Canary in the Coal Mine: Bank Liquidity Shortages and Local Economic Activity*

Rajkamal Iyer† Shohini Kundu‡ Nikos Paltalidis§

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Abstract

This paper proposes a novel measure for assessing the build-up of economic risks at the regional level using spatial variation in bank liquidity. We find that an increase in deposit rates offered by banks within a region is associated with contractions in economic activity. At the onset of a downturn, deposit growth slows down, prompting banks to increase deposit rates to support their balance sheet. This increase in deposit rates reflects the liquidity squeeze experienced by banks, which in turn serves as an indicator of an impending economic contraction. Deposit rates, being forward-looking, have better predictive power than other variables.

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†Rajkamal Iyer is at the Imperial College and CEPR. email: r.iyer@imperial.ac.uk

‡Shohini Kundu is at the Anderson School of Management, University of California, Los Angeles and CEPR. email: shohini.kundu@anderson.ucla.edu

§Nikos Paltalidis is at the Durham University Business School. email: nikos.e.paltalidis@durham.ac.uk

As is often the case, we are navigating by the stars under cloudy skies.

-Jerome H. Powell, Jackson Hole Economic Symposium, August 25, 2023

1 Introduction

Economic and financial risks do not typically materialize overnight. Generally, there is a gradual and heterogeneous build-up of risks across different regions within an economy, sometimes triggering a national recession or a crisis. While understanding the spatial heterogeneity in the buildup of risks at the regional level is crucial from a policy perspective, measurement of these risks in real-time is often difficult. Empirically, it has been challenging to obtain reliable measures that capture spatial differences in risks at a regional level.[1]

In this paper, we present a novel real-time measure for assessing the build-up of regional economic and financial risks, using spatial variation in bank liquidity. Our main idea centers around the relationship between regional economic activity and deposit growth in local banks. As there is a contraction in regional economic activity, corporate profits and household incomes decline. This, in turn, impacts the deposit growth of banks operating within the region, exerting pressure on the liability side of their balance sheet.[2] If banks expect the economic shocks to be short-lived, they are likely to use short-term funding in response to these transitory liquidity shocks.[3] However, if banks anticipate a more persistent economic decline, which directly affects their future liquidity needs, they would need to raise more long-term funding to weather the shock. Consequently, in response to a more persistent economic slowdown, banks may increase their deposit rates to attract additional deposits to manage their liquidity shortages.[4]

We capture regional variation in bank liquidity shortages using deposit rates offered by local banks operating within a geography. Our findings reveal that when regional banks operating within a county increase their deposit rates, it is associated with a slowdown in economic

[1]For instance, during the Global Financial Crisis of 2007-2009, contraction in economic activity varied significantly across regions. 35 out of the 51 states and a federal district in the US experienced a drop in GDP exceeding 2 percent while other regions experienced less severe declines or even positive GDP growth (see Appendix Figure B.1). Extending the sample from 2000 to 2020 further underscores the significant variation in economic activity, with some regions experiencing robust growth while others face with economic contractions (see Figure 1).

[2]See Appendix Table B.22 – total deposit growth declines one year before a county recession.

[3]Banks are supposed be better informed about the about local economy than other market participants given their lending relationships and deposit taking activities (e.g., Petersen and Rajan (1994)). Moreover, raising deposit rates is costly as it affects a substantial part of banks balance sheet.

[4]Deposits are generally more stable than wholesale funding and priced lower. However, raising deposit rates is costly for banks, given that it impacts a significant portion of their balance sheet compared to using short-term funding markets. In addition, note that the asset side of banks tends to consists of more illiquid assets, making adjustments on this side of their operations more challenging.

activity in that region up to two years ahead. This relationship allows us to predict regional variation in economic activity, effectively capturing the build-up of economic risk. Specifically, we find that an increase in deposit rates at the county level serves as an early indicator of changes in economic activity across various dimensions such as lower GDP growth, reduced business formation, and higher loan delinquencies. Even in periods without monetary policy changes, credit booms, or imminent national recessions, the increase in deposit rates at the county level remains associated with a slowdown in economic activity within those regions.

Importantly, employing deposit rates as a predictor of local business cycle activity, presents several advantages over other indicators utilized in the existing literature. Firstly, deposit rates are readily available in real-time, providing a more current assessment compared to other indicators that are measured with lags or that rely on proprietary information. Secondly, deposit rates are forward-looking, reflecting banks' expectations of future local economic conditions based on their lending and deposit-taking activities. By contrast, other indicators, such as past deposit growth, often tend to be backward-looking and do not captures banks' expectations of future economic activity. Lastly, deposit rates are available at a more granular level which aids in our understanding of risk build-up at regional levels – an aspect that has been relatively underexplored in previous research.[5]

We begin by examining whether deposit rates offered by local banks operating within a county help predict economic activity. For this analysis, we focus on metro counties, which represent a substantial share of the national GDP and exhibit a competitive banking structure.[6] To capture regional variation in bank liquidity shortages, we measure deposit rates offered by regional, single state banks. Our results demonstrate that an increase in deposit rates offered by banks within a county is associated with lower future economic activity compared to counties where deposit rates do not experience a similar increase. The model's predictive power, assessed by the Area under the Receiver Operating Characteristic Curve (AUC), is 0.73.[7]

While monetary policy changes may play an important role in deposit rates offered by banks, the results are robust to the inclusion of time fixed effects. Moreover, we find that even in periods when there are virtually no changes in monetary policy rates – from 2011

[5]Much of the literature is focused on measuring risk at the national level. There is very little empirical work that tries to measure risks at more granular level in real time in a parsimonious way.

[6]Our findings are robust to the inclusion of other counties in the analysis.

[7]The Area under the Receiver Operating Characteristic Curve (AUC) allows us to diagnose the accuracy of our model. An AUC of 1 indicates that a classifier can perfectly distinguish recessions from non-recessions and an AUC of 0 indicates that a classifier predicts all non-recessions as recessions and all recessions as non-recessions. To benchmark this estimate, Schularick and Taylor (2012) report that prostate cancer diagnostic tests find AUCs of about 0.75; Iyer et al. (2016) report that AUCs of 0.6 or greater indicates strong predictive value in information-scarce environments, and AUCs of 0.7 or greater indicates strong predictive value in more information-rich environments.

through 2015 – an increase in deposit rates at the county level is associated with a decline in future county economic activity. Importantly, during this period, there were no significant expansions in credit or imminent national recessions, suggesting that the predictive power of deposit rates is not merely an artifact of credit expansions or monetary policy.

It is worth noting that we do not claim that bank liquidity directly causes changes in economic activity. Our premise is simply that banks are an important channel through which economic activity is conducted and as such, local deposit rates can be used as a useful barometer of underlying economic conditions. As such, banks' deposit rates can serve as a useful aggregator of the underlying economic conditions, providing valuable insights into the state of the local economy.

To delve deeper into the underlying mechanism behind our results, we investigate whether banks that increase deposit rates experience liquidity stress. Our findings reveal that banks that increase deposit rates experience a decline in deposit growth in the preceding quarters, indicating liquidity stress. This slowdown in deposits is observed for both insured and uninsured deposits. Banks that raise rates by more experience more pronounced declines in deposit growth in the preceding quarters.[8] In addition, as an economic downturn approaches, banks tend to increase their reliance on insured deposits to support their balance sheets, narrowing the gap between uninsured and insured deposit rates. We validate that these deposit rate increases are not driven by increased loan demand, as loan growth declines following deposit rate hikes.

One of the key challenges in establishing the relation between deposit rates and economic downturns is that it is difficult to pin down the exact timing of the downturn. In addition, economic activity could be affected by other factors such as monetary policy, banking structure, etc. To cleanly validate the link between deposit rates offered by banks and local economic activity, we employ two quasi-natural experiments. First, we examine the impact of natural disasters – which have a negative impact on economic activity – on deposit rates. Unlike other economic downturns, the timing of economic downturns associated with natural disasters is more certain. In addition, these shocks are orthogonal to monetary policy shocks, precautionary savings motives or credit booms. Hence, they provide a clean setting to identify the relation between bank liquidity shortages and deposit rates. We find no evidence of an increase in deposit rates in affected regions prior to natural disasters. However, after the disaster strikes, we observe a decline in deposit growth and increase in deposit rates, indi-

[8] To complement these findings on bank deposit growth, we also examine aggregate deposit growth at the county level. Our analysis reveals that counties that experience a more substantial decline in economic activity exhibit lower deposit growth compared to other counties, one year before the downturn.

cating that banks adjust their rates in response to the adverse economic conditions caused by the disaster. Moreover, we find a strong association between the increase in deposit rates after a natural disaster hits, i.e., change in deposit rates ex post, and the subsequent degree of economic contraction. Notably, the ex ante deposit rates, before the disaster, do not predict these outcomes, which is consistent with the shock being unanticipated.[9] The results using natural disasters as shocks, suggest that the association between deposit rates and economic activity is unlikely to be an artifact of monetary policy, precautionary savings motives, banking structures or credit booms. To further validate this association, we use a second quasi-natural experiment. We build on the literature which argues that regions facing higher import competition experience larger declines in economic activity. We examine whether single-state banks raise deposit rates in regions that are particularly vulnerable to import competition. We exploit within-bank variation and find that banks set higher rates in regions that face higher import competition. These regions with higher import competition also experience more substantial economic contractions.

Collectively, our results suggest that liquidity shortages in banks, resulting from underlying economic conditions, influence deposit rates. An important question that remains is whether deposit rates demonstrate superior predictive power compared to other bank-level variables. For instance, one might consider using deposit growth directly at the county level instead of deposit rates.[10] To address this comparison, we conduct estimations using deposit growth and compute the AUCs. We find that the predictive power when using deposit growth is notably lower than that achieved by using deposit rates alone. Similarly, we also find the predictive power of deposit rates is higher than credit growth. We further validate that deposit rates are a robust leading indicator of local business cycles by showing that deposit rates outperform other leading economic indicators such as auto sales, unemployment insurance claims, and job openings. This is consistent with the idea that the deposit rate, being a forward-looking measure that incorporates banks' expectation of future economic activity, is a better predictor compared to other variables that are backward-looking.

Lastly, we extend our examination to the state level. We find the results estimated at the county level also hold at the state level. Moreover, at the state level, we investigate whether liquidity squeezes, as indicated by deposit rates, are associated with a higher risk of bank fail-

[9] Similarly, we also examine the effect of the shale gas boom – which has a positive impact on economic activity – on deposit rates. We find that deposit rates decrease after the boom in affected regions, indicating that deposit rates reflect liquidity conditions.

[10] As discussed earlier, one of the issues with other bank variables is the frequency at which they are available and the granularity. Generally, most of the bank balance sheet variables are available at the holding company level.

ures.[11] Our analysis reveals that a higher deposit rates in 2006 are, indeed, linked to a higher incidence of bank failures on both the extensive and intensive margin during the subsequent crisis period from 2008 through 2012. By examining the association between deposit rates and bank failures at the state level, we further strengthen the case for deposit rates being informative of local liquidity conditions and an indicator of regional economic stability. Overall, our findings underscore the significance of deposit rates offered by banks in a region as a valuable measure of liquidity squeezes, providing insight into the buildup of economic and financial risk at the regional level.

1.1 Related Literature

Our results contribute to several strands of the literature. There is a large body of work which documents that the slope of the Treasury yield curve (term premium) and corporate bond spreads can predict the likelihood of a recession in the very near term (e.g., Estrella and Hardouvelis (1991), Estrella and Mishkin (1998), Ang et al. (2006), Rudebusch and Williams (2009), and Engstrom and Sharpe (2019)).[12] We add to this literature in several ways. First, we focus on the measurement of economic risks across counties and states, exploiting variation in economic activity across regions. There has been very little empirical work that focuses on measuring economic risks at the local level. Second, our results suggest that a simple model that uses bank deposit rates can predict regional economic and financial risks with a high degree of accuracy. This provides a useful measure to incorporate in existing forecasting models. Finally, our work also adds to the recent literature that emphasizes the importance of real-time measures of economic activity (Chetty et al. (2020)). Deposit rates are easily available in real time and provide a reliable barometer of future economic activity.

Our paper also speaks to the literature that studies the prediction of financial crises. Recent empirical research indicates that excessive credit expansion fueled by financial intermediaries may result in financial crises, and thus in severe economic recessions (e.g., Mian and Sufi (2009), Schularick and Taylor (2012), Jordà et al. (2013), Jordà et al. (2016), Mian et al. (2017), López-Salido et al. (2017), Baron and Xiong (2017), Bordalo et al. (2018), Mian et al. (2019), Krishnamurthy and Muir (2017), Müller and Verner (2021), and Greenwood et al. (2022)). In contrast to the extant literature that focuses on credit, our paper finds that the deposit rates offered by banks increases at the onset of a downturn, irrespective of whether a downturn is preceded

[11] Due to the low occurrence of bank failures at the county level, this particular analysis is conducted at the state level.

[12] Several papers use financial indicators such as stock returns, stock price volatility, and stock market liquidity to predict economic growth. See Fama (1990), Schwert (1990), Campbell et al. (2001), Levine and Zervos (1998).

by a credit boom. In comparison to credit growth, which exhibits strong predictive power for financial crises (large recessions), deposit rates also demonstrate the ability to predict smaller economic contractions that are challenging to anticipate using credit growth alone.[13] This may be because deposit rates are a forward-looking variable that aggregates information from both the slowdown in money growth (as proxied by deposit growth) and the credit positions across banks in an economy, unlike credit growth, which is a backward-looking variable.

Our results also speak to the literature on money growth and recessions. Several papers have argued that money growth plays an important role in the dynamics of business cycles. Following the seminal work by Friedman and Schwartz (1963), several papers have highlighted the association between a decrease in money growth and recessions. Our results are consistent with this literature, especially the work that relates banks to business cycles (King and Plosser (1984); Morgan et al. (2004)). Our paper adds to this literature by showing that the deposits rates offered by banks help aggregate information about money growth. Given the difficulties in measuring money supply growth at the regional level, our results suggest that deposit rates could be a valuable measure that captures money growth dynamics.

Our paper contributes to the literature on the role of bank liquidity in local economic activity. Previous studies have shown that bank liquidity can affect real economic activity (e.g., Jayaratne and Strahan (1996); Morgan et al. (2004); Gilje et al. (2016); Cortés and Strahan (2017); Kundu et al. (2021)). We add to this literature by showing that deposit rates, which capture local liquidity conditions of banks, can be a useful indicator of regional economic activity. While we do not claim that our findings are causal, they are consistent with the hypothesis that bank liquidity shortages can contribute to economic contractions to some degree through reduction in credit supply.

Finally, our paper also contributes to the literature which finds banks increase their deposit rate in response to liquidity shocks to shore up funding (e.g., Acharya and Mora (2015); Cortés and Strahan (2017); Egan et al. (2017)). This literature mainly focuses on shocks to bank liquidity during crises and shows that banks respond to these shocks by increasing deposit rates. We complement these findings by showing that deposit rates offered by banks in a region can be used as a proxy for the liquidity position of banks in that region, in turn, reflecting local economic conditions. In addition, our findings also highlight that banks increase their reliance on insured deposits at the onset of a downturn. This relates to the literature that highlights the importance of the proper design of deposit insurance schemes and the need to

[13] Boissay et al. (2016) point out that it is difficult for the literature predicting financial crises to predict other types of recessions that are not accompanied by an expansion in credit. See also Muir (2017).

regulate banks due to moral hazard concerns (e.g., Laeven (1983), Demirgüç-Kunt et al. (2008), Calomiris and Jaremski (2019)).

The rest of this paper is organized as follows. Section 2 presents an overview of the datasets used in this study. Section 3 explores the relation between bank deposit rates and local economic activity. Section 4 presents our main findings and validates that deposit rates effectively capture the liquidity stress of banks during economic contractions through two quasi-natural experiments. Section 5 explains the mechanism linking bank liquidity shortages and deposit rates. Section 6 conducts the analysis at the state level to investigate the out-of-sample predictive power of deposit rates and establish that deposit rates can also predict financial risk as measured by the incidence of bank failures. Section 7 compares the predictive power of bank deposit rates to other variables, including measures of credit and deposit growth and other leading indicators of economic activity such as auto sales, unemployment insurance claims, and job openings. Finally, Section 8 concludes.

2 Data

This project employs several datasets, which are described below. Further details about the data can be found in Appendix Section A.

Deposit Rates We use data on deposit rates from S&P Ratewatch. S&P Ratewatch provides depository interest rate coverage on banks and credit unions in the US for more than 70 standard retail banking products, ranging from deposit products to consumer loan and mortgages at the weekly frequency. Deposit rates are available at a granular geographic level with zip code, county, and state identifiers. We focus on the deposit rates for 12-month certificates of deposit ($10K 12-month CDs) with a minimum account size of $10,000 because this is the most common deposit product. Our sample period is 2001 through 2020. Our dataset covers 8,361 distinct banks and 2,897 distinct counties (approximately 90% of all US counties).

Gross Domestic Product We obtain Gross Domestic Product (GDP) data from the Bureau of Economic Analysis (BEA) at the county, state, and national levels. State GDP is available at the quarterly frequency from 2005Q1. County GDP data is available at the annual frequency from 2001.

Business Formation We use data on annual new business applications by county from the US

Census Business Formation Statistics (BFS).

Mortgage Delinquency We collect data on early stage delinquencies at the county level from the National Mortgage Database, conducted in collaboration with the Federal Housing Finance Agency (FHFA).

Supplementary Measure of Economic Activity We use data on unemployment rates across counties from the Bureau of Labor Statistics (BLS). We also use data on the consumer price index (CPI) for metro areas from the Bureau of Labor Statistics (BLS). The BLS reports the monthly estimates of CPI for 23 metro areas. We use the annual CPI data for these metro counties.

Bank Balance Sheet, Income Statements and Deposits Data We extract bank balance sheet and income statement information from the Reports of Condition and Income (Call Reports) sourced from the Federal Reserve Bank of Chicago. We supplement data from the call reports using quarterly data on banks' insured and uninsured deposits from the FDIC Statistics on Depository Institutions (SDI). The FDIC SDI reports the total volume of insured and uninsured deposits and insured deposits, at the bank level, for all FDIC insured banks. We also utilize data on branch-level bank deposits sourced from the FDIC. This data is from the annual survey conducted by the FDIC, covering all FDIC-insured institutions. In addition, we use quarterly data on non-performing loans from S&P Market Intelligence.

Small Business Lending and Mortgage Lending We use data on small business lending, collected under the Community Reinvestment Act (CRA). We use data on mortgage lending, collected under the Home Mortgage Disclosure Act (HMDA). We aggregate the CRA and HMDA data to the bank $\times$ county $\times$ year level between 2001 and 2020.

Natural Disaster and Fracking We use data on natural disasters from the Spatial Hazard Events and Losses Database for the United States (SHELDUS). SHELDUS provides detailed data on losses at the county level. We restrict our sample to large natural disasters that last fewer than 31 days with total damages above $1 bn 2018 dollars.

Shipping Costs We use data on shipping costs and a vector of control variables at the commuting zone level from Barrot et al. (2022). The authors measure the exposure of an industry to import competition using the 1998 physical shipping costs obtained from import data. A commuting zone's exposure to import competition is constructed by combining the industry shipping costs with the industry composition in each commuting zone, expressed in labor share.

Other Financial Data We use data on spreads on credit default swaps and equity prices for a subset of banks. The high-frequency data on CDS spreads is obtained from Markit, while equity returns are sourced from CRSP. To combine these datasets and identify the common set of banks present in both the CDS and equity data, we perform a manual merge.

Other Leading Economic Indicators We supplement our baseline analysis with other leading indicators of local business cycle fluctuations at the state level. These indicators include state auto sales, unemployment claims, and job openings. Data on auto sales comes from from RL Polk, which reports zip code-monthly data. Data on state monthly unemployment claims comes from the Department of Labor. Data on state job openings comes from the Bureau of Labor Statistics.

Rural-Urban Continuum Codes We use data on Rural-Urban continuum codes from the US Department of Agriculture Economic Research Service (USDA ERS). The Rural-Urban Continuum Codes are a classification scheme that distinguishes metropolitan counties by population size of their metropolitan area and non-metropolitan counties by the degree of urbanization and adjacency to a metropolitan county. Metro counties are counties with a 1993 USDA ERS Rural-Urban Continuum Codes of 0 or 1.

Bank Failures We retrieve the list of failed banks from the Federal Deposit Insurance Corporation (FDIC). We examine bank failures from 2008 to 2012; there were 25 bank failures in 2008, 140 in 2009, 157 in 2010, 92 in 2011, and 51 in 2012.

Business Cycle Expansions and Contractions We use data on business cycles from the National Bureau of Economic Research (NBER) US Business Cycle Expansions and Contractions. We highlight recessions between 2001 and 2020 throughout our analysis.

3 Bank Deposit Rates and Economic Activity

This section examines bank deposit rates and economic activity across geographies. We primarily focus our analysis on banks which offer the 12-month certificate of deposit (CD) with a minimum account size of $10,000 – the most common deposit product.[14] We examine the number of such banks that operate in each county from 2001 through 2020. Appendix Figure B.2 presents a heatmap of the average number of banks per county between 2001 and 2020. On average, three to four banks operate in each county while 83% of counties report more than one bank.

3.1 Deposit Rates and Economic Activity

We begin our analysis by examining the variation in economic activity across counties and states. Figure 1 presents the timing and duration of recessions at the county level. For simplicity, we define a county to be in a recession if its GDP growth between two consecutive years is below -2%. Figure 1a indicates that the percent of counties in recession increased from 16% in 2005 to 50% in 2009. Figure 1b presents a density probability plot of the percent of years in the sample period (2001-2020) that a county was in a recession. On average, counties were in recessions 25% of the sample period with a standard deviation of 12.45%. Similarly, we examine the timing and duration of recessions at the state level. A state is defined to be in a recession if its GDP growth between two consecutive quarters is below -2%. Figure 2b shows that states were in recessions 5.05% of quarters in the sample period (2005-2020) with a standard deviation of 3.12% The statistics reported above highlight that the occurrence of economic contractions exhibits wide heterogeneity across counties and states.[15] A similar pattern emerges when examining economic expansions.

Next, we investigate the relation between the local deposit rates and local recessions. To measure local deposit rates, we exploit the geographic variation in deposit rates across banks, with a particular focus on single-state banks that operate regionally. The advantage of using single-state banks is that their deposit base and lending is more local (Berger and Udell (1995); Petersen and Rajan (1994)), thereby mirroring the local economic conditions.[16] The differences

[14] As discussed later, the results are robust to using other deposit contracts.

[15] The onset and duration of regional recessions depend on factors that differ in each business cycle such as the industrial composition of the region or idiosyncratic shocks (e.g., Hamilton and Owyang (2012); Brown (2017)).

