposit Concentration and Loan Maturity

This table reports the results of the OLS analysis following regression equation (2). The dependent variable is (log) of loan maturity in days. Panel A reports the results for the 1997-2017 sample of small business loans. Panels B and C report the result for the 2012-2017 subsample where we have information on the location (state) of the borrower. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	Dependent Variable = Log(Days to Maturity)					
	Panel A: Sample 1997-2017, No State Controls		*Panel B: Sample 2012-2017, No State Controls*		*Panel C: Sample 2012-2017, With State Controls*	
	(1)	(2)	(3)	(4)	(5)	(6)
Bank HHI_{t-1}	1.348***	1.351***	2.199***	2.233***	2.516***	2.601***
	(3.22)	(3.26)	(2.68)	(2.72)	(3.71)	(3.88)
Bank HHI_{t-1} x ΔFF $Rate_t$		7.111		-74.8		-186.9
		(0.18)		(0.46)		(1.26)
log (Loan Size)	0.0729***	0.0728***	0.0362*	0.0362*	0.0395**	0.0394**
	(5.79)	(5.79)	(1.74)	(1.74)	(2.07)	(2.07)
Local Bank Dummy					-0.530***	-0.530***
					(5.75)	(5.77)
Other Bank $Controls_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	-	-
State x Quarter Fixed Effects	-	-	-	-	Yes	Yes
Observations	1,618,261	1,618,261	414,726	414,726	414,726	414,726
R^2	4.5%	4.5%	7.1%	7.1%	10.7%	10.7%

Table 4: Bank Deposit Concentration and Loan Interest Rates

This table reports the results of the OLS analysis following regression equation (3). The dependent variable is loan interest rate. Panel A reports the results for the 1997-2017 sample of small business loans. Panels B and C report the result for the 2012-2017 subsample where we have information on the location (state) of the borrower. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	Dependent Variable = Loan Interest Rate					
	Sample 1997-2017		*Sample 2012-2017, No State Controls*		*Sample 2012-2017, With State Controls*	
Bank HHI_{t-1}	-0.537	3.677**	-6.162**	8.195***	-6.686**	5.464**
	(0.51)	(2.06)	(2.05)	(3.07)	(2.47)	(2.36)
log (Loan Maturity)	0.089***	0.229***	0.147**	0.646***	0.133**	0.553***
	(2.88)	(3.58)	(2.46)	(3.92)	(2.43)	(3.68)
Bank HHI_{t-1} x log(Loan Maturity)		-0.764*		-2.512***		-2.109***
		(1.76)		(3.28)		(3.14)
log (Loan Size)	-0.199***	-0.199***	-0.202***	-0.204***	-0.208***	-0.210***
	(5.74)	(5.79)	(3.12)	(3.30)	(3.65)	(3.81)
Local Bank Dummy					-0.371*	-0.335
					(1.68)	(1.54)
Other Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State x Quarter Fixed Effects	-	-	-	-	Yes	Yes
Observations	1,618,261	1,618,261	414,726	414,726	414,726	414,726
R^2	79.5%	79.6%	26.8%	27.7%	31.4%	32.0%

Table 5: Bank Deposit Concentration, Loan Maturity, and Loan Interest Rates: by Loan Risk

