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

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Abstract

This paper proposes a vulnerability index 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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1 Introduction

The aggregate US economy is essentially a collection of different regional economies operating within it. However, as highlighted during the Great Recession, there can be substantial variation in regional economic activity compared to the national average (Beraja et al. (2019)). Understanding the vulnerabilities of these different regional economies to economic contractions is essential for designing targeted fiscal policies and effectively implementing monetary policy. Empirically, however, measuring the susceptibility of regional economies to economic shocks has been a persistent challenge. In this paper, we introduce a regional vulnerability index that assesses the build-up of economic risks across regions, leveraging spatial variation in bank liquidity.

In this paper, we present a regional vulnerability index for assessing the build-up of regional economic risks, using spatial variation in bank liquidity. Our main idea centers around the relationship between regional economic activity and deposit growth in local banks. During economic contractions, corporate profits and household incomes decline, which negatively impacts deposit growth for banks operating in those regions. This, in turn, puts pressure on the liability side of their balance sheets.[1] If banks anticipate a prolonged economic decline that threatens their future liquidity, they respond by raising long-term funding to buffer against the shock. As a result, during persistent slowdowns, banks increase deposit rates to attract additional deposits and manage liquidity shortages.[2]

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 in a county raise their deposit rates, it is associated with a slowdown in economic activity in that region up to two years ahead. This relationship allows us to create a measure that captures a region's vulnerability to economic shocks. Specifically, we find that an increase in county deposit rates 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. We also find that higher county deposit rates are associated with slower employment growth, weaker wage growth, and reduced business activity in key sectors that employ a significant share of the county's workforce. Overall, the model's ability to predict future GDP growth, as assessed by the Area under the Receiver Operating Characteristic Curve (AUC), is 0.73.[3]

[1]See Appendix Table B.24 – total deposit growth declines one year before a county recession.

[2]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. Furthermore, banks' assets tend to be relatively illiquid, making it more difficult to adjust their asset portfolios in response to changing economic conditions.

[3]The Area under the Receiver Operating Characteristic Curve (AUC) allows us to diagnose the accuracy of our

Importantly, even in periods without monetary policy changes, credit booms, or imminent national recessions, increases in county deposit rates are associated with slower economic activity within those regions. While monetary policy changes can influence deposit rates offered by banks, our results remain robust even after controlling for time-specific effects. Additionally, we find that even during periods of virtually no changes in monetary policy rates – from 2011 through 2015 – increases in county-level deposit rates are linked to declines in future county economic activity. Notably, there were no significant credit expansions or impending national recessions during this period, suggesting that the predictive power of deposit rates is not merely an artifact of these factors.

It is worth noting that we do not claim that bank liquidity directly *causes* changes in economic activity. Even in areas where local bank lending is a small fraction of overall lending, we observe a negative relationship between deposit rates and economic activity. This suggests that bank lending is unlikely to be the primary driver of economic contractions. Instead, our findings indicate that deposit rates capture unique information about economic activity beyond credit supply fluctuations. Further tests confirm that credit supply does not drive the deposit rate-GDP growth relationship. Hence, we propose that banks act as important conduits for economic activity, making regional deposit rates valuable indicators of underlying economic conditions. In this context, banks' deposit rates can be viewed as useful aggregators of regional economic conditions, providing valuable insights into the state of the local economy.

To further investigate the mechanism behind our results, we examine whether banks that raise deposit rates experience liquidity stress. Our findings show that banks increasing deposit rates tend to experience a decline in deposit growth in the preceding quarters, suggesting liquidity stress. This slowdown is evident for both insured and uninsured deposits.[4] 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 a downturn. In addition,

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.

[4] To complement these findings on bank deposit growth, we also analyze aggregate deposit growth at the county level. We find that counties experiencing a more pronounced economic downturn exhibit lower deposit growth compared to others, one year before the decline.

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 regional economic activity, we employ a quasi-natural experiment. 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, indicating that banks adjust their rates in response to the adverse economic conditions caused by the disaster.[5] 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. Importantly, the ex ante deposit rates, before the disaster, do not predict these outcomes, suggesting that the shock was unanticipated. Our findings cannot be explained by changes in credit growth after the natural disasters; we find no evidence of a relationship between credit growth after a natural disaster and subsequent economic contractions. This suggests that the information aggregated in deposit rates captures underlying economic conditions that may not be accounted for by other variables. These findings support those of Cortés and Strahan (2017), which argue that the effect of credit demand shocks is short-lived, dissipating within a year.

An important question is whether deposit rates demonstrate superior predictive power compared to other bank-level variables.[6] For instance, one might consider using deposit growth directly at the county level instead of deposit rates. 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 that the predictive power of deposit rates is higher than credit growth. We further validate that deposit rates are a robust leading indicator of regional 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

[5] Similarly, explore the causal relationship between bank liquidity and economic activity using fracking shocks. 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.

[6] 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.

idea that the deposit rate, being a forward-looking measure that incorporates banks' expectations 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 failures.[7] 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 regional economic vulnerability. Overall, our findings underscore the significance of deposit rates offered by banks in a region as a valuable measure of economic vulnerability at the regional level.

1.1 Related Literature

Our results contribute to several strands of the literature.

First, there is a large body of work that examines the factors that help predict 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)). Our research contributes to the literature in several ways. First, we focus on measuring economic risks across counties and states, exploiting regional variations in economic activity. There is very limited empirical work on measuring risks at the regional level in a parsimonious manner. Furthermore, in contrast to the extant literature that focuses on credit, our paper finds that increases in deposit rates offered by banks are followed by contractions in economic activity, regardless of whether a downturn is preceded by a credit boom. Additionally, deposit rates demonstrate the ability to predict smaller economic contractions that are difficult to anticipate using credit growth alone.[8] 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

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

[8] 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).

growth) and the credit positions across banks in an economy, unlike credit growth, which is a backward-looking variable.

Second, our paper contributes to the literature on recessions. A significant body of work documents that the slope of the Treasury yield curve (term premium) and corporate bond spreads can predict the likelihood of a near-term recession (e.g., Estrella and Hardouvelis (1991), Estrella and Mishkin (1998), Ang et al. (2006), Rudebusch and Williams (2009), and Engstrom and Sharpe (2019)).[9] We add to this literature in several ways. First, we focus on measuring economic risks at the regional level. Second, our results suggest that a simple model using bank deposit rates can accurately predict regional economic risks, providing a useful measure for incorporation into existing forecasting models. Finally, our work also contributes to the recent literature emphasizing the importance of real-time measures of economic activity (Chetty et al. (2020)). Deposit rates are readily available in real time and offer a reliable barometer of future economic activity.

Third, our results contribute to the literature on money growth and recessions. Several papers have argued that money growth plays a significant 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 demonstrating that the deposit rates offered by banks help aggregate information about money growth. Given the challenges 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.

Fourth, our paper contributes to the literature on the role of bank liquidity in economic activity. Previous studies have demonstrated 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 reflect 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 a reduction in credit supply.

Finally, our paper also contributes to the literature that finds banks increase their deposit rates 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 primarily focuses on shocks to

[9]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).

bank liquidity during crises. 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 economic conditions. Additionally, our findings highlight that banks increase their reliance on insured deposits at the onset of a downturn. This relates to the literature that emphasizes the importance of proper deposit insurance schemes and the need to 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 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. Finally, Section 6 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).

Industry Activity: We use data on industry activity from the Quarterly Census of Employment and Wages (QCEW), produced by the Bureau of Labor Statistics (BLS). The QCEW tabulates data on the number of establishments, employment, and quarterly wages. We collapse the data to create a panel at the county *times* industry $\times$ year level. This panel is used to identify the dominant industry in the last ten years, measured by total employment.

Supplementary Measure of Economic Activity We use data on unemployment rates across counties from the BLS. We also use data on the consumer price index (CPI) for metro areas from the 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 from 2001 and 2020.

Natural Disasters 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.

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 BLS.

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 explores the spatial disparities in bank deposit rates and economic activity across different regions. By examining these geographic variations, we establish a microfoundation for the vulnerability index, shedding light on how deposit rates and economic conditions differ across banks and regions.

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.[10] We examine the number of such banks that operate in each county from 2001 through 2020. Appendix Figure B.1 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. Appendix Figure B.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.[11] A similar pattern emerges when examining economic expansions.

To examine the relationship between regional deposit rates and regional economic downturns, we leverage the geographic variation in deposit rates across banks, focusing on single-state banks that operate across distinct regional markets. The advantage of using single-state banks is that their deposit base and lending are more regional (Berger and Udell (1995); Petersen and Rajan (1994)), mirroring regional economic conditions.[12] Differences in regional economic conditions are reflected in the deposit rates of single-state banks. For illustration, Appendix Figure B.4 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. These heatmaps reveal that at the same point in time, these banks offered higher rates in certain areas and lower rates in others. This

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

[11] 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)).

[12] The results are robust to using national banks – see Appendix Table B.7 and Appendix Table B.8. However, national banks can smooth liquidity shocks due to their multi-state presence, making them less sensitive to regional economic conditions (e.g., Granja and Paixao (2019); Morgan et al. (2004)).

intrastate variation in deposit rates is consistent with previous research by Heitfield (1999), Biehl (2002), and Heitfield and Prager (2004), which found that smaller banks, unlike larger ones, set deposit rates based on regional competitive conditions.[13] This suggests that regional market dynamics play a significant role in shaping deposit rates at single-state banks.

Figure 2 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 3 presents heatmaps of county deposit rates in 2006, 2009, and 2017.[14] We observe that deposit rates offered by banks exhibit regional variation 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 4, there is a clear association between deposit rates and future GDP growth. We find that higher deposit rates offered by banks are associated with lower GDP growth. Moreover, in Figure 5, we sort regions into quintiles based on the deposit rate offered by banks in 2006 and explore whether recession risk is higher in regions with higher deposit rates.[15] 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 that a region experiences a larger than 2% drop in GDP in 2008.

4 Main Results

In this section, we rigorously examine the relationship between our regional vulnerability index and regional economic activity. First, we demonstrate that rising deposit rates within a

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

[14] Appendix Figure B.3 presents heatmaps of state deposit rates in 2006, 2009, and 2017.

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

region correlate with contractions in economic activity. We then explore the heterogeneous impact of liquidity shortages across regions and find that the link between deposit rates and economic performance is particularly pronounced in areas with more intense competition for deposits and among banks experiencing greater balance sheet constraints.

We argue that higher deposit rates signal liquidity shortages, supporting this claim with evidence from a quasi-natural experiment. Additionally, we compare the predictive power of deposit rates to other variables, showing that deposit rates have superior forecasting accuracy. Finally, we highlight that bank deposit rates offer predictive insights into economic and financial activity at coarser levels of geographic granularity as well.

4.1 Baseline Effects

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: the county-level. We begin our analysis by focusing on metropolitan (metro) counties as these regions exhibit a competitive banking structure.[16] 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.[17] 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.

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

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.[18]

[16] 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.

[17] 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.

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

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. Our findings indicate that larger contractions in economic activity follow larger increases in deposit rates. 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. Our point estimates remain economically meaningful, as the average county GDP growth is 1.25%, and statistically significant across all forecasting horizons. Although time fixed effects are generally omitted in forecasting, there is a risk that the correlation between economic activity and deposit rates is predominantly influenced by unobserved time-varying aggregate factors. Hence, as a robustness exercise, in columns (4)-(6), we introduce time fixed effects. As shown in the table, we find the results are similar to the estimates in columns (1)-(3). In fact, the estimated magnitudes are slightly higher.