[16] The results are robust to using national banks – see Appendix Table B.6 and Appendix Table B.7. However, national banks have the ability to smooth liquidity shocks due to their multi-state presence, making them less sensitive to local economic conditions (e.g., Granja and Paixao (2019); Morgan et al. (2004)).

in local economic conditions are reflected in the deposit rates of single-state banks.[17]

Figure 3 presents a heatmap of the average deposit rates by county between 2001 and 2020. We construct the average deposit rates by exploiting the geographic variation in deposit rates across banks. First, we create a panel at the bank $\times$ county $\times$ month-year level, using the deposits rate data. Then, we compute the average deposit rate across banks for each county in each month. The annual county deposit rate is computed by averaging across the monthly county deposit rates in each year. Figure 4 and Figure 5 present heatmaps of the deposit rates for counties and states, respectively, for the years 2006, 2009, and 2017. We observe that deposit rates offered by banks exhibit regional variation at both the county and state levels at any given point in time. Interestingly, there is also temporal variation in regions with higher deposit rates. These heatmaps emphasize two key findings: (1) there is meaningful variation in deposit rates across regions, and (2) the variation in deposit rates is unlikely to be driven solely by banking structures, as different regions have higher rates at different points in time despite little change in bank concentration.

Given the spatial and temporal variation in economic activity and deposit rates across geographic regions, we further investigate the relationship between deposit rates and county economic activity. We start by examining whether higher deposit rates in 2006 are associated with lower GDP growth two years ahead in 2008. As shown in Figure 6a and Figure 6b, there is a clear association between deposit rates and future GDP growth at the county and state levels, respectively. We find that higher deposit rates offered by banks are associated with lower GDP growth at both the county and state levels. Moreover, in Figure 7a and Figure 7b, we sort regions into quintiles based on the deposit rate offered by banks in 2006 and explore whether recession risk is higher in counties and states with higher deposit rates.[18] Again, we observe a meaningful association between deposit rates and recession risk, where higher quintiles of deposit rates in 2006 are linked to a higher risk a county or state experiences a larger than 2% drop in GDP in 2008.

[17] Heitfield (1999), Biehl (2002), and Heitfield and Prager (2004) find that small banks compete locally and therefore exhibit substantial heterogeneity in deposit rates across regions.

[18] The lowest quintile represents regions with the lowest deposit rates, while the highest quintile includes regions offering the highest rates.

4 Heterogeneity in Bank Deposit Rates

4.1 Main Results

In this section, we rigorously test the relation between bank liquidity and local economic activity.

Table 1 provides summary statistics for the main variables of interest from 2001 through 2020. Average annual county GDP growth is 1.25% with a standard deviation of 7.80%. Average state GDP growth at the quarterly frequency is 0.31% with a standard deviation of 1.79%. We compute the average deposit rate as well as the dispersion (standard deviation) of deposit rates at the county and state levels. We find that across these measures, the average county deposit rate is 1.63% with a standard deviation of 1.30% across the sample. The dispersion of county deposit rates is 0.20% with a standard deviation of 0.23%.

We start our empirical framework with the most basic geographic unit. We begin our analysis by focusing on metropolitan (metro) counties as these regions exhibit a competitive banking structure.[19] Moreover, metro counties comprise nearly 60% of the national GDP. In the final reporting month of every year, we calculate the average deposit rate for each county.[20] Using this data, we estimate a OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity.

$$Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t} \quad (1)$$

where Y denotes the measure of economic activity, such as GDP growth, business formation, or county delinquency rate in our baseline specification, and *Rate* denotes the average bank deposit rate. We report county clustered standard errors.[21]

Our key empirical finding, presented in Table 2, is that the deposit rate within a county is a salient indicator of economic activity. In columns (1)-(3), we account for the time-invariant heterogeneity associated with counties through county fixed effects. The dependent variables in columns (1)-(3), represent economic activity one year ahead, two years ahead, and three years ahead, respectively. The independent variables are standardized for ease of interpretation. In Panel A, we examine the association between future GDP growth and the deposit rate.

[19] Note that for metro regions, banking concentration remains stable over the entire sample period. Later, we report the results for all counties and also conduct the analysis at state level.

[20] Our empirical findings are robust to alternate methods of constructing the average deposit rate, such as averaging over different time horizons and using a variety of deposit rates.

[21] Our findings are robust to Conley (1999) standard errors, adjusted for spatial dependence within 100 kilometers, throughout our analysis.

Our findings indicate that larger contractions in economic activity follow larger increases in deposit rates. Our point estimates remain economically meaningful and statistically significant across all forecasting horizons. Column (1) indicates that a one standard deviation increase in deposit rates is associated with a 0.1 percentage points lower GDP growth one year ahead. Column (2) indicates that a one standard deviation increase in deposit rates is associated with a 0.4 percentage points lower GDP growth two years ahead. Column (3) indicates that a one standard deviation increase in deposit rates is associated with a 0.4 percentage points lower GDP growth three years ahead. Note that these coefficients are robust to the inclusion of GDP lags.[22] These point estimates are economically meaningful as the average county GDP growth is 1.25% (see Table 1). While in any forecasting exercise, one should not include time fixed effects, one may be concerned that the relation between economic activity and deposit rates is mainly driven by some time varying factors at the aggregate level. As a robustness exercise, in columns (4)-(6), we introduce time fixed effects. As can be seen, we find the results are similar to the estimates in columns (1)-(3). In fact, the estimated magnitudes are slightly higher. Furthermore, we use the unemployment rate as an alternate measure of economic activity and show robustness in Panel A of Appendix Table B.2.

In Panel B of Table 2, we explore a different measure of economic activity by focusing on future new business formation. We investigate the relationship between the natural-log transformed number of new businesses and the deposit rate.[23] Consistent with our earlier findings, which show a negative association between the deposit rate and economic activity, we observe that an increase in deposit rates is linked to a decline in new business formation. In Panel C of Table 2, we use a measure of consumer financial health as a proxy for economic activity: mortgage delinquency. The 30-89 day mortgage delinquency rate serves as an early indicator of the overall health of the mortgage market, capturing borrowers who have missed one or two payments. A higher delinquency rate may indicate household financial stress and reduced spending capacity. In line with our previous results which demonstrate an association between increased deposit rates and a contraction in economic activity, we find that higher deposit rates are associated with a heightened risk of credit losses.[24] We further utilize data on the 90-day delinquency rate, which reflects more severe economic distress and find similar

[22]See Appendix Table B.1.

[23]The number of new businesses is measured as the number of applications for an employee identification number in the US Census Business Formation Statistics.

[24]We estimate Table 2 using the 1-month certificates of deposit ($10K 1-month CDs) with a minimum account size of $10,000 month deposit rate and find similar statistical results as reported in Appendix Table B.3. The economic magnitudes are larger with the 1-month certificates of deposit, suggesting that these higher-frequency rates may better capture real-time liquidity stress. We further show that our results are robust to other deposit contracts in Appendix Table B.4.

results, reported in Panel B of Appendix Table B.2. Lastly, for a subset of counties with available data on CPI growth, our analysis reveals a significant, negative relation between deposit rates and the CPI growth rate in Panel C of Appendix Table B.2. Overall, the findings from various measures of economic activity consistently indicate that higher deposit rates are associated with a future contraction in economic activity. Note that these results do not imply a causal relationship between deposit rates and economic activity.[25] The central premise of our analysis is that deposit rates capture fluctuations in local economic conditions and thus, are an early indicator of economic activity.

An important question that arises is whether the relation between local deposit rates and local economic activity are mainly driven by monetary policy changes (Drechsler et al. (2017); Drechsler et al. (2022); Jiménez et al. (2022)). As shown earlier, we have established that our results are robust to the inclusion of time fixed effects, which account for monetary policy changes at the national level. However, to further ensure that our findings are not solely influenced by monetary policy, we conduct a subsample analysis over the period of 2010-2015, a timeframe characterized by relatively stable short-term interest rates. In Table 3, we replicate the results reported in Table 2 for this specific period. We find similar results even in the absence of any monetary policy changes.[26] The estimated magnitudes of the relation between deposit rates and changes in economic activity are higher. Table 3, Panel A, reveals that a one standard deviation increase in deposit rates is associated with a 3 percentage points decrease in GDP growth two years ahead.[27] The estimated magnitudes are also larger for changes in business formation and credit losses, though the statistical significance is somewhat weaker in some specifications of Panels B and C in Table 3.[28]

The results from the period between 2010-2015 also help us address another issue as to whether forecasting power of deposit rates are mainly a result of credit booms. The extant literature on credit booms highlights that periods of excessive credit growth are often followed by periods of large contractions in economic activity (Schularick and Taylor (2012)). While the period just before the global financial crisis in 2008 experienced a phase of high credit growth, the years between 2010-2015 marked a period of stagnant credit growth. Therefore,

[25] A large body of research has shown that bank lending can influence economic activity, hence, it is plausible that a portion of the contraction may be attributed to this channel (e.g., Jayaratne and Strahan (1996); Schnabl (2012); Iyer et al. (2014)).

[26] Moreover, we show that the local deposit rate remains a strong predictor of local economic activity in this period, even after accounting for changes in deposit rates due to monetary policy and market power. This finding is corroborated in unreported regressions controlling for the Fed Funds rate and deposit spreads.

[27] We use the unemployment rate as an alternate measure of economic activity and show robustness during the 2010-2015 period in Panel A of Appendix Table B.5.

[28] Panel B of Appendix Table B.5 uses a complementary definition of credit losses and demonstrates robustness in the 2010-2015 period.

the association between deposit rates and economic activity during the period from 2010-2015 suggests that the forecasting power of deposit rates extends beyond periods of expansionary credit. In Table 4, we include different measures of credit growth in the estimation and find that higher credit growth is positively associated with GDP growth. This is consistent with the existing literature which argues that large credit expansions are weak indicators of non-financial recessions (Boissay et al. (2016)) and only have predictive value for crises (discussed later in Section 7). More, importantly, the inclusion of credit growth in the estimation does not alter the results on deposit rates. This estimation over the period between 2010 and 2015 also highlights that the results are not primarily driven by the global financial crisis in 2008.

Our analysis, so far, focuses on regional banks. An important question is how the baseline findings would differ in areas where larger banks are more dominant. We hypothesize that regional banks must compete more in areas where larger banks are more dominant. To examine how the share of large banks in a county affects the relation between the county average deposit rate of single-state banks and future GDP growth, we define a bank to be "large" if it operates in more than one state. Appendix Table B.6 shows that the coefficient associated with the county average deposit rate is quantitatively and statistically similar to that of our baseline findings in Table 2, regardless of the share of large banks. However, the relation between the deposit rate and future economic growth is stronger in counties where there is a larger share of large banks, as indicated by the interactions between the county deposit rate and the quartile of the share of large banks. This suggests that the deposit rate is a stronger indicator of future economic growth in areas with greater competition for deposits.[29] We discuss this result further in Section 4.2.

The baseline estimation captures a temporal element as our analysis is conducted over several years. To understand whether deposit rates have predictive value in the cross-section, we estimate the relation between deposit rates in 2006 and GDP growth one year ahead, two year ahead and three year ahead respectively. The results are reported in Panel A of Appendix Table B.9. We find that at the one-year horizon, there is positive relationship between GDP growth at deposit rates, however this relationship flips and turns negative at a two-year horizon. This indicates that high deposit rates are indicative of a future contraction in economic activity over a longer horizon, rather than reflecting short term fluctuations in economic activity. This intuition also bears out when examining the relationship between deposit rates in 2006 and CPI growth in 2008, as presented in Panel B of Appendix Table B.9. The predictive

[29] We show in Appendix Table B.7 that the economic and statistical significance of our baseline results increases when we consider the set of all banks. These relations are not driven by the rate-setting behavior of failed banks over our sample, as shown in Appendix Table B.8.

value is higher at longer horizons as compared to shorter horizons.[30] Overall, the results of the cross-sectional analysis are consistent with the results reported in Table 2, which also suggest that the predictive value of deposit rates is stronger at a two-year horizon than at a one-year horizon.

To further understand the predictive value of deposit rates, we estimate a Receiver Operating Characteristic (ROC) curve. We use an efficient, rank-based algorithm known as the Area under the ROC Curve (AUC) which measures the model's predictions.[31] An AUC of 1 indicates that a classifier can perfectly distinguish recessions from non-recessions points; an AUC of 0 indicates that a classifier predicts all non-recessions as recessions and all recessions as non-recessions. An AUC between 0.5 and 1 suggests that the classifier has greater predictive value than a coin toss. There is no "gold-standard" for the AUC benchmark because it is context-specific. As Iyer et al. (2016) note, an AUC of 0.6 or greater indicates strong predictive value in information-scarce environments, and an AUC of 0.7 or greater indicates strong predictive value in more information-rich environments.

To this end, we estimate the relation between deposit rates and county recessions using a logit model in Table 5. We define a county to be in a recession if its GDP growth between two consecutive years is below -2%.[32] The unconditional probability of a county recession is 14.45% over the sample period. We estimate the likelihood of a recession in county c in year $t + k$ as a function of the average deposit rate within a county in year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity.

$$logit(p_{c,t+k}) = \beta_0 + \beta_1 Rate_{c,t} + \alpha_c + \epsilon_{c,t} \tag{2}$$

where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, $Rate$ denotes the average bank deposit rate. We assume that $\epsilon_{c,t}$ is well-behaved.

Our findings indicate that the likelihood of a recession rises following an increase in the deposit rate within a county. Column (1) indicates that a one standard deviation increase in the deposit rate increases the likelihood of a recession occurring one year ahead by 16.05%.

[30] Precautionary savings increase at the onset of recessions. This can make the deposit rate a weaker indicator of contractions in economic activity over shorter time horizons (closer to a recession), as deposit inflows at the onset of a recession can be driven by precautionary savings rather than by changes in economic activity. Levine et al. (2021) find that deposit inflows in the initial months of the COVID-19 pandemic were triggered by a surge in the supply of precautionary savings.

[31] The AUC measures the ability of a classifier to distinguish between positive and negative points. It is a diagnostic test of accuracy and discrimination that represents the probability that a randomly chosen recession case is ranked as more likely to be in a recession than a randomly chosen non-recession case. Essentially, the separation between the distributions of recessions and non-recessions give a prediction model its classification ability, as assessed by the AUC.

[32] The results are robust to using other thresholds.

Column (2) indicates that a one standard deviation increase in the deposit rate increases the likelihood of a recession occurring two years ahead by 37.44%. Column (3) indicates that a one standard deviation increase in the deposit rate increases the likelihood of a recession occurring three years ahead by 32.80%. These estimates are economically meaningful, stable, and statistically significant at the 1% level across all forecasting horizons. Moreover, the diagnostic tests indicate that the covariates are jointly statistically significant. The two-year forecast classifier yields an AUC of 0.73 – above the random coin toss classifier. We also estimate the regression using the rate on uninsured deposits in Appendix Table B.10 and find stronger results; a one standard deviation increase in the uninsured deposit rate is associated with an increase in the likelihood of a recession occurring two years ahead by 52.53%, with an AUC of 0.74.[33] Overall, our findings suggest that deposit rates have high predictive value.

4.2 Heterogeneous Effects of Bank Liquidity Shortages

We propose that deposit rates offered by banks within a county increase when certain banks face liquidity shortages. This conjecture is built on two assumptions: (1) there is competition for deposits among banks within a county, and (2) there is variation in liquidity needs among banks within a county. To delve deeper into the impact of these cross-sectional dimensions of heterogeneity, we first examine whether these effects are more pronounced in regions with a higher concentration of banks.

While the preceding estimation focused on metropolitan counties, in Appendix Table B.11, we present the estimation results for rural and urban counties, separately. We find that the point estimate attenuates the AUC is lower in the sample of rural and urban counties, relative to metro counties.[34] Thus, deposit rates exhibit higher predictive value in settings with increased competition for funds.

Another dimension that the analysis has hitherto disregarded is the variation in banks' balance sheets. While economic contraction within a county, is associated with an increase in the average deposit rates among banks operating in a county, the composition and strength of banks' balance sheets may differ, potentially leaving some banks more exposed to liquidity shortages than others. Consequently, within a county, we may observe varying responses in the deposit rates among banks, depending on their respective balance sheet strength. Some banks might respond to these conditions by increasing their deposit rates by a larger margin, while others may not experience the same magnitude of rate adjustment. In Appendix Table B.13, we demonstrate that banks that face greater constraints tend to increase their rates by a

[33] Note that the sample in which we can observe rates on uninsured deposits is limited.

[34] Note that in the Appendix Table B.12, we also report the results across all counties and find similar results.

larger margin. Specifically, banks with higher rate increases are smaller in size, have a higher credit-to-assets ratio, lower income, and higher loan and lease loss provisions. These findings clearly indicate that the magnitude of the increase in deposit rates is contingent upon the balance sheet conditions of banks.

Exploiting this differential response, we examine whether an increase in the dispersion of deposit rates across banks operating within a county, is associated with a contraction in economic activity. In Appendix Table B.14, we present the results of this analysis. Similar to the results obtained with average deposit rates, we find that the dispersion of deposit rates within a county is also linked to a contraction in economic activity. Furthermore, the AUC associated with the dispersion of deposit rates is 0.76, as reported in Appendix Table B.15.

4.3 Validation from Two Quasi-Natural Experiments

The preceding analysis indicates that higher deposit rates are associated with a contraction of economic activity. However, pinpointing the precise timing of an economic contraction and the onset of increased deposit rates presents a challenge. That is, it is difficult to show when deposit rates start responding to an impending economic downturn. Moreover, as previously discussed, other factors such as monetary policy, precautionary savings motives, banking structures and credit booms could drive the results. To further address these issues, we employ two quasi-natural experiments. In the first experiment, we directly examine how bank liquidity varies around natural disasters and unexpected shale gas discoveries. In the second experiment, we turn to micro evidence and test whether single-state banks differentially respond to local economic conditions, as measured by the degree of import competition, through their deposit rate-setting behavior.

4.3.1 Natural Disasters and Fracking on Bank Liquidity

Natural disasters are unforeseen occurrences that signal the onset of economic downturns. Unlike other economic downturns, whose timing can be difficult to predict, the timing of economic downturns associated with natural disasters is more certain. In addition, these shocks are orthogonal to monetary policy shocks, precautionary savings motives, banking structures and credit booms. Hence, they provide a clean setting to identify the relation between bank liquidity shortages and deposit rates. Therefore, we hypothesize that deposit rates should only increase *after* a natural disaster hits.

We begin by examining deposit rates around natural disasters. We follow the methodology of Barrot and Sauvagnat (2016) and restrict our sample to disasters that last fewer than 31 days with total estimated damages above one billion 2018 constant dollars. Figure 8 plots the evolution of deposit rates offered in county c in the years from a natural disaster. Specifically, we plot the δ_{t+d} coefficient estimates from a regression of deposit rates in county c at year t on binary variables that indicate the number of years from the natural disaster which occurs in year d.

$$Rate_{c,t} = \beta_0 + \sum_{k=-5}^{5} \delta_{t+d} + \alpha_c + \epsilon_{c,t}$$

Our findings support our hypothesis that deposit rates increase only after natural disasters and remain elevated for nearly two years before declining. We further test whether the increase in deposit rates reflects liquidity constraints by examining deposit growth around natural disasters. We use a within bank-county estimator in Appendix Table B.16 to show that following natural disasters, counties experience a 5.21 percentage points decline in deposit growth.[35] This finding further supports our key hypothesis that deposit growth declines when an economy enters a contractionary phase, straining bank liquidity and prompting banks to increase deposit rates.

Since natural disasters are unexpected shocks that signal the start of economic downturns, the ex ante deposit rate is expected to have limited predictive ability in forecasting recessions triggered by such disasters. We present empirical support for this hypothesis and demonstrate that ex ante deposit rates cannot forecast economic contractions stemming from unforeseen shocks such as natural disasters in Appendix Table B.17. In contrast, our findings reveal a robust correlation between the ex post deposit rate changes and subsequent GDP growth. Specifically, we find that counties that increase their deposit rates after natural disasters experience worse economic contractions two years later, as illustrated in Figure 9. A one percentage point increase in the deposit rate is associated with a 0.024 percentage point decline in GDP growth. This relationship is statistically significant at the 1% level.

To further illustrate that deposit rates reflect liquidity conditions, we also examine the impact of shale oil and gas discoveries during the fracking boom between 2003 and 2009 on deposit rates. We contend that unexpected technological breakthroughs enabled counties to substantially boost their oil and natural gas production from 2003 through 2009, as demonstrated by Gilje (2019). The resulting unexpected wealth windfalls increased bank liquidity over this period. We use a within-county estimator, while accounting for aggregate economic conditions through year fixed effects to study how the deposit rate varies with shale gas pro-

[35]Notably, Kundu et al. (2021) has established a strong negative relationship between local natural disasters and deposit growth; Gilje et al. (2016) has established a strong positive relation between bank fracking boom exposure and bank deposit growth.

duction during the fracking boom. Appendix Table B.18 shows that an increase in shale gas production, associated with a surge in bank liquidity during the fracking boom, leads to a decrease in deposit rates.[36]

Overall, these findings bolster our central hypothesis: an increase in deposit rates effectively captures economic contractions. It also highlights that the mechanism operates via the liquidity stress experienced by banks during economic contractions, which necessitates an increase in deposit rates.

4.3.2 Import Competition on Bank Liquidity

We further investigate the key mechanism that links bank deposit rates to regional economic activity using an instrumental variable strategy. Our analysis builds on the findings of Autor et al. (2013), Autor et al. (2014), Acemoglu et al. (2016), Pierce and Schott (2016) among others, which demonstrate the adverse effects of import competition on US local labor markets and household balance sheets. Rising import penetration is associated with lower domestic output, value-added, higher unemployment, lower labor force participation, and reduced wages in local labor markets. Overall, regions with higher import competition experience more substantial economic contractions. As a result, we hypothesize that banks increase deposit rates in regions that are more vulnerable to import competition as these regions are expected to experience greater economic contraction.

We use data on shipping costs from Barrot et al. (2022) to identify the link between regional economic activity and deposit rates. The unit of analysis is the commuting zone (CZ), which are clusters of counties characterized by strong commuting connections within the cluster and weaker connections between clusters. These CZs serve as representations of local labor markets. Within this context, local labor markets can be seen as subeconomies that experience varying trade shocks based on their specialization in different industries (Autor et al. (2013)). Barrot et al. (2022) measure the exposure of an industry to import competition using the 1998 physical shipping costs obtained from import data. A CZ's exposure to import competition is constructed by combining the industry shipping costs with the industry composition in each commuting zone, expressed in labor share.

We examine the effect of import competition on deposit rates within-bank. Specifically,

[36] We also explore the causal relationship between bank liquidity and economic activity using fracking shocks (results not reported here). Similar to Gilje (2019), we investigate the impact of a sudden increase in liquidity within bank branches located in regions with fracking exposure on the economic activity in regions without fracking exposure where these banks have branches. Our findings reveal significant effects of bank liquidity on the GDP of counties without fracking exposure, but these effects are only observed in cases where the liquidity shock is substantial.

we investigate whether banks exhibit varying rates across regions with differential exposure to import competition. We begin by showing that there is substantial variation in bank deposit rates within-bank. Appendix Figure B.3 presents heatmaps of deposit rates for several single-state banks in 2007 including the Bank of Colorado, Colony Bank, Citizens National Bank of Meridian Bank Seacoast National Bank, BancFirst, and Limestone Bank. We observe that at the same point in time, these banks set higher rates in certain areas and lower rates in others. The variation in deposit rates across regions within single-state banks is consistent with prior studies by Heitfield (1999), Biehl (2002), and Heitfield and Prager (2004). These studies find that smaller banks set deposit rates based on the competitive environment in their metropolitan statistical area (MSA), in contrast to large banks which are more likely to set uniform rates across regions.

