

Deposit Rates as Regional Economic Indicators*

Rajkamal Iyer[†]

Shohini Kundu[‡]

Nikos Paltalidis[§]

Abstract

This paper shows that local bank deposit rates are strong predictors of local economic downturns, outperforming deposit growth, credit growth, and standard leading indicators such as auto sales, unemployment claims, and job openings. A one standard deviation increase in county deposit rates predicts a 1.35 percentage point decline in GDP growth three years ahead and delivers an AUC of 0.73 in forecasting local recessions. We argue that deposit rates outperform quantity-based measures because, as equilibrium prices, they embed forward-looking information about the marginal cost of bank funding that quantities do not fully capture. Consistent with a funding-conditions channel, counties exposed to the 2018 Wells Fargo regulatory enforcement experienced deposit outflows, rising deposit rates, contractions in small-business lending, and slower GDP growth. Bank-level evidence further shows that the largest rate increases occur at banks with stretched credit-to-deposit ratios and low cash holdings, rather than at banks with weaker capital or higher non-performing loans. Together, these results establish deposit rates as a timely, granular, and publicly observable indicator of regional economic risk.

*Acknowledgments: We thank Jonathan Parker, Jeremy Stein, and Annette Vissing-Jørgensen for their valuable suggestions. We also thank Taha Ahsin, Juliane Begenau, Patrick Bolton, Kristle Romero Cortés, Andrea Eisfeldt, Mike Faulkender, Mark Grinblatt, Valentin Haddad, Marcin Kacperczyk, Anil Kashyap, Edward Leamer, Nadya Malenko, Tatyana Marchuk, Tyler Muir, Greg Nini, Raghuram Rajan, Antoinette Schoar, Alexi Savov, Dominik Supera, Savitar Sundaresan, Anand Systla, Ivo Welch, Xiaoyun Yu, Rebecca Zarutskie, and Jinyuan Zhang for helpful comments. We are also thankful to seminar and conference participants at the Carnegie Mellon Tepper School of Business, University of Pittsburgh, Johns Hopkins Carey, NYU Stern, UCLA Anderson, Imperial College Business, Chicago Booth Banking Workshop, Banco de Portugal, Temple University Fox, Federal Reserve Bank of Richmond, Federal Reserve/FDIC/CSBS Community Banking Research Conference, AFA Annual Meeting, AFFECT Workshop, OCC Bank Research Symposium, Federal Reserve Board Conference on the Macroeconomic Seeds of Financial Imbalances, IESE Turmoil and Regulatory Reform Workshop, FMA Annual Meeting, Wharton Conference on Liquidity and Financial Fragility, FDIC Bank Research Conference, Federal Reserve Short-Term Funding Markets Conference, Beachside Banking Chat, Deutsche Bundesbank-Center for Advanced Studies on the Foundations of Law and Finance-Center for European Transformation-CEPR Conference on Regulating Financial Markets, Indian School of Business Summer Research Conference, European Economic Association Annual Meeting, Annual Meeting of the Swiss Society for Financial Market Research, Tehran Institute for Advanced Studies, Conference on Research on Economic Theory and Econometrics. This research was funded in part by the Laurence and Lori Fink Center for Finance and the UCLA Ziman Center for Real Estate's Rosalinde and Arthur Gilbert Program in Real Estate, Finance and Urban Economics.

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

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

[§]Nikos Paltalidis is at the Ecole de Management Léonard De Vinci. email: nikos.paltalidis@devinci.fr

1 Introduction

The modern literature on financial crises and economic downturns has largely focused on the asset side of financial intermediaries’ balance sheets. Credit booms predict banking crises, household deleveraging amplifies recessions, and rapid credit expansion forecasts severe downturns (e.g., [Schularick and Taylor, 2012](#); [Mian and Sufi, 2016](#); [Jordà et al., 2016](#); [Greenwood et al., 2022](#)). Yet banks are funded institutions. Every expansion in credit must ultimately be financed through liabilities, and periods of financial stress are often characterized as much by pressure on funding markets as by deterioration in loan portfolios. The omission matters: in our data, 48% of U.S. county recessions over 2001–2020 are preceded by three years of *negative* credit growth, leaving the credit-boom narrative silent on roughly half of local downturns. We argue that the missing signal sits on the liability side, specifically, in the price of bank funding.

This paper studies local bank deposit rates as a predictor of regional economic downturns. Deposit rates are the equilibrium price banks pay for marginal funding. When funding conditions tighten, banks compete more aggressively for deposits, causing rates to rise before balance-sheet quantities adjust. We show that these prices contain information about future regional economic conditions that is largely absent from traditional quantity-based measures such as credit growth or deposit growth. Our approach parallels recent work arguing that financial prices reveal variation in intermediary health and expectations that quantities alone do not capture ([Krishnamurthy and Muir, 2025](#)). But whereas existing work focuses primarily on asset markets and crisis episodes, we show that funding prices in retail deposit markets forecast a broad set of regional downturns, including ordinary non-crisis recessions.

Our empirical analysis exploits geographic variation in deposit pricing across U.S. counties. Because national interest rates and monetary policy affect all banks simultaneously, aggregate deposit rates are difficult to interpret. County-level variation instead allows us to isolate local funding conditions while absorbing aggregate macroeconomic forces through time fixed effects. More broadly, our approach follows a growing literature that uses cross-regional variation to study macroeconomic mechanisms ([Guren et al., 2021](#)). We therefore focus primarily on single-state banks, for which deposit pricing is more likely to reflect local funding pressures and competitive conditions than centralized balance-sheet management ([Berger and Udell, 1995](#); [Petersen and Rajan,](#)

1994; Heitfield, 1999; Biehl, 2002; Heitfield and Prager, 2004; Granja et al., 2022a). Although single-state banks are smaller and more geographically concentrated, the predictive relationship is strongest in competitive metropolitan markets where deposit pricing is more responsive to local funding conditions. We therefore interpret single-state banks primarily as a measurement device for isolating local funding pressures rather than as the economically dominant source of regional credit supply.

County-level increases in deposit rates strongly predict subsequent local economic slowdowns across a broad set of outcomes, including GDP growth, employment growth, business formation, and wage growth. A one standard deviation increase in deposit rates predicts a 1.35 percentage point decline in GDP growth over the subsequent three years. In forecasting local recessions, our specification achieves an AUC of 0.73, substantially exceeding standard benchmarks for information-rich forecasting environments.¹ These results are robust to controlling for lagged local economic conditions, indicating that deposit rates contain forward-looking information rather than merely reflecting contemporaneous or recently realized weakness.

The predictive relationship between deposit rates and economic activity is not driven solely by national monetary policy. Our baseline specifications include time fixed effects that absorb aggregate policy shifts and national macroeconomic conditions. Moreover, the relationship remains strong during the 2010–2015 zero lower bound period, when short-term policy rates were effectively constant and aggregate credit conditions remained relatively subdued. Even in this environment, cross-county variation in deposit rates continued to forecast subsequent declines in local economic activity.

Why do deposit rates forecast local economic activity? Deposit rates reflect the marginal cost of bank funding and therefore respond to shifts in local funding conditions before those pressures fully appear in balance-sheet quantities. Our interpretation is that rising deposit rates capture localized funding stress that subsequently affects lending and economic activity through banks' funding constraints. To examine a setting consistent with this interpretation, we study the 2018 regulatory enforcement action against Wells Fargo, which imposed a binding asset cap following the bank's fake-accounts scandal. Counties with greater pre-existing exposure to Wells Fargo experienced plausibly exogenous contractions in deposit supply after the enforcement action. Using

¹ See (Iyer et al., 2016) for discussion.

a difference-in-differences design, we show that these counties subsequently experienced slower deposit growth, higher deposit rates, reductions in small-business lending, and weaker GDP growth. While we do not interpret this setting as fully identifying the underlying transmission mechanism, the evidence is consistent with localized funding contractions contributing to weaker local economic activity.