While our findings suggest that there is a strong relation between deposit rates and future economic growth, it is unclear whether the effect may be reverse causal. That is, one may be concerned that there is autocorrelation in GDP growth, and that changes in deposit rates *lag* changes in economic conditions rather than lead. To mitigate this concern and establish that the effect between deposit rates and future GDP growth are not confounded by past economic growth, we incorporate several lags of economic growth into our baseline analysis in Table 3. By including these lagged variables, we aim to control for the influence of past economic growth on the current and future state of the economy. Our results demonstrate that even after accounting for the historical trajectory of economic growth, deposit rates continue to exhibit a significant predictive power for future economic growth. The point estimates presented in Table 3 are remarkably similar to our baseline estimates in Table 2, further reinforcing the notion that deposit rates are a reliable indicator of future economic trends, independent of historical economic performance.[19]

While GDP growth measures the value of goods and services produced, it may be in-

[19]It is worth noting that our analysis also reveals that higher past economic growth is associated with lower future economic growth.

fluenced by external factors like trade and might not fully reflect how widely the benefits are distributed. For instance, increased productivity or investment can boost GDP without necessarily creating more jobs. In Panel B of Table 2, we use employment growth as an additional measure of economic growth. Employment growth provides a direct measure of job creation and destruction in the economy. Our findings indicate that local labor markets tighten follow larger increases in deposit rates. Specifically, we find that a one standard deviation increase in deposit rates is associated with a 0.57 percentage points to 0.85 percentage points decline in employment growth two years ahead in columns (2) and (5), respectively. Note that these magnitudes are substantial, relative to the average county employment growth of 0%. We use the unemployment rate as an alternate measure of economic activity and show robustness in Panel A of Appendix Table B.1.

To further examine the relationship between deposit rates and economic activity, we explore additional measures of economic conditions. In Panel C of Table 2, we focus on future new business formation, measured as the natural-log transformed number of new businesses.[20] 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. We supplement this measure of business activity with a measure of consumer financial health in Panel D of Table 2, the mortgage delinquency rate. The 30-89 day mortgage delinquency rate serves as an early indicator of the overall health of the mortgage market, capturing borrowers who missed one or two payments. A higher delinquency rate can indicate household financial stress and reduced spending capacity. Our findings indicate that higher deposit rates are associated with a heightened risk of credit losses. We further utilize data on the 90-day delinquency rate, which reflects more severe economic distress and find similar results, reported in Panel B of Appendix Table B.1. 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.1. 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.[21] The central premise of our analysis is that deposit rates capture fluctuations in regional economic conditions and thus, are an early indicator of economic activity.

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

[21] 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)).

A potential concern is that the observed relationships between economic indicators and bank lending are driven by the behavior of banks that eventually fail. To address this concern, we investigate whether our findings are influenced by the rate-setting behavior of failed banks. Appendix Table B.2 shows that our results are robust to the exclusion of failed banks. Hence, the relationships we document are not driven by the anomalous behavior of banks that ultimately fail.

We verify that our baseline findings are robust to alternative choices of deposit product. Specifically, we re-estimate Table 2 using the 1-month certificates of deposit (CDs) with a minimum account size of $10,000 and a monthly deposit rate. The results, reported in Appendix Table B.3, show similar statistical significance and direction as our baseline findings. Notably, the economic magnitudes are larger when using the 1-month CDs, suggesting that these higher-frequency rates may more accurately capture real-time liquidity stress. Furthermore, we demonstrate the robustness of our results to various other deposit contracts in Appendix Table B.4, reinforcing the reliability of our findings.

4.1.1 Deposit rates and performance of key sectors

Our analysis has thus far revealed a robust link between higher deposit rates and lower economic activity, including lower GDP growth, employment growth, business formation, and higher delinquencies. To further understand the mechanisms underlying these relationships, we turn our attention to the industry-level dynamics within counties. Specifically, we examine how the dominant industry in each county fares when deposit rates rise. By focusing on the industry with the highest employment share over the past decade, we can assess whether the aggregate trends we observed earlier are mirrored in the performance of key sectors that underpin regional economies. Appendix Table B.5 presents the results. Higher deposit rates are linked to declines in the dominant industry of a county. Specifically, we find that a one standard deviation increase in deposit rates is associated with a 0.63 to 1.22 percentage point decline in employment growth (Panel A, columns (2) and (6)), a 0.72 to 1.44 percentage point decline in wage growth (Panel B, columns (2) and (6)), and a decline in the growth rate of establishments (Panel C, columns (2) and (6)). Overall, these findings indicate that higher deposit rates have a negative impact on the dominant industries in counties, leading to slower employment and wage growth, as well as reduced business activity.

4.1.2 Are the findings driven by monetary policy changes?

An important question that arises is whether the relation between regional deposit rates and regional 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 from 2010 through 2015 – a period characterized by relatively stable short-term interest rates. In Table 4, we replicate the results reported in Table 2 for this specific period. We find qualitatively similar results during this period, when the short-rate remained stable.[22] The estimated magnitudes of the relationship between deposit rates and changes in economic activity are quantitatively higher. Table 4, 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. 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 4.

4.1.3 Cross-sectional

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, two years, and three years ahead. The results are reported in Panel A of Appendix Table B.6. 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.6. The predictive value is higher at longer horizons as compared to shorter horizons.[23] Overall, the results of the cross-sectional analysis

[22] Moreover, we show that the regional deposit rate remains a strong predictor of regional 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.

[23] 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.

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.

4.1.4 Does presence of multi-state banks matter?

Thus far, our analysis has focused on local banks. An important question is how the baseline findings would differ in areas where larger banks are more dominant. We hypothesize that local banks may face increased competition in areas with a greater presence of larger banks. To examine how the share of large banks in a county affects the relationship between the county deposit rate of single-state banks and future GDP growth, we define a bank as "large" if it operates in more than one state.[24] Appendix Table B.7 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 relationship between the deposit rate and future economic growth is stronger in counties with 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.[25] This suggests that the deposit rate is a stronger indicator of future economic growth in areas with greater competition for deposits.[26] We discuss this result further in Section 4.2.

In counties dominated by large, multi-state banks, we find that the deposit rates set by single-state banks remain a significant predictor of lower future GDP growth. This finding is important for two reasons: First, it highlights the relevance of single-state bank deposit rates as indicators of regional market conditions. Second, it suggests that the relationship between deposit rates and GDP growth operates independently of credit growth. These findings are explored in greater detail in Section 4.4.

4.1.5 Predictive value of deposit rates

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.[27] An AUC of 1 indicates

[24] Begenau and Stafford (2022) find that large banks are likely to use uniform rate setting policies.

[25] See Supera (2021) for how market power affects the transmission of monetary policy to business lending via time deposits.

[26] We show in Appendix Table B.8 that the economic and statistical significance of our baseline results increases when we consider the set of all banks.

[27] 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.

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. We define a county to be in a recession if its GDP growth between two consecutive years is below -2%.[28] 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 in Table 5 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%. 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.9 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.[29] Overall, our findings suggest that deposit rates have high predictive value.

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

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

4.2 Heterogeneous Effects of Bank Liquidity Shortages

We examine the properties of regional deposit rates as a vulnerability index of regional economic risk. We propose that the 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 focuses on metropolitan counties, Appendix Table B.10 presents the estimation results for rural and urban counties, separately. We find that the point estimates attenuate and the AUC is lower in the sample of rural and urban counties, relative to metro counties.[30] 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.12, we demonstrate that banks that face greater constraints tend to increase their rates by a 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 heterogeneity across banks, 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.13, 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.14.

[30] We find similar trends with the OLS results, in which point estimates are larger when estimated for metro countries relative to urban and rural. Note that in Appendix Table B.11, we also report the results across all counties and find similar results.

4.3 Validation from Natural Disasters

While our previous analysis indicates a correlation between higher deposit rates and economic contractions, determining the exact timing of these events remains challenging. Specifically, it is difficult to identify when deposit rates start responding to an impending economic downturn. Moreover, other factors such as monetary policy, precautionary savings motives, banking structures, and credit booms could influence these results. To address these issues, we employ a quasi-natural experiment, directly examining how bank liquidity varies around natural disasters and unexpected shale gas discoveries.

Natural disasters are unforeseen events 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. Additionally, these shocks are orthogonal to monetary policy shocks, precautionary savings motives, banking structures, and credit booms. Therefore, they provide a clean setting for identifying the relationship between bank liquidity shortages and deposit rates. 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 6 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.

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

Our findings support our hypothesis that deposit rates increase only after natural disasters and remain elevated for nearly two years before declining. We further validate that the increase in deposit rates reflects liquidity constraints by examining deposit growth around natural disasters. Using a within bank-county estimator in Table 6, we show that following natural disasters, counties experience a 5.21 percentage point decline in deposit growth.[31] 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 down-

[31] 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.

turns, 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 Table 7. 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 7a. A one percentage point increase in the ex post deposit rate is associated with a 1.5 percentage points decline in GDP growth two years later. This relationship is statistically significant at the 1% level.[32] Notably, we find no evidence of a relationship between credit growth after a natural disaster and subsequent economic contractions, as illustrated in Figure 7b. This observation is consistent with the results presented in Table 8, suggesting that the information aggregated in deposit rates captures underlying economic conditions that may not be accounted for by other variables. Additionally, our findings support those of Cortés and Strahan (2017), which argue that the effect of credit demand shocks is short-lived, dissipating within a year. In the next section, we explore the outperformance of deposit rates compared to other regional economic growth indicators, including various measures of credit growth.

Overall, these findings bolster our central hypothesis: an increase in deposit rates effectively captures economic contractions. These findings also highlight that the mechanism operates through the liquidity stress experienced by banks during economic contractions, which necessitates an increase in deposit rates. Thus, deposit rates provide a useful vulnerability index for assessing regional economic risks.

4.4 Deposit Rates Outperform Other Leading Indicators

An important question is how the predictive value of regional deposit rates, as a vulnerability index, compares 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?

[32] 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.

4.4.1 Deposit rates vs. deposit growth

Our primary conjecture is that deposit rates serve as an asset pricing measure of deposit scarcity, reflecting the balance between deposit supply and demand. In this context, deposit rates act as a sufficient statistic for bank liquidity conditions. We demonstrate that this pricing measure of liquidity shortages captures underlying economic conditions not directly accounted for by deposit growth alone, making it a valuable vulnerability index for assessing economic risks. Appendix Table B.15 illustrates this point. Panel A examines the predictive value of deposit growth on county recessions, while Panel B adds deposit rates. The results show that the deposit growth alone yields an AUC of 0.68 (Panel A), lower than the 0.73 obtained with deposit rates (Panel B) at the two-year forecasting horizon – a substantial difference. Furthermore, the point estimates associated with deposit growth are unstable, with fluctuating signs and statistical significance across Panels A and B. In contrast, the point estimates associated with deposit rates remain consistently statistically and economically significant, even after controlling for deposit growth between Panel B and our baseline specification (Table 5). Notably, the predictive value, as measured by the pseudo R^2 and AUC, remains largely unchanged with the addition of deposit growth.[33]

4.4.2 Deposit rates vs. credit growth

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)). Our evidence suggests that the forecasting power of deposit rates operates independently of credit booms. First, our results from 2010-2015 show that deposit rates predict economic activity even during periods of stagnant credit growth, extending their forecasting power beyond expansionary credit phases. Second, our quasi-natural experimental design, which exploits natural disasters unrelated to credit booms, reveals that counties experience liquidity strain following disasters, signaling impending economic contractions. Building on these findings, we further explore how the predictive value of deposit rates compares to various credit growth measures.