Based on this finding, we test whether banks set higher deposit rates in regions that face greater import competition between 2001 and 2007, according to the following regression specification:

$$\text{Deposit Rate}_{b,z,t} = \beta_1 \cdot \text{Shipping Costs}_z + X_z + \alpha_{b,s,t} + \epsilon_{b,z,t} \tag{3}$$

where Rate denotes bank b's deposit rate at the commuting zone level z of state s measured in month-year t, Shipping Costs denotes the shipping costs at the commuting zone level, and X is a vector of controls including total employment, the share of manufacturing employment, total income, logarithm of total debt, the 1991-1999 change in loan originations, and the 1991-1999 change in net Chinese import penetration, as well as quintiles of the change in house prices between 1999 and 2007. We measure deposit rates at the CZ level by collapsing the bank $\times$ county $\times$ month-year panel data on deposit rates to the bank $\times$ CZ $\times$ month-year level using county GDP weights.[37]

Table 6 reports our results. Our estimation includes bank $\times$ month-year $\times$ state fixed effects, allowing us to identify how banks differentially set deposit rates within in the same state and time period, by exploiting variation in shipping costs across commuting zones. We find that a one standard deviation increase in shipping costs is associated with up to a 0.03 pp increase in the deposit rate (see column (1)). This coefficient is economically meaningful as a bank that operates in a region with shipping costs at the 95$^{\text{th}}$ percentile is estimated to report a deposit rate that is 0.07 pp higher than a bank that operates in a region with shipping costs at the 5$^{\text{th}}$ percentile. This difference corresponds to 0.06 standard deviations of the deposit rate. The point estimate remains stable and statistically significant at the 1% level even

[37] The result is robust to alternate weights such as equal weights, employment weights, and population weights.

after saturating the model with control variables and fixed effects. Overall, our findings indicate that banks set higher deposit rates in regions that face stiffer import competition (lower shipping costs). We further show that these findings are robust at the commuting zone level in Appendix Table B.19; CZs with greater import competition (lower shipping costs) report higher average deposit rates. Overall, our findings demonstrate that the deposit rate serves as a useful barometer of local economic conditions. Banks set higher rates in regions in response to liquidity shortages in regions that face greater economic headwinds, such as those that are experiencing increased import competition.

5 Explaining the Link Between Liquidity Shortages and Deposit Rates

Thus far, we have established a robust relation between deposit rates and economic activity. This section delves into the mechanism underlying these findings.

At the core of our analysis lies the premise that that as an economy enters a downturn, banks face liquidity squeezes, prompting them to raise deposit rates in response to funding pressure. Building upon this premise, we explore the relation between changes in deposit rates and the growth of insured and uninsured deposits. To this end, we sort banks based on their quarterly changes in deposit rates into quartiles, at the quarterly frequency. First, we calculate the average deposit rate for banks in each quarter across all counties. Then, we determine the quarterly changes in banks' deposit rates, enabling us to gain valuable insights into their dynamic adjustments over time.

Our empirical framework regresses bank b's outcome variable on the quartile indicators at time t (quarter-year).

$$\begin{aligned}\Delta ln(Y)_{b,t+k} = \beta_0 + \beta_1 \mathbb{1}_{P25<\text{Dep Rate Change}\leq P50,b,t} + \beta_2 \mathbb{1}_{P50<\text{Dep Rate Change}\leq P75,b,t} \\ + \beta_3 \mathbb{1}_{\text{Dep Rate Change}>P75,b,t} + \alpha_t + \epsilon_{b,t}\end{aligned} \tag{4}$$

where $\Delta ln(Y)$ denotes growth in the outcome variable, $\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$, $\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$, $\mathbb{1}_{\text{Dep Rate Change}>P75}$ denote the second, third, and fourth quartile of the change in bank's deposit rates between two consecutive quarters, respectively, and k denotes the lead/lag of the dependent variable and ranges from -3 to +3 quarters. Our regression specification includes quarter-year fixed effects to control for aggregate shocks.

Table 7 presents the dynamics of the relation between the deposit growth rates for insured and uninsured deposits and the quarterly change in banks' deposit rates. In Panel A, the dependent variable is the growth in banks' insured deposits. In Panel B, the dependent variable is the growth in banks' uninsured deposits. It is worth noting that the vast majority of depositor households maintain deposits below the insured limit, with more than 99 percent of deposit accounts falling under the $250,000 deposit insurance limit (Federal Deposit Insurance Corporation (2023)). Uninsured depositors typically encompass large depositors, such as non-financial or financial corporations, along with wealthy individuals or entities exceeding the deposit insurance limit.

Our analysis yields several noteworthy observations. Firstly, we discover a decline in the growth of insured deposits in the quarters leading up to rate changes. This decline is observed across all banks, irrespective of the magnitude of deposit rate adjustments. Similarly, we also observe a slowdown in the growth of uninsured deposits during this period. However, our findings indicate that banks, which eventually raise rates to a greater extent, also experience a more substantial decline in the growth of uninsured deposits. In simpler terms, banks facing significant withdrawals of uninsured deposits tend to raise their deposit rates by a larger margin in the subsequent quarter. Unsurprisingly, we also find higher growth in both insured and uninsured deposits in the quarter immediately following the rate change.[38]

In Table 8, we directly investigate the growth in the ratio of insured to uninsured deposits to gain insights into the funding composition dynamics surrounding deposit rate changes. Generally, we find that the growth in the ratio of insured to uninsured deposits is stable over time and across banks. However, consistent with our findings in Table 7, we observe a noteworthy increase in the growth of insured to uninsured deposits for banks in the fourth quartile (of rate changes) during the quarter preceding the rate change. This increase is primarily driven by a decline in uninsured deposits.

To further understand whether the change in the ratio of insured to uninsured deposits is a mechanical response or a deliberate choice by banks to adjust their deposit composition, we explore the gap between uninsured and insured deposit rates at the county level in Appendix Table B.20. Our analysis reveals that the gap between uninsured and insured deposit rates narrows as banks approach a county recession. This suggests that, on average, banks tend to raise their insured deposit rates more significantly compared to their uninsured deposit rates as they approach a county recession, thereby, attracting more insured deposit funding. Further, we note a substantial increase in the dispersion of deposit rates before country recessions, consistent with our findings in Section 4.2.

[38]Unreported, these banks also increase the rate on uninsured deposits.

We also examine the relation between the growth in lending with changes in deposit rates to understand the assets side adjustments of banks' balance sheet. This analysis allows us to test whether the deposit rate increases are driven by increased loan demand. Table 9 presents our findings regarding lending growth. Notably, we observe that higher lending growth precedes higher rate changes. Specifically, banks in the fourth quartile exhibit higher lending growth in the quarters leading up to rate changes. However, after the rate change, lending growth slows down. Additionally, the differential lending growth among banks in different quartiles starts to converge after the rate change. This suggests that banks that raise their rates by a larger margin, do so, primarily to strengthen their balance sheets rather than to expand their lending activities. Further, in Appendix Table B.21, we examine the growth rates of non-performing loans (NPL). We do not find much in terms of significant differentials across banks in terms of higher NPL growth quarters following rate changes. Together, the findings validate that these deposit rate increases are not driven by increased loan demand, as loan growth declines following deposit rate hikes.

Overall, our findings suggest the following channel is at work. As a county approaches an economic downturn, insured deposit growth decreases across all banks. Uninsured depositors decrease their deposits more for riskier banks. As a result, county deposit growth declines. Indeed, we observe a decrease in total deposit growth at the county level one year before a recession in Appendix Table B.22. In order to offset the funding shortfall and bolster their balance sheets, banks respond by increasing deposit rates to attract funds from insured depositors. However, the magnitude of the increase in deposit rates is contingent on the level of competition for bank deposits and the balance sheet conditions of banks within a county as discussed earlier in Section 4.2.

Considering the aforementioned mechanism, it is necessary to ascertain whether the results stem from informed depositors withdrawing from risky banks prior to a downturn or if the slower deposit growth primarily originates from an overall slowdown in economic activity preceding the downturn. Our findings strongly support the latter explanation, as we observe a deceleration in insured deposit growth. Insured deposits, by their nature, are not influenced by bank riskiness and are, therefore, less sensitive to recession risk. Moreover, Appendix Table B.8 shows that our baseline findings are not driven by the rate-setting policies of failed banks. Nevertheless, we explore bank credit default swap spreads and equity returns over several business cycles to gauge bank risk in Appendix Figure B.4. Interestingly, we do not find any significant spikes in CDS spreads or declines in bank equity prices until after national recessions occur. In contrast, we observe an increase in the deposit rate years in advance. This suggests that it is less likely that "smart money" had anticipated the recession in advance, as such expectations would likely be reflected in other tradable instruments as well.

6 State Level Economic and Financial Risks

This section examines whether bank deposit rates can predict changes in economic activity at the state level.

State GDP data is available at the quarterly frequency from 2005, allowing us to investigate whether deposit rates can forecast economic activity on a quarterly basis at the state level. We calculate the average deposit rate for each state, through aggregation of county characteristics. That is, we construct the state deposit rate by taking a weighted average of the county deposit rate in the last reporting month of each quarter, weighted by the 2004 county GDP.[39]

Table 10 reports the relation between deposit rates and economic activity at the state level. As before, the independent variables are standardized for ease of interpretation. We account for the time-invariant heterogeneity associated with states through state fixed effects. The dependent variables in columns (1) through (3) are the changes in state GDP four quarters ahead, eight quarters ahead, and twelve quarters ahead, respectively. Consistent with our baseline findings at the county level, our results demonstrate that deposit rates are a salient indicator of economic activity at the state level. Column (1) shows that a one standard deviation increase in deposit rates is associated with a 0.1 percentage point reduction in state-level GDP growth. Similar magnitudes are observed for deposit rates and economic activity eight quarters ahead and twelve quarters ahead. Furthermore, in columns (3)-(6), we present the results with the inclusion of time fixed effects. We find similar results to those estimated in columns (1) through (3). Thus, an increase in deposit rates offered by banks within a state is associated with a decline in economic activity.

In Table 11, we present the results of a logit analysis that examines the association between deposit rates and larger than 2% drops in state GDP. The unconditional probability of a larger than 2% drop in state GDP is 5.02% over the sample period. The dependent variable in columns (1) through (3) indicates whether a larger than 2% drop in state GDP is observed four quarters ahead, eight quarters ahead, and twelve quarters ahead, respectively. Consistent with our findings at the county level, our results indicate that an increase in deposit rates is

[39] Unreported, we verify that our findings are robust to alternate measures of state deposit rates, using alternative weights: *Equal-Weight*, *Emp-Weight*, and *Pop-Weight*. The Equal-Weight measure calculates the state deposit rate by taking an equal-weighted average of the county deposit rate for the last reporting month of each quarter. The Emp-, and Pop-Weight measures are similarly constructed by taking an average of the county deposit rate, weighted by the 2004 county GDP, employment, and population, respectively, in each state for the last reporting month of each quarter.

linked to a higher likelihood of experiencing a larger than 2% drop in state GDP. Specifically, in column (2), we observe that a one standard deviation increase in deposit rates increases the likelihood of a larger than 2% drop in GDP eight quarters ahead by 49.98%. Additionally, the estimated AUC (Area Under the Curve) reported in column (2) is 0.73, indicative of the model's predictive accuracy.

We also assess the predictive performance of our model out-of-sample using k-fold cross-validation, examining how well the model generalizes to independent datasets. Specifically, our dataset is partitioned into k subsamples of equal size. $k-1$ subsamples are used as the training set while one subsample is retained as the validation or testing set in which we evaluate the predictive performance (AUC). We estimate the AUC iteratively k times, so that each of the k subsamples is used as the testing set once. We plot the k-fold ROC curves and estimate the cross-validated AUC across the k-folds for statistical inference. Our default number for k is 10. k-fold cross-validation is a powerful tool that tests a model's ability to generalize to new cases that were not used in the estimation process. This allows us to flag issues such as overfitting and selection bias and produce realistic estimates of predictive value. Appendix Figure B.5 in the appendix reports the k-fold ROC curves and summarizes the cross-validated AUC. We find that our predictive model generalizes well to independent datasets and reports a high model prediction performance. Specifically, we find that at the state level, the cross-validated AUC is 0.66 for recessions eight quarters ahead. The predictive accuracy is lower, at 0.55, for recessions twelve quarters ahead.[40]

To gain further insights into the out-of-sample predictive value of deposit rates, we analyze the relation between the deposit rates prevailing in the last quarter of 2020 for each state and the corresponding GDP growth in the last quarter of 2022. The results are presented in Figure 10. We find that higher deposit rates in the last quarter of 2020 are associated with a larger decline in GDP growth in the last quarter of 2022.

The results presented above indicate a strong relation between deposit rates and the build-up of economic risk at the state level. This build-up of economic risk also carries implications for the risk of financial institution failures. To explore this further, we delve into the relationship between deposit rates and financial risk at the state level. Specifically, we examine the association between state deposit rates in 2006 and bank failures between 2008 and 2012.[41] Our findings reveal a clear pattern where higher deposit rates at the state level correspond to greater incidence of bank failures, both on the extensive and intensive margins as presented in

[40]The cross-validated AUC at the county level is 0.63 for recessions two years ahead. The predictive accuracy is lower at 0.60 for county recessions three years ahead.

[41]Most bank failures between 2001 and 2023 occurred in the crisis period defined between 2008 and 2012.

Figure 11. On the extensive margin, Figure 11a illustrates a positive association between state deposit rates in 2006 and the likelihood of a state experiencing any bank failures during the crisis period of 2008-2012. Additionally, on the intensive margin, Figure 11b presents a binscatter plot that demonstrates a strong positive relationship between quantiles of state deposit rates in 2006 and the percentage of bank failures in each quantile during the 2008-2012 period.[42]

These relationships are not only statistically significant but also economically meaningful. Specifically, a one standard deviation increase in state deposit rates in 2006 is associated with a 18.5 percentage points increase in the likelihood that a state experiences any bank failure during the crisis period. Moreover, it corresponds to a 0.66 percentage points increase in the share of failed banks in a state, corresponding to 0.43 standard deviations. These findings demonstrate that deposit rates can also serve as an early indicator of solvency risk, as evidenced by the likelihood and severity of bank failures during the 2008-2012 crisis period. However, it is important to note that liquidity shortages of banks do not always lead to solvency risk. The association between increased liquidity risk and solvency risk is observed only in certain instances.[43] Therefore, while our analysis reveals that banks' deposit rates tend to increase in response to liquidity shortages, this association with bank failures is limited to extreme cases.

7 Deposit Rates vs. Other Indicators

An important question that arises is how does the predictive value of bank deposit rates compare to that of other variables. Specifically, does the information aggregated in deposit rates capture underlying economic conditions that may not be accounted for by other variables? To answer this, we assess and compare the predictive value of deposit rates against other variables.

In Appendix Table B.23, we begin by examining the relation between different measures of credit growth and county recessions. Panel A presents the results for growth in small business loans, Panel B for growth in mortgage credit, and Panel C for growth in total credit (sum of small business and mortgage loans). The estimated AUC across these panels is approximately 0.70, which is lower than the 0.73 obtained with deposit rates in Table 5.[44] We find that an increase in mortgage credit growth is a significant indicator of large drops in GDP two years later. This result differs from Table 4, in which we find a weak negative association between

[42]The percentage of bank failures is computed as the ratio of the number of failed banks to the total number of banks in each quantile.
[43]See Goldstein and Pauzner (2005) for a related theoretical model.
[44]Note, a 0.03 improvement in the AUC is substantial.

mortgage credit growth and future GDP growth two years later. This finding suggests that credit growth may have greater predictive value in forecasting economic contractions induced by large shocks, but not small shocks, consistent with Schularick and Taylor (2012). However, relying on mortgage credit growth as an indicator of recessions is unreliable; the point estimate is unstable, as the relation between credit growth and the likelihood of future recessions is negative for both one-year and three-year forecasts.

To directly compare the predictive value of county deposit rates and credit growth, we conduct a horse-race analysis in Appendix Table B.24. Panel A includes the growth in small business loans, Panel B for growth in mortgage credit, and Panel C for growth in total credit, in addition to the deposit rate. The point estimate associated with deposit rates is larger in magnitude than the baseline estimate and remains economically meaningful and statistically significant at the 1% level, even after the inclusion of credit growth variables across panels and forecasting horizons. Specifically, we find that a one standard deviation increase in the deposit rate increases the likelihood of a recession occurring two years ahead by 39%, after accounting for credit growth. Importantly, the inclusion of credit growth measures does not add explanatory power, as indicated by the change in the pseudo R^2, nor does it substantially improve the predictive value, as evidenced by the change in the AUC. The inclusion of credit growth measures does not quantitatively or qualitatively affect the precision of our baseline point estimates reported in Table 5.

Similarly, we turn our attention to deposit growth, examining its predictive value in Table 12. Panel A examines the predictive value of deposit growth alone on county recessions, while Panel B adds the deposit rate. Panel A indicates that the AUC obtained with deposit growth alone is 0.69, which is lower than the 0.73 obtained with deposit rates in Table 5. Moreover, the point estimate associated with the deposit growth is unstable, with fluctuating signs and statistical significance over the forecasting horizons considered. In contrast, we find that the point estimates associated with the deposit rates remain statistically and economically significant – extremely close to the estimates produced in the baseline Table 5 – even after accounting for deposit growth in Panel B. Moreover, the predictive value, as evinced by the pseudo R^2 and AUC hardly change with the addition of deposit growth.[45]

While our findings suggest that deposit rates offer valuable insights compared to other bank measures, a key question remains: do they outperform established leading indicators of local business cycle fluctuations? This comparison is important to validate deposit rates as a reliable forecasting tool for local business cycles. To this end, we compare the predictive value

[45]We show that these findings are robust under an OLS specification that examines the relation between deposit growth and deposit rates on GDP growth in Appendix Table B.25.

of deposit rates (column (1)) to other leading economic indicators of recessions including the natural-log transformed number of auto sales (column (2)), unemployment insurance claims (column (3)), and job openings (column (4)) at the state level.[46] We study the relation between each of these indicators and future economic growth, eight quarters ahead in Panel A of Table 13. Using a within-state estimator, we find that there is no statistically distinguishable relation between the auto sales or unemployment insurance claims on future economic growth. Although there is a strong relation between job openings and future economic growth, it bears a negative correlation. This implies that an increase in job openings in the present is associated with *weaker* economic growth in the future, potentially indicating mean reversion. To assess predictive value, we compare the R^2 values across all four specifications. Notably, the deposit rate demonstrates the highest explanatory power for future economic growth, accounting for 6.03% of the variation in column (1). In comparison, the natural-log transformed number of auto sales, unemployment insurance claims, and job openings explain 3.77%, 3.65%, and 4.31% of the variation in columns (2)-(4), respectively.

We further validate that state deposit rates are a robust leading indicator of local business cycles by running a horse-race analysis between our measure of state deposit rates and other leading economic indicators of local business cycle activity in Panel B of Table 13. The dependent variables in columns (1) through (3) are the changes in state GDP four quarters ahead, eight quarters ahead, and twelve quarters ahead, respectively. Using a within-state estimator, we find that only the state deposit rate can robustly predict future state GDP growth in any statistical or quantitative sense; the point estimates and standard errors of the other indicators are unstable across the forecasting horizon. Furthermore, the combined inclusion of the natural-log transformed number of auto sales, unemployment insurance claims, and job openings adds only an additional 0.89% to the R^2, beyond the 6.03% explained by the deposit rate alone.

Deposit rates may exhibit better predictive value compared to other variables, as they are forward-looking rather than backward-looking. The other benefit of deposit rates is that they are easily available in the public domain in real time as compared to other variables. Overall, these results underscore the comparative predictive value of deposit rates as a valuable indicator of economic downturns, outperforming other measures in this context.

[46] Relatedly, Khan and Ozel (2016) show that bank accounting measures are associated with changes in the state coincident index.

8 Conclusion

This paper proposes a novel measure for assessing the build-up of economic risks at the regional level. We find that an increase in deposit rates offered by banks operating within a region is associated with a contraction in future economic activity in that region.

We examine the mechanism behind the predictive power of deposit rates and find that banks which experience an outflow of deposits increase deposit rates in the following quarter. These banks raise deposit rates to attract deposits and support their balance sheets in response to funding shortages. Consequently, our results indicate that, at the onset of an economic contraction, banks increase their deposit rates in response to a liquidity squeeze. As a result, an increase in deposit rates can serve as a predictive signal for an impending economic contraction.

The granularity of our indicator – the deposit rates – allows for prediction of localized downturns at regional levels. Our market-based measure is both easy to construct and utilize, providing a valuable early warning signal of impending downturns that complements existing metrics. Furthermore, our finding that banks rely more on insured deposits as they approach a downturn raises concerns about moral hazard arising from deposit insurance schemes.