Bank-level evidence supports this interpretation. Declines in both insured and uninsured deposit growth precede increases in deposit rates, indicating that banks raise rates in response to funding pressures rather than expanding lending opportunities. Consistent with this mechanism, loan growth falls – not rises – following increases in deposit rates. Moreover, the banks that increase rates most aggressively are those with tighter liquidity positions, including high credit-to-deposit ratios, low cash holdings, and limited securities buffers. By contrast, rate increases are not concentrated among poorly capitalized banks or banks with elevated non-performing loans, suggesting that deposit rates primarily reflect funding stress rather than deteriorating asset quality.

Finally, deposit rates consistently outperform competing indicators in forecasting regional economic conditions. In head-to-head comparisons, deposit rates dominate credit growth, deposit growth, auto sales, unemployment insurance claims, and job openings in predicting subsequent local downturns. Unlike many conventional indicators, which either lag economic conditions or measure realized quantities, deposit rates provide a real-time market-based signal of marginal funding stress within the banking system. More broadly, our results suggest that the liability side of bank balance sheets contains economically important information about future activity that is not captured by standard credit aggregates alone.

Our results contribute to three strands of the literature. First, we extend a literature focused primarily on asset-side and credit-based predictors of economic downturns to the liability side of bank balance sheets. The money view emphasizes declining money growth as a precursor to recessions ([Friedman and Schwartz, 1963](#)), while the credit view highlights credit supply fluctuations as central drivers of downturns ([Mishkin, 1978](#)).² Deposit rates combine these perspectives, offering a forward-looking indicator that extends a literature that has mainly focused on credit-based predictors of financial crises (e.g., [Mian and Sufi, 2009](#); [Schularick and Taylor, 2012](#); [Jordà et al., 2013, 2016](#);

²Following the seminal work by [Friedman and Schwartz \(1963\)](#), several papers have highlighted the association between a decrease in money growth and recessions including [Romer et al. \(1990\)](#), [King and Plosser \(1984\)](#), [Baker et al. \(2018\)](#). Other papers in support of the credit view include [Bernanke \(1983\)](#), [Gertler \(1988\)](#), [Schularick and Taylor \(2012\)](#).

Mian et al., 2017; López-Salido et al., 2017; Baron and Xiong, 2017; Bordalo et al., 2018; Mian et al., 2019; Greenwood et al., 2022; Müller and Verner, 2024; Krishnamurthy and Muir, 2025).

Second, we address a measurement gap by using deposit rates to assess regional economic risk. Popular predictors of economic activity such as the yield curve and corporate bond spreads operate at the national level (e.g., Estrella and Hardouvelis, 1991; Estrella and Mishkin, 1998; Ang et al., 2006; Rudebusch and Williams, 2009; Engstrom and Sharpe, 2019). In contrast, deposit rates are set locally, reflecting banks’ real-time responses to funding pressures in their specific markets. Consequently, they capture regional financial stress that aggregate, national indicators often overlook. This offers a granular, bank-level perspective on how localized funding constraints propagate into local economic activity, aligning with recent calls for high-frequency, geographically disaggregated indicators in macroeconomic monitoring (Chetty et al., 2020).

Third, we contribute to the literature on deposits and regional credit supply. While prior work establishes that deposits matter for local lending and growth (e.g., Jayaratne and Strahan, 1996; Morgan et al., 2004; Gilje et al., 2016; Cortés and Strahan, 2017; Kundu et al., 2021), we show that deposit rates, which reflect local funding conditions, serve as reliable, observable signals of funding pressure. Our findings complement studies of deposit shocks and funding fragility (e.g., Acharya and Mora, 2015; Cortés and Strahan, 2017; Egan et al., 2017; Drechsler et al., 2021), suggesting that deposit rates can proxy for latent deposit constraints, not fully captured by quantity measures alone.

The paper proceeds as follows. Section 2 describes the data and construction of county-level deposit rate measures. Section 3 documents geographic variation in deposit rates and local economic activity. Section 4 presents the main empirical results, relating local deposit rates to local economic activity. Section 5 studies the 2018 Wells Fargo regulatory enforcement as a plausibly exogenous deposit supply shock and examines its effects on deposit rates, lending, and local economic activity. Section 6 presents bank-level evidence consistent with a funding-pressure channel and compares the predictive content of deposit rates with credit growth, deposit growth, and standard leading indicators. Section 7 concludes.

2 Data

Our analysis combines geographically granular data on deposit rates, bank balance sheets, lending activity, and local economic outcomes across U.S. counties from 2001 through 2020.

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 loans 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 (CD) with a minimum account size of \$10,000 because these products are widely reported across banks and counties and closely track banks' marginal retail funding costs. Relative to checking or savings accounts, CD rates adjust more rapidly to local funding conditions and competitive pressures, making them particularly suitable for measuring variation in deposit funding stress. 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. County Gross Domestic Product (GDP), our primary measure of local economic activity, is obtained from the Bureau of Economic Analysis (BEA) and is available annually beginning in 2001. We additionally use quarterly state-level GDP data from the BEA, available beginning in 2005.

Employment, Wages, and Business Formation. We measure local labor market activity using employment and wage data from the Quarterly Census of Employment and Wages (QCEW), produced by the Bureau of Labor Statistics (BLS). Data on county-level business formation come from the Census Bureau's Business Formation Statistics (BFS).

Bank Balance Sheet, Income Statements and Deposits Data. Bank balance sheet and income statement variables are obtained from Call Reports and S&P Market Intelligence. Information on insured and uninsured deposits comes from the FDIC's Statistics on Depository Institutions (SDI), which provide bank-level measures of total deposits and their insured and uninsured components for all FDIC-insured institutions. In addition, branch-level deposit data are obtained from the FDIC Summary of Deposits (SoD).

Small Business Lending and Mortgage Lending. Data on small business lending and mortgage lending are collected under the Community Reinvestment Act (CRA) and the Home Mortgage Disclosure Act (HMDA), respectively.

Other Leading Economic Indicators. We compare the predictive content of deposit rates with several commonly used state-level leading indicators of economic activity, including auto sales, unemployment insurance claims, and job openings. Auto sales data are obtained from RL Polk and aggregated from ZIP codes to the state level. State-level unemployment insurance claims are from the U.S. Department of Labor, and job openings are from the Bureau of Labor Statistics (BLS).

Rural-Urban Continuum Codes. Rural–Urban Continuum Codes are obtained from the U.S. Department of Agriculture Economic Research Service (USDA ERS). The Rural–Urban Continuum Codes classify U.S. counties by metropolitan status and degree of urbanization, distinguishing metropolitan counties by the population size of their metro area and nonmetropolitan counties by their urbanization level and proximity to a metro area. Counties with a 1993 USDA ERS Rural–Urban Continuum Code of 0 or 1 are classified as metropolitan.³

Business Cycle Expansions and Contractions. Business cycle dates are from the National Bureau of Economic Research (NBER) U.S. Business Cycle Expansions and Contractions series. The sample period spans 2001 through 2020.