To directly compare the predictive value of county deposit rates and credit growth (small business lending growth in Panel A, mortgage lending growth in Panel B, and total lending growth in Panel C), we conduct a horse-race analysis in Table 8. Deposit rates remain an economically meaningful and statistically significant indicator of economic contractions. Specifi-

[33] These findings are robust under an OLS specification, as shown in Appendix Table B.16, which examines the relationship between deposit growth, deposit rates, and GDP growth.

cally, we find that even after accounting for various measures of credit growth, a one standard deviation increase in the deposit rate is associated with a decline in future economic growth by 0.47 to 0.50 percentage points. This is remarkably similar to our baseline estimate of 0.44 percentage points. Notably, we find that higher credit growth is *positively* associated with GDP growth. These findings are consistent with existing literature, which suggests that large credit expansions are unreliable predictors of non-financial recessions (Boissay et al. (2016)) and instead only demonstrate predictive value for financial crises. Further, the inclusion of credit growth measures does not alter the relationship between deposit rates and economic growth, as indicated by the coefficient, 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 in Appendix Table B.17.[34]

To complement these comparisons between the predictive value of deposit rates and measures of credit growth, we conduct two additional tests. The findings of these tests rule out the possibility that our proposed channel of liquidity shortages operates through the credit channel.

First, to isolate the liquidity shortage channel and demonstrate the predictive power of deposit rates, independent of credit supply, we examined regions where single-state lending accounts for less than 10% of all lending. Our analysis, presented in Table 9, reveals that even in these areas, where single-state banks have a limited presence in the small business lending (Panel A), mortgage lending (Panel B), and total lending (Panel C) markets, their deposit rates remain a significant predictor of economic activity. Notably, the point estimates are 2 to 4 times larger than the baseline estimates for the two-year prediction model, suggesting that credit supply can indeed dampen the predictive value of deposit rates. The fact that we can predict economic activity in regions with minimal single-state lending share highlights the importance of the liquidity shortage channel and the independent predictive power of deposit rates.

Second, to further establish the predictive power of deposit rates, we employ a residual analysis that controls for the effects of fluctuations in credit supply. This approach allows us to isolate the unique information embedded in deposit rates about economic activity, independent of credit supply. We first regress deposit rates on contemporaneous and lagged measures of credit growth. The resulting residual deposit rates, purged of credit supply influences, are then used to predict future economic growth. The results, presented across Panels A, B, and C of Appendix Table B.19, reveal a statistically and economically significant relationship between the residual deposit rates and GDP growth. This indicates that the predictive power

[34]Appendix Table B.18 reports the estimation results, using credit growth measures alone. The AUC is approximately 0.70 – lower than the AUC obtained with deposit rates.

of deposit rates increases after accounting for credit supply. The findings suggest that credit supply does not drive the deposit rate-GDP growth relationship; instead, deposit rates capture unique information about economic activity beyond credit supply fluctuations. This reinforces our previous conclusions, highlighting the potential of deposit rates as an independent indicator of economic activity. Section 5 examines the interplay between rate hikes and lending growth, revealing that banks that raise rates more substantially do so to strengthen their balance sheets, rather than expand lending.

4.4.3 Deposit Rates vs. other leading indicators

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 regional business cycle fluctuations? This comparison is important to validate deposit rates as a reliable forecasting tool for regional business cycles. To this end, we compare the predictive value 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.[35] We study the relation between each of these indicators and future economic growth, eight quarters ahead in Panel A of Table 10. 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).[36] 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 regional business cycles by running a horse-race analysis between our measure of state deposit rates and other leading economic indicators of regional business cycle activity in Panel B of Table 10. 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

[35] Due to data availability limitations at the county level, we conduct this analysis at the state level.

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

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. Additionally, deposit rates are readily available in the public domain in real time, unlike many 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.

4.5 Generalizability and Implications for Financial Risk

To assess the generalizability of our findings beyond the county level, we conduct a parallel analysis at the state level and explore the out-of-sample predictive performance of deposit rates. We then examine whether the accumulation of economic risk at the state level is associated with an increase in the risk of financial institution failures. The findings of this analysis help validate deposit rates as a useful vulnerability index for assessing regional economic risks.

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.[37]

Appendix Table B.20 reports the relation between deposit rates and economic activity at the state level. Consistent with our baseline findings at the county level, our results demonstrate that deposit rates are a salient indicator of future economic activity at the state level. Further, we evaluate the predictive value of state deposit rates in Appendix Table B.21, using a logit specification. 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%.[38] Additionally, the estimated AUC (Area Under the Curve) at a two-year horizon is 0.73.

[37]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.

[38]The unconditional probability of a larger than 2% drop in state GDP is 5.02% over the sample period.

We further assess the predictive performance of deposit rates 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 the cross-validated AUC is 0.66 for recessions, eight quarters ahead. The predictive accuracy is lower for recessions twelve quarters ahead, at 0.55.[39]

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 8. 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.

4.5.1 Implications for Financial Risk

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.[40] 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 Figure 9. On the extensive margin, Figure 9a 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 9b presents a binscatter

[39] 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.

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

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.[41]

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.[42] 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.

5 How do Liquidity Shortages Affect 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 begin by exploring 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. 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 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).

$$\begin{aligned}\Delta ln(Y)_{b,t+k} = \beta_0 &+ \beta_1 \mathbb{1}_{P25<\text{Dep Rate Change}\leq P50,b,t} + \beta_2 \mathbb{1}_{P50<\text{Dep Rate Change}\leq P75,b,t} \\ &+ \beta_3 \mathbb{1}_{\text{Dep Rate Change}>P75,b,t} + \alpha_t + \epsilon_{b,t}\end{aligned} \tag{3}$$

[41] 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.

[42] See Goldstein and Pauzner (2005) for a related theoretical model.

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 11 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.[43]

In Table 12, 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 11, 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

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

Table B.22. 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 on the predictive value of the dispersion of deposit rates in Section 4.2.

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 deposit rate increases are driven by increased loan demand. Table 13 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, and the differential lending growth among banks in different quartiles starts to converge. 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.23, we examine the growth rates of non-performing loans (NPL). We find no significant differences across banks in terms of NPL growth following rate changes. Together, these 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 decline in total deposit growth at the county level one year before a recession in Appendix Table B.24. 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.2 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.6. 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 the prices of other tradable instruments as well.

6 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. Deposit rates effectively capture the susceptibility of regional economies to economic shocks, serving as a valuable indicator of regional economic risk accumulation. By leveraging spatial variation in bank liquidity, deposit rates provide a robust vulnerability index for assessing the build-up of regional economic risks.

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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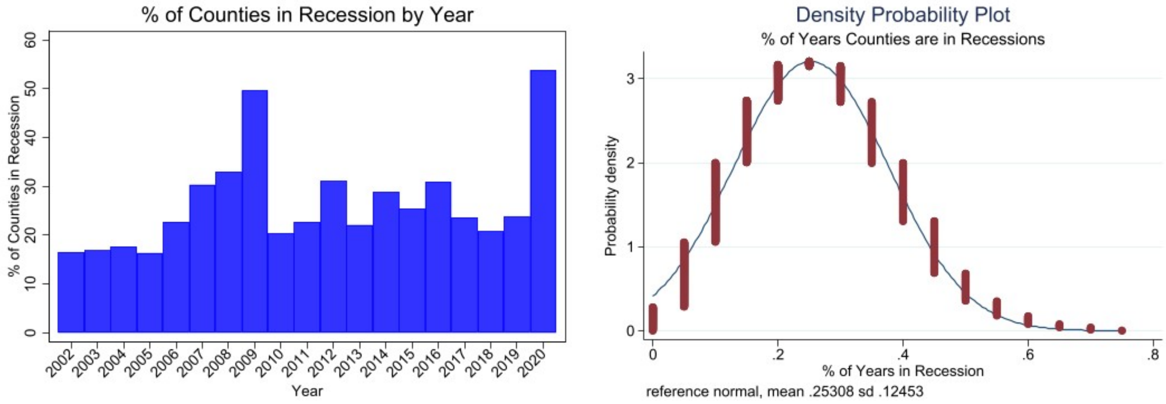
7 Figures and Tables

Figure 1: Recessions Across Counties and Time

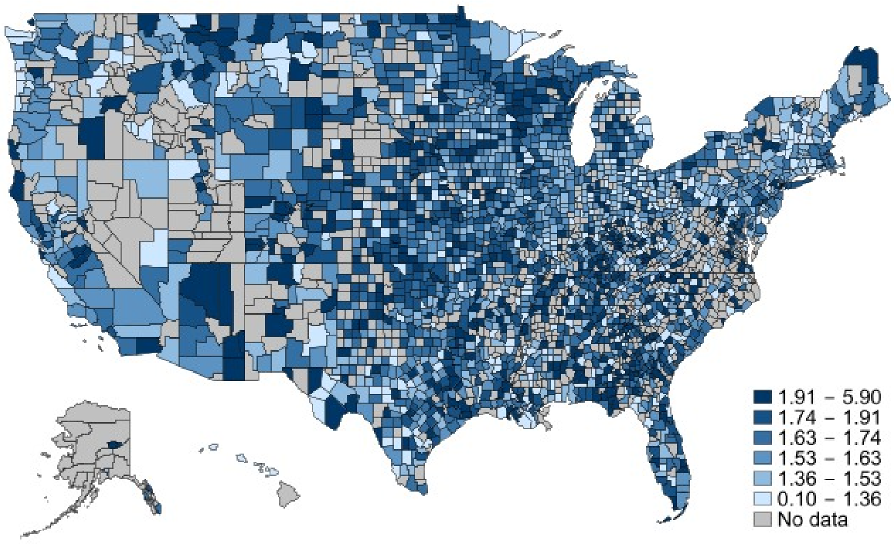


(a) % of Counties in Recession

(b) % of Recessions within Counties

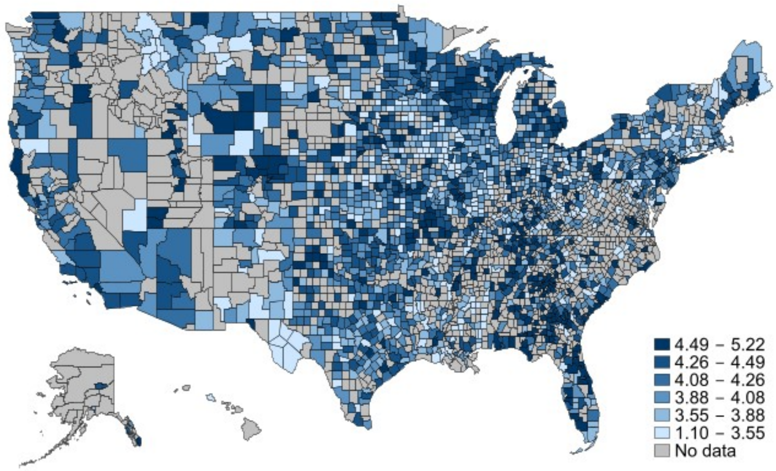
Notes: This figure presents the percentage of counties in recessions by year in Figure 1a, and a density probability plot of the percent of year counties are in recessions in Figure 1b based on county GDP data. A county is in a recession if its GDP growth between two consecutive years is below -2%.

Figure 2: Deposit Rates by County (2001-2020)

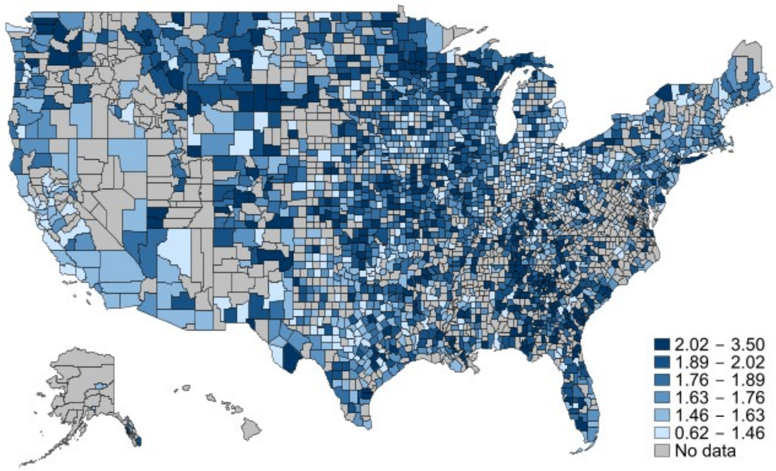


Notes: This figure uses RateWatch data to present a heatmap of the average deposit rate (12-month, $10K CDs) in each county from 2001 to 2020. The deposit rate is the rate on the 12-month certificate of deposit of at least $10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ 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. 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.