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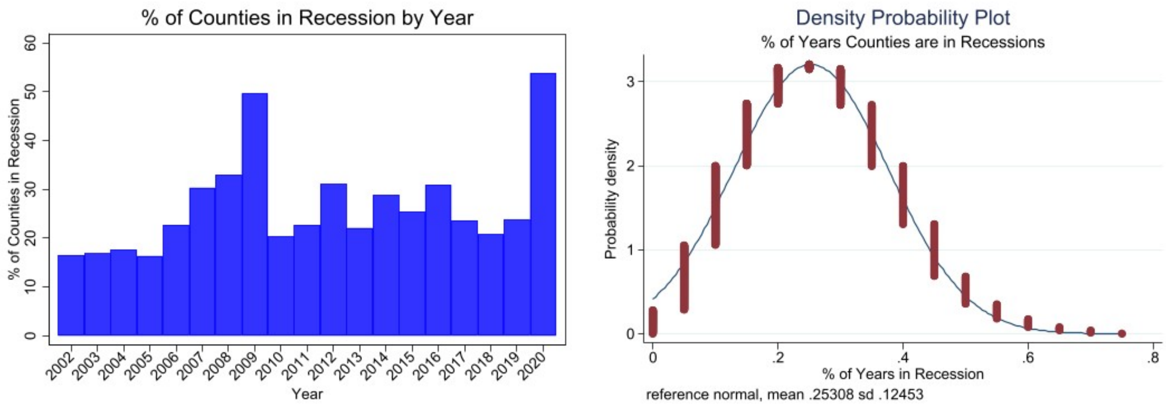
9 Figures and Tables

Figure 1: Recessions Across Counties and Time

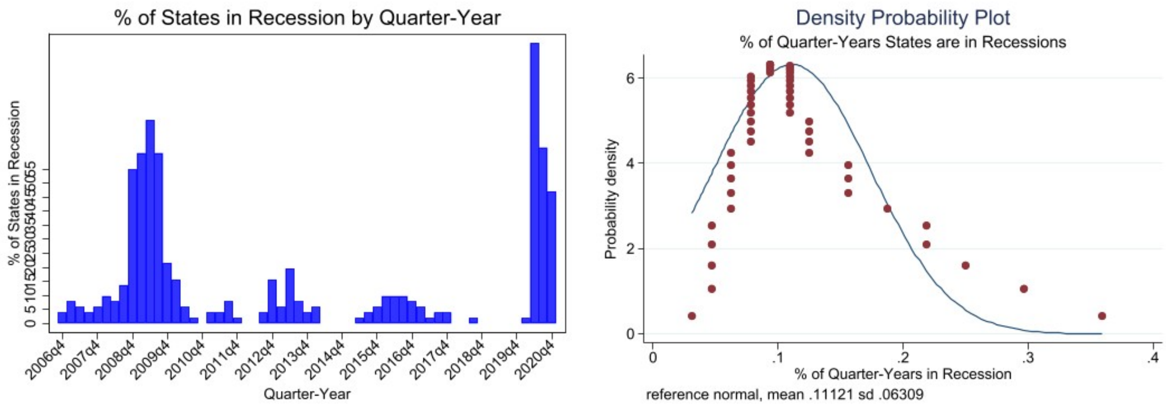


(a) % of Counties in Recession

(b) % of Recessions within Counties

Notes: This figure presents the percentage of counties in recessions by year in Figure 1a, and a density probability plot of the percent of year counties are in recessions in Figure 1b based on county GDP data. A county is in a recession if its GDP growth between two consecutive years is below -2%.

Figure 2: Recessions Across States and Time

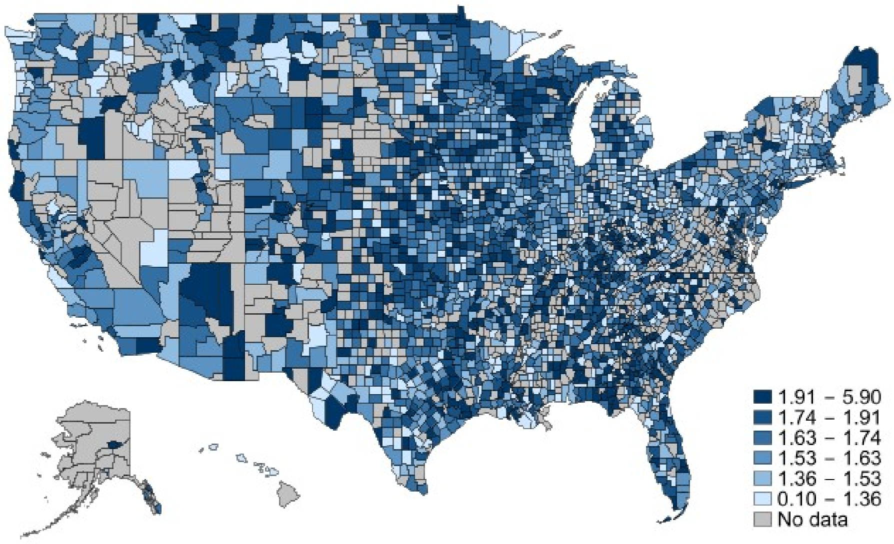


(a) % of States in Recession

(b) % of Recessions within States

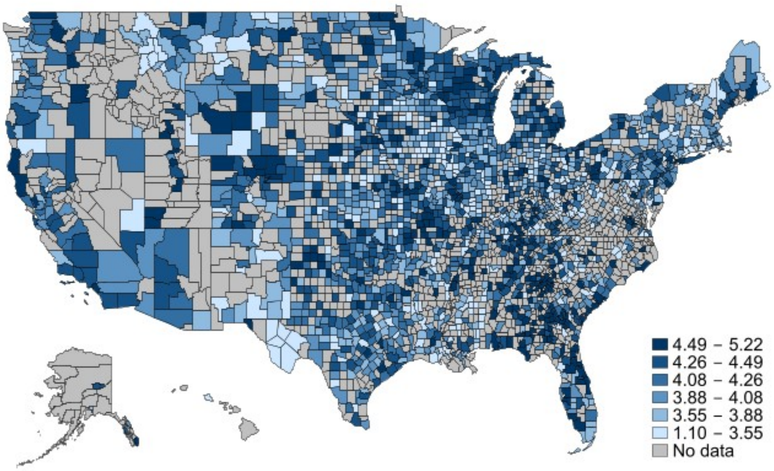
Notes: This figure presents the percentage of states in recessions by quarter-year in Figure 2a, and a density probability plot of the percent of quarter-years states are in recessions in Figure 2b based on state GDP data. A state is in a recession if its GDP growth between two consecutive quarters is below -2%.

Figure 3: Deposit Rates by County (2001-2020)

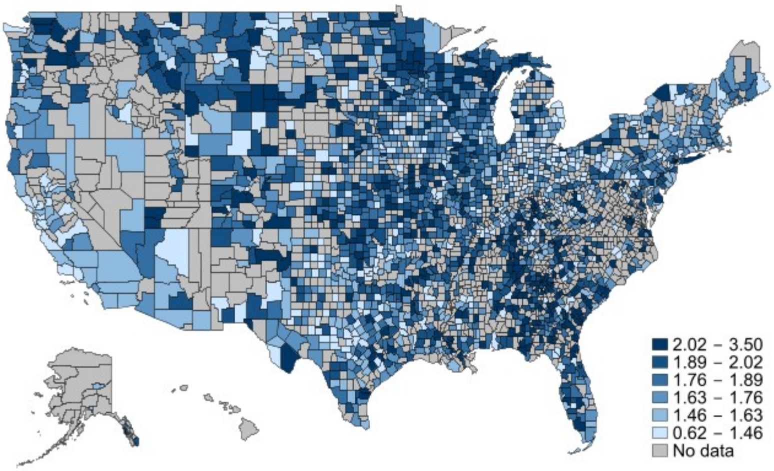


Notes: This figure uses RateWatch data to present a heatmap of the average deposit rate (12-month, $10K CDs) in each county from 2001 to 2020. The deposit rate is the rate on the 12-month certificate of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is computed as the average of the monthly county deposit rates in each year. We present the time-series average of these annual county deposit rates. The analysis is restricted to single-state banks. The intensity of the blue shading represents the quantile range of the deposit rate.

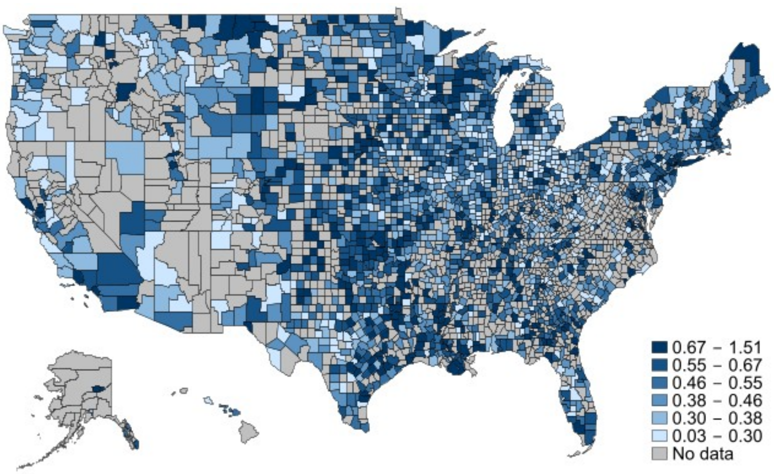
Figure 4: Deposit Rate Across Counties and Time



(a) 2006



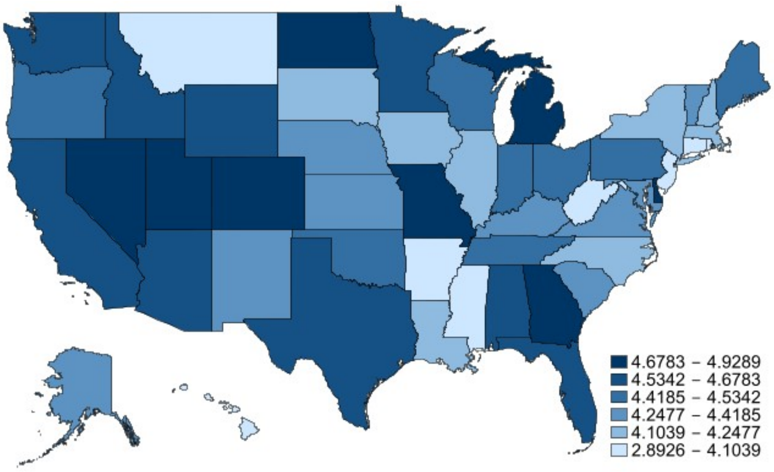
(b) 2009



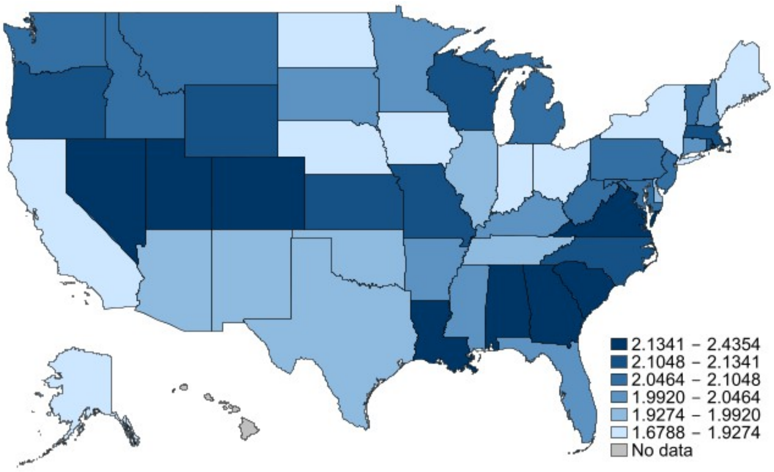
(c) 2017

Notes: This figure uses RateWatch data to present a heatmap of county deposit rates (12-month, \$10K CDs). Figure 4a presents county deposit rates in 2006; Figure 4b presents county deposit rates in 2009; Figure 4c presents county deposit rates in 2017. The deposit rate is the rate on the 12-month certificate of deposit of at least \$10,000. The intensity of the blue shading represents the quantile range of the deposit rate. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is computed as the average of the monthly county deposit rates in each year. The analysis is restricted to single-state banks. The intensity of the blue shading represents the quantile range of the deposit rate.

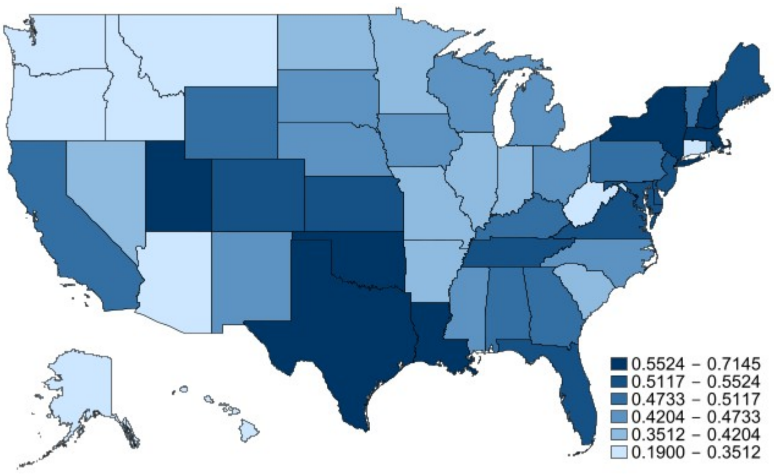
Figure 5: Deposit Rate Across States and Time



(a) 2006Q4



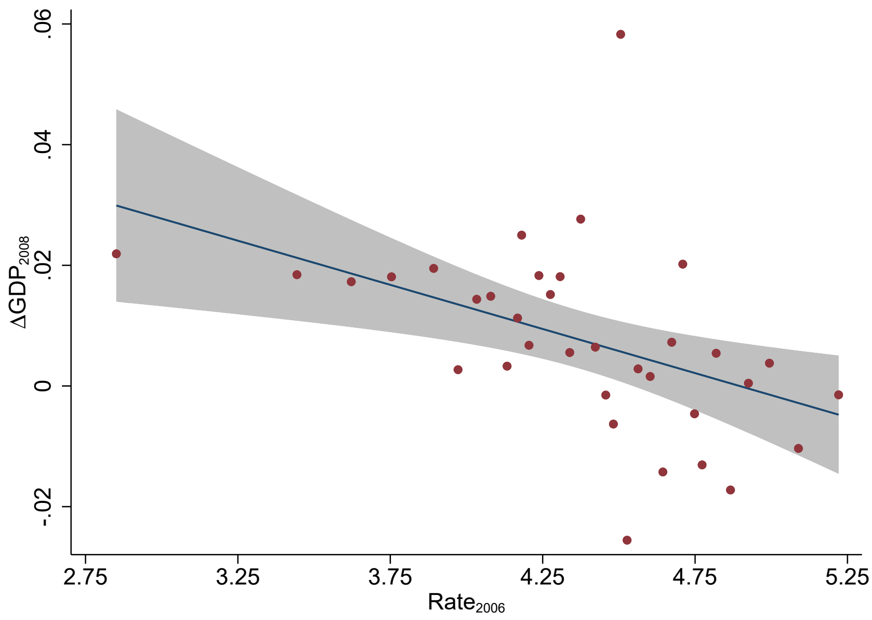
(b) 2009Q1



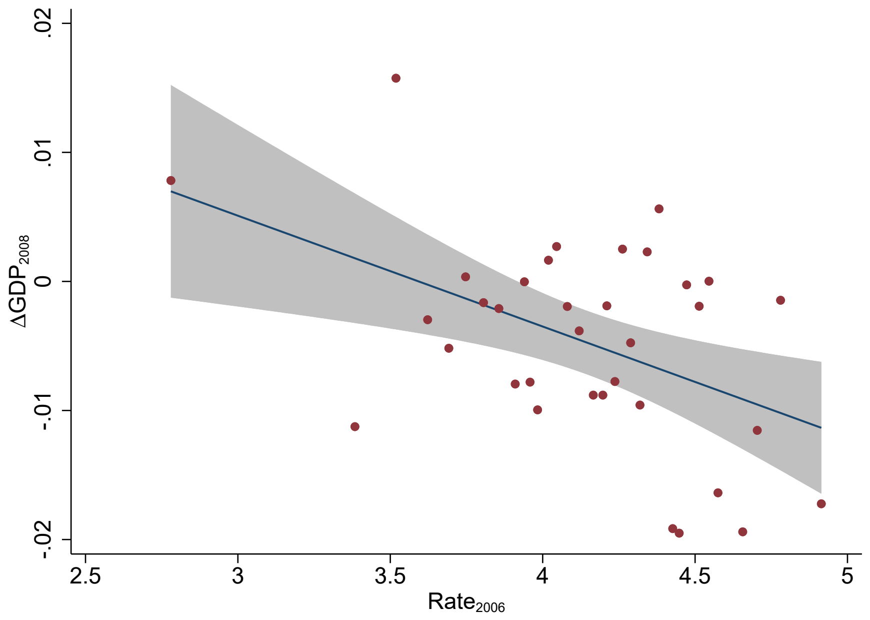
(c) 2017Q1

Notes: This figure uses RateWatch data to present a heatmap of state deposit rates (12-month, $10K CDs). Figure 5a presents state deposit rates in 2006Q4; Figure 5b presents state deposit rates in 2009Q1; Figure 5c presents state deposit rates in 2017Q1. The deposit rate is the rate on the 12-month certificate of deposit of at least $10,000. The intensity of the blue shading represents the quantile range of the deposit rate. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is computed as the average of the monthly county deposit rates in each year. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The analysis is restricted to single-state banks. The intensity of the blue shading represents the quantile range of the deposit rate.

Figure 6: 2006 Deposit Rates Predict 2008 GDP Growth



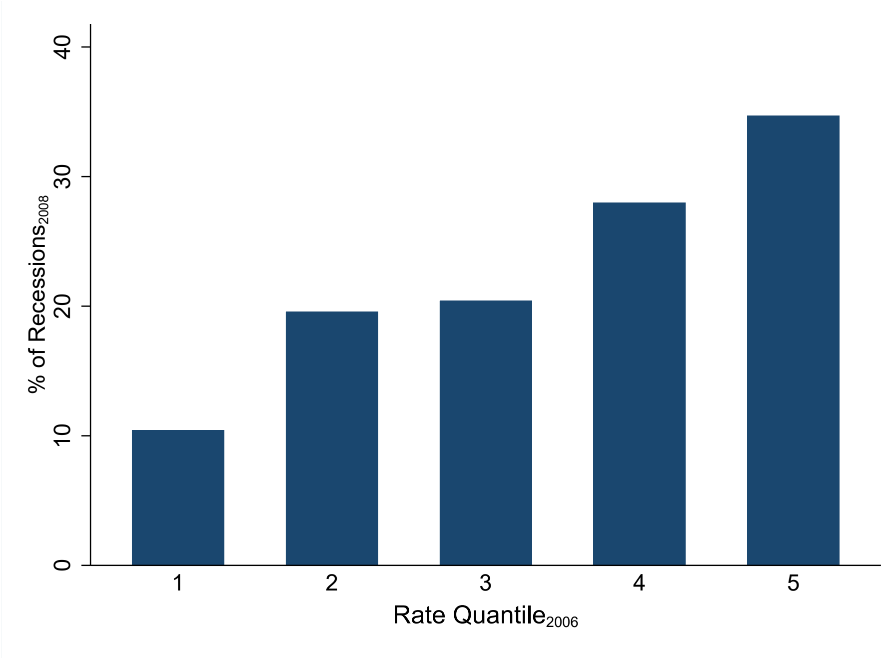
(a) County



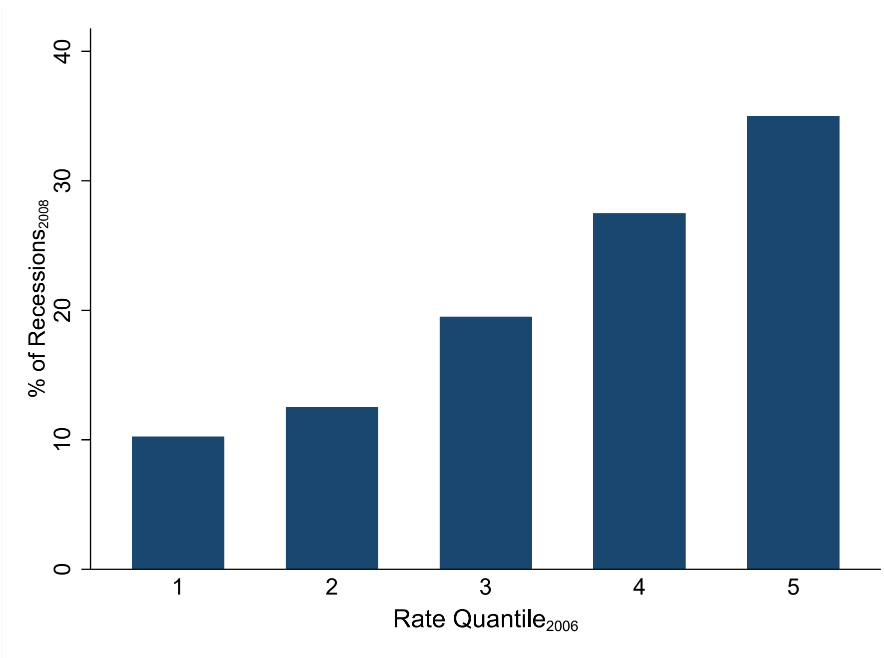
(b) State

Notes: This figure illustrates the binned bivariate averages ("binscatter") of the 2008 GDP growth rates at the county and state levels plotted against the 2006 deposit rates at the county and state levels. Figure 6a presents the binscatter (35 bins) of the annual county GDP growth in 2008 against the annual county deposit rates in 2006. Figure 6b presents the binscatter (35 bins) of the quarterly state GDP growth in 2008 against the quarterly state deposit rates in 2006. The red dots represent the bins, the blue line graphs the 2008 GDP growth rates, as well as the confidence interval (gray shading). The deposit rate is the rate on the 12-month certificate of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The analysis is restricted to single-state banks.

Figure 7: 2006 Deposit Rates Predict 2008 Recessions



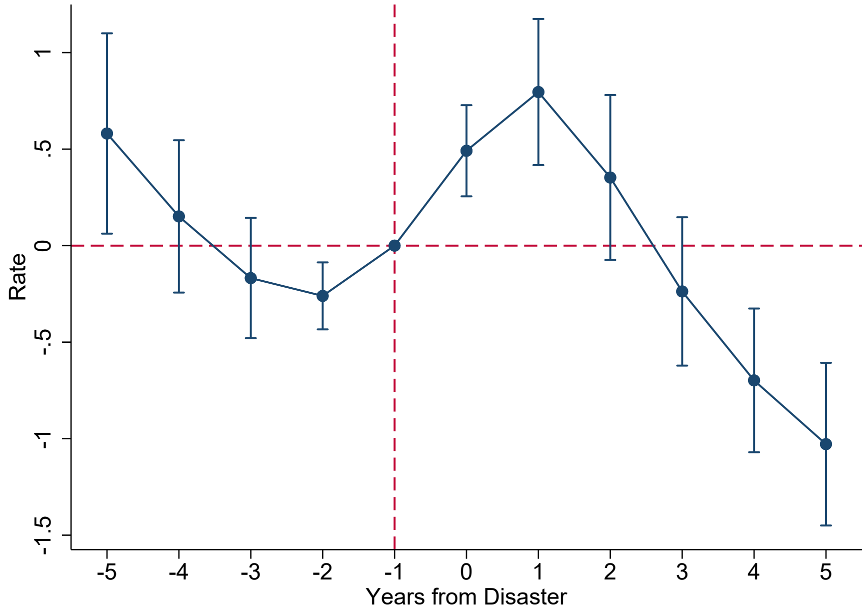
(a) County



(b) State

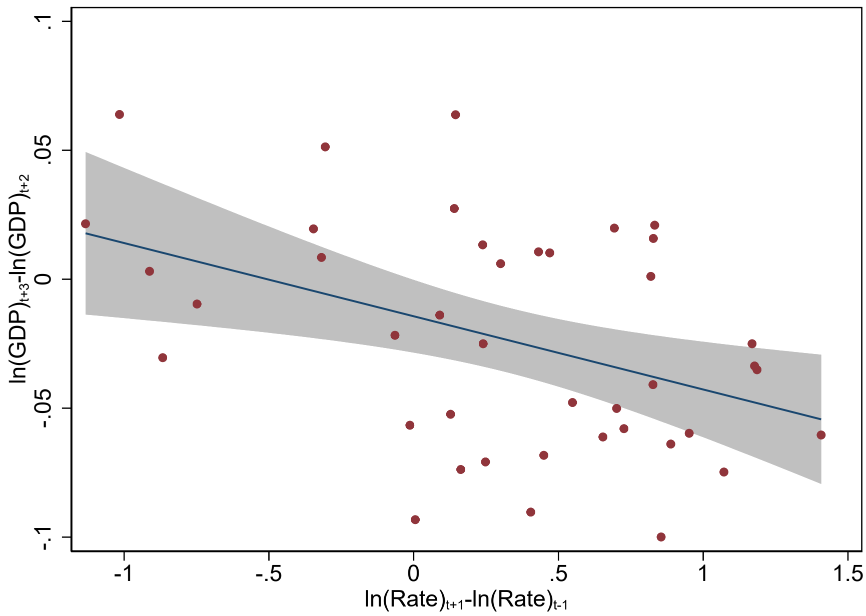
Notes: This figure presents bar graphs of the percent of county-years (state-quarters) in recession in 2008, categorized by the rate quintile of deposit rates across county-years (state-quarters) in 2006 in Figure 7a and Figure 7b, respectively. The deposit rate is the rate on the 12-month certificate of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The analysis is restricted to single-state banks. A state is in a recession if its GDP growth between two consecutive quarters is below -2%.