3 Stylized Facts: Local Economic Activity and Deposit Rates

This section establishes three facts that motivate our empirical analysis. First, many local recessions are not preceded by credit expansions, suggesting that local downturns cannot be understood solely through the lens of boom-bust credit cycles. Second, deposit quantities and deposit prices move in opposite directions prior to local downturns, consistent with tightening funding conditions. Third, variation in deposit rates is overwhelmingly local rather than bank-wide, supporting our interpretation of deposit rates as a measure of local funding stress.

³We use the 1993 vintage to avoid endogenous reclassification driven by economic changes over the sample period.

3.1 Local Recessions and Deposit Dynamics

We begin by documenting substantial spatial and temporal heterogeneity in local recessions.⁴ Figure 1 presents the timing and duration of recessions at the county level. For simplicity, we define a county to be in recession if annual GDP growth falls below -2%, approximately the 20th percentile of county-level GDP growth over the sample period. Figure 1a shows that the share of counties in recession rises from 16% in 2005 to nearly 50% in 2009, indicating substantial synchronization during the Global Financial Crisis. Figure 1b presents the distribution of recession incidence across counties between 2001 and 2020. On average, counties spend roughly 25% of the sample period in recession, with substantial cross-county heterogeneity.

We next examine the behavior of deposits and lending around local recessions. Figure 2 presents coefficient estimates from regressions relating county recession indicators to deposit growth in Panel 2a, deposit rates in Panel 2b, and lending growth in Panel 2c. All specifications include county and year fixed effects.

The figure reveals a striking divergence between deposit quantities and deposit prices prior to local downturns. Deposit growth declines steadily in the years leading up to recessions, while deposit rates rise sharply and peak shortly before the downturn begins. This inverse relationship between deposit quantities and prices is consistent with tightening local funding conditions and a contraction in deposit supply. By contrast, lending growth is already subdued several years before recessions and declines only gradually into the downturn, rather than displaying a sharp pre-recession expansion followed by collapse.

To quantify this observation, we classify each county recession according to average credit growth in the three years preceding the downturn. If average credit growth is negative, we classify the episode as a credit contraction; otherwise, as a credit expansion. We find that 48% of county-level recessions are preceded by credit contractions.⁵ These findings suggest that while credit cycles matter, a substantial share of local recessions emerge outside the traditional credit-boom framework, motivating the examination of funding conditions as an additional source of regional economic stress.

⁴The onset and duration of local recessions depend on factors that differ across business cycles, including regional industrial composition and exposure to idiosyncratic shocks (e.g., [Hamilton and Owyang, 2012](#); [Brown, 2017](#)).

⁵This result is robust across alternative measures of credit growth, including mortgage lending, small-business lending, and total lending growth.

3.2 Local Variation in Deposit Rates

We next examine whether deposit rate variation primarily reflects local funding conditions or bank-wide pricing policies. Our analysis focuses on 12-month certificates of deposit with a minimum balance of \$10,000, the most frequently reported retail deposit product in the RateWatch database.⁶ Appendix Figure A.1 shows broad geographic coverage in the data: between 2001 and 2020, 83% of counties had more than one bank reporting deposit rates.

To isolate local variation in pricing, we focus primarily on single-state banks, whose operations are geographically concentrated and therefore more likely to respond to local economic conditions rather than national treasury management or internal capital markets (Berger and Udell, 1995; Petersen and Rajan, 1994; Granja et al., 2022a). Appendix Figure A.2 presents heatmaps of deposit rates for several single-state banks in 2007, including Bank of Colorado, Colony Bank, Citizens National Bank of Meridian, Seacoast National Bank, BancFirst, and Limestone Bank. Even within the same bank and year, deposit rates vary substantially across locations, indicating that banks actively adjust deposit pricing across regional markets. This intrastate variation in deposit rates is consistent with previous research by Heitfield (1999), Biehl (2002), and Heitfield and Prager (2004), which finds that smaller banks, unlike larger ones, set deposit rates based on regional competitive conditions.

We formally assess the sources of this variation using branch-level regressions with alternative fixed-effects specifications. Appendix Table A.1 shows that county-year fixed effects explain substantially more variation in deposit rates than bank fixed effects and slightly more variation than bank-year fixed effects. Moreover, adding bank or bank-year fixed effects contributes little additional explanatory power once county-year effects are included. These results indicate that deposit pricing responds strongly to local conditions rather than reflecting uniform bank-wide pricing policies.

Motivated by these findings, we aggregate branch-level deposit rates to construct a county-level measure of local funding conditions. Specifically, we compute the average deposit rate across banks within each county and month and then aggregate these monthly observations to the annual frequency. Figure 3 summarizes the average level of county deposit rates over the full sample period from 2001 to 2020, while Figure 4 presents cross-sectional snapshots for 2006, 2009, and 2017.

⁶Our results are robust across alternative deposit products and maturities.

Two patterns stand out. First, deposit rates vary substantially across regions at a given point in time. Second, the geographic distribution of high-rate regions changes meaningfully over time despite relatively stable local banking structures, suggesting that the observed variation reflects evolving local funding conditions rather than persistent differences in market concentration.

3.3 Deposit Rates and Subsequent Economic Activity

We next examine the relationship between deposit rates and future local economic activity. We begin by studying whether cross-sectional variation in deposit rates prior to the Global Financial Crisis predicts the severity of the subsequent downturn across regions. Specifically, we examine whether county deposit rates in 2006 forecast regional economic outcomes during the 2008 contraction. Figure 5 plots county deposit rates against subsequent GDP growth. Counties with higher pre-crisis deposit rates subsequently experienced significantly weaker economic performance during the downturn. Figure 6 presents similar evidence by grouping counties into quintiles based on deposit rates. Counties in the highest deposit-rate quintiles experienced substantially larger declines in economic activity than counties in the lowest quintiles.

These relationships extend beyond the Global Financial Crisis. Figure 7 shows a strong negative relationship between deposit rates and subsequent GDP growth over the full sample period. The relationship remains robust after including county and year fixed effects in Figure 7a, as well as state and quarter-year fixed effects in Figure 7b. Together, these patterns suggest that local deposit rates contain forward-looking information about subsequent regional economic conditions.

4 Main Results

4.1 County-Level Deposit Rates Predict Future Local Activity

Table 1 reports summary statistics for the main variables used in the analysis. County GDP growth averages 1.25% per year, with a standard deviation of 7.80%, indicating substantial cross-county variation in local economic performance. The average county deposit rate is 1.52%, with a standard deviation of 1.27%.

We begin with a county-level panel specification that relates future economic activity in county

c and year $t + k$ to the average deposit rate in year t :

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

where Y denotes GDP growth, employment growth, business formation, or wage growth. The specification includes county and year fixed effects, and standard errors are clustered at the county level. We consider horizons from one to six years. All continuous variables are standardized for ease of interpretation.

Table 2 shows that higher deposit rates predict weaker future economic activity across all outcomes. The estimated effects are strongest at a three-year horizon: a one standard deviation increase in deposit rates is associated with a 1.35 percentage point decline in GDP growth. The pattern is similar for employment growth, business formation, and wage growth. These results remain robust when we add lagged economic controls, indicating that deposit rates contain information beyond recent local growth dynamics.

A natural concern is that deposit rates simply proxy for recent economic weakness rather than predict future activity. Table 3 addresses this concern by adding several lags of GDP growth to the baseline specification. The estimated coefficients on deposit rates remain stable and statistically significant, showing that the predictive content of deposit rates is not explained by past local growth alone.