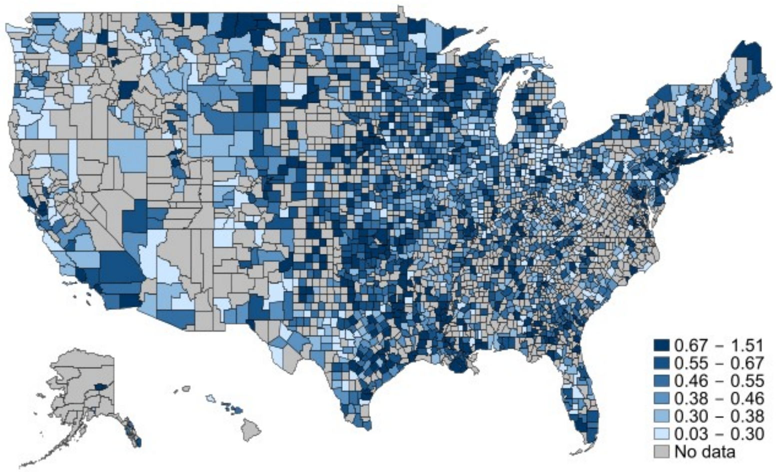
Figure 3: Deposit Rate Across Counties and Time



(a) 2006



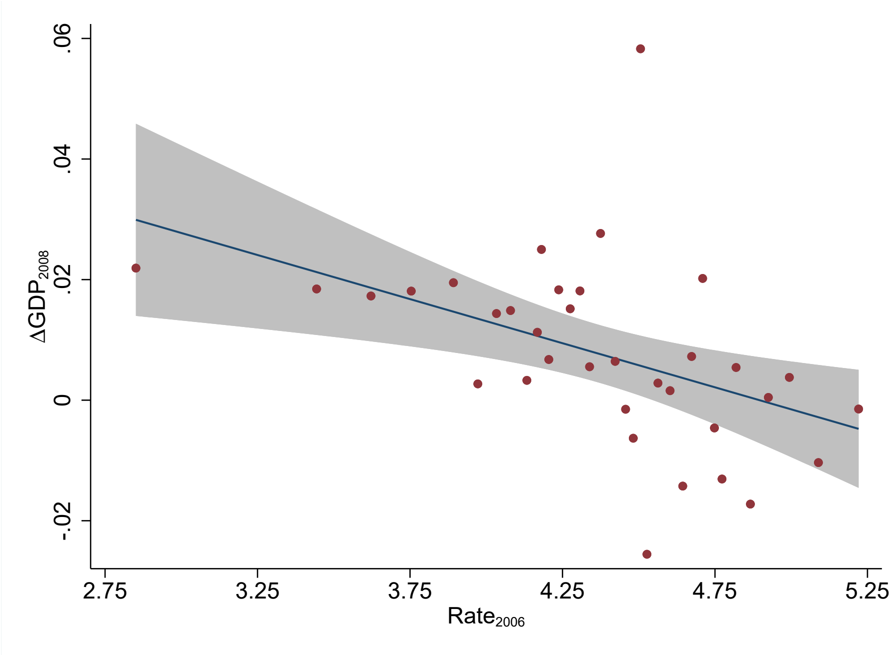
(b) 2009



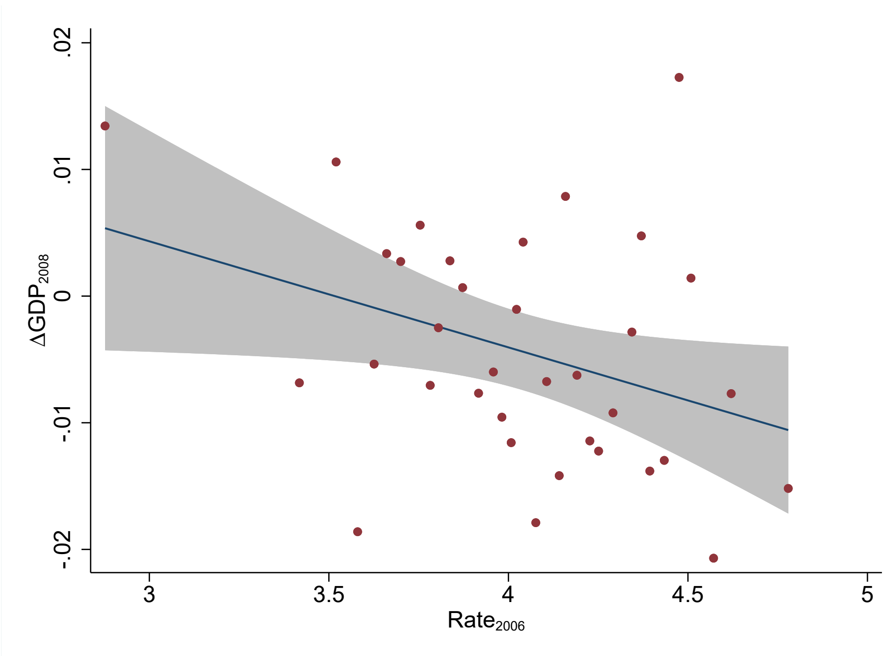
(c) 2017

Notes: This figure uses RateWatch data to present a heatmap of county deposit rates (12-month, \$10K CDs). Figure 3a presents county deposit rates in 2006; Figure 3b presents county deposit rates in 2009; Figure 3c 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 $\times$ 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 analysis is restricted to single-state banks. The intensity of the blue shading represents the quantile range of the deposit rate.

Figure 4: 2006 Deposit Rates Predict 2008 GDP Growth



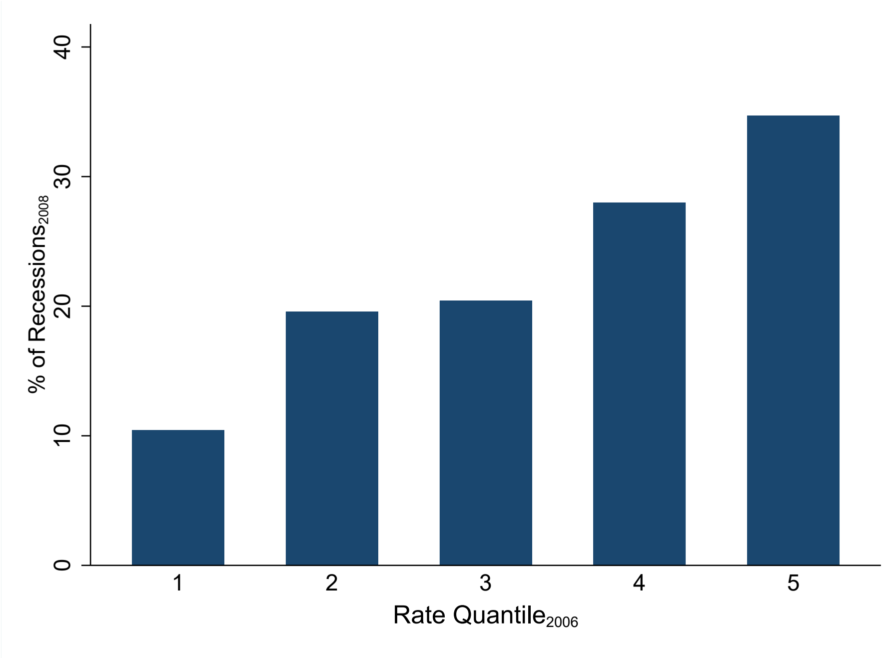
(a) County



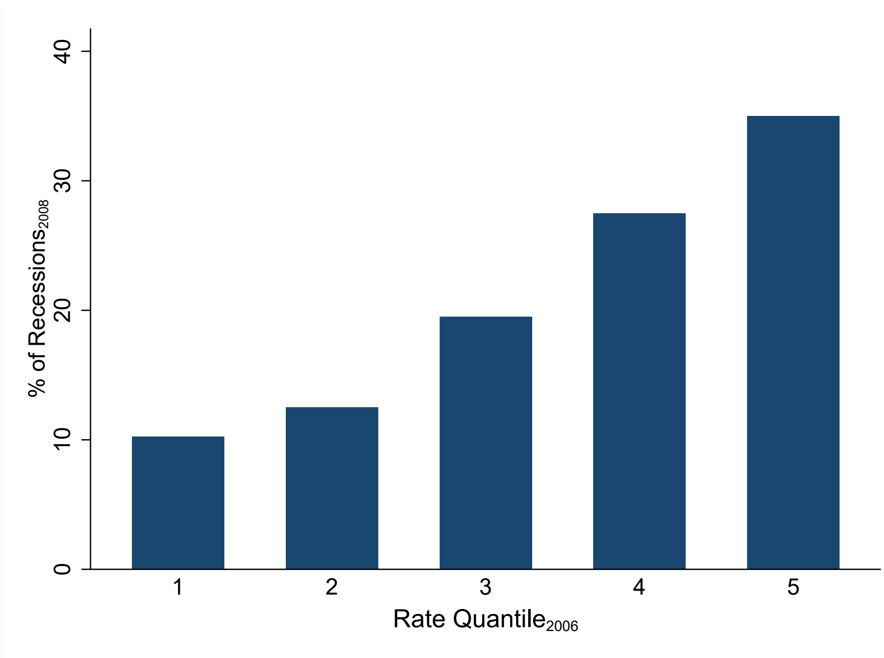
(b) State

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 4a presents the binscatter (35 bins) of the annual county GDP growth in 2008 against the annual county deposit rates in 2006. Figure 4b 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 5: 2006 Deposit Rates Predict 2008 Recessions



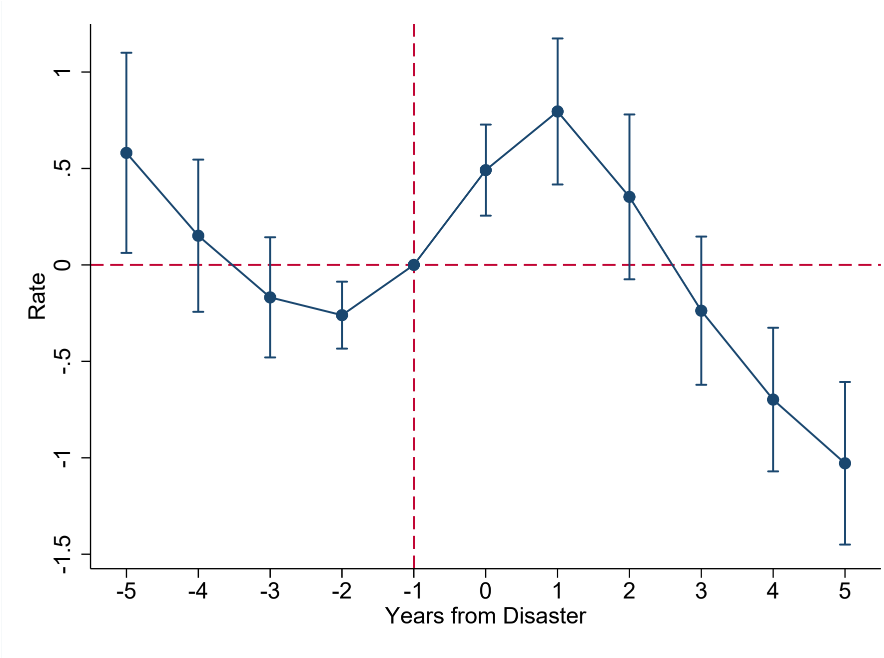
(a) County



(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 5a and Figure 5b, 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 × 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. A state is in a recession if its GDP growth between two consecutive quarters is below -2%.