Panels A and B report the results of the OLS analysis following regression equation (2), where the dependent variable is (log) loan maturity. Panels C and D report the results following regression equation (3), where the dependent variable is loan interest rate. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Each column reports the results of analysis when the sample loans are confined to one credit risk category. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	Risk Rating ≤ 2		*Risk Rating = 3*		*Risk Rating = 4*	
Panel A: Log(Days to Maturity), 1997-2017 Sample						
Bank HHI_{t-1}	2.139***	2.165***	1.032**	1.042**	1.305***	1.292***
	(2.89)	(2.94)	(2.35)	(2.40)	(2.61)	(2.61)
ΔFF $Rate_t$ x Bank HHI_{t-1}		30.072		35.352		-20.842
		(0.53)		(0.85)		(0.48)
Other Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	170,400	170,400	784,008	784,008	663,853	663,853
R^2	6.0%	6.0%	5.4%	5.4%	4.9%	4.9%
Panel B: Log(Days to Maturity), 2012-2017 Sample						
Bank HHI_{t-1}	2.271*	2.268*	2.425***	2.437***	2.444***	2.540***
	(1.91)	(1.90)	(3.55)	(3.56)	(3.06)	(3.32)
ΔFF $Rate_t$ x Bank HHI_{t-1}		6.685		-31.187		-178.763
		(0.02)		(0.20)		(1.06)
Other Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
State x Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	40,270	40,270	189,536	189,536	184,856	184,856
R^2	29.0%	29.0%	12.6%	12.6%	12.9%	13.0%
Panel C: Loan Interest Rates, 1997-2017 Sample						
Bank HHI_{t-1}	-0.780	3.143	-0.146	3.770**	-0.903	4.225*
	(0.73)	(0.99)	(0.17)	(2.29)	(0.60)	(1.88)
log (Loan Maturity)	0.123***	0.252*	0.078***	0.207***	0.080**	0.254***
	(5.48)	(1.91)	(2.90)	(3.38)	(1.99)	(3.43)
Bank HHI_{t-1} x log(Loan Maturity)		-0.712		-0.704*		-0.940*
		(1.13)		(1.74)		(1.84)
Other Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	170,400	170,400	784,008	784,008	663,853	663,853
R^2	78.6%	78.7%	81.3%	81.4%	78.7%	78.8%
Panel D: Loan Interest Rates, 2012-2017 Sample						
Bank HHI_{t-1}	-2.472	9.773***	-5.608**	4.969*	-7.863***	5.255*
	(0.74)	(3.84)	(2.39)	(1.81)	(2.86)	(1.84)
log (1+Loan Maturity)	0.121***	0.523***	0.075*	0.430***	0.155**	0.624***
	(4.47)	(4.58)	(1.88)	(2.99)	(2.31)	(3.58)
Bank HHI_{t-1} x log(Loan Maturity)		-2.171***		-1.817***		-2.282***
		(3.52)		(2.75)		(3.11)
Other Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
State x Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	40,270	40,270	189,536	189,536	184,856	184,856
R^2	50.5%	51.1%	39.5%	40.0%	30.3%	30.9%

Table 6: Out-of-State Bank Deposit Concentration

Panels A reports the results of the OLS analysis following regression equation (2), where the dependent variable is (log) loan maturity. Panel B reports the results following regression equation (3), where the dependent variable is loan interest rate. *Out-of-state Bank HHI* is a weighted average of *Branch HHI* s across all counties where a given bank operates yet located outside of the state where the loan was originated. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. The sample contains small business loans originated between 2012 and 2017. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	2012-2017 Sample		*Risk Rating ≤ 2*		*Risk Rating = 3*		*Risk Rating = 4*	
Panel A: Log(Days to Maturity)								
Out-of-state Bank HHI_{t-1}	1.852**	1.869**	2.846**	2.715**	1.787**	1.740**	1.428	1.405
	(2.347)	(2.405)	(2.18)	(2.05)	(2.25)	(2.16)	(1.43)	(1.47)
ΔFF $Rate_t$ x Out-of-state Bank HHI_{t-1}		-36.230		304.669		109.286		42.366
		(0.218)		(0.99)		(0.62)		(0.21)
log (Loan Size)	0.035*	0.035*	0.048**	0.048**	0.034	0.034	0.020	0.020
	(1.707)	(1.706)	(2.54)	(2.52)	(1.55)	(1.55)	(0.67)	(0.67)
Observations	391,009	391,009	37,815	37,815	177,197	177,197	175,919	175,919
R^2	11.1%	11.1%	30.7%	30.7%	13.2%	13.2%	13.5%	13.5%
Panel B: Loan Interest Rates								
Out-of-state Bank HHI_{t-1}	-8.797***	5.766***	0.357	15.587***	-7.925***	4.786*	-10.806***	3.960
	(3.398)	(2.702)	(0.16)	(7.00)	(3.35)	(1.92)	(4.47)	(1.63)
log (Loan Maturity)	0.123**	0.625***	0.112***	0.611***	0.075*	0.500***	0.134**	0.660***
	(2.203)	(4.567)	(4.01)	(5.54)	(1.76)	(3.69)	(2.06)	(4.37)
Out-of-state Bank HHI_{t-1} x log(Loan Maturity)		-2.488***		-2.662***		-2.151***		-2.517***
		(4.527)		(4.88)		(3.83)		(4.53)
log (Loan Size)	-0.196***	-0.197***	-0.233***	-0.233***	-0.189***	-0.191***	-0.197***	-0.198***
	(3.637)	(3.831)	(6.03)	(6.05)	(4.14)	(4.34)	(3.58)	(3.76)
Observations	391,009	391,009	37,815	37,815	177,197	177,197	175,919	175,919
R^2	34.1%	35.0%	52.4%	53.3%	39.6%	40.2%	35.0%	35.9%