While GDP growth measures the value of goods and services produced, it can be influenced by external factors like trade and may not fully reflect how the benefits are distributed. For example, increased productivity or investment can boost GDP without necessarily creating more jobs. To capture economic activity more directly, we turn to employment growth in Panel B of Table 2. Higher deposit rates predict weaker labor market conditions over horizons of one to six years, with the strongest effects again appearing roughly three years ahead. A one standard deviation increase in deposit rates is associated with a 0.55 to 0.94 percentage point decline in employment growth, economically large relative to the average county employment growth rate of 0.71%.

Panels C and D show that the predictive content of deposit rates extends beyond aggregate output and employment. Higher deposit rates predict lower future business formation and weaker wage growth, indicating that elevated funding pressures are associated with broader declines in local

economic dynamism and household income growth. Across specifications, the strongest effects generally occur at horizons of two to four years, consistent with the gradual transmission of local funding conditions into real economic activity.

4.2 Deposit Rates Reflect Local Funding Conditions

A central premise of our analysis is that county-level deposit rates reflect localized funding conditions rather than purely bank-wide pricing policies or aggregate funding costs. Because county deposit rates are constructed by averaging across banks operating within a region, the observed variation may arise from two distinct sources: differences in bank composition across counties or within-bank adjustments in deposit pricing across locations. In this section, we present evidence that the predictive content of deposit rates primarily reflects the latter channel, namely local funding conditions embedded in within-bank pricing decisions.

4.2.1 Bank Composition versus Within-Bank Pricing

To isolate the local component of deposit pricing, we conduct placebo exercises that reassign deposit rates across metro and non-metro counties. In the first exercise, we replace each bank's deposit rate in metropolitan counties with its average deposit rate across the non-metro counties in which it operates. In the second exercise, we reverse the assignment, replacing non-metro deposit rates with metro-area averages. If county deposit rates merely capture persistent bank-wide pricing policies, these reassigned rates should retain predictive power for future economic activity.

The reassigned rates exhibit little predictive power. Appendix Tables [A.2](#) and [A.3](#) show that the reassigned deposit rates are economically and statistically insignificant across specifications for GDP growth, employment growth, business formation, and wage growth. The predictive relationship largely disappears once the local component of deposit pricing is removed. These findings indicate that deposit rates contain information about localized funding pressures rather than simply reflecting the types of banks operating within a county.

4.2.2 Competition and the Informativeness of Deposit Rates

If deposit rates primarily reflect local funding pressures, their predictive content should be strongest in markets where banks compete more aggressively for deposits. Multi-state banks are particularly

relevant in this context because they intensify local deposit competition while simultaneously relying less on local funding conditions due to their broader access to internal and external funding markets.⁷

To examine this mechanism, we test whether the relationship between single-state bank deposit rates and future GDP growth varies with the local presence of multi-state banks. We define a bank as multi-state if it operates branches in more than one state and measure the county-level share of deposits held by such banks. Appendix Table A.4 shows that the predictive relationship between deposit rates and future GDP growth strengthens in counties with greater multi-state bank presence. The interaction terms are positive and economically meaningful, suggesting that deposit rates become especially informative in markets with more intense competition for deposits.⁸ At the same time, the coefficient on county deposit rates remains quantitatively and statistically similar to the baseline estimates across specifications, indicating that the predictive content of single-state bank deposit rates persists even in counties with substantial multi-state bank presence.

Taken together, these findings are consistent with a funding-pressure interpretation of deposit rates. In more competitive deposit markets, banks facing funding shortages must raise deposit rates more aggressively to attract and retain funding, since depositors can more easily shift balances across institutions. By contrast, banks operating in less competitive markets can absorb localized funding pressures with smaller pricing adjustments. As a result, deposit rates become especially informative about emerging liquidity stress and subsequent local economic weakness in competitive banking environments.

4.3 Monetary Policy and Aggregate Interest Rate Changes

An important alternative explanation is that the predictive relationship between deposit rates and future economic activity simply reflects monetary policy transmission. Deposit rates naturally respond to changes in policy rates, and monetary tightening is itself associated with slower future economic growth (Drechsler et al., 2017, 2021, 2022; Jiménez et al., 2026). While our baseline specifications include year fixed effects that absorb aggregate policy shocks, we conduct two additional exercises to distinguish local funding conditions from broader monetary policy effects.

First, we perform a subsample analysis over the period from 2010 through 2015, when

⁷Consistent with this interpretation, prior work finds that multi-state banks tend to follow more uniform rate-setting policies across locations (Begenau and Stafford, 2022).

⁸See Supera (2021) for related evidence on how market power affects the transmission of monetary policy through time deposits.

short-term interest rates remained relatively stable. This period offers a useful test because monetary policy-driven changes in deposit rates were minimal, allowing us to isolate the role of local liquidity conditions. In Appendix Table A.5, we replicate the results reported in Table 2 for this period. We find qualitatively similar results, suggesting that the predictive power of deposit rates holds even in a setting where monetary policy is unlikely to be the driving factor. The estimated magnitudes are, if anything, larger than in the full sample. Panel A of Table A.5 shows that a one standard deviation increase in deposit rates is associated with a 5.49 percentage point decline in GDP growth two years ahead. We observe similarly strong effects for employment growth, business formation, and wage growth.

Second, we test whether the predictive power of deposit rates depends on how responsive deposit growth is to monetary policy. If monetary policy transmission plays a dominant role, we would expect the relationship between deposit rates and economic activity to be stronger in areas where banks exhibit a higher sensitivity of deposit growth to changes in the Fed Funds rate. To test this, we construct bank-level deposit betas, measuring how each bank’s deposit growth responds to changes in the Fed Funds rate. We then aggregate these betas to the county level by weighting each bank’s beta by its average deposit share. This allows us to assess whether deposit rates are more predictive of economic downturns in areas where banks have more (or less) responsive deposit growth. Appendix Table A.6 indicates that the interaction between deposit rates and deposit betas is insignificant, while the deposit rate itself remains strongly predictive of economic downturns. This finding demonstrates that deposit rates capture localized funding conditions that are distinct from broader monetary policy effects.

4.4 Predictive Value of Deposit Rates

We next assess whether deposit rates forecast local recessions. Using a logit model with county fixed effects, we relate the probability of a recession at horizon k to the county’s deposit rate in year t :

$$\text{logit}(p_{c,t+k}) = \beta_0 + \beta_1 \text{Rate}_{c,t} + \alpha_c + \epsilon_{c,t}, \quad (2)$$

where a county is classified as being in recession if annual GDP growth falls below -2% . Over the sample period, the unconditional probability of a county recession is 14.45%. We consider

horizons of one to three years. Following the forecasting literature, we omit year fixed effects in this specification so as not to absorb the aggregate variation in recession probabilities that the model is designed to predict (e.g. [Schularick and Taylor, 2012](#); [Jordà et al., 2015, 2021](#)). Results are qualitatively similar when year fixed effects are included.

Appendix Table [A.7](#) shows that higher county deposit rates strongly predict future recessions. A one standard deviation increase in the deposit rate raises the probability of a recession one year ahead by 14%, two years ahead by 38%, and three years ahead by 33%. The two-year forecast model achieves an AUC of 0.73, indicating substantial classification power in an information-rich forecasting environment.⁹

A natural question is whether deposit rates simply proxy for local business-cycle momentum. Because local economic activity is persistent, counties experiencing weaker contemporaneous growth may also exhibit both higher deposit rates and a greater likelihood of future recession. To examine whether deposit rates contain information beyond recent output dynamics, we estimate horse-race specifications that jointly include deposit rates and lagged GDP growth.