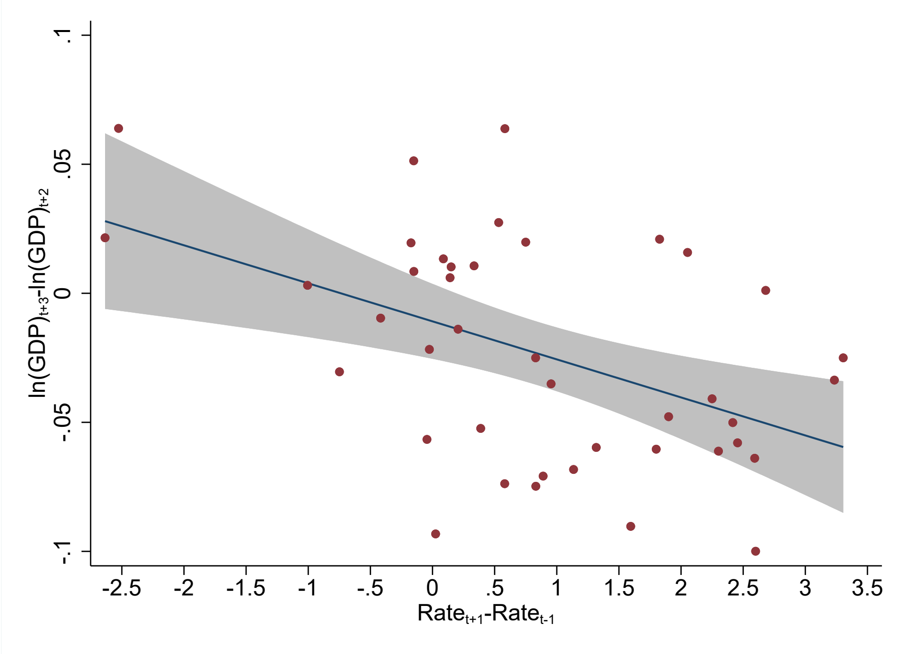
Figure 6: Deposit Rates around Natural Disasters



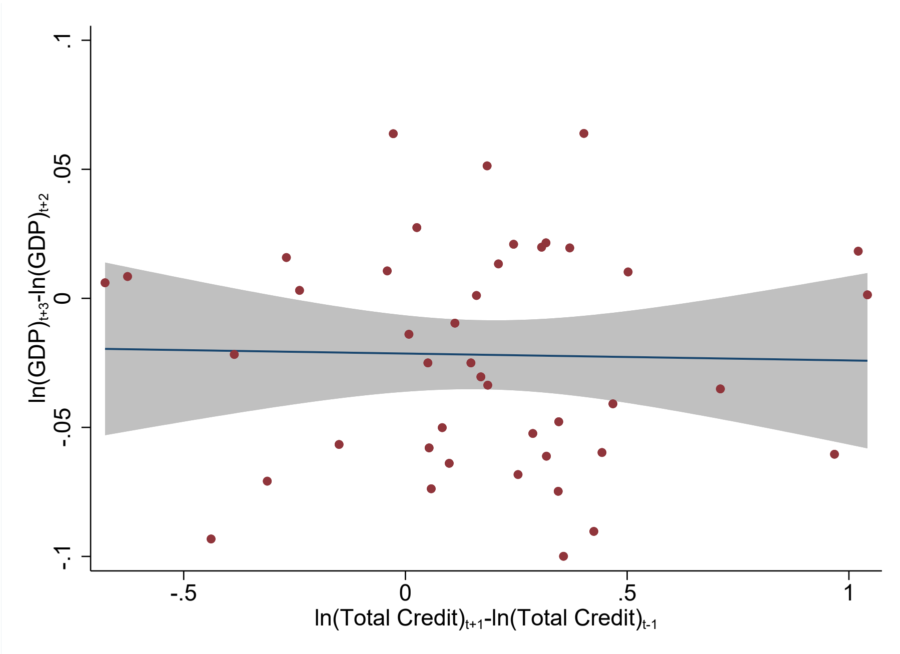
Notes: This figure presents the deposit rates around natural disasters. The figure plots the δ_{t+d} coefficients in the following regression specification of $Rate_{c,t} = \beta_0 + \sum_{t=-5}^{5} \delta_{t+d} + \alpha_c + \epsilon_{c,t}$ where d denotes to the year of the natural disaster, c denotes 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 7: Ex Post Deposit Rate Change around Disasters Predicts Future GDP Growth

(a) Deposit Rate Change

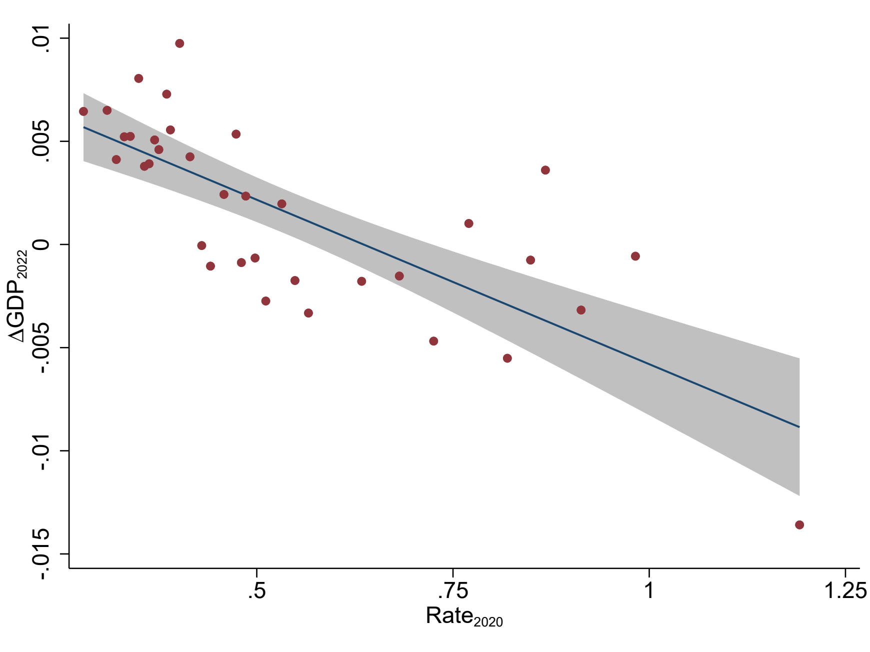


(b) Credit Growth



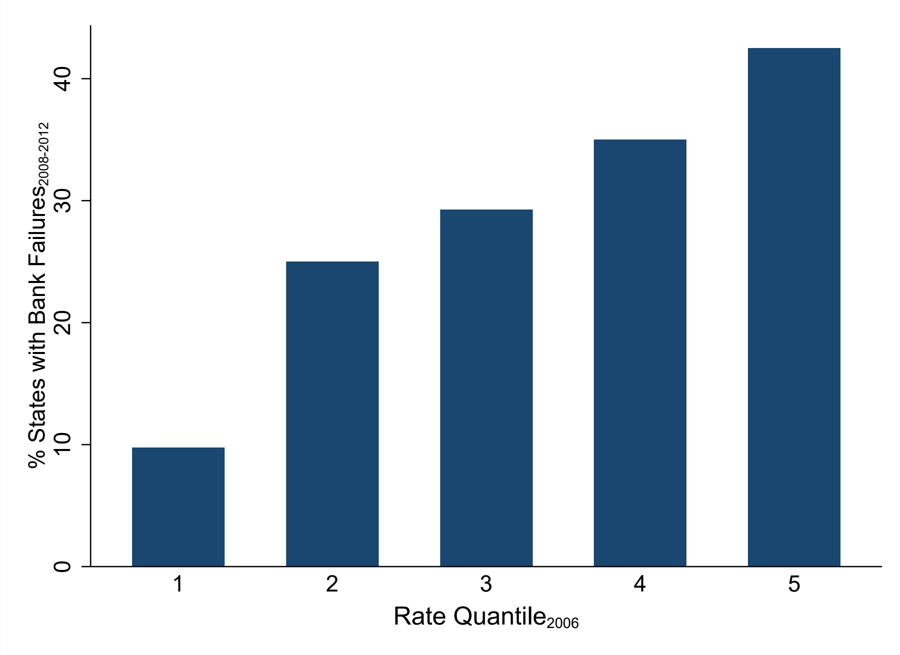
Notes: This figure illustrates the binned bivariate averages ("binscatter") of county-level GDP growth rate against the change in deposit rates (Figure 7a) and the total credit growth (Figure 7b) after a natural disaster. The figure presents the binscatter (35 bins) of the annual county GDP growth, three years after a natural disaster, against the change in the deposit rate one year following a natural disaster in Figure 7a, and against the growth in total credit – sum of small business lending and mortgage lending – one year following a natural disaster in Figure 7b. 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 of Figure 7a) is computed as the difference of the deposit rate one year after a natural disaster, relative to one year before. The total credit growth (x-axis of Figure 7b) is computed as the natural-log difference of the total volume of credit 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 8: 2020 State Deposit Rates Predict 2022 State GDP Growth

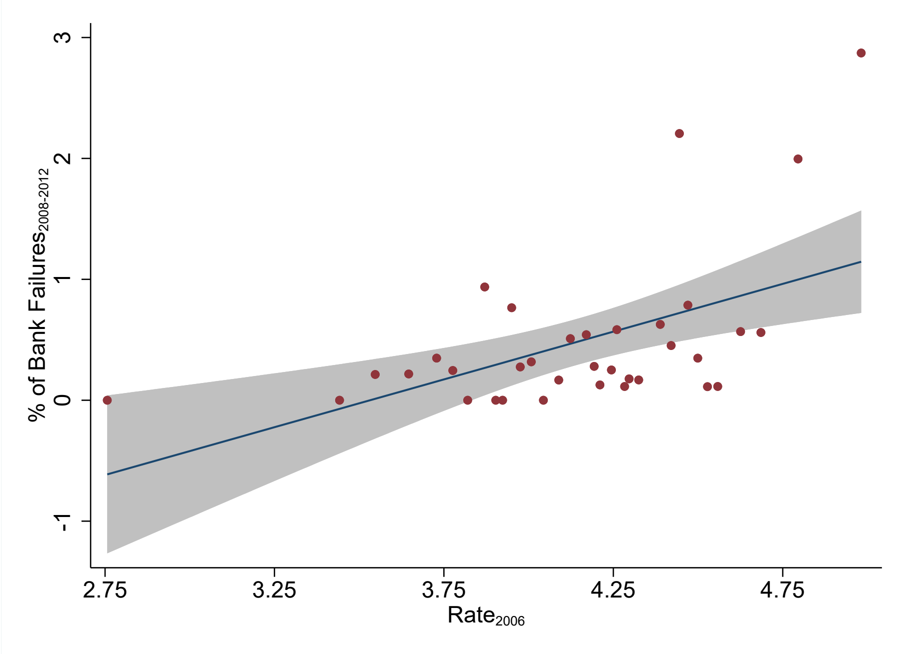


Notes: This figure illustrates the binned bivariate averages ("binscatter") of the 2022 quarterly state GDP growth rate against the 2020 quarterly deposit rate at the state level. The figure presents the binscatter (35 bins) of the quarterly state GDP growth in 2022 against the quarterly state deposit 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 9: 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 9a and Figure 9b present the association between state deposit rates in 2006 and bank failures between 2008 and 2012. Figure 9a 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 9b 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$^{\text{th}}$ percentile value, median, 75$^{\text{th}}$ 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: Employment Growth						
Δln(Employment)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0038***	-0.0085***	-0.0080***	-0.0026	-0.0057***	-0.0095***
	(0.0004)	(0.0004)	(0.0004)	(0.0017)	(0.0017)	(0.0018)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,638	4,347	4,079	4,638	4,347	4,079
R^2	0.1681	0.2263	0.2127	0.6300	0.6469	0.6647
Panel C: 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 D: 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 employment growth is 0.00%, 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 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 4: Economic Activity and Deposit Rate: 2010-2015