Figure 8: Deposit Rates around Natural Disasters



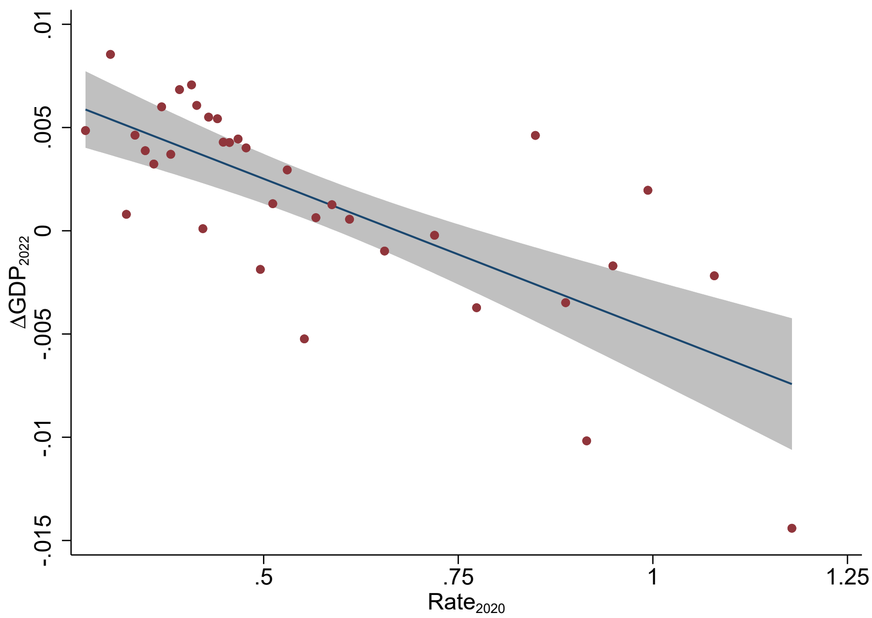
Notes: This figure presents the deposit rates around natural disasters. The figure plots the δ_{t+d} coefficients in the following regression specification of $Rate_{c,t} = \beta_0 + \sum_{k=-5}^{5} \delta_{t+d} + \alpha_c + \epsilon_{c,t}$ where d denotes to the year of the natural disaster, c denotes the county, t denotes the current year, and *Rate* denotes the deposit rate. The base year is -1 years from the disaster. We restrict our sample to disasters that last less than 31 days with total estimated damages above one billion 2018 constant dollars, following Barrot and Sauvagnat (2016). The deposit rate is the rate on the 12-month certificate of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Standard errors are clustered by county FIPS.

Figure 9: Ex Post Deposit Rate Change around Disasters Predicts Future GDP Growth



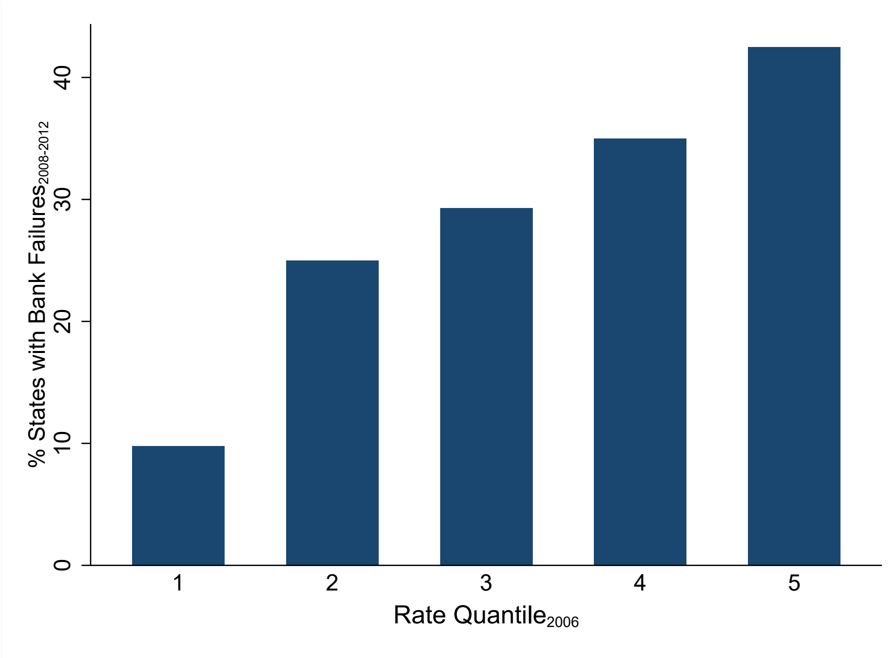
Notes: This figure illustrates the binned bivariate averages ("binscatter") of county-level GDP growth rate against the change in deposit rates after a natural disaster. The figure presents the binscatter (35 bins) of the annual county GDP growth, three years after a natural disaster, against the change in the deposit rate one year following a natural disaster. The red dots represent the bins, the blue line graph the predicted GDP growth rates from a linear regression, as well as the confidence interval (gray shading). The change in the deposit rate (x-axis) is computed as the natural-log difference of the deposit rate one year after a natural disaster, relative to one year before. The annual change in the deposit rate three years after a natural disaster (y-axis) is computed as the natural-log difference in GDP. The sample is restricted to natural disasters that last less than 31 days with total damages above $1 bn 2018 dollars.

Figure 10: 2020 State Deposit Rates Predict 2022 State GDP Growth

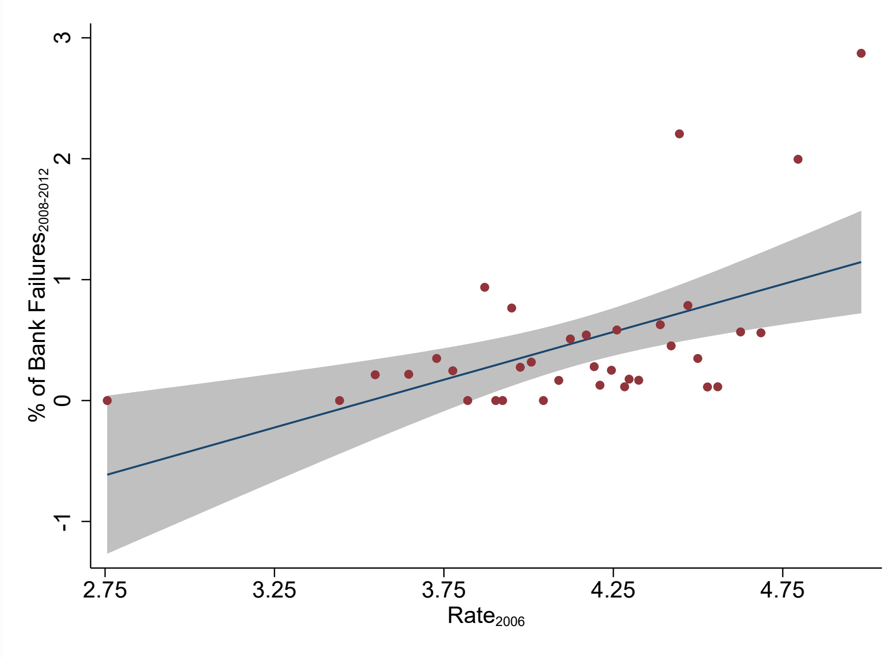


Notes: This figure illustrates the binned bivariate averages ("binscatter") of the 2022 quarterly state GDP growth rate against the 2020 quarterly deposit rate at the state level. The figure presents the binscatter (35 bins) of the quarterly state GDP growth in 2022 against the quarterly state deposit rates in 2020. The red dots represent the bins, the blue line graphs the 2022 GDP growth rates from a linear regression, as well as the confidence interval (gray shading). The deposit rate is the rate on the 12-month certificate of deposit of at least $10,000.

Figure 11: Deposit Rates Predict Bank Failures



(a) Extensive Margin



(b) Intensive Margin

Notes: The figures present the relation between deposit rates and financial risk at the state level. Figure 11a and Figure 11b present the association between state deposit rates in 2006 and bank failures between 2008 and 2012. Figure 11a presents a bar graph of the percent of states that experienced a bank failure between 2008 and 2012, categorized by the rate quintile of deposit rates across state-quarters in 2006. Figure 11b illustrates the binned bivariate averages ("binscatter") of the percent of banks that fail between 2008 and 2012 against the quarterly deposit rate at the state level. The figure presents the binscatter (35 bins) of the percent of banks that experienced failure between 2008 and 2012 against the quarterly state deposit rates in 2006. The red dots represent the bins, the blue line graph the predicted 2020 GDP growth rates from a linear regression, as well as the confidence interval (gray shading). The deposit rate is the rate on the 12-month certificate of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The analysis is restricted to single-state banks.

Table 1: Summary Statistics (2001-2020)

	N	P25	Median	P75	Mean	SD
Monthly Bank Deposit Rate	464,467	0.4900	1.1875	2.4800	1.6288	1.3670
Monthly Bank Dep. Rate SD	263,575	0.0859	0.1768	0.3246	0.2353	0.2060
Annual Deposit Rate	39,732	0.5000	1.1914	2.5436	1.6333	1.3416
Annual County Dep. Rate SD	39,428	0.0348	0.1399	0.2874	0.2036	0.2270
Annual County GDP Growth	59,127	-2.2974	1.2247	4.5548	1.2544	7.8028
Quarterly State Deposit Rate	3,247	0.3859	0.6785	1.9781	1.3265	1.3075
Quarterly State Dep. Rate SD	3,247	0.1959	0.3067	0.4862	0.3517	0.1813
Quarterly State GDP Growth	3,197	-0.2554	0.4171	1.0521	0.3084	1.7906

Notes: The table summarizes the key measures of the level and dispersion of bank deposit rates, as well as GDP growth. The columns, left to right, denote the variable of interest, number of observations, 25^{th} percentile value, median, 75^{th} percentile value, mean, and standard deviation in Columns 2-7. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks.

Table 2: Economic Activity and Deposit Rate

Panel A: GDP Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0012	-0.0044***	-0.0037***	-0.0031	-0.0073**	-0.0138***
	(0.0008)	(0.0007)	(0.0006)	(0.0032)	(0.0035)	(0.0040)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,578	4,292	4,029	4,578	4,292	4,029
R^2	0.1069	0.1196	0.1183	0.2668	0.2757	0.2796

Panel B: Business Formation

ln(Applications)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0488***	-0.0541***	-0.0755***	0.0055	-0.0111	-0.0277
	(0.0033)	(0.0033)	(0.0036)	(0.0146)	(0.0169)	(0.0171)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	3,923	3,640	3,378	3,923	3,640	3,378
R^2	0.9797	0.9795	0.9804	0.9933	0.9935	0.9935

Panel C: Delinquency Rate

Delinquency Rate (30-89 days)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.4066***	0.3447***	0.2800***	0.0564*	0.0858**	0.0767*
	(0.0151)	(0.0149)	(0.0147)	(0.0339)	(0.0363)	(0.0424)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	2,356	2,337	2,146	2,356	2,337	2,146
R^2	0.5594	0.5253	0.5321	0.9280	0.9263	0.9239

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t + k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, natural-log of the number of new business applications in Panel B, and the 30-89 day mortgage delinquency rate in Panel C. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.72%, average log-transformed # of applications is 7.74%, and average early-stage delinquency rate is 2.50% for metro counties from 2001 through 2020. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table 3: Economic Activity and Deposit Rate: 2010-2015

Panel A: GDP Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0146*	-0.0310***	-0.0103	0.0158	-0.0509***	-0.0196
	(0.0086)	(0.0081)	(0.0082)	(0.0216)	(0.0171)	(0.0168)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	1,456	1,437	1,424	1,456	1,437	1,424
R^2	0.2425	0.2373	0.2437	0.2490	0.2429	0.2508

Panel B: Business Formation

ln(Applications)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.1238***	-0.2570***	-0.4117***	0.0472	-0.0135	-0.1252***
	(0.0162)	(0.0197)	(0.0227)	(0.0343)	(0.0397)	(0.0449)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	1,477	1,457	1,442	1,477	1,457	1,442
R^2	0.9977	0.9966	0.9957	0.9983	0.9981	0.9978

Panel C: Delinquency Rate

Delinquency Rate (30-89 days)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	1.2431***	1.3169***	0.8743***	0.1168	0.0798	-0.0018
	(0.0455)	(0.0465)	(0.0388)	(0.0752)	(0.0822)	(0.0773)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	1,088	1,078	1,069	1,088	1,078	1,069
R^2	0.8740	0.9151	0.9362	0.9643	0.9642	0.9639

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t + k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, natural-log transformed number of new business applications in Panel B, and the 30-89 day mortgage delinquency rate in Panel C. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.84%, average log-transformed # of applications is 7.67%, and average early-stage delinquency rate is 2.81% for metro counties from 2010 through 2015. The independent variables are standardized. The sample period is from 2010 through 2015. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table 4: Economic Activity and Deposit Rates after Accounting for Credit

Panel A: Small Business Lending Growth			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0022**	-0.0059***	-0.0058***
	(0.0009)	(0.0009)	(0.0009)
Δ ln(SBL)	0.0022***	0.0019*	-0.0012
	(0.0008)	(0.0010)	(0.0015)
County FIPS FE	✓	✓	✓
N	4,328	4,049	3,790
R^2	0.1044	0.1183	0.1248

Panel B: Mortgage Growth			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0021**	-0.0058***	-0.0060***
	(0.0010)	(0.0009)	(0.0010)
Δ ln(Mortgages)	0.0006	0.0029***	0.0021***
	(0.0006)	(0.0007)	(0.0007)
County FIPS FE	✓	✓	✓
N	4,328	4,049	3,790
R^2	0.1027	0.1204	0.1256

Panel C: Total Credit Growth			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0021**	-0.0059***	-0.0060***
	(0.0010)	(0.0009)	(0.0010)
Δ ln(Total)	0.0003	0.0029***	0.0008
	(0.0006)	(0.0007)	(0.0008)
County FIPS FE	✓	✓	✓
N	4,328	4,049	3,790
R^2	0.1026	0.1202	0.1246

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $\Delta ln(GDP)_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \beta_2 \cdot \Delta ln(Credit)_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta ln(GDP)$ denotes GDP growth, $Rate$ denotes the average bank deposit rate, and $\Delta ln(Credit)$ denotes credit growth. Credit growth is measured as the natural-log difference of small business lending in Panel A, natural-log difference of mortgages in Panel B, and natural-log difference of total lending (small business lending and mortgages) in Panel C. The deposit rate is the rate on 12-month certificates of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.72% for metro counties from 2010 through 2015. The independent variables are standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table 5: Deposit Rates Predict County Recessions

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0232***	0.0541***	0.0474***
	(0.0049)	(0.0053)	(0.0058)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0780	0.1022	0.0949
AUC	0.7016	0.7302	0.7231
Overall test statistic, χ^2	284.8578	382.0780	313.1834
p-value	0.0492	0.0000	0.0009

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ in metro counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 Rate_{c,t} + \beta_2 Rate_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, $Rate$ denotes the average bank deposit rate, t denotes the current year, and k denotes the number of leading years ($k = 1, 2, 3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table 6: Instrumental Variable Regression: Shipping Costs and Bank Deposit Rates

Rate	(1)	(2)	(3)	(4)	(5)	(6)
Shipping Costs	-0.0264***	-0.0205***	-0.0207***	-0.0181***	-0.0166***	-0.0130***
	(0.0055)	(0.0047)	(0.0047)	(0.0045)	(0.0045)	(0.0047)
log Employment						0.0085
						(0.0131)
Manufacturing Employment (%)						-0.0121*
						(0.0063)
log Income						0.0288*
						(0.0158)
log Debt						-0.0098
						(0.0142)
Δ_{91-99}HMDA Loan Orig.					-0.0090	0.0064
					(0.0062)	(0.0075)
Δ_{91-99} Net CH Import		-0.0045	-0.0048	-0.0038	-0.0033	0.0014
		(0.0053)	(0.0052)	(0.0051)	(0.0051)	(0.0052)
Bank × Month-Year FE	✓	✓	✓			
State FE		✓				
State × Month-Year FE			✓			
Bank × Month-Year × State FE				✓	✓	✓
Quintiles HP Growth						✓
N	350,251	350,250	350,187	263,644	263,644	263,644
R^2	0.9070	0.9114	0.9141	0.9345	0.9345	0.9348

Notes: This table presents the relation between shipping costs and bank deposit rates. The table presents regressions of bank deposit rates from 2001 to 2007 on shipping costs at the commuting zone level. The regression specification is the following: Deposit $\text{Rate}_{b,z,t} = \beta_1 \cdot \text{Shipping Costs}_z + X_z + \alpha_{b,s,t} + \epsilon_{b,z,t}$ where Rate denotes bank b's deposit rate at the commuting zone level z of state s measured in month-year t, Shipping Costs denotes the shipping costs at the commuting zone level, and X is a vector of controls including total employment, the share of manufacturing employment, total income, logarithm of total debt, the 1991-1999 change in loan originations, and the 1991-1999 change in net Chinese import penetration, as well as quintiles of the change in house prices between 1999 and 2007. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the Rate is constructed at the commuting level by taking a weighted average of the bank deposit data, weighted by a county's share of a commuting zone's GDP. The independent variables used in this regression come from Barrot et al. (2022). We refer readers to Barrot et al. (2022) for construction of the independent variables. The independent variables are standardized. The sample period is 2001 through 2007. The analysis is restricted to single-state banks. Two-way commuting zone and month-year clustered standard errors are reported in parentheses.

Table 7: Insured and Uninsured Deposit Growth and Bank Rate Changes

Panel A: Insured Deposit Growth

$\Delta ln(\text{Insured})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$	0.0010	-0.0001	-0.0014*	0.0005	0.0035***	0.0019***	0.0020***
	(0.0007)	(0.0007)	(0.0008)	(0.0007)	(0.0007)	(0.0006)	(0.0006)
$\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$	0.0009	-0.0013	-0.0033***	0.0013*	0.0061***	0.0032***	0.0012
	(0.0006)	(0.0008)	(0.0009)	(0.0007)	(0.0006)	(0.0005)	(0.0009)
$\mathbb{1}_{\text{Dep Rate Change}>P75}$	0.0015**	0.0001	-0.0033***	0.0052***	0.0080***	0.0045***	0.0017**
	(0.0007)	(0.0008)	(0.0008)	(0.0008)	(0.0009)	(0.0006)	(0.0007)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	234,296	238,782	243,571	243,714	238,978	234,508	230,172
R^2	0.0484	0.0548	0.0533	0.0535	0.0568	0.0597	0.0611

Panel B: Uninsured Deposit Growth

$\Delta ln(\text{Uninsured})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$	-0.0005	0.0017	-0.0034	0.0023	0.0044	-0.0015	-0.0050
	(0.0028)	(0.0035)	(0.0029)	(0.0031)	(0.0028)	(0.0027)	(0.0031)
$\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$	0.0048*	0.0019	-0.0065**	-0.0035	0.0082**	0.0011	-0.0061
	(0.0026)	(0.0030)	(0.0032)	(0.0028)	(0.0032)	(0.0031)	(0.0042)
$\mathbb{1}_{\text{Dep Rate Change}>P75}$	0.0014	0.0028	-0.0125***	-0.0004	0.0093***	0.0019	-0.0018
	(0.0027)	(0.0026)	(0.0030)	(0.0034)	(0.0026)	(0.0033)	(0.0031)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	233,084	237,548	242,312	242,464	240,887	239,551	238,319
R^2	0.0689	0.0703	0.0700	0.0703	0.0703	0.0706	0.0708

Notes: The table presents the coefficients estimated from the following regression for bank b at time t (quarter-year): $\Delta ln(Y)_{b,t+k} = \beta_0 + \beta_1 \mathbb{1}_{P25<\text{Dep Rate Change}\leq P50,b,t} + \beta_2 \mathbb{1}_{P50<\text{Dep Rate Change}\leq P75,b,t} + \beta_3 \mathbb{1}_{\text{Dep Rate Change}>P75,b,t} + \alpha_t + \epsilon_{b,t}$ where $\Delta ln(Deposits)_{b,t+k}$ denotes growth in insured deposits (Panel A) and uninsured deposits (Panel B), $\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$, $\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$, $\mathbb{1}_{\text{Dep Rate Change}>P75}$ denote the second, third, or fourth quartile of a bank's deposit rate change between two consecutive quarters, respectively. k denotes the number of lead/lag quarters. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across counties for each bank in each month is computed. The quarterly bank deposit rate is the bank deposit rate in the last reporting month of quarter. This rate is used to compute the quarterly change in banks' deposit rates. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Two-way bank and quarter-year clustered standard errors are reported in parentheses.