Table 7: Bank Deposit Concentration, Loan Maturity, and Loan Interest Rates: Local vs. Non-Local Loans

Panels A reports the results of the OLS analysis following regression equation (2), where the dependent variable is (log) loan maturity. Panel B reports the results following regression equation (3), where the dependent variable is loan interest rate. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Columns 1 and 2 report the results for the 2012-2017 sample of small business loans, while columns 3-4 and 5-6 split the sample into two sub-samples based on the *Local Lender* indicator. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

2012-2017 Sample	*Full Sample*		*Local Banks*		*Non-Local Banks*	
Panel A: Log(Days to Maturity)						
Bank HHI_{t-1}	-1.206	-1.131	3.238***	3.347***	-1.447	-1.675*
	(1.07)	(0.97)	(5.09)	(5.36)	(1.60)	(1.93)
Local Lender	-1.362***	-1.363***	-	-	-	-
	(6.89)	(6.64)	-	-	-	-
Local Lender x Bank HHI_{t-1}	4.392***	4.400***	-	-	-	-
	(4.28)	(4.11)	-	-	-	-
log (Loan Size)	0.039**	0.039**	0.047**	0.047**	0.036	0.036
	(2.04)	(2.03)	(2.40)	(2.39)	(1.60)	(1.60)
Other Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Interactions with ΔFF $Rate_t$	Yes	Yes	Yes	Yes	Yes	Yes
State x Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	414,726	414,726	373,232	373,232	41,469	41,469
R^2	11.0%	11.0%	7.5%	7.5%	29.7%	29.8%
Panel B: Loan Interest Rates						
Bank HHI_{t-1}	-13.612***	-12.723	-5.709**	4.721**	-9.924**	-10.108
	(2.83)	(1.15)	(2.27)	(2.51)	(2.44)	(0.92)
log (Loan Maturity)	0.386***	0.410	0.108*	0.477***	0.297***	0.292
	(3.17)	(1.23)	(1.92)	(3.32)	(2.79)	(1.03)
Bank HHI_{t-1} x log(Loan Maturity)		-0.132	-	-1.834***	-	0.031
		(0.07)	-	(2.95)	-	(0.02)
Local Lender x Bank HHI	8.358**	18.436	-	-	-	-
	(2.13)	(1.57)	-	-	-	-
Local Lender x log (Loan Maturity)	-0.284**	0.080	-	-	-	-
	(2.20)	(0.22)	-	-	-	-
Local Lender x Bank HHI_{t-1} x log(Loan Maturity)		-1.797	-	-	-	-
		(0.84)	-	-	-	-
log (Loan Size)	-0.205***	-0.207***	-0.198***	-0.200***	-0.215**	-0.215**
	(3.65)	(3.79)	(3.75)	(3.91)	(2.15)	(2.15)
Other Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	414,726	414,726	373,232	373,232	41,469	41,469
R^2	32.6%	33.0%	32.4%	32.9%	49.2%	49.2%