Panel A: GDP Growth

$\Delta ln(\text{GDP})$	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: Employment Growth

$ln(\text{Employment})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0143***	-0.0101***	-0.0046	0.0115	-0.0170***	-0.0228***
	(0.0035)	(0.0034)	(0.0038)	(0.0075)	(0.0063)	(0.0085)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	1,477	1,457	1,442	1,477	1,457	1,442
R^2	0.4461	0.4743	0.4880	0.4620	0.4869	0.5110

Panel C: Business Formation

$ln(\text{Applications})$	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 D: 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 employment growth is 0.62%, 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 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: 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 7: 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: $logit(p_{c,t+k}) = \beta_0 + \beta_1 \mathbb{1}_{Disaster,c} \times Rate_{c,t} \times Shock_{c,t} + \beta_2 \mathbb{1}_{Disaster,c} \times Rate_{c,t} + \beta_3 Rate_{c,t} + \beta_4 Shock_{c,t} + \alpha_c + \epsilon_{c,t+k}$ 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 8: 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	-0.0016*	-0.0050***	-0.0048***
	(0.0009)	(0.0009)	(0.0009)
Δ ln(SBL)	0.0061***	0.0032***	0.0031***
	(0.0020)	(0.0010)	(0.0009)
County FIPS FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.0740	0.1149	0.1019

Panel B: Mortgage Lending Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0011	-0.0047***	-0.0048***
	(0.0010)	(0.0008)	(0.0009)
Δ ln(Mortgages)	0.0036***	-0.0009	0.0072***
	(0.0007)	(0.0007)	(0.0008)
County FIPS FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.0700	0.1121	0.1118

Panel C: Total Lending Growth

Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0011	-0.0047***	-0.0049***
	(0.0010)	(0.0008)	(0.0009)
Δ ln(Total)	0.0039***	-0.0006	0.0075***
	(0.0008)	(0.0007)	(0.0008)
County FIPS FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.0705	0.1118	0.1123

Notes: This table presents the relation between county deposit rates and economic activity in metro counties, after controlling for credit growth. 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+mortgage) 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. 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 9: Economic Activity and Deposit Rates with Low Single-State Lending Share

Panel A: Small Business Lending Share			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0040*	-0.0092***	-0.0124***
	(0.0020)	(0.0019)	(0.0017)
County FIPS FE	✓	✓	✓
N	589	583	569
R^2	0.2318	0.2585	0.3000

Panel B: Mortgage Lending Share			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0005	-0.0140***	-0.0136***
	(0.0013)	(0.0016)	(0.0015)
County FIPS FE	✓	✓	✓
N	1,268	1,150	1,130
R^2	0.2376	0.3280	0.2966

Panel C: Total Lending Share			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0025*	-0.0158***	-0.0156***
	(0.0014)	(0.0017)	(0.0017)
County FIPS FE	✓	✓	✓
N	960	889	878
R^2	0.2063	0.3155	0.3058

Notes: This table presents the relation between county deposit rates and economic activity in metro counties counties where single-state banks' lending volume accounts for less than 10% of the total. 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: $\Delta ln(GDP)_{c,t+k} = \beta_1 \cdot Rate_{c,t} + \alpha_c + \epsilon_{c,t}$ where $\Delta ln(GDP)$ denotes GDP growth, and *Rate* denotes the average bank deposit rate. Panel A restricts the sample to metropolitan counties where single-state banks' small business lending volume accounts for less than 10% of the total; Panel B restricts the sample to metropolitan counties where single-state banks' mortgage lending volume accounts for less than 10% of the total. Panel C restricts the sample to metropolitan counties where single-state banks' total lending volume (small business+mortgage) accounts for less than 10% of the total. 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% 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 10: 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 state 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 state 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. $ln(\text{Auto Sales})$ denotes the natural-log of auto sales. $ln(\text{UI Claims})$ denotes the natural-log of the number of unemployment insurance claims. $ln(\text{Job Openings})$ 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.

Table 11: Insured and Uninsured Deposit Growth and Bank Rate Changes

Panel A: Insured Deposit Growth

Δln(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

Δln(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 × 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 12: 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 13: 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 12, and $\Delta ln(Loans)_{b,t+k}$, denoting lending growth in Table 13. $\mathbb{1}_{P25<\text{Dep Rate Change}\leq P50}$, $\mathbb{1}_{P50<\text{Dep Rate Change}\leq P75}$, $\mathbb{1}_{\text{Dep Rate Change}>P75}$ 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.

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.

Industry Activity: We use data on industry activity from the Quarterly Census of Employment and Wages (QCEW), produced by the Bureau of Labor Statistics (BLS). At the national level, the program publishes data for nearly every North American Industry Classification System (NAICS) industry. At the state, county, and Metropolitan Statistical Area (MSA) levels, the QCEW program offers more granular data, publishing establishment, employment, and wage information down to the 6-digit NAICS industry level. Specifically, this includes quarterly and annual establishment counts and wage data, as well as monthly and annual employment data. Additionally, the QCEW program produces data on establishments, employment, and wages stratified by establishment size for the first quarter of each year. This richly detailed information enables in-depth analysis of local economies and industry trends. QCEW reports data, starting at the 6-digit NAICs level to higher industry levels and to the county, MSA, State, and national levels. We collapse the data to create a panel at the county *times* industry $\times$ year level. This panel is used to identify the dominant industry in the last ten years, measured by total employment.

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.

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.

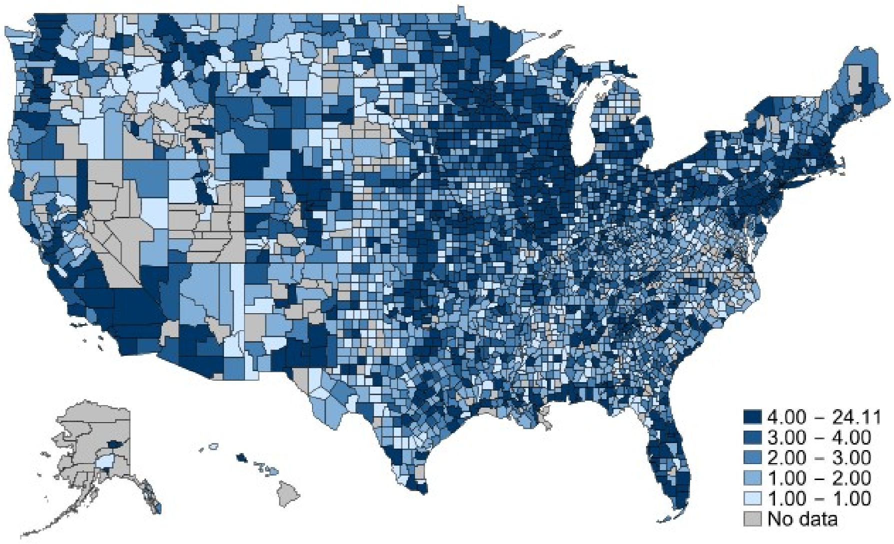
Rural-Urban Continuum Codes We use data on Rural-Urban continuum codes from the US Department of Agriculture Economic Research Service (USDA ERS). The Rural-Urban Continuum Codes are a classification scheme that distinguishes metropolitan counties by population size of their metropolitan area and non-metropolitan 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.

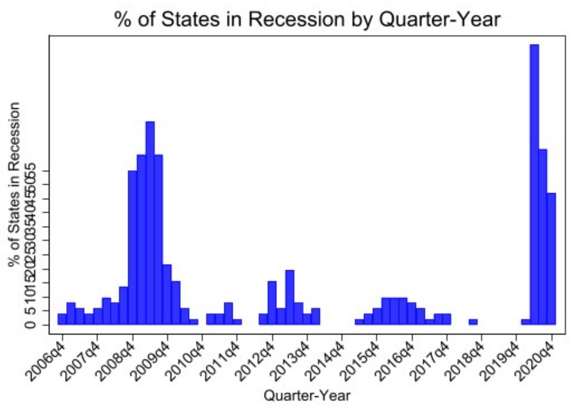
Appendix B Figures and Tables

Figure B.1: Number of Banks per County (2001-2020)

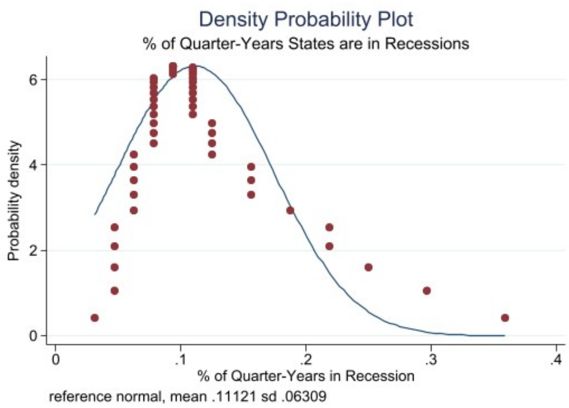


Notes: This figure presents a heatmap of the average number of banks that offer 12-month certificates of deposit of at least $10,000 in each county from 2001 to 2020. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the total 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.2: Recessions Across States and Time



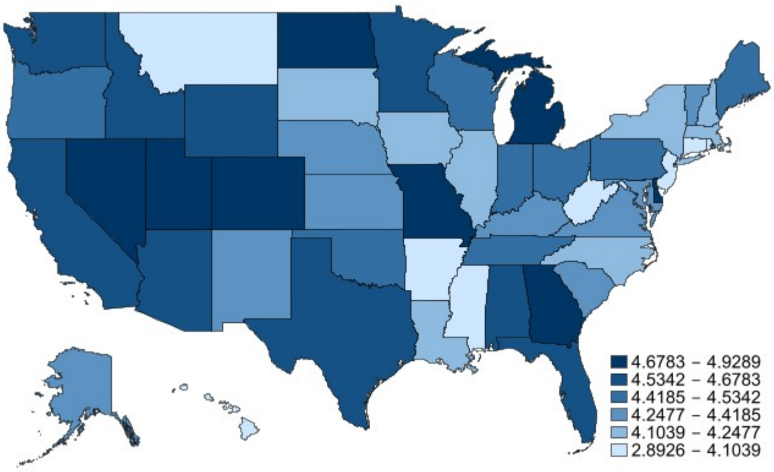
(a) % of States in Recession



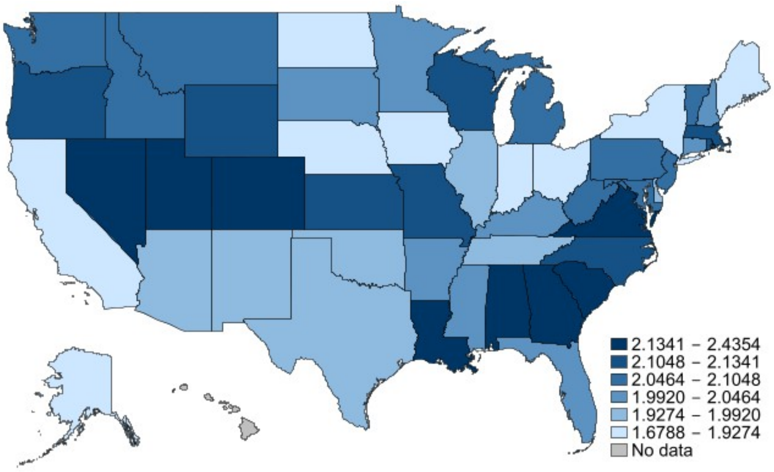
(b) % of Recessions within States

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

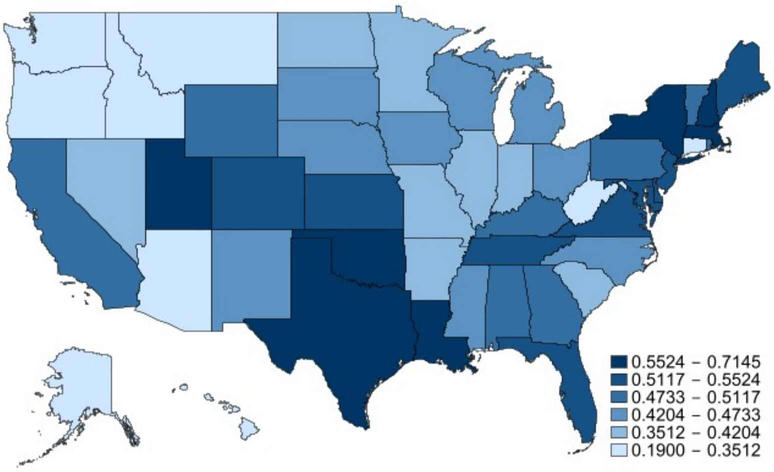
Figure B.3: Deposit Rate Across States and Time