Table 8: Ratio of Insured to Uninsured Deposit Growth and Bank Rate Changes

$\Delta ln(\frac{\text{Insured}}{\text{Uninsured}})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$	0.0016	-0.0012	0.0019	-0.0018	-0.0010	0.0031	0.0071**
	(0.0029)	(0.0036)	(0.0031)	(0.0031)	(0.0029)	(0.0029)	(0.0032)
$\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$	-0.0033	-0.0028	0.0031	0.0047*	-0.0021	0.0019	0.0076*
	(0.0028)	(0.0032)	(0.0034)	(0.0028)	(0.0032)	(0.0032)	(0.0042)
$\mathbb{1}_{\text{Dep Rate Change}>P75}$	0.0001	-0.0024	0.0094***	0.0055	-0.0015	0.0025	0.0038
	(0.0027)	(0.0028)	(0.0030)	(0.0033)	(0.0026)	(0.0035)	(0.0033)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	228,690	233,080	237,696	242,462	240,885	239,376	238,072
R^2	0.0825	0.0828	0.0822	0.0819	0.0810	0.0813	0.0815

Table 9: Loan Growth and Bank Rate Changes

$\Delta ln(\text{Loans})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$	-0.0002	0.0013*	0.0016**	0.0022***	-0.0002	0.0011*	0.0013**
	(0.0007)	(0.0007)	(0.0007)	(0.0008)	(0.0006)	(0.0006)	(0.0005)
$\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$	-0.0017**	0.0009	0.0029***	0.0018**	0.0004	0.0012**	0.0014**
	(0.0008)	(0.0008)	(0.0008)	(0.0007)	(0.0007)	(0.0006)	(0.0005)
$\mathbb{1}_{\text{Dep Rate Change}>P75}$	0.0018**	0.0028***	0.0061***	0.0054***	0.0019***	0.0019***	0.0022***
	(0.0009)	(0.0008)	(0.0009)	(0.0008)	(0.0006)	(0.0006)	(0.0005)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	212,897	217,267	221,913	222,368	218,083	213,718	209,460
R^2	0.0226	0.0223	0.0221	0.0229	0.0262	0.0307	0.0317

Notes: The table presents the coefficients estimated from the following regression for bank b at time t (quarter-year): $Y_{b,t+k} = \beta_0 + \beta_1 \mathbb{1}_{P25<\text{Dep Rate Change}\leq P50,b,t} + \beta_2 \mathbb{1}_{P50<\text{Dep Rate Change}\leq P75,b,t} + \beta_3 \mathbb{1}_{\text{Dep Rate Change}>P75,b,t} + \alpha_t + \epsilon_{b,t}$ where Y is $\Delta ln(\frac{Uninsured}{Insured})_{b,t+k}$, denoting the growth in the ratio of insured to uninsured deposits in Table 8, and $\Delta ln(Loans)_{b,t+k}$, denoting lending growth in Table 9. $\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$, $\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$, $\mathbb{1}_{\text{Dep Rate Change}>P75}$ denote the second, third, or fourth quartile of a bank's deposit rate change between two consecutive quarters, respectively. k denotes the number of lead/lag quarters. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across counties for each bank in each month is computed. The quarterly bank deposit rate is the bank deposit rate in the last reporting month of quarter. This rate is used to compute the quarterly change in banks' deposit rates. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Two-way bank and quarter-year clustered standard errors are reported in parentheses.

Table 10: GDP Growth and State Deposit Rate

Δln(GDP)	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead
Rate	-0.0010***	-0.0011***	-0.0005**	-0.0031*	-0.0047**	-0.0069***
	(0.0002)	(0.0002)	(0.0002)	(0.0017)	(0.0018)	(0.0020)
State FE	✓	✓	✓	✓	✓	✓
Quarter-Year FE				✓	✓	✓
N	3,040	2,836	2,632	3,040	2,836	2,632
R^2	0.0169	0.0175	0.0121	0.6802	0.7035	0.7201

Notes: This table presents the relation between state deposit rates and economic activity. The table presents the results from estimating an OLS model of the change in economic activity in county s in quarter-year $t+k$ as a function of the average deposit rate within a county at quarter-year t. We consider up to twelve-quarter (k = 4, 8, 12) lead indicators of economic activity. The regression specification is the following: $\Delta ln(GDP)_{s,t+k} = \beta_1 \cdot Rate_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t}$ where $\Delta ln(GDP)$ denotes GDP growth. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The independent variable is standardized. The sample period is from 2005Q1 through 2020Q4. The analysis is restricted to single-state banks. State clustered standard errors are reported in parentheses.

Table 11: Deposit Rates Predict State Recessions

$\mathbb{1}_{Recession}$	(1)	(2)	(3)
	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead
Rate	0.0240***	0.0250***	0.0146***
	(0.0034)	(0.0039)	(0.0037)
State FE	✓	✓	✓
N	3,040	2,836	2,632
pseudo R^2	0.0829	0.0849	0.0562
AUC	0.7393	0.7291	0.6864
Overall test statistic, χ^2	126.0803	97.2976	60.8829
p-value	0.0000	0.0001	0.1619

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a state recession in state s at time (quarter-year) $t+k$: $logit(p_{s,t+k}) = \beta_0 + \beta_1 Rate_{s,t} + \beta_2 Rate_{s,t} + \alpha_c + \epsilon_{s,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, *Rate* denotes the average bank deposit rate, t denotes the current year, and k denotes the number of leading quarters ($k = 4, 8, 12$). A state is in a recession if its GDP growth between two consecutive quarters is below -2%. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The independent variable is standardized. The sample period is from 2005Q1 through 2020Q4. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table 12: Deposit Rate Predicts Recessions after Accounting for Deposit Growth

Panel A: Deposit Growth

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Δ ln(Deposit)	-0.1467***	0.0043	0.0986*
	(0.0504)	(0.0505)	(0.0515)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0750	0.0724	0.0738
AUC	0.6981	0.6823	0.6913
Overall test statistic, χ^2	267.6699	240.1727	236.2742
p-value	0.1749	0.5029	0.5377

Panel B: Deposit Rate and Growth

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0242***	0.0544***	0.0469***
	(0.0049)	(0.0053)	(0.0058)
Δ ln(Deposit)	-0.0200***	-0.0051	0.0078
	(0.0063)	(0.0060)	(0.0062)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0805	0.1023	0.0952
AUC	0.7037	0.7302	0.7229
Overall test statistic, χ^2	301.1634	384.4420	314.1366
p-value	0.0118	0.0000	0.0009

Notes: The table presents the average marginal effects of the covariates estimated from the following logit models of a county recession in county c at time (year) $t+k$ in metro counties. In Panel A, we estimate $logit(p_{c,t+k}) = \beta_0 + \beta_1 \cdot \Delta ln(Deposit)_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$. In Panel B, we estimate $logit(p_{c,t+k}) = \beta_0 + \beta_1 \cdot \Delta Rate_{c,t} + \beta_2 \cdot \Delta ln(Deposit)_{c,t} + \alpha_c + \epsilon_{c,t+k}$. $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, $\Delta ln(Deposits)$ denotes deposit growth, t denotes the current year, and k denotes the number of leading years ($k = 1,2,3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. The independent variables are standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table 13: Horse Race: State Deposit Rate vs. Other Leading Indicators

Panel A: Univariate

Δln(GDP)	8 Qtrs Ahead	8 Qtrs Ahead	8 Qtrs Ahead	8 Qtrs Ahead
Rate	-0.0020***			
	(0.0003)			
ln(Auto Sales)		-0.0026		
		(0.0017)		
ln(UI Claims)			0.0008	
			(0.0011)	
ln(Job Openings)				-0.0043***
				(0.0012)
State FE	✓	✓	✓	✓
N	2,224	2,224	2,224	2,224
R^2	0.0603	0.0377	0.0365	0.0431

Panel B: Multivariate

Δln(GDP)	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead
Rate	-0.0014***	-0.0019***	-0.0011***
	(0.0003)	(0.0004)	(0.0004)
ln(Auto Sales)	0.0063***	0.0034	-0.0112***
	(0.0023)	(0.0030)	(0.0030)
ln(UI Claims)	-0.0038**	-0.0037*	-0.0011
	(0.0016)	(0.0021)	(0.0020)
ln(Job Openings)	-0.0098***	-0.0082***	0.0058***
	(0.0023)	(0.0019)	(0.0018)
State FE	✓	✓	✓
N	2,428	2,224	2,020
R^2	0.0587	0.0692	0.0507

Notes: This table presents the relation between state deposit rates and economic activity. Panel A presents the results from estimating an OLS model of the change in economic activity in county s in quarter-year $t+8$ as a function of the average deposit rate within a county at quarter-year t. We consider eight-quarter lead indicators of economic activity. The regression specification is the following: $\Delta ln(GDP)_{s,t+8} = \beta_1 \cdot X_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t}$ where $\Delta ln(GDP)$ denotes GDP growth. X denotes the independent variable at the state-quarterly frequency - the average deposit rate in column 1, natural-log of auto sales in column 2, natural-log of the number of unemployment insurance claims in column 3, and natural-log of the number of job openings in column 4. Panel B presents the results from estimating an OLS model of the change in economic activity in county s in quarter-year $t+k$ as a function of the average deposit rate within a county at quarter-year t. We consider up to twelve-quarter (k = 4, 8, 12) lead indicators of economic activity. The regression specification is the following: $\Delta ln(GDP)_{s,t+k} = \beta_1 \cdot Rate_{s,t} + \beta_2 \cdot ln(\text{Auto Sales})_{s,t} + \beta_3 \cdot ln(\text{UI Claims})_{s,t}) + \beta_4 \cdot ln(\text{Job Openings})_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t}$ where $\Delta ln(GDP)$ denotes GDP growth. *Rate* denotes the average bank deposit rate. ln(Auto Sales) denotes the natural-log of auto sales. ln(UI Claims) denotes the natural-log of the number of unemployment insurance claims. ln(Job Openings) denotes the natural-log of the number of job openings. The state deposit rate is then constructed as the weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP. The independent variables are standardized. The sample period is from 2005Q1 through 2017Q4. State clustered standard errors are reported in parentheses.

For Online Publication:

Canary in the Coal Mine: Bank Liquidity Shortages and Local Economic Activity

Appendix A Data Appendix

This project employs several datasets. We describe the sources in detail below.

Deposit Rates We use data on deposit rates from S&P Ratewatch. S&P Ratewatch provides depository interest rate coverage on banks and credit unions in the US for more than 70 standard retail banking products, ranging from deposit products to consumer loan and mortgages at the weekly frequency. Deposit rates are available at a granular geographic level with zip code, county, and state identifiers. We focus on the deposit rates for 12-month certificates of deposit ($10K 12-month CDs) with a minimum account size of $10,000 because this is the most common deposit product. Our sample period is 2001 through 2020. Our dataset covers 8,361 distinct banks and 2,897 distinct counties (approximately 90% of all US counties).

Gross Domestic Product We obtain Gross Domestic Product (GDP) data from the Bureau of Economic Analysis (BEA) at the county, state, and national levels. GDP is the BEA's National Income and Product Accounts signature piece, measuring the value of the nation's output across various dimensions. The BEA estimates GDP at the national level for each quarter-year from 1947Q1. This data is reported at annual rates, for ease of comparison and is seasonally adjusted to remove the effects of yearly patterns such as holidays, inclement weather or factory production schedules. The BEA estimates the value of goods and services produced in each state (and DC), county, metropolitan areas and other statistical areas. State GDP data is available at the quarterly frequency from 2005Q1. County GDP data is available at the annual frequency from 2001.

Business Formation We use data on annual new business applications by county from the US Census Business Formation Statistics (BFS). The BFS measures business initiation activity as indicated by applications for an employee identification number (EIN). All requests for an EIN are accounted for except for those related to tax liens, estates, trusts, certain financial filings, applications lacking state-county geocodes, applications with specific NAICS codes in sectors 11 (agriculture, forestry, fishing and hunting) or 92 (public administration) that have low transition rates, and applications in particular industries such as private households and civic and social organizations. The county BFS data is available at the annual frequency from 2005.

Mortgage Delinquency We collect data on early stage delinquencies at the county level from the National Mortgage Database, conducted in collaboration with the Federal Housing Finance Agency (FHFA). The 30-89 day mortgage delinquency rate serves as an early indicator of the overall health of the mortgage market, capturing borrowers who have missed one or two payments. According to the Consumer Financial Protection Bureau (CFPB), this rate is sensitive to temporary economic shocks. To add to our analysis, we supplement this data with data on the 90-day delinquency rate, which measures serious delinquencies, capturing borrowers who have missed three or more payments. This particular measure reflects more severe economic distress. Mortgage delinquency data is available at the annual frequency from 2008.

Supplementary Measure of Economic Activity We use data on unemployment rates across counties from the Bureau of Labor Statistics (BLS). The BLS provides monthly estimates of total employment and unemployment for over 7,600 areas. We use annual unemployment rate data at the county level as an alternative measure of local economic conditions to GDP growth. We also use data on the consumer price index (CPI) for metro areas from the Bureau of Labor Statistics (BLS). The BLS reports the monthly estimates of CPI for 23 metro areas. We use the annual CPI data for these metro counties.

Bank Balance Sheet, Income Statements and Deposits Data We extract bank balance sheet and income statement information from the Reports of Condition and Income (Call Reports) sourced from the Federal Reserve Bank of Chicago. This data is provided for most FDIC-insured institutions and is reported at the quarterly frequency from 1976. The data of all bank filings are regulated by the Federal Reserve System, FDIC, and the Comptroller of the Currency. We supplement data from the call reports using quarterly data on banks' insured and uninsured deposits from the FDIC Statistics on Depository Institutions (SDI). The FDIC SDI reports the total volume of insured and uninsured deposits and insured deposits for all FDIC insured banks. We also utilize data on branch-level bank deposits sourced from the FDIC. The FDIC conducts an annual survey, covering all FDIC-insured institutions. The *Summary of Deposits* gathers branch-specific information, including total deposits and parent bank details as of June 30th of each year. In addition, we use quarterly data on non-performing loans from S&P Market Intelligence. Our sample ranges from 2001 through 2020.

Small Business Lending and Mortgage Lending We use data on small business lending, collected under the Community Reinvestment Act (CRA). The CRA is intended to demonstrate whether depository institutions to meet the credit needs of communities in which they operate, including low- and moderate-income neighborhoods. A small business loan is defined as a commercial & industrial loan of $1 million or less. All FDIC- and Federal Reserve-supervised financial institutions are subject to CRA requirements if they have assets above a prespecified threshold in two of the previous calendar years. Banks report the number and dollar amounts of lending across loan, applicant, and geographic characteristics. We use data on mortgage lending, collected under the Home Mortgage Disclosure Act (HMDA). The HMDA is intended to demonstrate whether lenders are serving the housing needs of their communities. Financial institutions are required to collect, record, and report any HMDA data on closed-end mortgage loans or open-end lines of credit above prespecified thresholds in two of the previous calendar years. Banks report the number and dollar amounts of lending across loan, applicant, and geographic characteristics. We aggregate the CRA and HMDA data to the bank $\times$ county $\times$ year level between 2001 and 2020.

Natural Disaster and Fracking We use data on natural disasters from the Spatial Hazard Events and Losses Database for the United States (SHELDUS). SHELDUS provides detailed data on losses at the county level. SHELDUS sources information on natural disasters from the "Storm Data and Unusual Weather Phenomena" published by the National Climatic Data Center (NCDC). We restrict our sample to large natural disasters that last fewer than 31 days with total damages above $1 bn 2018 dollars. The SHELDUS disaster dataset spans from 1960 through 2018. We use data on horizontal wells from Enverus (DrillingInfo), which offers comprehensive analytics on oil and gas. The database includes historical and current information on various well-related data, such as well type, well construction, active rig locations, well-level production, leases, units, permits, completions, and well logs, for a wide range of wells, including oil, gas, and geothermal wells. The Enverus dataset is available from 1994.

Shipping Costs We use data on shipping costs and a vector of control variables at the commuting zone level from Barrot et al. (2022). The authors measure the exposure of an industry to import competition using the 1998 physical shipping costs obtained from import data. A CZ's exposure to import competition is constructed by combining the industry shipping costs with the industry composition in each commuting zone, expressed in labor share. Controls include total employment, the share of manufacturing employment, total income, logarithm of total debt, the 1991-1999 change in loan originations, and the 1991-1999 change in net Chinese import penetration, as well as quintiles of the change in house prices between 1999 and 2007. The sample period for our analysis is 2001 through 2007.

Other Financial Data We use data on spreads on credit default swaps and equity prices for a subset of banks. The high-frequency data on CDS spreads is obtained from Markit, while equity returns are sourced from CRSP. To combine these datasets and identify the common set of banks present in both the CDS and equity data, we perform a manual merge.

Other Leading Economic Indicators We supplement our baseline analysis with other leading indicators of local business cycle fluctuations at the state level. These indicators include state auto sales, unemployment claims, and job openings. Data on auto sales comes from from RL Polk, which reports zip code-monthly data. Data on state monthly unemployment claims comes from the Department of Labor. Data on state job openings comes from the Bureau of Labor Statistics.

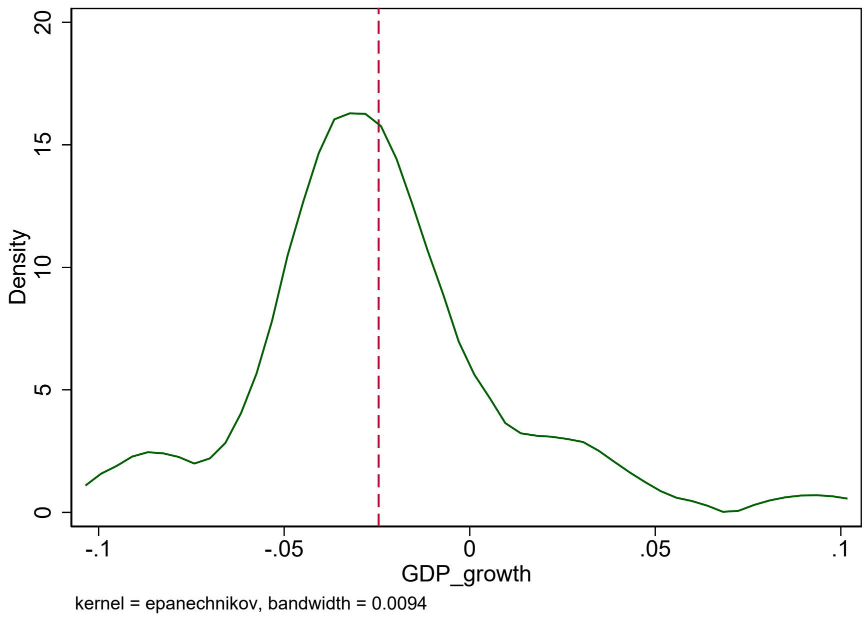
Rural-Urban Continuum Codes We use data on Rural-Urban continuum codes from the US Department of Agriculture Economic Research Service (USDA ERS). The Rural-Urban Continuum Codes are a classification scheme that distinguishes metropolitan counties by population size of their metropolitan area and non-metropolitan counties by the degree of urbanization and adjacency to a metropolitan county. There are three categories of metropolitan counties and six categories of non-metropolitan counties. The Rural-Urban Continuum Codes were developed in 1974 and have been updated each decennial (1983, 1993, 2003, 2013) with a slight revision in 1988. We use the 1993 Rural-Urban Codes and identify metro counties as counties that report a Rural-Urban Code of 0 or 1.

Bank Failures We retrieve the list of failed banks from the Federal Deposit Insurance Corporation (FDIC). The Failed Bank List includes banks which have failed since October 1, 2000. The dataset reports the bank name, location, acquiring institution, closing date, and insurance fund number. A bank failure refers to the closure of a bank by a federal or state banking regulatory authority. Typically, a bank is closed down when it becomes incapable of fulfilling its obligations to depositors and other stakeholders. We examine bank failures from 2008 to 2012; there were 25 bank failures in 2008, 140 in 2009, 157 in 2010, 92 in 2011, and 51 in 2012.

Business Cycle Expansions and Contractions We use data on business cycles from the National Bureau of Economic Research (NBER) US Business Cycle Expansions and Contractions. The NBER's Business Cycle Dating Committee maintains a chronology of US business cycles, identifying the peak and trough months of economic activity. The NBER defines a recession as a decline in economic activity that is spread across the economy and lasts more than a few months. There are three criteria used to determine a recession – depth, diffusion, and duration, albeit, exceptional circumstances in one criteria can partially offset weaker indications from other criteria. We highlight recessions between 2001 and 2020 throughout our analysis.

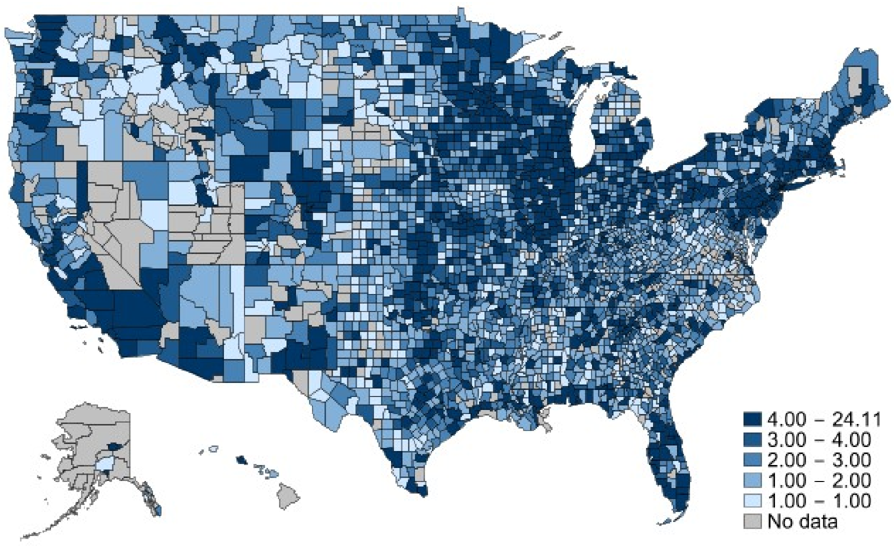
Appendix B Figures and Tables

Figure B.1: Density of State GDP Growth in 2009



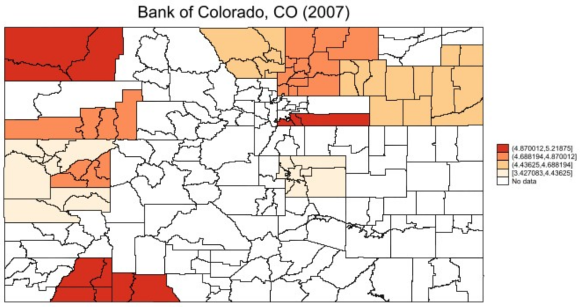
Notes: This figure presents the kernel density of state GDP growth in 2009. The average state GDP growth was -2.45%, as demarcated by the dashed, red line.

Figure B.2: Number of Banks per County (2001-2020)

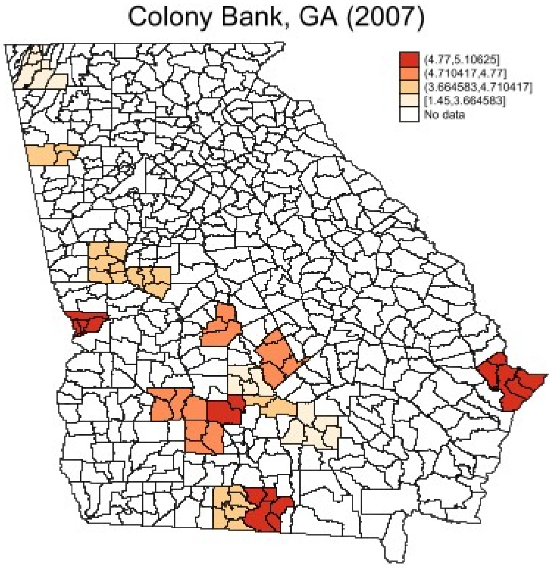


Notes: This figure presents a heatmap of the average number of banks that offer 12-month certificates of deposit of at least $10,000 in each county from 2001 to 2020. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the total number of banks in each county for each month is computed. Then, the mean number of banks is computed across the sample period. The intensity of the blue shading represents the number of banks operating in a particular county.