Appendix Table [A.7](#) shows that deposit rates remain strongly predictive even after controlling for lagged GDP growth, while lagged GDP growth adds little stable forecasting power. The AUC increases only marginally, from 0.73 to 0.74, when GDP lags are included. Moreover, the coefficients on lagged GDP growth are economically unstable across specifications, consistent with mean-reversion dynamics rather than reliable forecasting power. These findings indicate that deposit rates contain forward-looking information about future local economic conditions that is not subsumed by recent output fluctuations.

4.5 Predictive Content is Stronger in Competitive Markets

If deposit rates primarily capture local funding pressures, their predictive content should be strongest in markets where funding conditions are rapidly incorporated into deposit pricing. Competitive banking markets are particularly useful in this context because banks facing local funding shortages must adjust deposit rates more aggressively to retain and attract depositors.

⁹The AUC (Area Under the Curve) measures the ability of a classifier to distinguish between positive and negative observations. An AUC of 1 indicates perfect classification, 0 indicates complete misclassification, and values above 0.5 indicate better-than-random performance. 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 examine this idea, we study how the predictive relationship between deposit rates and future recessions varies across local banking markets. Appendix Table A.8 shows that the predictive content of deposit rates is strongest in large metropolitan counties, weaker in smaller urban counties, and weakest in rural areas. In large metropolitan counties, a one standard deviation increase in deposit rates is associated with a 37% higher probability of a recession two years ahead. The corresponding effect declines to 12% in smaller urban counties and becomes statistically insignificant in rural counties. The AUC follows the same pattern, declining monotonically from 0.73 in large metropolitan counties to 0.66 in small urban counties and 0.64 in rural areas.

These patterns suggest that deposit rates are most informative when local funding pressures are quickly transmitted into pricing decisions. In competitive urban markets, banks facing funding shortages cannot easily absorb deposit outflows without adjusting rates, causing deposit pricing to respond more strongly to emerging liquidity stress. By contrast, deposit pricing in less competitive markets appears less responsive to local funding conditions and therefore contains less information about future economic weakness.

4.6 Generalizability and Out-of-Sample Fit using State-Level Data

4.6.1 State-level analysis

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.¹⁰ The findings of this analysis help validate deposit rates as a useful heuristic for assessing regional economic risks.

Appendix Table A.9 reports the relationship between deposit rates and subsequent economic activity at the state level. Consistent with our county-level results, deposit rates remain a strong leading indicator of future economic performance. Using a logit specification in Appendix Table A.10, we find that a one-standard deviation increase in deposit rates raises the probability of a GDP contraction greater than 2% eight quarters ahead by nearly 50%. The corresponding AUC at the two-year horizon is 0.72, indicating strong predictive accuracy. Moreover, this buildup of economic

¹⁰State 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. We construct the state deposit rate by taking a weighted average of the county deposit rate for each state in the last reporting month of each quarter, weighted by the 2004 county GDP.

risk extends to financial stability: higher state deposit rates in 2006 are associated with a greater incidence of bank failures between 2008 and 2012, both in terms of occurrence and intensity, as shown in Appendix Figure A.3.

4.6.2 Out-of-sample forecasting

We assess the predictive performance of deposit rates out-of-sample using k -fold cross-validation, examining how well the model generalizes to independent datasets. 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. We partition our dataset 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.

Appendix Figure A.4 reports the k -fold ROC curves and summarizes the cross-validated AUC from the logit model used in Appendix Table A.10. 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 0.63 for recessions, eight quarters ahead.

5 Validation from the Wells Fargo Regulatory Enforcement

Our interpretation of deposit rates is that they capture localized funding pressures that subsequently transmit to lending and real economic activity through bank balance sheets. To examine a setting consistent with this funding-channel interpretation, we study the 2018 regulatory enforcement action against Wells Fargo. In February 2018, the Federal Reserve imposed a binding asset cap on Wells Fargo following the bank’s fake-accounts scandal, restricting consolidated assets to their 2017 year-end level. The enforcement created plausibly exogenous cross-county variation in local deposit conditions based on pre-existing Wells Fargo exposure. Counties with greater Wells Fargo presence experienced a localized funding shock unrelated to contemporaneous regional economic

conditions.¹¹

If local funding conditions play an important role in transmitting deposit supply contractions to economic activity, counties more exposed to the Wells Fargo enforcement should subsequently experience declining deposit growth, rising deposit rates, weaker lending activity, and slower output growth. We examine these predictions using a difference-in-differences design comparing counties with and without pre-existing Wells Fargo presence before and after the enforcement action. Appendix Figure B.1 illustrates substantial geographic variation in Wells Fargo’s county-level deposit share in 2017.

We estimate the following specification:

$$Y_{c,t} = \beta_1 \cdot 1_{\text{WF County } c} \times Post_t + \alpha_c + \alpha_t + \epsilon_{c,t}, \quad (3)$$

where Y denotes outcomes including deposit growth, deposit rates, small business lending, and GDP growth. The indicator $1_{\text{WF County}}$ identifies counties with Wells Fargo presence in 2017, while $Post$ denotes the post-enforcement period beginning in 2018. The specification includes county and year fixed effects, and the sample spans 2012 through 2023.

Appendix Figure B.2 supports the parallel-trends assumption underlying the empirical design. Prior to the enforcement action, treated and control counties exhibit similar trends in deposit growth and deposit rates. Following the enforcement, counties with Wells Fargo exposure experience a sharp decline in deposit growth alongside a corresponding increase in deposit rates.

Panel A of Table 4 reports the effects of the enforcement action on county deposit growth. Across specifications, counties with Wells Fargo exposure experience declines in deposit growth of up to 1.08 percentage points following the enforcement action, equivalent to roughly 27% of average county deposit growth. These findings suggest that banks were unable to fully offset the deposit contraction through alternative funding sources. Importantly, the decline in deposit growth is not solely driven by the closure of Wells Fargo branches. Even after excluding Wells Fargo from the calculation, county-level deposit growth remains significantly lower in exposed counties, as shown in Appendix Table B.1.

¹¹Existing work has used the Wells Fargo enforcement to study fintech adoption driven by mistrust of banks (Yang, 2025), the fragility of small banks during the SVB crisis (Ruan and Vij, 2024), and employment outcomes during the Paycheck Protection Program (Granja et al., 2022b).

Panel B of Table 4 shows that counties exposed to the enforcement action also experience significant increases in deposit rates. Deposit rates rise by approximately 5.7 basis points, representing roughly 9% of the average county deposit rate. Together, the decline in deposit growth and increase in deposit rates are consistent with a localized tightening in deposit funding conditions.

An important distinction is whether the enforcement generated broader local funding stress or merely constrained Wells Fargo's own balance-sheet capacity. Appendix Table B.1 shows that non-Wells-Fargo banks in affected counties also experience deposit outflows and increases in deposit rates following the enforcement action. This pattern is consistent with prior work showing that the enforcement reduced depositor trust across local banking markets in exposed counties (Yang, 2025), thereby amplifying local funding pressures. Together, these findings suggest that the enforcement generated a broader tightening in local deposit markets rather than solely restricting Wells Fargo's own lending capacity.

We next examine whether the deterioration in local funding conditions is associated with weaker lending activity and slower economic growth. Because small businesses rely heavily on local bank branches for financing (Petersen and Rajan, 1994), they are likely to be particularly sensitive to localized funding pressures. Consistent with this mechanism, Panel A of Table 5 shows that counties exposed to the Wells Fargo enforcement experienced declines in small business lending of between 6.5% and 8.8% following the shock. Panel B of Table 5 further shows that these counties subsequently experienced declines in GDP growth of up to 0.43 percentage points. Together, these patterns are consistent with tighter local funding conditions transmitting to real economic activity through reduced credit availability.