Table 8: Deposit Concentration and Employment Growth

This table reports the results from the OLS regressions following equation (4). The dependent variable is (log) growth in employment measured at county-industry-year level. Panel A reports the resuls for the full sample covering the 1995-2017 period. Panel B reports the results based on the subsample confined to county-industry-year observations that are characterized by below-median establishment size. Similarly, Panel C reports the results based on the subsample confined to county-industry-year observations that are characterized by above-median establishment size. Standard errors are clustered by county and industry-year. T-statistics reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	Dependent Variable: Δ log Employment											
	Panel A: Full Sample				*Panel B: Counties with Below-Median Average Establishment Size*				*Panel C: Counties with Above-Median Average Establishment Size*			
County Deposit HHI$_{t-1}$	0.010		0.001		0.010		-0.005		-0.013		-0.004	
	(1.32)		(0.14)		(1.03)		(0.41)		(1.21)		(0.24)	
County Deposit HHI$_{t-1}$ *x LTD*	0.045**		0.048	0.045	0.075***		0.086**	0.098**	0.109***		0.062	0.031
	(2.20)		(1.60)	(1.54)	(2.74)		(2.09)	(2.37)	(3.29)		(1.22)	(0.62)
County Deposit HHI$_{t-1}$ *x ΔFF Rate$_t$*	-0.895***		-0.833**		-0.982***		-1.017**		-0.517**		-0.420	
	(4.30)		(2.36)		(3.71)		(2.30)		(2.20)		(1.09)	
Branch Deposit HHI$_{t-1}$		0.010**	0.009			0.015**	0.018**			-0.008	-0.006	
		(2.03)	(1.52)			(2.30)	(2.14)			(1.22)	(0.65)	
Branch Deposit HHI$_{t-1}$ *x LTD*		0.020*	-0.002	0.001		0.032*	-0.007	-0.013		0.062***	0.033	0.044
		(1.70)	(0.11)	(0.08)		(1.89)	(0.28)	(0.52)		(3.30)	(1.18)	(1.48)
Branch Deposit HHI$_{t-1}$ *x ΔFF Rate$_t$*		-0.448***	-0.047			-0.458***	0.022			-0.278*	-0.069	
		(3.53)	(0.22)			(2.94)	(0.08)			(1.94)	(0.29)	
Industry x Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Fixed Effect	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	Yes	-
County x Year Fixed Effects	-	-	-	Yes	-	-	-	Yes	-	-	-	Yes
Observations	1,920,723	1,920,723	1,920,723	1,919,231	960,573	960,573	960,573	958,566	960,118	960,118	960,118	955,221
R^2	4.2%	4.2%	4.2%	8.9%	3.8%	3.8%	3.8%	11.8%	6.9%	6.9%	6.9%	14.1%

Table 9: Deposit Concentration and Wage Growth

This table reports the results from the OLS regressions following equation (4). The dependent variable is (log) growth in total wages measured at county-industry-year level. Panel A reports the results for the full sample covering the 1995-2017 period. Panel B reports the results based on the subsample confined to county-industry-year observations that are characterized by below-median establishment size. Similary, Panel C reports the results based on the subsample confined to county-industry-year observations that are characterized by above-median establishment size. Standard errors are clustered by county and industry-year. T-statistics reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	Dependent Variable: Δ log Total Wages											
	Panel A: Full Sample				*Panel B: Counties with Below-Median Average Establishment Size*				*Panel C: Counties with Above-Median Average Establishment Size*			
County Deposit HHI_{t-1}	0.004		-0.014		0.009		-0.015		-0.017		-0.018	
	(0.43)		(1.08)		(0.79)		(0.92)		(1.42)		(1.05)	
County Deposit HHI_{t-1} *x LTD*	0.050**		0.067*	0.066*	0.087***		0.111**	0.131***	0.077**		0.048	0.004
	(2.03)		(1.81)	(1.90)	(2.81)		(2.32)	(2.72)	(2.12)		(0.87)	(0.07)
County Deposit HHI_{t-1} *x ΔFF Rate* $_t$	-1.232***		-1.021**		-1.294***		-1.532***		-0.980***		-0.076	
	(5.00)		(2.48)		(4.52)		(3.07)		(3.53)		(0.16)	
Branch Deposit HHI_{t-1}		0.012**	0.019**			0.020***	0.027***			-0.005	0.003	
		(2.10)	(2.35)			(2.61)	(2.65)			(0.75)	(0.29)	
Branch Deposit HHI_{t-1} *x LTD*		0.020	-0.012	-0.008		0.034*	-0.0161	-0.027		0.044**	0.0217	0.043
		(1.30)	(0.51)	(0.39)		(1.78)	(0.55)	(0.93)		(2.08)	(0.69)	(1.30)
Branch Deposit HHI_{t-1} *x ΔFF Rate* $_t$		-0.643***	-0.157			-0.549***	0.171			-0.678***	-0.645**	
		(3.98)	(0.58)			(3.09)	(0.55)			(3.79)	(2.07)	
Industry x Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Fixed Effect	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	Yes	-
County x Year Fixed Effects	-	-	-	Yes	-	-	-	Yes	-	-	-	Yes
Observations	1,920,723	1,920,723	1,920,723	1,919,231	960,573	960,573	960,573	958,566	960,118	960,118	960,118	955,221
R^2	5.2%	5.2%	5.2%	10.2%	4.6%	4.6%	4.6%	12.8%	7.7%	7.7%	7.7%	15.1%