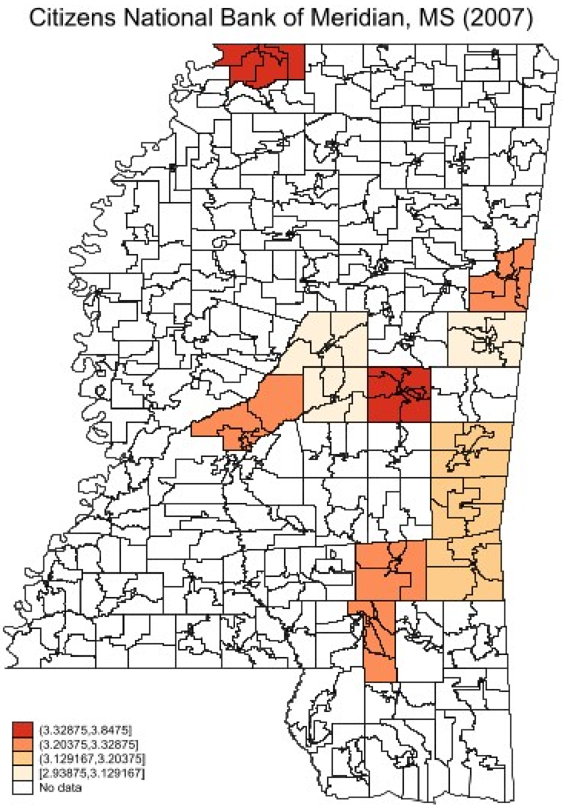
Figure B.3: Bank Deposit Rates: 2007



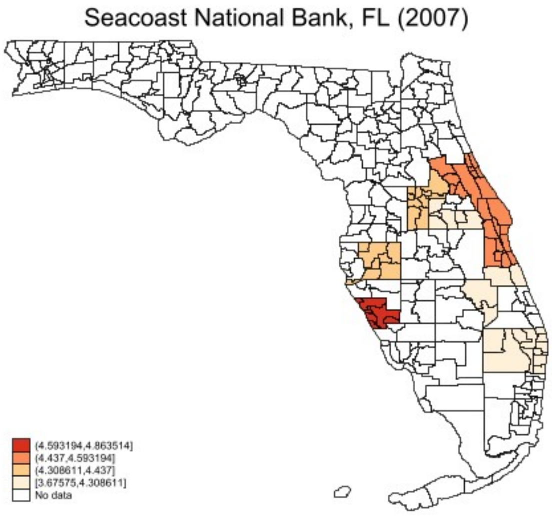
(a) Bank of Colorado



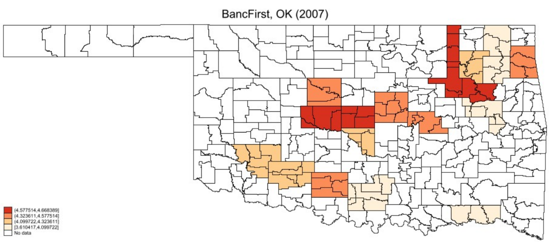
(b) Colony Bank



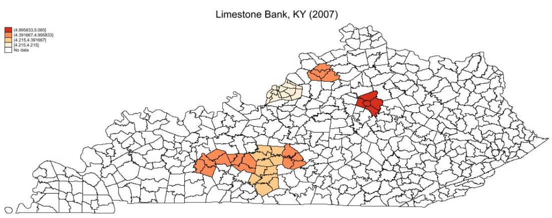
(c) Citizens National Bank of Meridian



(d) Seacoast National Bank



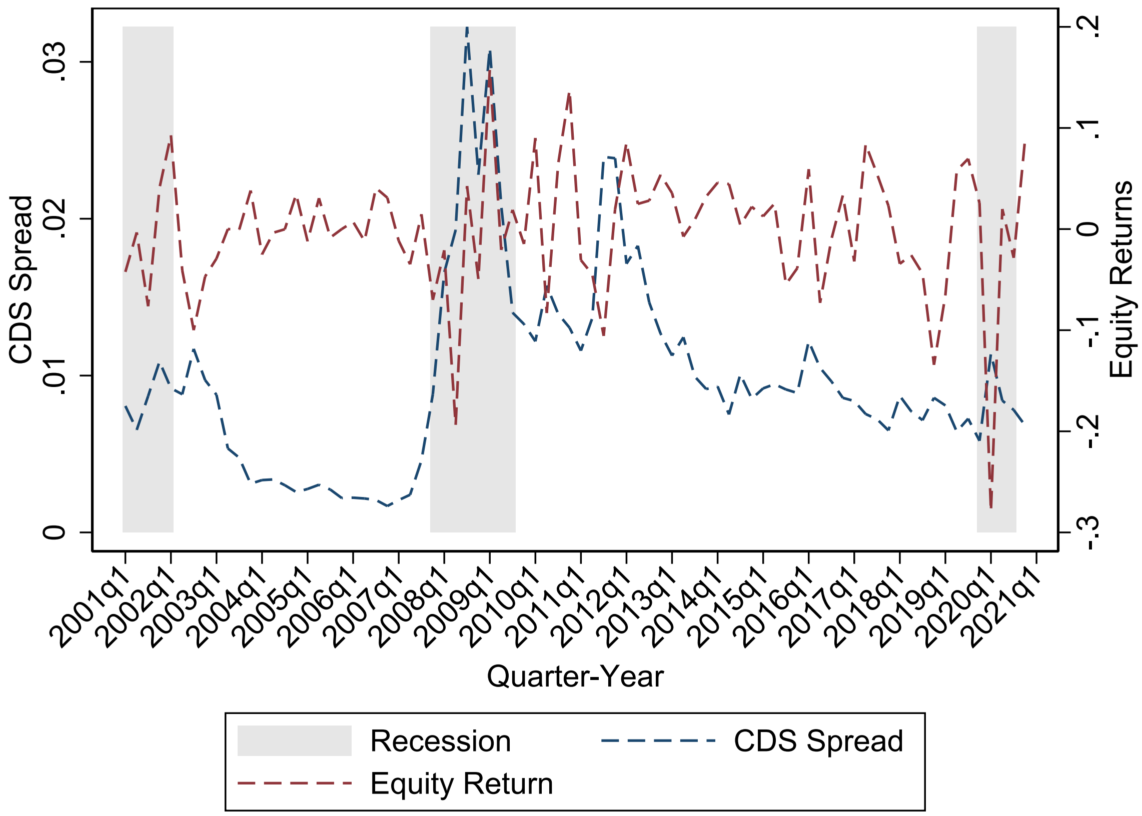
(e) BancFirst (OK)



(f) Limestone Bank

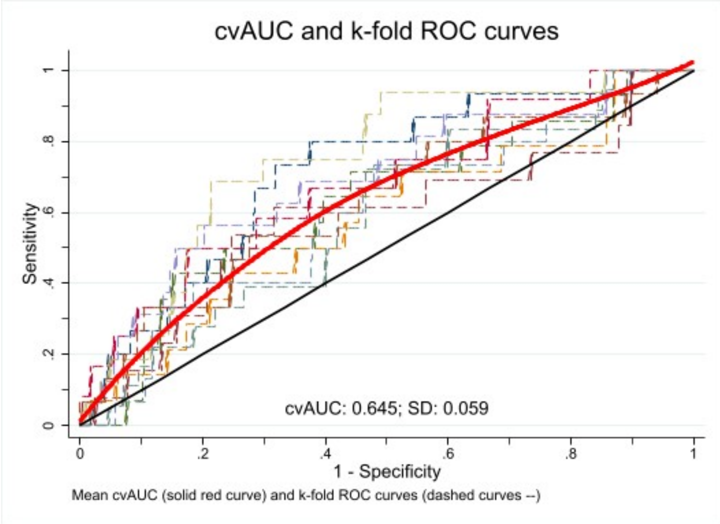
Notes: This figure uses RateWatch data to present a heatmap of county deposit rates (12-month, \$10K CDs) in 2007. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the annual bank deposit rate in each county is computed as the average of the monthly bank-county deposit rates in each year. Heatmaps of the deposit rates are presented for the following banks in 2007: Bank of Colorado (Appendix Figure B.3a), Colony Bank (Appendix Figure B.3b), Citizens National Bank of Meridian Bank (Appendix Figure B.3c), Seacoast National Bank (Appendix Figure B.3d), BancFirst (Appendix Figure B.3e), and Limestone Bank (Appendix Figure B.3f). The deposit rate is the rate on the 12-month certificate of deposit of at least \$10,000. The intensity of the blue shading represents the quantile range of the deposit rate.

Figure B.4: CDS Spreads and Equity Returns

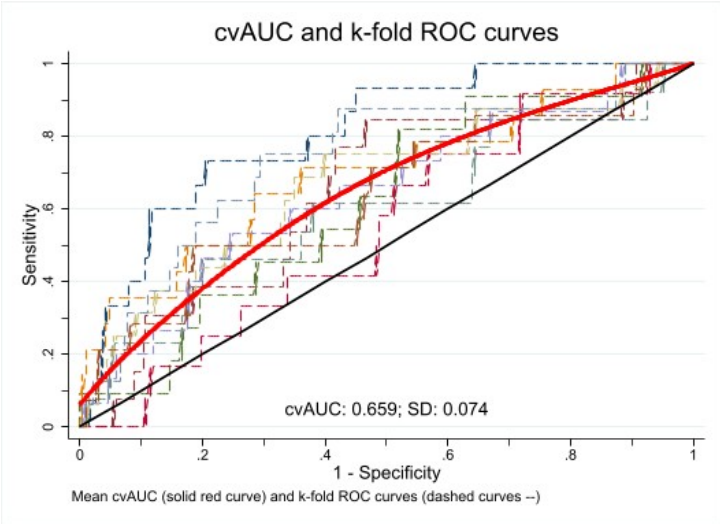


Notes: This figure presents a time-series plot of the quarterly average credit default swap spread and quarterly equity returns for a subset of banks that issue both equity and credit default swaps. The left y-axis indicates CDS spreads. The rigth y-axis indicates equity returns. The gray bars indicate national recessions, according the NBER Business Cycle Dating Committee. The data is at the quarterly frequency and spans from 2001Q1 through 2020Q4. The analysis is restricted to single-state banks.

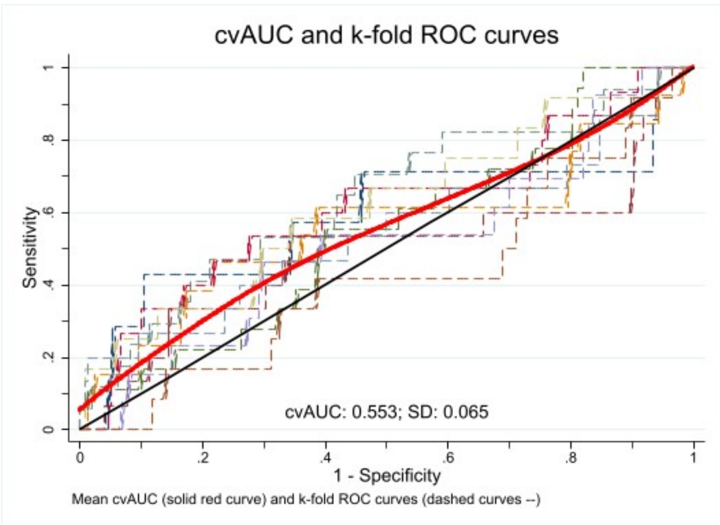
Figure B.5: Out-of-Sample Estimation: Deposit Rates Predict State Recessions



(a) Recession in 4 Quarters



(b) Recession in 8 Quarters



(c) Recession in 12 Quarters

Notes: This figure presents the k-fold cross-validated ROC curves and AUC. The dataset is partitioned into k subsamples of equal size. $k-1$ subsamples are used as the training set while one subsample is retained as the validation or testing set in the AUC is evaluated. The AUC iteratively k times, so that each of the k subsamples is used as the testing set once. Each fold is analyzed using the following logistic regression: $logit(p_{c,t+k}) = \beta_0 + \beta_1 Rate_{c,t} + \alpha_c + \epsilon_{c,t}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, *Rate* denotes the average bank deposit rate. We assume that $\epsilon_{c,t}$ is well-behaved. We consider up to 12-quarter (k = 4, 8, 12) lead indicators of economic activity. The cross-validated AUCs are averaged from each fold. 10 folds are used to produce these figures. Figure B.5a, Figure B.5b, and Figure B.5c reports the cross-validated AUCs using the 4-quarter, 8-quarter, 12-quarter forecast classifiers. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks.

Table B.1: Economic Activity and Deposit Rate with GDP Lags

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0012	-0.0044***	-0.0038***	-0.0051	-0.0099***	-0.0141***
	(0.0009)	(0.0009)	(0.0007)	(0.0039)	(0.0036)	(0.0040)
L1.Δ ln(GDP)	-0.0026*	-0.0069**	-0.0088***	-0.0035**	-0.0092***	-0.0094***
	(0.0015)	(0.0027)	(0.0023)	(0.0017)	(0.0027)	(0.0023)
L2.Δ ln(GDP)	-0.0069***	-0.0080***	-0.0047***	-0.0087***	-0.0091***	-0.0038***
	(0.0025)	(0.0022)	(0.0013)	(0.0025)	(0.0022)	(0.0014)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	3,763	3,497	3,240	3,763	3,497	3,240
R^2	0.1279	0.1574	0.1427	0.2901	0.2999	0.2902

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $\Delta ln(GDP)_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \beta_2 \cdot \Delta ln(GDP)_{c,t-1} + \beta_3 \cdot \Delta ln(GDP)_{c,t-2} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta ln(GDP)$ denotes GDP growth. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.72% from 2001 through 2020. The independent variables are standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.2: Additional Measures of Economic Activity and Deposit Rate

Panel A: Unemployment Rate

Unemp. Rate	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0940***	0.5314***	1.0450***
	(0.0219)	(0.0236)	(0.0273)
County FIPS FE	✓	✓	✓
N	4,867	4,570	4,302
R^2	0.2705	0.3248	0.4859

Panel B: Late Stage Delinquency Rate

Delinquency Rate (90+ days)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.4468***	0.6700***	0.6388***
	(0.0306)	(0.0326)	(0.0304)
County FIPS FE	✓	✓	✓
N	2,356	2,337	2,146
R^2	0.3579	0.4223	0.4652

Panel C: CPI Growth

CPI (% Chg.)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.1878***	-0.2053***	-0.1123***
	(0.0192)	(0.0222)	(0.0280)
County FIPS FE	✓	✓	✓
N	2,570	2,558	2,424
R^2	0.0565	0.0380	0.0295

Notes: This table presents the relation between county deposit rates and unemployment rates (Panel A),late stage delinquency rates (Panel B), and inflation (Panel C) in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \epsilon_{c,t}$ where Y denotes the unemployment rate in Panel A, the 90+ day mortgage delinquency rate in Panel B, and the annual percentage change in CPI in Panel C. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The average unemployment rate, delinquency rate, and annual CPI growth is 5.85%, 2.26%, and 1.94%, respectively, for metro counties from 2001 to 2020. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.3: Economic Activity and Deposit Rate: 1-Month CD

Panel A: GDP Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0047	-0.0070***	-0.0023**
	(0.0030)	(0.0022)	(0.0010)
County FIPS FE	✓	✓	✓
N	1244	1089	957
R^2	0.1737	0.1972	0.1531

Panel B: Business Formation

ln(Applications)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0493***	-0.0444***	-0.0585***
	(0.0056)	(0.0072)	(0.0065)
County FIPS FE	✓	✓	✓
N	1,332	1,173	1,043
R^2	0.9779	0.9780	0.9780

Panel C: Delinquency Rate

Delinquency Rate (30-89 days)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.4292***	0.3703***	0.3651***
	(0.0388)	(0.0394)	(0.0371)
County FIPS FE	✓	✓	✓
N	1049	988	877
R^2	0.6335	0.6178	0.6409

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, natural-log transformed number of new business applications in Panel B, and the 30-89 day mortgage delinquency rate in Panel C. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 1-month certificate of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.4: GDP Growth and Different Deposit Contracts

Δln(GDP)	1-Month	6-Month	12-month	24-Month	Uninsured
Rate	-0.0130***	-0.0115***	-0.0124***	-0.0122***	-0.0118***
	(0.0041)	(0.0021)	(0.0021)	(0.0022)	(0.0020)
County FIPS FE	✓	✓	✓	✓	✓
N	944	944	944	944	944
R^2	0.2512	0.2704	0.2836	0.2833	0.2804

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+2$ as a function of the average deposit rate within a county at year t. The regression specification is the following: $\Delta ln(GDP)_{c,t+2} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta ln(GDP)$ denotes GDP growth. *Rate* denotes the average bank deposit rate on 1-month certificates of deposit of at least $10,000 in column 1, 6-month certificates of deposits of at least $10,000 in column 2, 12-month certificates of deposits of at least $10,000 in column 3, 24-month certificates of deposits of at least $10,000 in column 4, and uninsured 12-month certificates of deposit of at least $100,000 from 2001 through September of 2008, and at least $250,000 thereafter. We restrict the sample to counties that report all of these rates. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.5: Economic Activity and Deposit Rate: 2010-2015

Panel A: Unemployment Rate

Unemp. Rate	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	7.2242***	6.9442***	6.4290***
	(0.2283)	(0.2269)	(0.2000)
County FIPS FE	✓	✓	✓
N	1,477	1,457	1,442
R^2	0.7060	0.7262	0.7616

Panel B: Late Stage Delinquency Rate

Delinquency Rate (90+ days)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	2.2136***	2.4790***	1.9962***
	(0.1067)	(0.1193)	(0.1093)
County FIPS FE	✓	✓	✓
N	1,088	1,078	1,069
R^2	0.7470	0.7709	0.7704

Notes: This table presents the relation between county deposit rates and unemployment rates in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t + k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \epsilon_{c,t}$ where Y denotes the unemployment rate in Panel A and the 90+ day mortgage delinquency rate in Panel B. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The average unemployment rate and average late stage delinquency rate is 7.26% and 3.13%, respectively, for metro counties from 2010 to 2015. The independent variable is standardized. The sample period is from 2010 through 2015. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.6: Economic Activity, Deposit Rate, and Share of Large Banks

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0017	-0.0055***	-0.0056***	-0.0032	-0.0078**	-0.0149***
	(0.0010)	(0.0010)	(0.0011)	(0.0034)	(0.0034)	(0.0040)
$\mathbb{1}_{\text{Share of Large Banks} \leq P25} \times$Rate	0.0018	0.0054	0.0080**	0.0014	0.0057	0.0080*
	(0.0060)	(0.0059)	(0.0040)	(0.0061)	(0.0060)	(0.0043)
$\mathbb{1}_{P25 < \text{ Share of Large Banks} \leq P50} \times$Rate	0.0004	0.0014	0.0037**	-0.0001	0.0011	0.0033**
	(0.0016)	(0.0016)	(0.0015)	(0.0016)	(0.0016)	(0.0015)
$\mathbb{1}_{P50 < \text{Share of Large Banks} \leq P75} \times$Rate	0.0008	0.0012	0.0019	0.0002	0.0006	0.0014
	(0.0018)	(0.0016)	(0.0014)	(0.0018)	(0.0016)	(0.0014)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,578	4,292	4,029	4,578	4,292	4,029
R^2	0.1070	0.1204	0.1205	0.2669	0.2766	0.2817

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $\Delta ln(GDP)_{c,t+k} = \beta_1 \cdot Rate_{c,t} \times \mathbb{1}_{\text{Share of Large Banks} \leq P25} + \beta_2 \cdot Rate_{c,t} \times \mathbb{1}_{P25 < \text{Share of Large Banks} \leq P50} + \beta_3 \cdot Rate_{c,t} \times \mathbb{1}_{P50 < \text{Share of Large Banks} \leq P75} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta ln(GDP)$ denotes GDP growth. *Rate* denotes the average bank deposit rate, and $\mathbb{1}_{\text{Share of Large Banks} \leq P25}$, $\mathbb{1}_{P25 < \text{Share of Large Banks} \leq P50}$, and $\mathbb{1}_{P50 < \text{Share of Large Banks} \leq P75}$ denote whether the county's share of non-single state ("'large") banks is in the first, second, or third quartiles, respectively. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.72% from 2001 through 2020. The *Rate* variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.7: Economic Activity and Deposit Rate: All Banks

Panel A: GDP Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0015**	-0.0047***	-0.0041***	-0.0049	-0.0078**	-0.0155***
	(0.0007)	(0.0007)	(0.0006)	(0.0032)	(0.0038)	(0.0044)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	5,268	4,972	4,681	5,268	4,972	4,681
R^2	0.1103	0.1261	0.1222	0.2737	0.2841	0.2861

Panel B: Business Formation

ln(Applications)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0525***	-0.0599***	-0.0798***	-0.0263	-0.0425*	-0.0575***
	(0.0032)	(0.0031)	(0.0033)	(0.0181)	(0.0228)	(0.0219)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,498	4,198	3,897	4,498	4,198	3,897
R^2	0.9794	0.9794	0.9802	0.9928	0.9930	0.9930

Panel C: Delinquency Rate

Delinquency Rate (30-89 days)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.4508***	0.3930***	0.3265***	0.0709*	0.0997**	0.0917*
	(0.0146)	(0.0145)	(0.0143)	(0.0384)	(0.0444)	(0.0478)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	2,622	2,610	2,403	2,622	2,610	2,403
R^2	0.6039	0.5692	0.5738	0.9281	0.9247	0.9217

Notes: This table presents the relation between county deposit rates and economic activity in metro counties, inclusive of all banks. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, natural-log of the number of new business applications in Panel B, and the 30-89 day mortgage delinquency rate in Panel C. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.72%, average log-transformed # of applications is 7.74%, and average early-stage delinquency rate is 2.50% for metro counties from 2001 through 2020. The independent variable is standardized. The sample period is from 2001 through 2020. County clustered standard errors are reported in parentheses.