(a) 2006Q4



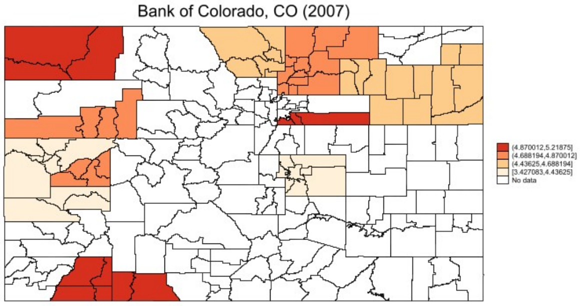
(b) 2009Q1



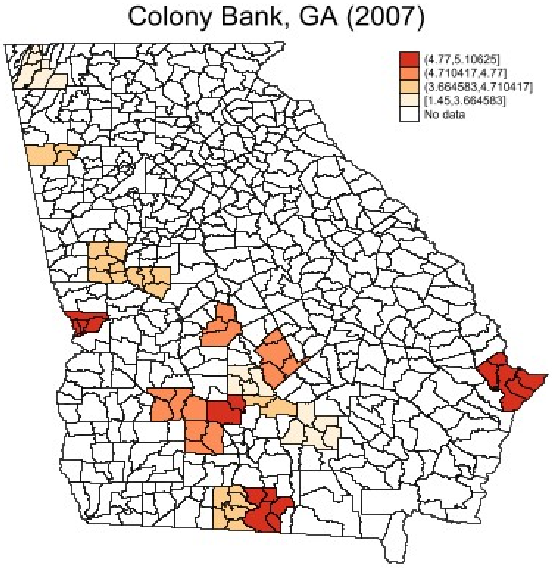
(c) 2017Q1

Notes: This figure uses RateWatch data to present a heatmap of state deposit rates (12-month, \$10K CDs). Figure B.3a presents state deposit rates in 2006Q4; Figure B.3b presents state deposit rates in 2009Q1; Figure B.3c 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 × 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 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.

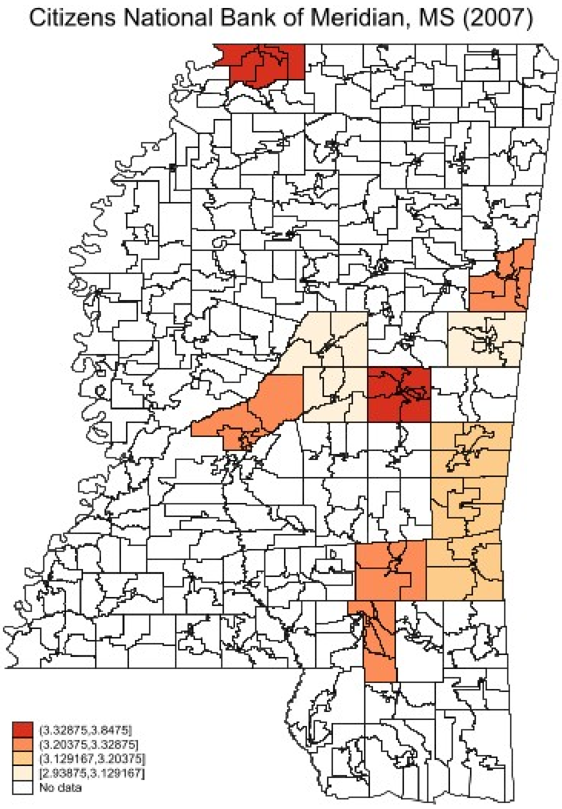
Figure B.4: Bank Deposit Rates: 2007



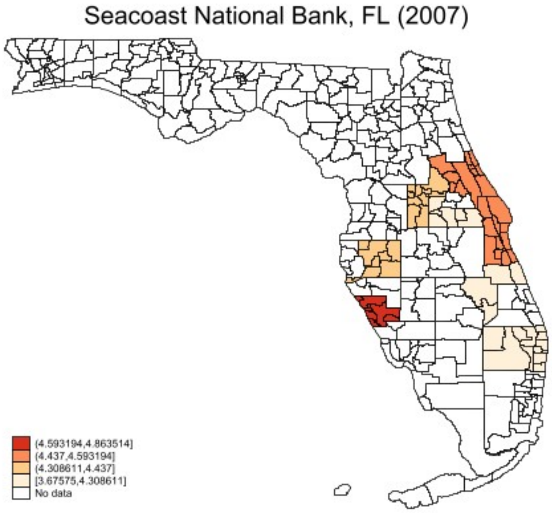
(a) Bank of Colorado



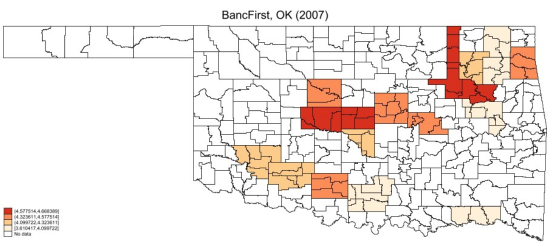
(b) Colony Bank



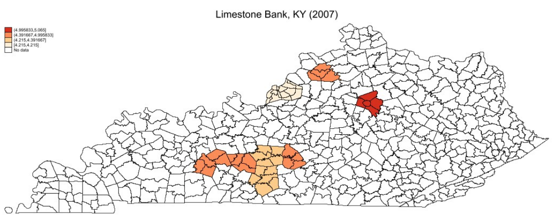
(c) Citizens National Bank of Meridian



(d) Seacoast National Bank



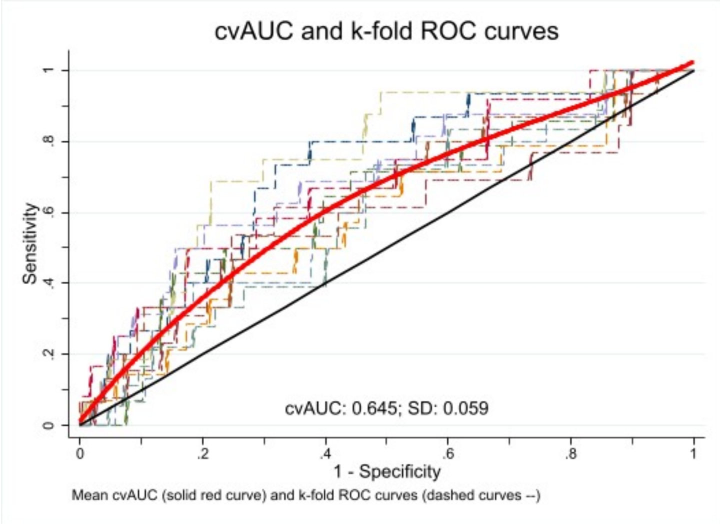
(e) BancFirst (OK)



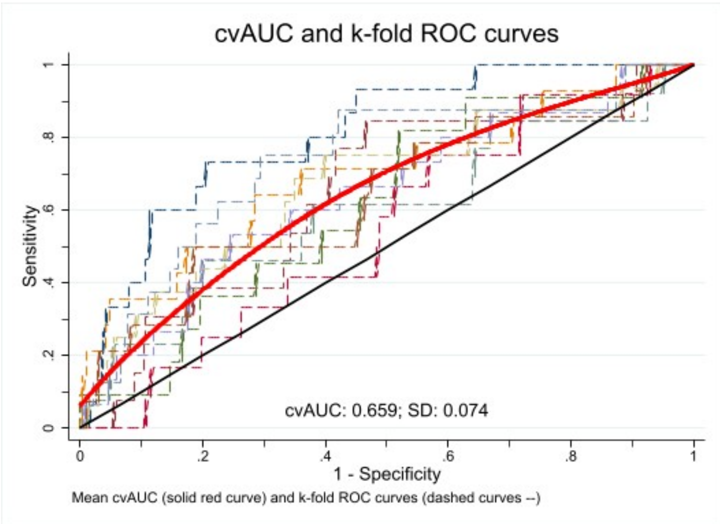
(f) Limestone Bank

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.4a), Colony Bank (Appendix Figure B.4b), Citizens National Bank of Meridian Bank (Appendix Figure B.4c), Seacoast National Bank (Appendix Figure B.4d), BancFirst (Appendix Figure B.4e), and Limestone Bank (Appendix Figure B.4f). 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.

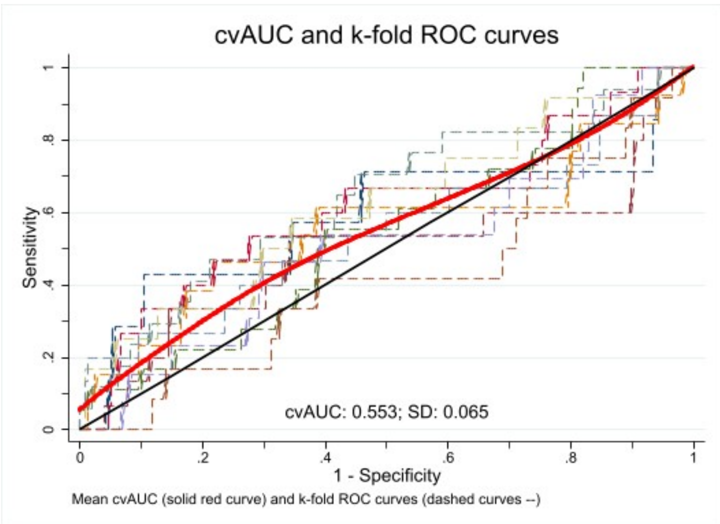
Figure B.5: Out-of-Sample Estimation: Deposit Rates Predict State Recessions