Table A1: Long-Term Debt-to-Assets (LTD) Ratios

This table reports the long-term debt-to-assets (LTD) ratio for the top 10 and bottom 10 NAICS 3-digit industries. For each firm in Compustat, we sum up its long-term debt and total assets over the period of 1994-2017 and calculate the ratio of aggregate long-term debt to aggregate total assets. For each industry, LTD is defined as the (time-invariant) median of the aggregate long-term debt to aggregate total assets ratio across all firms in the industry. Finance and government related industries are excluded from the list.

NAICS3	Description	LTD
511	Publishing Industries (except Internet)	0.014
316	Leather and Allied Product Manufacturing	0.037
454	Nonstore Retailers	0.048
453	Miscellaneous Store Retailers	0.049
334	Computer and Electronic Product Manufacturing	0.051
541	Professional, Scientific, and Technical Services	0.056
519	Other Information Services	0.059
325	Chemical Manufacturing	0.066
813	Religious, Grantmaking, Civic, Professional, and Similar Organizations	0.070
451	Sporting Goods, Hobby, Musical Instrument, and Book Stores	0.071
811	Repair and Maintenance	0.360
486	Pipeline Transportation	0.366
314	Textile Product Mills	0.371
487	Scenic and Sightseeing Transportation	0.375
517	Telecommunications	0.379
713	Amusement, Gambling, and Recreation Industries	0.380
622	Hospitals	0.413
623	Nursing and Residential Care Facilities	0.424
113	Forestry and Logging	0.425
721	Accommodation	0.481

Table A2: Bank Deposit Concentration, Loan Maturity, and Loan Interest Rates: Alternative Sets of Bank Controls

Panel A reports the results of the OLS analysis following regression equation (2), where the dependent variable is (log) loan maturity. Panel B reports the results following regression equation (3), where the dependent variable is loan interest rate. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

Panel A: Log(Days to Maturity), 1997-2017 Sample			
Bank HHI_{t-1}	1.102**	1.185**	1.348***
	(2.34)	(2.58)	(3.22)
log (Loan Size)	0.079***	0.074***	0.073***
	(6.04)	(5.76)	(5.79)
Log(assets)	0.468***	0.370***	0.238*
	(3.01)	(2.79)	(1.93)
Log(assets)^2	-0.015***	-0.013***	-0.009**
	(3.07)	(3.09)	(2.40)
NPL/Assets		-1.946	-1.566
		(1.43)	(1.32)
ROA		13.17	10.85
		(1.57)	(1.50)
C&I Loans/Assets		0.228	0.681
		(0.48)	(1.47)
(Cash + Securities)/Assets		-0.443	0.018
		(1.39)	(0.06)
Mortgage Loans/Assets		-0.601*	-0.249
		(1.96)	(0.85)
Trading Assets/Assets		31.75**	33.47***
		(2.34)	(2.70)
Consumer Loans/Assets		0.306	0.548
		(0.53)	(0.98)
Equity/Assets			0.679
			(0.87)
Deposits/Assets			-1.128***
			(4.50)
Other Loan Controls	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes
Observations	1618261	1,618,261	1,618,261
R^2	3.6%	4.1%	4.5%