Table B.8: Economic Activity and Deposit Rate: Excluding Failed Banks

Panel A: GDP Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0015**	-0.0047***	-0.0041***	-0.0050	-0.0077**	-0.0154***
	(0.0007)	(0.0007)	(0.0006)	(0.0033)	(0.0038)	(0.0044)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	5,268	4,972	4,681	5,268	4,972	4,681
R^2	0.1103	0.1261	0.1222	0.2738	0.2841	0.2861

Panel B: Business Formation

ln(Applications)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0525***	-0.0598***	-0.0797***	-0.0242	-0.0404*	-0.0557**
	(0.0032)	(0.0031)	(0.0033)	(0.0180)	(0.0226)	(0.0217)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,498	4,198	3,897	4,498	4,198	3,897
R^2	0.9794	0.9794	0.9802	0.9928	0.9930	0.9930

Panel C: Delinquency Rate

Delinquency Rate (30-89 days)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.4668***	0.4067***	0.3377***	0.0686*	0.0975**	0.0878*
	(0.0152)	(0.0151)	(0.0148)	(0.0395)	(0.0453)	(0.0488)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	2,622	2,610	2,403	2,622	2,610	2,403
R^2	0.6034	0.5687	0.5732	0.9280	0.9246	0.9216

Notes: This table presents the relation between county deposit rates and economic activity in metro counties, excluding the sample of failed banks. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, natural-log of the number of new business applications in Panel B, and the 30-89 day mortgage delinquency rate in Panel C. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.72%, average log-transformed # of applications is 7.74%, and average early-stage delinquency rate is 2.50% for metro counties from 2001 through 2020. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.9: Economic Activity and Deposit Rate: 2006

Panel A: GDP Growth

$\Delta ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0162**	-0.0158**	-0.0025
	(0.0065)	(0.0062)	(0.0068)
N	241	242	239
R^2	0.0168	0.0181	0.0005

Panel B: CPI Growth

CPI (% Chg.)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0668	-0.3187**	-0.6433***
	(0.1328)	(0.1255)	(0.1610)
N	124	123	124
R^2	0.0011	0.0498	0.0820

Notes: This table presents the relation between county deposit rates in 2006 and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A and the annual percentage change in CPI in Panel B. *Rate* denotes the average bank deposit rate. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variable is standardized. County clustered standard errors are reported in parentheses.

Table B.10: Uninsured Deposit Rates Predict County Recessions

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0453***	0.0759***	0.0385***
	(0.0087)	(0.0108)	(0.0127)
County FIPS FE	✓	✓	✓
N	1,979	1,677	1,500
pseudo R^2	0.1026	0.1119	0.0868
AUC	0.7317	0.7403	0.7086
Overall test statistic, χ^2	180.4015	171.1807	114.3634
p-value	0.7656	0.8051	1.0000

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ in metro counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 Rate_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, *Rate* denotes the average bank deposit rate, t denotes the current year, and k denotes the number of leading years ($k = 1,2,3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. The deposit rate is the rate on uninsured 12-month certificates of deposit of at least $100,000 from 2001 through September of 2008, and at least $250,000 thereafter. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.11: Deposit Rates Predict County Recessions: Urban and Rural

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0051**	0.0226***	0.0096***
	(0.0025)	(0.0026)	(0.0027)
County FIPS FE	✓	✓	✓
N	31,082	28,983	27,044
pseudo R^2	0.0741	0.0754	0.0740
AUC	0.6828	0.6844	0.6814
Overall test statistic, χ^2	2254.0163	2226.0640	2014.4377
p-value	0.0000	0.0000	0.0001

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ in metro counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 Rate_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, *Rate* denotes the average bank deposit rate, t denotes the current year, and k denotes the number of leading years ($k = 1,2,3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.12: Deposit Rates Predict County Recessions: All Counties

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0076***	0.0272***	0.0150***
	(0.0023)	(0.0024)	(0.0025)
County FIPS FE	✓	✓	✓
N	35,438	33,038	30,854
pseudo R^2	0.0800	0.0825	0.0803
AUC	0.6919	0.6944	0.6908
Overall test statistic, χ^2	2705.3303	2744.4082	2460.0860
p-value	0.0000	0.0000	0.0000

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ for all counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 Rate_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, *Rate* denotes the average bank deposit rate, t denotes the current year, and k denotes the number of leading years ($k = 1, 2, 3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.13: Change in Deposit Rate and Bank Characteristics in 2007 and 2008

Δ ln(Rate)	(1)	(2)
	2007	2008
ln(Assets)	-0.0100***	-0.0128***
	(0.0019)	(0.0037)
Equity/Assets	-0.0024	0.0081***
	(0.0016)	(0.0026)
Cash/Assets	0.0100***	-0.0042
	(0.0035)	(0.0061)
Deposits/Assets	-0.0035*	-0.0314***
	(0.0021)	(0.0045)
Loan/Assets	0.0130***	0.0286***
	(0.0045)	(0.0089)
Hedging/Assets	0.0003	0.0035
	(0.0013)	(0.0037)
Dividends/Assets	-0.0020	-0.0166***
	(0.0014)	(0.0027)
Income/Assets	-0.0090***	-0.0238***
	(0.0028)	(0.0050)
Securities/Assets	0.0146***	0.0148*
	(0.0043)	(0.0086)
LLLP/Assets	0.0146***	0.0148*
	(0.0043)	(0.0086)
Constant	-0.0603***	-0.4946***
	(0.0037)	(0.0073)
N	5,255	5,325
R^2	0.0149	0.0481

Notes: The dependent variable is the change in the average bank deposit rate between 2006 and 2007 in column (1): $ln(\text{Dep. Rate})_{b,2007}$. The dependent variable is the change in the average bank deposit rate between 2007 and 2008 in column 2: $ln(\text{Dep. Rate})_{b,2008}$. The independent variables are Bank Characteristics$_b$ reported in 2006 in column 1 and Bank Characteristics$_b$ reported in 2007. These variables include the natural-log of total bank assets, the average loan balance divided by total assets, the total equity divided by total assets, the total cash holdings divided by total bank assets, the total deposits divided by total assets, the net derivatives contracts held for hedging divided by total assets, the total dividend on common stocks divided by total assets, the operating income divided by total assets, the total securities divided by total assets, the total loan lease loss provisions divided by total assets. Column (1) uses all the bank characteristics mentioned above. The independent variables are standardized. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.14: GDP Growth and the Dispersion of Deposit Rates

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Dispersion	-0.0040***	-0.0050***	-0.0048***
	(0.0008)	(0.0008)	(0.0010)
County FIPS FE	✓	✓	✓
N	3,381	3,193	3,015
R^2	0.1114	0.1267	0.1224

Notes: This table presents the relation between the dispersion of county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot SD_{c,t} + \alpha_c + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, new business formation in Panel B, and the delinquency rate in Panel C. SD denotes the dispersion of county deposit rates. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the dispersion (standard deviation) of deposit rates across banks for each county in each month is computed. The annual county dispersion of deposit rates is the county dispersion in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.15: Dispersion of Deposit Rates Predicts County Recessions

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Dispersion	0.0447***	0.0729***	0.0604***
	(0.0063)	(0.0072)	(0.0074)
County FIPS FE	✓	✓	✓
N	3,170	2,959	2,801
pseudo R^2	0.0864	0.1180	0.0979
AUC	0.7145	0.7579	0.7294
Overall test statistic, χ^2	252.0311	288.2553	243.8795
p-value	0.0492	0.0000	0.0009

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ in metro counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 SD_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, SD denotes the standard deviation of bank deposit rates, t denotes the current year, and k denotes the number of leading years ($k = 1, 2, 3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the dispersion (standard deviation) of deposit rates across banks for each county in each month is computed. The county dispersion of deposit rates is the county dispersion in the last reporting month of each year. The independent variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.16: County Deposit Growth Declines after Natural Disasters

Δ ln(Dep Amt)	t-3	t-2	t-1	t	t+1	t+2	t+3
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\mathbb{1}_{Disaster}$	0.0010	-0.0129	0.0031	0.0223	-0.0521***	-0.0084	-0.0035
	(0.0165)	(0.0167)	(0.0176)	(0.0213)	(0.0132)	(0.0116)	(0.0109)
Bank $\times$ County FE	✓	✓	✓	✓	✓	✓	✓
N	402,770	453,031	510,636	578,629	598,952	548,604	488,958
R^2	0.2202	0.2183	0.2110	0.2062	0.2072	0.1604	0.1478

Notes: This table presents the relation between bank b's deposit growth in county c at time (year) $t+k$ and an indicator for a county recession. The regression specification is the following: $\Delta ln(\text{Dep Amt})_{b,c,t+k} = \beta_0 + \delta_0 \mathbb{1}_{Disaster,c,t} + \alpha_c + \alpha_{b,c} + \epsilon_{b,c,t+k}$ where $\Delta ln(DepAmt)_{b,c,t+k}$ is the change in the total amount of deposits, and k denotes the number of years around the county natural disaster ($k = -3, -2, \ldots, 2, 3$). The sample is restricted to natural disasters that last fewer than 31 days with total damages above \$1 bn 2018 constant dollars. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Two-way county and bank clustered standard errors are reported in parentheses.

Table B.17: Ex Ante Deposit Rate Cannot Predict Disaster-Induced Recessions

$\mathbb{1}_{Recession}$	(1)	(2)	(3)
	1 Year Ahead	2 Years Ahead	3 Years Ahead
$\mathbb{1}_{\text{Disaster}} \times$ Rate $\times$ Shock	-0.1256	0.0173	0.0274
	(0.0869)	(0.0682)	(0.0739)
$\mathbb{1}_{\text{Disaster}} \times$ Rate	0.0963***	0.0806***	0.0520***
	(0.0157)	(0.0166)	(0.0165)
Rate	0.0250***	0.0133***	-0.0071***
	(0.0024)	(0.0025)	(0.0026)
Shock	-0.0500	0.0948	0.3429***
	(0.0729)	(0.0634)	(0.0626)
County FIPS FE	✓	✓	✓
N	32950	30743	28594
pseudo R^2	0.0836	0.0812	0.0795
AUC	0.6957	0.6921	0.6899
Overall test statistic, χ^2	2764.9614	2472.5013	2235.2807
p-value	0.0000	0.0000	0.0001

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ in metro counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 \mathbb{1}_{Disasterc} \times Rate_{c,t} \times Shock_{c,t} + \beta_2 \mathbb{1}_{Disasterc} \times Rate_{c,t} + \beta_3 Rate_{c,t} + \beta_4 Shock_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, *Rate* denotes the average bank deposit rate, *Disaster* denotes whether the county has experienced any natural disaster in the sample period, *Shock* takes a value of 1 when the disaster hits the county and 0 otherwise. t denotes the current year, and k denotes the number of leading years ($k = 1, 2, 3$). The deposit rate is the rate on 12-month certificates of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The sample is restricted to natural disasters that last fewer than 31 days with total damages above \$1 bn 2018 constant dollars. The *Rate* variable is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.18: Fracking and Deposit Rates around Recessions

Rate	(1)	(2)	(3)	(4)
	Current Year	1 Year Ahead	2 Years Ahead	3 Years Ahead
ln(Shale Gas) × Boom	-0.0256*	-0.0189*	-0.0160*	-0.0143
	(0.0141)	(0.0105)	(0.0096)	(0.0088)
ln(Shale Gas)	0.0068	0.0024	0.0048	0.0067
	(0.0130)	(0.0093)	(0.0086)	(0.0088)
County FIPS FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
N	6,048	5,923	5,842	5,454
R^2	0.9568	0.9601	0.9618	0.9630

Notes: This table presents the relation between county deposit rates and economic activity. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 0, 1, 2, 3) annual lead indicators of economic activity. The regression specification is the following: $Rate_{c,t+k} = \beta_1 \cdot ln(\text{Shale Gas})_{c,t} \times \text{Boom}_t + \beta_2 \cdot ln(\text{Shale Gas})_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where *Rate* denotes the average bank deposit rate, $ln(\text{Shale Gas})$ denotes the natural-log of gas production from horizontal wells, and Boom denotes the fracking boom from 2003 through 2009. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. $ln(\text{Shale Gas})$ is standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.19: Instrumental Variable Regression: Shipping Costs and Regional Deposit Rates

Rate	(1)	(2)	(3)
Shipping Costs	-0.0343***	-0.0238**	-0.0260***
	(0.0088)	(0.0096)	(0.0093)
log Employment			0.0098
			(0.0121)
Manufacturing Employment (%)			-0.0157**
			(0.0077)
log Income			0.0192
			(0.0129)
log Debt			-0.0414***
			(0.0153)
Δ_{91-99}HMDA Loan Orig.			-0.0205**
			(0.0091)
Δ_{91-99} Net CH Import		-0.0013	-0.0007
		(0.0068)	(0.0060)
Month-Year FE	✓	✓	
State FE		✓	
State-Month-Year FE			✓
N	51,982	51,982	51,663
R^2	0.9374	0.9481	0.9574

Notes: This table presents the relation between shipping costs and commuting zone deposit rates. The table presents regressions of deposit rates from 2001 to 2007 on shipping costs at the commuting zone level. The regression specification is the following: Deposit $\text{Rate}_{z,t} = \beta_1 \cdot \text{Shipping Costs}_z + X_z + \alpha_{s,t} + \epsilon_{z,t}$ where Rate denotes the deposit rate at the commuting zone level z of state s measured in month-year t, Shipping Costs denotes the shipping costs at the commuting zone level, and X is a vector of controls including total employment, the share of manufacturing employment, total income, logarithm of total debt, the 1991-1999 change in loan originations, and the 1991-1999 change in net Chinese import penetration, as well as quintiles of the change in house prices between 1999 and 2007. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each commuting zone in each month is computed. The independent variables used in this regression come from Barrot et al. (2022). We refer readers to Barrot et al. (2022) for construction of the independent variables. Independent variables are standardized for ease of interpretation. The sample period is 2001 through 2007. The analysis is restricted to single-state banks. Two-way commuting zone and month-year clustered standard errors are reported in parentheses.

Table B.20: Gap Between Uninsured and Insured Rate by Years from County Recession

	N	P25	Median	P75	Mean	SD
L3.Gap	4,168	-0.1345	0.0481	0.2192	0.0452	0.3202
L2.Gap	4,645	-0.1583	0.0400	0.2414	0.0377	0.4177
L1.Gap	5,416	-0.1716	0.0381	0.2500	0.0388	0.4199
Gap	6,164	-0.13	0.0663	0.2664	0.0744	0.3904
F1.Gap	4,654	-0.1333	0.055	0.2575	0.0714	0.3921
F2.Gap	3,924	-0.1424	0.0583	0.2800	0.0796	0.4143
F3.Gap	3,637	-0.145	0.0620	0.2875	0.0718	0.4189

Notes: This table summarizes the gap between uninsured and insured deposit rates by years from county recessions. The uninsured deposit rate is the rate on uninsured 12-month certificates of deposit of at least \$100,000 from 2001 through September of 2008, and at least \$250,000 thereafter. The insured deposit rate is the rate on 12-month certificates of deposit of at least \$10,000. The table reports the gap (uninsured rate-insured rate) at the county level in the three years before and after a county recession. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average uninsured and insured deposit rates across banks for each county in each month are computed. The annual uninsured and insured county deposit rates are the county deposit rates in the last reporting month of each year. A county is in a recession if its GDP growth between two consecutive years is below -2%. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks.

Table B.21: NPL Growth and Bank Rate Changes

$\Delta ln(\text{NPL})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$	-0.0005	-0.0037	0.0094	-0.0015	-0.0032	0.0080	-0.0085
	(0.0065)	(0.0061)	(0.0073)	(0.0058)	(0.0062)	(0.0050)	(0.0062)
$\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$	-0.0042	-0.0083	0.0063	-0.0022	0.0101*	0.0089	0.0036
	(0.0068)	(0.0072)	(0.0062)	(0.0060)	(0.0059)	(0.0061)	(0.0057)
$\mathbb{1}_{\text{Dep Rate Change}>P75}$	0.0041	-0.0016	-0.0056	0.0041	0.0094	-0.0058	0.0038
	(0.0065)	(0.0058)	(0.0068)	(0.0064)	(0.0059)	(0.0054)	(0.0052)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	165,314	168,233	171,285	171,690	169,033	166,507	164,031
R^2	0.0064	0.0063	0.0063	0.0062	0.0063	0.0064	0.0064

Notes: The table presents the coefficients estimated from the following regression for bank b at time t (quarter-year): $\Delta ln(NPL)_{b,t+k} = \beta_0 + \beta_1 \mathbb{1}_{P25<\text{Dep Rate Change}\leq P50,b,t} + \beta_2 \mathbb{1}_{P50<\text{Dep Rate Change}\leq P75,b,t} + \beta_3 \mathbb{1}_{\text{Dep Rate Change}>P75,b,t} + \alpha_t + \epsilon_{b,t}$ where $\Delta ln(NPL)_{b,t+k}$ denotes non-performing loans growth, $\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$, $\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$, $\mathbb{1}_{\text{Dep Rate Change}>P75}$ denote the second, third, or fourth quartile of a bank's deposit rate change between two consecutive quarters, respectively. k denotes the number of lead/lag quarters. The deposit rate is the rate on 12-month certificates of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across counties for each bank in each month is computed. The quarterly bank deposit rate is the bank deposit rate in the last reporting month of quarter. This rate is used to compute the quarterly change in banks' deposit rates. The analysis is restricted to single-state banks. Two-way bank and quarter-year clustered standard errors are reported in parentheses.

Table B.22: Deposit Growth and County Recessions

Δ ln(Deposits)	(1)	(2)	(3)
F1.Recession	-0.0038***		
	(0.0007)		
F2.Recession		0.0000	
		(0.0007)	
F3.Recession			0.0028***
			(0.0008)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	57,896	54,838	51,781
R^2	0.1158	0.1176	0.1212

Notes: This table presents the relation between recessions and deposit growth. The regression specification is the following: $\Delta ln(\text{Dep Amt})_{c,t} = \beta_0 + \delta_0 \mathbb{1}_{Recession,c,t+k} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\mathbb{1}_{Recession,c,t+k}$ indicates whether county c is in recession at time $t+k$ and k denotes the number of years after t ($k = 1, 2, 3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.

Table B.23: Credit Growth and Recessions

Panel A: Small Business Lending Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Δ ln(SBL)	-0.0284***	-0.0043	-0.0003
	(0.0057)	(0.0059)	(0.0063)
County FIPS FE	✓	✓	✓
N	4,310	4,014	3,772
pseudo R^2	0.0781	0.0716	0.0726
AUC	0.7039	0.6831	0.6838
Overall test statistic, χ^2	291.1538	235.2338	230.1487
p-value	0.0229	0.5567	0.6130

Panel B: Mortgage Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Δ ln(Mortgages)	-0.0323***	0.0321***	-0.0444***
	(0.0055)	(0.0060)	(0.0057)
County FIPS FE	✓	✓	✓
N	4,310	4,014	3,772
pseudo R^2	0.0809	0.0803	0.0852
AUC	0.7024	0.7031	0.7098
Overall test statistic, χ^2	278.3751	285.9539	311.8129
p-value	0.0702	0.0201	0.0008

Panel C: Total Credit Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Δ ln(Total)	-0.0324***	0.0299***	-0.0443***
	(0.0058)	(0.0060)	(0.0057)
County FIPS FE	✓	✓	✓
N	4,310	4,014	3,772
pseudo R^2	0.0772	0.0310	0.0014
AUC	0.7021	0.7014	0.7086
Overall test statistic, χ^2	277.1707	281.4208	307.1817
p-value	0.0805	0.0787	0.0847

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ in metro counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 \cdot \Delta ln(Credit)_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, $\Delta ln(Credit)$ denotes credit growth, t denotes the current year, and k denotes the number of leading years ($k = 1,2,3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. Credit growth is measured as the natural-log difference of small business lending in Panel A, natural-log difference of mortgages in Panel B, and natural-log difference of total lending (small business lending and mortgages) in Panel C. The independent variables are standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.24: Deposit Rates Predict County Recessions Even After Accounting for Credit Growth

Panel A: Small Business Lending Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0253***	0.0552***	0.0483***
	(0.0050)	(0.0053)	(0.0058)
Δ ln(SBL)	-0.0304***	-0.0102*	-0.0058
	(0.0058)	(0.0058)	(0.0061)
County FIPS FE	✓	✓	✓
N	4,310	4,014	3,772
pseudo R^2	0.0840	0.1022	0.0952
AUC	0.7113	0.7300	0.7238
Overall test statistic, χ^2	320.8831	376.1042	310.7111
p-value	0.0009	0.0000	0.0011

Panel B: Mortgage Lending Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0220***	0.0560***	0.0483***
	(0.0047)	(0.0054)	(0.0056)
Δ ln(Mortgages)	-0.0318***	0.0339***	-0.0460***
	(0.0055)	(0.0062)	(0.0056)
County FIPS FE	✓	✓	✓
N	4,310	4,014	3,772
pseudo R^2	0.0856	0.1116	0.1090
AUC	0.7074	0.7445	0.7392
Overall test statistic, χ^2	296.0942	462.9733	406.6135
p-value	0.0158	0.0000	0.0000

Panel C: All Credit Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0222***	0.0554***	0.0485***
	(0.0047)	(0.0054)	(0.0056)
Δ ln(Total)	-0.0319***	0.0309***	-0.0461***
	(0.0057)	(0.0062)	(0.0057)
County FIPS FE	✓	✓	✓
N	4,310	4,014	3,772
pseudo R^2	0.0853	0.1095	0.1085
AUC	0.7073	0.7420	0.7385
Overall test statistic, χ^2	295.4063	455.9748	400.2319
p-value	0.0169	0.0000	0.0000

Notes: The table presents the average marginal effects of the covariates estimated from the following logit model of a county recession in county c at time (year) $t+k$ in metro counties: $logit(p_{c,t+k}) = \beta_0 + \beta_1 Rate_{c,t} + \beta_2 \cdot \Delta ln(Credit)_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $logit(p) = ln(\frac{p}{1-p})$ denotes the log of the odds ratio, $Rate$ denotes the average bank deposit rate, $\Delta ln(Credit)$ denotes credit growth, t denotes the current year, and k denotes the number of leading years ($k = 1, 2, 3$). A county is in a recession if its GDP growth between two consecutive years is below -2%. Credit growth is measured as the natural-log difference of small business lending in Panel A, natural-log difference of mortgages in Panel B, and natural-log difference of total lending (small business lending and mortgages) in Panel C. The deposit rate is the rate on 12-month certificates of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variables are standardized. The independent variables are standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedacticity-robust standard errors are reported in parentheses.

Table B.25: GDP Growth and Deposit Growth

Panel A: Deposit Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Δ ln(Deposits)	0.0018*	-0.0001	-0.0004
	(0.0010)	(0.0007)	(0.0008)
County FIPS FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.0670	0.1020	0.0937

Panel B: Deposit Rate and Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0013	-0.0048***	-0.0045***
	(0.0010)	(0.0008)	(0.0009)
Δ ln(Deposits)	0.0020*	0.0005	0.0001
	(0.0010)	(0.0007)	(0.0009)
County FIPS FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.0674	0.1118	0.0997

Notes: This table presents the relation between county deposit rates and economic activity in metro counties. The table presents the results from estimating an OLS model of the change in economic activity in county c in year $t+k$ as a function of the average deposit rate within a county at year t. We consider up to three-year (k = 1, 2, 3) annual lead indicators of economic activity. The regression specification in Panel A is $\Delta ln(GDP)_{c,t+k} = \beta_1 \cdot \Delta ln(Deposits)_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$. The regression specification in Panel B is $\Delta ln(GDP)_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \beta_2 \cdot \Delta ln(Deposits)_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$. $\Delta ln(GDP)$ denotes GDP growth, *Rate* denotes the average bank deposit rate, and $\Delta ln(Deposits)$ denotes deposit growth. The deposit rate is the rate on 12-month certificates of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank × county × month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The independent variables are standardized. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. County clustered standard errors are reported in parentheses.