An important question is whether the observed effects reflect broader local funding pressures or simply a contraction in Wells Fargo's own lending activity. To address this possibility, we repeat the analysis excluding counties above the 90th percentile of Wells Fargo lending share. Appendix Table B.2 shows that the results remain economically and statistically significant within this restricted sample. These findings further suggest that the observed effects are not solely driven by Wells Fargo-specific lending frictions.

As a complementary exercise, we estimate a two-stage least squares specification that instruments county deposit rates using the interaction between Wells Fargo exposure and the post-enforcement period. Appendix Table B.3 reports 2SLS estimates linking higher deposit rates

to weaker subsequent GDP growth. The estimates are economically large, although they should be interpreted cautiously given the weak first stage.¹²

Appendix Figure B.3 further examines the timing of the transmission mechanism through local projections. Deposit growth declines immediately following the enforcement action, accompanied by a simultaneous increase in deposit rates. Small business lending subsequently contracts, followed by a decline in GDP growth. These dynamics are consistent with a sequence in which tighter local funding conditions precede reductions in lending activity and weaker economic performance.

Overall, the evidence is consistent with a deposit funding channel in which localized contractions in deposit supply are associated with higher deposit rates, weaker lending, and slower economic activity. While we do not interpret the Wells Fargo setting as identifying the underlying transmission mechanism, the combination of deposit outflows, rising deposit rates, reduced lending, and weaker output provides evidence consistent with local funding conditions playing an important role in local economic fluctuations.

6 Mechanism and Predictive Content of Deposit Rates

Thus far, we have shown that deposit rates strongly predict future local economic activity and that exogenous contractions in deposit supply are associated with higher deposit rates, weaker lending, and slower output growth. In this section, we examine the bank-level dynamics underlying these relationships and show that they are consistent with a funding-pressure interpretation of deposit rate increases. We then compare the predictive content of deposit rates with deposit growth, credit growth, and other leading indicators of economic activity.

6.1 Do Deposit Rate Increases Reflect Funding Pressure?

Our central hypothesis is that increases in deposit rates primarily reflect tighter funding conditions rather than stronger loan demand alone. When banks experience deposit outflows or face difficulty attracting stable funding, they raise deposit rates to retain existing depositors and compete for new funding sources. Under this interpretation, increases in deposit rates should be preceded by slower

¹²The first-stage F-statistic of 2.87 falls below conventional weak-instrument thresholds. We therefore view the reduced-form evidence as the primary evidence of real effects and interpret the IV estimates as providing directional evidence consistent with the proposed mechanism.

deposit growth or deposit outflows and followed by weaker lending growth as funding constraints become binding.

This mechanism differs from a pure loan-demand interpretation. If banks raise deposit rates mainly because profitable lending opportunities expand, higher deposit rates should coincide with continued growth in lending as banks attract deposits to finance additional loans. By contrast, if deposit rate increases instead reflect funding stress, lending growth should eventually slow following the rate increase as banks adjust to tighter liquidity conditions.

To examine these dynamics, we study the evolution of deposit growth and lending around changes in bank-level deposit rates. We estimate both linear and nonlinear specifications. The linear specification relates future and past changes in bank outcomes to quarterly changes in deposit rates:

$$\Delta \ln(Y)_{b,t+k} = \beta_0 + \beta_1 \Delta Rate_{b,t} + \alpha_t + \epsilon_{b,t}, \quad (4)$$

where $\Delta \ln(Y)$ denotes the growth rate of the outcome variable, $\Delta Rate$ is the quarterly change in the bank's deposit rate, and α_t denotes time fixed effects. We consider horizons from $k = -3$ to $k = +3$ quarters.

To allow for nonlinearities, we additionally sort banks into quartiles based on the magnitude of deposit rate changes and estimate analogous specifications across quartiles of rate adjustments. The linear results are reported in Table 6, while the quartile-based results appear in Appendix Table A.11.

Table 6 and Appendix Table A.11 reveal three consistent patterns. First, insured and uninsured deposit growth both decline prior to increases in deposit rates in Panels A and B, with substantially larger declines in uninsured deposits among banks that subsequently implement the largest rate increases. Second, deposit growth recovers following the rate adjustment, particularly through insured deposits, consistent with banks relying more heavily on stable insured funding during periods of funding stress. Third, lending growth weakens after deposit rate increases in Panel C, particularly among banks in the highest quartile of rate changes.

Taken together, these dynamics are more consistent with funding pressures than with stronger loan demand alone. Under a pure loan-demand interpretation, lending growth would be expected to remain elevated following rate increases. Instead, lending growth slows after the rate adjustment,

suggesting that banks raising deposit rates most aggressively are responding to tightening funding conditions rather than expanding lending opportunities.

Appendix Table A.12 further shows that banks with tighter liquidity positions raise deposit rates more aggressively. Banks with higher credit-to-deposit ratios, lower cash holdings, lower dividend-to-asset ratios, and smaller securities portfolios subsequently implement larger rate increases. By contrast, Appendix Table A.13 shows little relationship between deposit rate increases and either Tier 1 capital ratios or non-performing loans. Overall, these findings suggest that deposit rate increases primarily reflect funding pressures rather than deteriorating asset quality or weak capitalization.

Taken together, these bank-level dynamics are consistent with a funding-pressure interpretation of deposit rate increases. Banks experiencing deposit outflows raise rates to stabilize funding and subsequently slow lending growth as funding constraints tighten. These patterns align closely with both the county-level evidence, where higher deposit rates predict weaker future economic activity, and the Wells Fargo natural experiment, which generated simultaneous deposit contractions, rising deposit rates, and weaker lending outcomes.

6.2 Do Deposit Rates Contain Information Beyond Deposit Quantities?

Deposit quantities and deposit prices capture distinct dimensions of local funding conditions. While deposit growth measures realized changes in funding volumes, deposit rates reflect the marginal cost of attracting deposits and may therefore incorporate forward-looking information about funding stress not captured by quantities alone. To examine whether deposit rates contain incremental predictive information beyond deposit growth, we jointly compare their ability to forecast future economic activity and local recessions.

Table 7 reports forecasting regressions for future GDP growth. Panel A shows that deposit growth alone has limited predictive power. The estimated coefficients are economically small, statistically unstable across horizons, and in some specifications carry the opposite sign from what standard credit-cycle narratives would predict. By contrast, Panel B shows that deposit rates remain economically and statistically significant predictors of future GDP growth even after controlling for deposit growth. At the three-year horizon, a one standard deviation increase in deposit rates predicts a 1.99 percentage point decline in GDP growth, while the coefficient on deposit growth is close to

zero.

Appendix Table [A.14](#) yields similar conclusions in recession-forecasting specifications. Deposit growth alone achieves AUC values between 0.68 and 0.70 across horizons in Panel A. Adding deposit rates materially improves forecasting performance, increasing the AUC to approximately 0.73 at the two- and three-year horizons in Panel B, matching the performance of the baseline specification. Once deposit rates are included, the predictive contribution of deposit growth becomes substantially weaker, with coefficients that are economically smaller and less stable across horizons. These findings suggest that deposit rates capture much of the forward-looking information contained in deposit quantities.

Taken together, these findings suggest that deposit rates largely subsume the predictive information contained in deposit quantities. This pattern is consistent with deposit rates functioning as forward-looking funding prices that adjust more rapidly to emerging liquidity pressures than realized deposit volumes alone.