(a) Recession in 4 Quarters



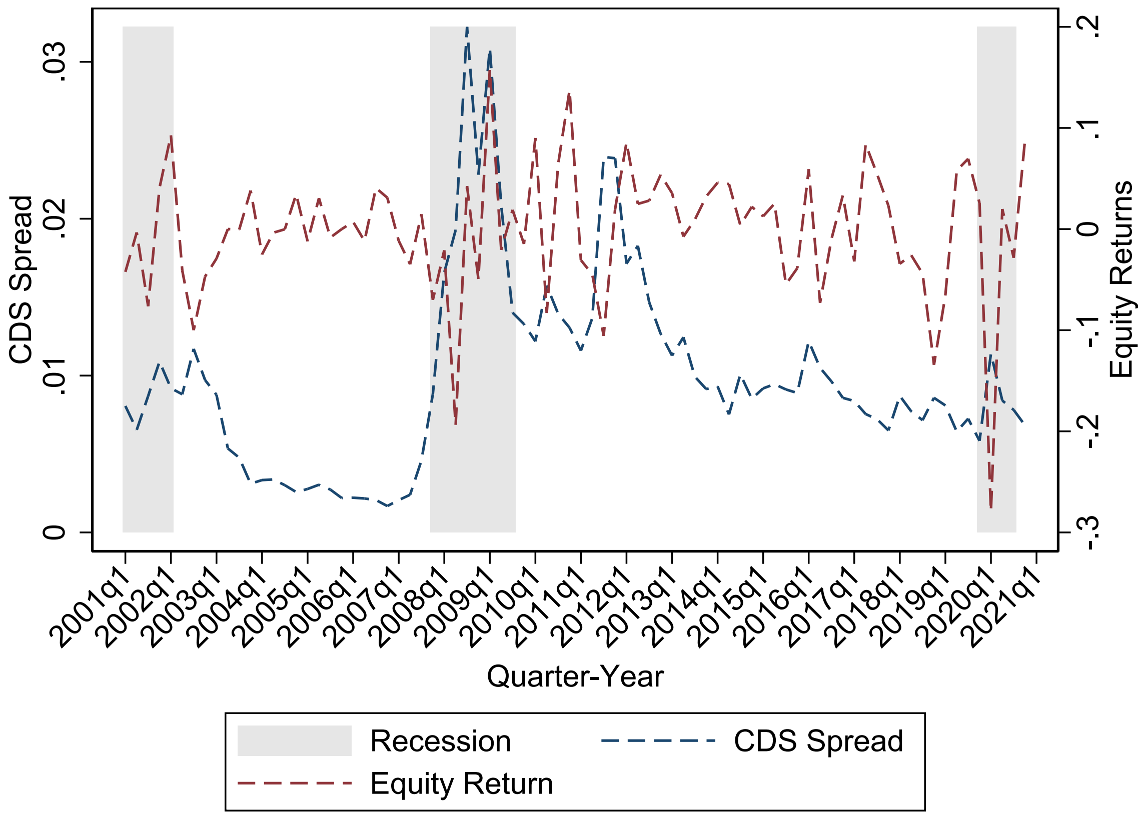
(b) Recession in 8 Quarters



(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.

Figure B.6: 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.

Table B.1: 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 × 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 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.2: 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	-0.0016**	-0.0047***	-0.0040***	-0.0037	-0.0048	-0.0134***
	(0.0008)	(0.0007)	(0.0006)	(0.0034)	(0.0032)	(0.0041)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,521	4,245	3,995	4,521	4,245	3,995
R^2	0.1098	0.1212	0.1199	0.2696	0.2752	0.2804

Panel B: Employment Growth

ln(Employment)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0039***	-0.0086***	-0.0081***	-0.0043**	-0.0059***	-0.0096***
	(0.0004)	(0.0004)	(0.0004)	(0.0018)	(0.0019)	(0.0019)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,560	4,280	4,029	4,560	4,280	4,029
R^2	0.1696	0.2269	0.2141	0.6388	0.6526	0.6701

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	-0.0506***	-0.0556***	-0.0767***	0.0007	-0.0171	-0.0343**
	(0.0033)	(0.0033)	(0.0036)	(0.0143)	(0.0170)	(0.0169)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	3,890	3,617	3,367	3,890	3,617	3,367
R^2	0.9788	0.9785	0.9797	0.9931	0.9932	0.9933

Panel D: 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	0.4336***	0.3722***	0.3051***	0.0849**	0.1224***	0.1187***
	(0.0157)	(0.0157)	(0.0158)	(0.0367)	(0.0383)	(0.0437)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	2,372	2,357	2,165	2,372	2,357	2,165
R^2	0.5639	0.5311	0.5383	0.9283	0.9266	0.9246

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 employment growth is 0.00%, 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.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	1,244	1,089	957
R^2	0.1737	0.1972	0.1531
Panel B: Employment Growth			
Δln(Employment)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0033***	-0.0042***	-0.0026***
	(0.0012)	(0.0011)	(0.0007)
County FIPS FE	✓	✓	✓
N	1,271	1,113	978
R^2	0.1751	0.1946	0.1876
Panel C: 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 D: 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	1,049	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. Average GDP growth is 1.72%, average employment growth is 0.00%, 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.4: GDP Growth and Different Deposit Contracts

$\Delta ln(\text{GDP})$	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: Industry Activity and Deposit Rate in the Dominant Industry of a Region

Panel A: Employment Growth in Dominant Industry

Δln(Employment)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0077***	-0.0122***	-0.0108***	-0.0025	-0.0063**	-0.0068**
	(0.0007)	(0.0008)	(0.0008)	(0.0029)	(0.0029)	(0.0033)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,633	4,342	4,074	4,633	4,342	4,074
R^2	0.1534	0.2020	0.1897	0.3472	0.3523	0.3612

Panel B: Wage Growth in Dominant Industry

Δln(Wages)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0077***	-0.0144***	-0.0144***	-0.0021	-0.0072*	-0.0093**
	(0.0009)	(0.0010)	(0.0009)	(0.0038)	(0.0037)	(0.0045)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,633	4,342	4,074	4,633	4,342	4,074
R^2	0.1148	0.1667	0.1766	0.2862	0.2953	0.3112

Panel C: Establishment Growth in Dominant Industry

ln(# Establishments)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0004	-0.0034***	-0.0052***	-0.0010	-0.0026	-0.0057*
	(0.0007)	(0.0007)	(0.0007)	(0.0026)	(0.0032)	(0.0030)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	4,638	4,347	4,079	4,638	4,347	4,079
R^2	0.1591	0.1732	0.1987	0.1999	0.2070	0.2180

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 $\times$ 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 employment growth is -0.77%, average wage growth is 2.15%, and average # establishment growth is -0.26% for the dominant industry in metro counties from 2001 through 2020. The dominant industry in a county is determined by identifying the industry with the highest employment over the past decade (rolling measure). 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.6: Economic Activity and Deposit Rate: 2006

Panel A: GDP Growth

Δln(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.7: 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.8: 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: Employment Growth

ln(Employment)	1 Year Ahead	2 Years Ahead	3 Years Ahead	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0033***	-0.0084***	-0.0083***	-0.0052***	-0.0092***	-0.0135***
	(0.0004)	(0.0004)	(0.0004)	(0.0018)	(0.0021)	(0.0022)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE				✓	✓	✓
N	5,376	5,070	4,771	5,376	5,070	4,771
R^2	0.1637	0.2239	0.2185	0.6127	0.6325	0.6525

Panel C: 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 D: 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 × 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 employment growth is 0.00%, 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.9: 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 $\times$ 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.10: 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 $\times$ 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.11: 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.12: 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.13: 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.14: 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.15: 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)	-0.0183***	0.0006	0.0129*
	(0.0063)	(0.0065)	(0.0068)
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 B.16: 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*	0.0004	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 $\times$ 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 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.17: 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	0.0254***	0.0550***	0.0479***
	(0.0050)	(0.0053)	(0.0058)
Δ ln(SBL)	-0.0303***	-0.0099*	-0.0060
	(0.0057)	(0.0058)	(0.0061)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0847	0.1029	0.0951
AUC	0.7114	0.7300	0.7233
Overall test statistic, χ^2	326.6300	382.1931	312.7583
p-value	0.0006	0.0000	0.0011

Panel B: Mortgage Lending Growth

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0222***	0.0557***	0.0479***
	(0.0047)	(0.0054)	(0.0056)
Δ ln(Mortgages)	-0.0311***	0.0342***	-0.0460***
	(0.0055)	(0.0062)	(0.0056)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0859	0.1125	0.1089
AUC	0.7071	0.7446	0.7389
Overall test statistic, χ^2	300.7770	470.6453	408.7833
p-value	0.0122	0.0000	0.0000

Panel C: Total Lending Growth

$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0223***	0.0552***	0.0481***
	(0.0047)	(0.0054)	(0.0056)
Δ ln(Total)	-0.0312***	0.0312***	-0.0460***
	(0.0057)	(0.0062)	(0.0056)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0856	0.1104	0.1084
AUC	0.7070	0.7421	0.7381
Overall test statistic, χ^2	300.1627	463.7024	402.3284
p-value	0.0130	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+mortgage) 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.18: 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)	-0.0282***	-0.0039	-0.0005
	(0.0057)	(0.0059)	(0.0063)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0787	0.0725	0.0729
AUC	0.7041	0.6837	0.6843
Overall test statistic, χ^2	296.0532	240.2963	232.6894
p-value	0.0176	0.5007	0.6028

Panel B: Mortgage Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Δ ln(Mortgages)	-0.0316***	0.0324***	-0.0443***
	(0.0055)	(0.0060)	(0.0056)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0811	0.0814	0.0855
AUC	0.7022	0.7040	0.7102
Overall test statistic, χ^2	281.7599	292.1490	314.7861
p-value	0.0635	0.0135	0.0007

Panel C: Total Credit Growth			
$\mathbb{1}_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Δ ln(Total)	-0.0317***	0.0302***	-0.0443***
	(0.0058)	(0.0060)	(0.0057)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0808	0.0798	0.0850
AUC	0.7019	0.7024	0.7090
Overall test statistic, χ^2	280.6678	287.6307	310.0895
p-value	0.0694	0.0212	0.0013

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+mortgage) 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.19: Economic Activity and Residual Deposit Rates

Panel A: Small Business Lending Growth			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate Residual	-0.0029***	-0.0072***	-0.0055***
	(0.0011)	(0.0010)	(0.0007)
County FIPS FE	✓	✓	✓
N	3,990	3,726	3,464
R^2	0.1065	0.1279	0.1210

Panel B: Mortgage Lending Growth			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate Residual	-0.0025**	-0.0069***	-0.0054***
	(0.0010)	(0.0009)	(0.0007)
County FIPS FE	✓	✓	✓
N	3,990	3,726	3,464
R^2	0.1054	0.1268	0.1203

Panel C: Total Lending Growth			
Δln(GDP)	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate Residual	-0.0025**	-0.0069***	-0.0054***
	(0.0010)	(0.0009)	(0.0007)
County FIPS FE	✓	✓	✓
N	3,990	3,726	3,464
R^2	0.1055	0.1269	0.1204

Notes: This table presents the relation between the residual of county deposit rates, after partialling out the effects of contemporaneous and lagged values of credit growth and economic activity in metro counties 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: $\Delta ln(GDP)_{c,t+k} = \beta_1 \cdot \text{Rate Residual}_{c,t} + \alpha_c + \epsilon_{c,t}$ where $\Delta ln(GDP)$ denotes GDP growth. Rate Residual represents the predicted residual from a regression model that estimates the relationship between the deposit rate and annual credit growth, according to the following specification $Rate_{c,t} = \beta_1 \cdot \text{Credit Growth}_{c,t-1,t} + \beta_2 \cdot \text{Credit Growth}_{c,t-2,t-1} + \beta_3 \cdot \text{Credit Growth}_{c,t-3,t-2} + \alpha_c + \epsilon_{c,t}$. Credit growth is measured as small business lending growth in Panel A, mortgage lending growth in Panel B, and total lending growth (small business lending+mortgage) 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 B.20: 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 state 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. Average quarterly GDP growth is 0.30% from 2005 through 2020. 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 B.21: 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 B.22: 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.23: 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.24: 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.