Panel B: Loan Interest Rates, 1997-2017 Sample

Bank HHI_{t-1}	3.244*	3.909**	3.677**
	(1.75)	(2.06)	(2.06)
log (Loan Maturity)	0.214***	0.226***	0.229***
	(3.11)	(3.50)	(3.58)
Bank HHI_{t-1} x log(Loan Maturity	-0.753	-0.785*	-0.764*
	(1.51)	(1.74)	(1.76)
Log(assets)^2	0.028***	0.023**	0.020**
	(2.75)	(2.44)	(2.25)
NPL/Assets		1.211	0.333
		(0.51)	(0.15)
ROA		-1.004	1.613
		(0.04)	(0.08)
C&I Loans/Assets		-1.543**	-2.067***
		(2.06)	(2.64)
(Cash + Securities)/Assets		-0.881**	-1.449***
		(2.09)	(3.32)
Mortgage Loans/Assets		0.519	-0.039
		(1.01)	(0.09)
Trading Assets/Assets		2.264	1.363
		(0.09)	(0.06)
Consumer Loans/Assets		-4.344***	-4.641***
		(3.09)	(3.52)
Equity/Assets			2.669*
			(1.78)
Deposits/Assets			2.175***
			(3.47)
Other Loan Controls	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes
Observations	1,618,261	1,618,261	1,618,261
R^2	78.5%	79.2%	79.6%

Table A3: Bank Deposit Concentration, Loan Maturity, and Loan Interest Rates: by Loan Size

Panels A and B report the results of the OLS analysis following regression equation (2), where the dependent variable is (log) loan maturity. Panels C and D report the results following regression equation (3), where the dependent variable is loan interest rate. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Each column reports the results of analysis when the sample loans are confined to one size category. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	<$100k loans	*$100-250k loans*	*$250k-1m loans*
Panel A: Log(Days to Maturity), 1997-2017 Sample			
Bank HHI_{t-1}	1.276***	1.151**	1.299**
	(2.77)	(2.25)	(2.06)
Other Bank Controls	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes
Observations	1,134,688	257,536	226,037
R^2	4.7%	3.6%	2.5%
Panel B: Log(Days to Maturity), 2012-2017 Sample			
Bank HHI_{t-1}	2.895***	1.501**	-0.229
	(3.96)	(2.36)	(0.21)
Other Bank Controls	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes
State x Quarter Fixed Effects	Yes	Yes	Yes
Observations	282,627	72,640	59,439
R^2	12.6%	11.3%	11.3%
Panel C: Loan Interest Rates, 1997-2017 Sample			
Bank HHI_{t-1}	4.116*	2.413	2.850
	(1.93)	(1.09)	(1.52)
log (Loan Maturity)	0.251***	0.146**	0.198***
	(3.02)	(2.52)	(3.80)
Bank HHI_{t-1} x log(Loan Maturity)	-0.904	-0.347	-0.405
	(1.64)	(0.92)	(1.25)
Other Bank Controls	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes
Observations	1,134,688	257,536	226,037
R^2	78.6%	83.1%	82.5%
Panel D: Loan Interest Rates, 2012-2017 Sample			
Bank HHI_{t-1}	5.033**	6.504	4.078
	(2.20)	(1.63)	(1.09)
log (Loan Maturity)	0.639***	0.297**	0.226*
	(3.83)	(2.51)	(1.81)
Bank HHI_{t-1} x log(Loan Maturity)	-2.271***	-1.200**	-0.762
	(3.22)	(2.03)	(1.27)
Other Bank Controls	Yes	Yes	Yes
Other Loan Controls	Yes	Yes	Yes
State x Quarter Fixed Effects	Yes	Yes	Yes
Observations	282,627	72,640	59,439
R^2	35.8%	28.9%	31.0%