6.3 Do Deposit Rates Contain Information Beyond Credit Growth?

A large literature argues that rapid credit growth predicts future financial crises and economic downturns ([Schularick and Taylor, 2012](#)). Our results suggest that deposit rates contain information about future economic conditions that is distinct from standard credit-growth measures. Our 2010-2015 results show that deposit rates forecast economic activity even during periods of stagnant credit growth, extending their utility beyond expansionary credit phases. In addition, the Wells Fargo natural experiment, which leverages regulatory enforcement timing unrelated to credit conditions, demonstrates that affected counties experience deposit supply contractions accompanied by rising deposit rates that precede economic slowdowns. Moreover, our bank-level analysis reveals that increases in deposit rates do not lead to increased lending. Building on these findings, we examine how the predictive content of deposit rates compares with various measures of credit growth in head-to-head forecasting specifications.

To compare the predictive content of deposit rates and credit growth directly, Table [8](#) reports horse-race specifications that jointly include county deposit rates and several measures of lending growth, including small-business lending growth in Panel A, mortgage lending growth in Panel B, and total lending growth in Panel C. Across all specifications, deposit rates remain economically and

statistically significant predictors of future GDP growth. At the three-year horizon, a one standard deviation increase in deposit rates predicts roughly a 1.98 percentage point decline in GDP growth even after controlling for contemporaneous lending growth.

By contrast, the coefficients on credit growth are less stable across specifications and generally indicate that stronger contemporaneous lending growth predicts stronger near-term economic performance rather than future contractions.¹³ Appendix Table A.16 further shows that adding credit growth contributes little incremental explanatory power once deposit rates are included, as reflected in only modest changes in pseudo- R^2 and AUC measures in recession-forecasting specifications.

We also examine whether deposit rates remain predictive in environments not characterized by strong credit expansions. This test is important because the credit-boom literature primarily studies downturns preceded by unusually rapid lending growth, whereas our earlier evidence shows that many local recessions emerge during periods of weak or contracting credit growth. If deposit rates merely proxy for traditional credit-cycle dynamics, their predictive power should weaken substantially in these settings.

To isolate environments less exposed to traditional credit-boom dynamics, we identify counties in the bottom quartile of pre-recession credit growth and interact this indicator with county deposit rates. These counties are less likely to have experienced downturns driven by prior credit booms and therefore provide a useful setting for assessing whether deposit rates retain predictive content outside standard credit-expansion episodes. Appendix Table A.17 shows that deposit rates remain strongly predictive in these low-credit-growth environments. The interaction terms indicate that a one standard deviation increase in deposit rates is associated with an additional decline in GDP growth of roughly 0.31 to 0.38 percentage points in counties with weak prior credit growth, relative to the baseline relationship. These findings suggest that the predictive content of deposit rates extends beyond traditional credit-boom episodes.

Lastly, we perform a residual analysis that removes the component of deposit rates explained by contemporaneous and lagged credit growth. Specifically, we regress deposit rates on current and lagged measures of lending growth and use the residualized component to forecast future GDP growth. Appendix Table A.18 shows that these residual deposit rates remain economically and statistically significant predictors of future economic activity across all lending measures. If

¹³Appendix Table A.15 presents specifications including only credit-growth measures and yields similar conclusions.

anything, the predictive relationship strengthens after removing variation associated with credit growth, suggesting that deposit rates capture forward-looking information about local funding conditions that is distinct from traditional credit-cycle measures.

Taken together, these findings suggest that deposit rates contain forward-looking information about local funding conditions that is not captured by standard measures of credit growth alone. Rather than simply reflecting credit-cycle dynamics, deposit rates appear to provide an independent signal of funding stress and future local economic weakness.

6.4 Do Deposit Rates Outperform Other Leading Indicators?

An important question is whether deposit rates outperform other commonly used indicators of regional business cycle fluctuations. To test this, we compare deposit rates with auto sales, unemployment insurance claims, and job openings using state-level forecasting specifications.¹⁴

Panel A of Table 9 presents univariate forecasting regressions relating each indicator to future state GDP growth twelve quarters ahead. Deposit rates strongly predict weaker future GDP growth, while unemployment insurance claims are statistically insignificant and job openings exhibit a counterintuitive negative relationship, likely reflecting mean-reversion dynamics. Comparing explanatory power across specifications, deposit rates alone explain approximately as much variation in future GDP growth as the other three indicators combined.¹⁵

Panel B of Table 9 presents multivariate horse-race specifications that jointly include all indicators. Deposit rates remain economically and statistically significant across forecasting horizons, while the coefficients on the other indicators remain small and often insignificant. Including auto sales, unemployment insurance claims, and job openings increases the R^2 by only about one percentage point beyond the variation explained by deposit rates alone.

Appendix Tables A.19 and A.20 provide complementary recession-forecasting evidence using logit specifications. Deposit rates achieve an AUC of 0.81 and a pseudo- R^2 of 0.14 when forecasting recessions twelve quarters ahead, substantially outperforming the alternative indicators. Extending the analysis across multiple forecasting horizons yields similar conclusions: the inclusion of the other indicators contributes little incremental explanatory power once deposit rates are included.

Overall, deposit rates outperform traditional leading indicators because they capture real-time

¹⁴Because several of these indicators are unavailable at the county level, this analysis is conducted using state-level data.

¹⁵Relatedly, Khan and Ozel (2016) show that bank accounting variables are correlated with changes in state coincident indices.

funding conditions and forward-looking bank behavior rather than realized macroeconomic outcomes. Unlike measures such as auto sales or job openings, which respond after economic conditions begin to deteriorate, deposit rates adjust immediately to shifts in liquidity and funding pressure, allowing them to serve as an early signal of future economic weakness.

7 Conclusion

This paper studies whether local bank deposit rates contain information about future regional economic activity. We show that rising deposit rates strongly predict subsequent declines in GDP growth, employment growth, business formation, and wage growth across U.S. counties. These relationships remain robust after controlling for deposit growth, credit growth, lagged economic conditions, and monetary policy shifts. Deposit rates also consistently outperform standard leading indicators of regional economic activity.

Our interpretation is that deposit rates capture localized funding pressures that are not fully reflected in balance-sheet quantities alone. Because deposit rates represent the marginal price of bank funding, they respond immediately to shifts in local funding conditions, whereas quantities adjust more gradually. Consistent with this interpretation, banks that raise deposit rates most aggressively subsequently experience deposit outflows and weaker lending growth, and tend to have tighter liquidity positions rather than weaker capital or deteriorating asset quality.

To examine a setting consistent with this mechanism, we study the 2018 Wells Fargo regulatory enforcement as a plausibly exogenous contraction in local deposit supply. Counties more exposed to the enforcement subsequently experience slower deposit growth, higher deposit rates, weaker small-business lending, and slower GDP growth. These patterns are consistent with tighter local funding conditions transmitting to regional economic activity through bank balance sheets.

More broadly, our findings suggest that the liability side of the banking system contains economically important information about future business-cycle fluctuations. Much of the existing literature emphasizes credit quantities and asset-market conditions as predictors of downturns. Our results instead highlight the informational content embedded in funding markets. Because deposit rates are timely, geographically granular, and publicly observable, they provide a useful complement to traditional measures of regional economic vulnerability and a new perspective on how local financial conditions propagate into real economic activity.