Table A4: Bank Deposit Concentration, Loan Maturity, and Loan Interest Rates: by Bank Size

Panels A and B report the results of the OLS analysis following regression equation (2), where the dependent variable is (log) loan maturity. Panels C and D report the results following regression equation (3), where the dependent variable is loan interest rate. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Each column reports the results of analysis when the sample loans are confined to one lender size category. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	<$50 billion banks	*>=$50 billion banks*
Panel A: Log(Days to Maturity), 1997-2017 Sample		
Bank HHI_{t-1}	0.965**	2.949***
	(2.22)	(4.40)
Other Bank Controls	Yes	Yes
Other Loan Controls	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Observations	674,009	944,252
R^2	4.6%	5.9%
Panel B: Log(Days to Maturity), 2012-2017 Sample		
Bank HHI_{t-1}	0.603	3.279***
	(0.82)	(3.50)
Other Bank Controls	Yes	Yes
Other Loan Controls	Yes	Yes
State x Quarter Fixed Effects	Yes	Yes
Observations	96,531	318,157
R^2	21.7%	10.2%
Panel C: Loan Interest Rates, 1997-2017 Sample		
Bank HHI_{t-1}	0.045	2.263*
	(0.03)	(1.79)
log (Loan Maturity)	0.088*	0.306***
	(1.88)	(3.90)
Bank HHI_{t-1} x log(Loan Maturity)	-0.015	-1.045**
	(0.06)	(2.39)
Other Bank Controls	Yes	Yes
Other Loan Controls	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Observations	674,009	944,252
R^2	76.1%	78.8%
Panel D: Loan Interest Rates, 2012-2017 Sample		
Bank HHI_{t-1}	0.898	15.941***
	(0.25)	(2.84)
log (1+Loan Maturity)	0.149	0.836***
	(0.94)	(3.03)
Bank HHI_{t-1} x log(Loan Maturity)	-0.181	-3.686***
	(0.20)	(2.99)
Other Bank Controls	Yes	Yes
Other Loan Controls	Yes	Yes
State x Quarter Fixed Effects	Yes	Yes
Observations	96,531	318,157
R^2	23.7%	20.6%

Table A5: Bank Deposit Concentration, Loan Maturity, and Loan Interest Rates: Pre- vs Post-Crisis

Panel A the results of the OLS analysis following regression equation (2), where the dependent variable is (log) loan maturity. Panel B reports the results following regression equation (3), where the dependent variable is loan interest rate. *Bank HHI* is a weighted average of *Branch HHIs* across all counties where a given bank operates. Loan controls include the (log of) loan size; the bank's assessment of borrower risk; an indicator for loans with pre-payment penalties; and an indicator for secured loans. Bank controls are log of total assets and its square, return on assets (net income/assets), C&I loans/assets, (cash + securities)/assets, mortgage loans/assets, trading assets/assets, consumer loans/assets, non-performing loans/assets, equity/assets, and deposits/assets. Standard errors are clustered at bank level. T-statistics are reported in parentheses. '*' denotes significance at the 10% level, '**' the 5% level, and '***' the 1% level.

	1997-2007 Sample	*2008-2017 Sample*
Panel A: Log(Days to Maturity)		
Bank HHI_{t-1}	0.842**	2.090***
	(2.04)	(3.01)
Other Bank Controls	Yes	Yes
Other Loan Controls	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Observations	859,167	759,094
R^2	3.5%	6.5%
Panel B: Loan Interest Rates		
Bank HHI_{t-1}	0.189	6.543**
	(0.20)	(2.15)
log (Loan Maturity)	0.049	0.462***
	(1.63)	(3.53)
Bank HHI_{t-1} x log(Loan Maturity)	0.096	-1.723**
	(0.70)	(2.37)
Other Bank Controls	Yes	Yes
Other Loan Controls	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Observations	859,167	759,094
R^2	74.7%	36.1%