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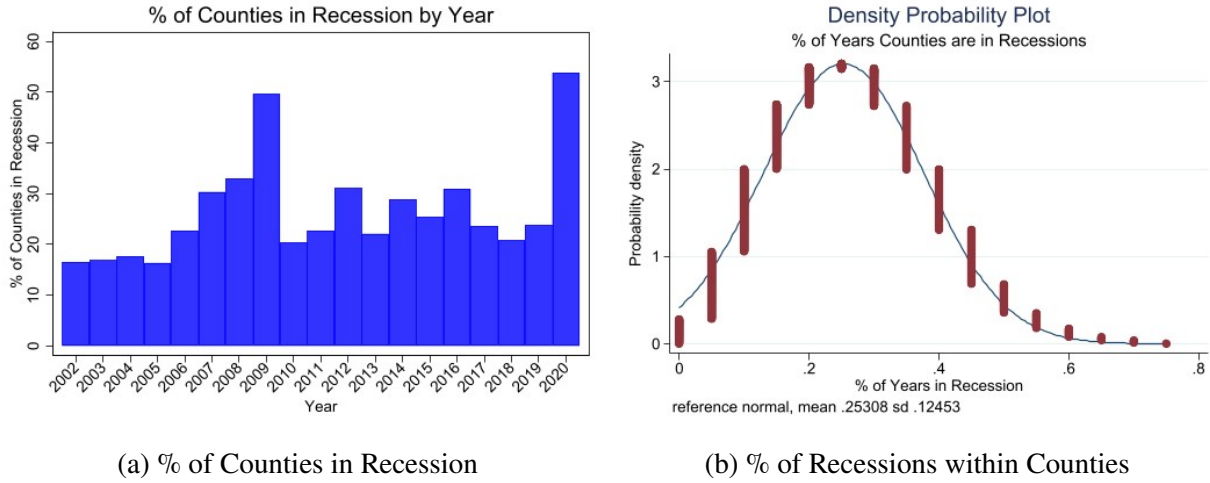
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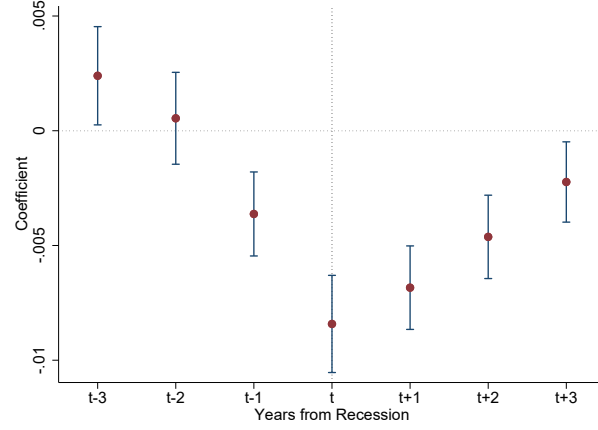
8 Figures and Tables

Figure 1: Recessions Across Counties and Time

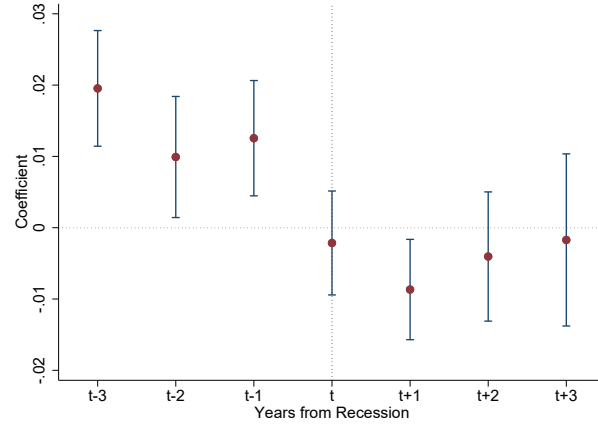


Notes: This figure presents the percentage of counties in recessions by year in Figure 1a, and a density probability plot of the percent of year counties are in recessions in Figure 1b based on county GDP data. A county is in a recession if its GDP growth between two consecutive years is below -2%.

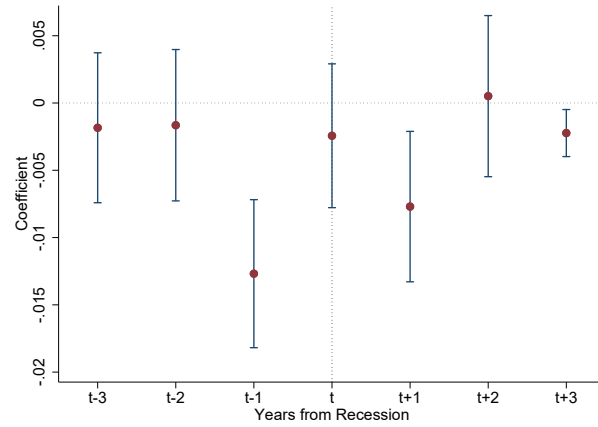
Figure 2: Dynamics around Recessions



(a) $\Delta \ln(\text{Deposits})$



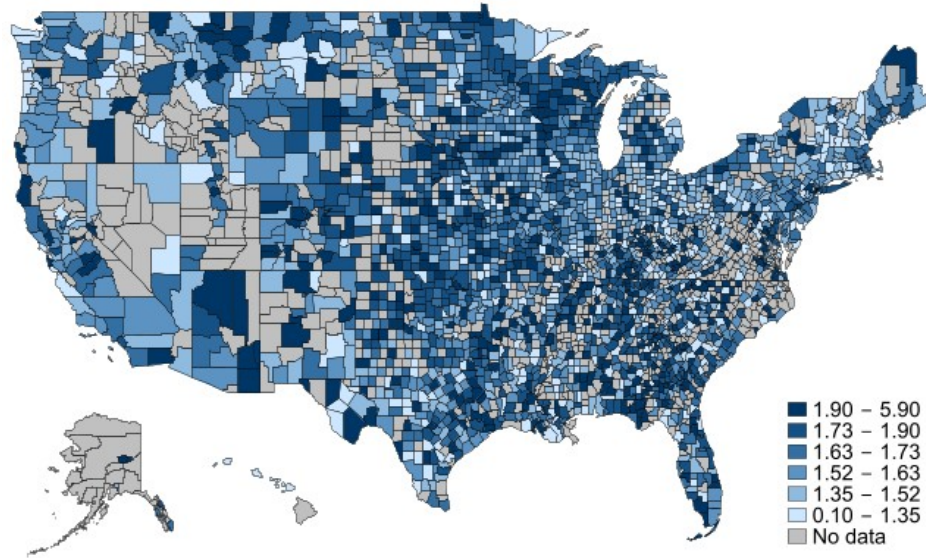
(b) Deposit Rate



(c) $\Delta \ln(\text{Total Lending})$

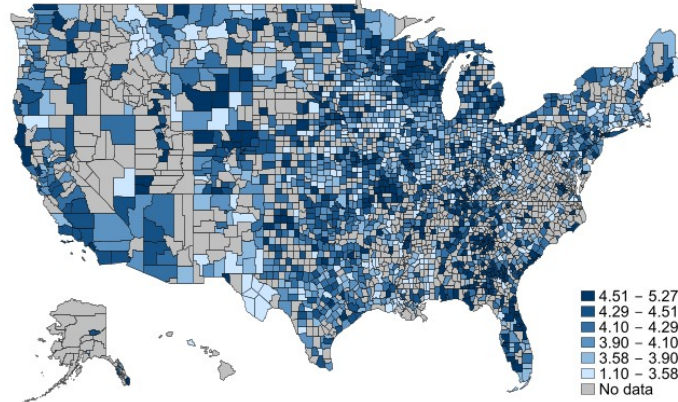
Notes: This figure plots the dynamics for deposit growth and deposit growth. The figures plot the coefficients from estimating the following regression: $Y_{c,t+k} = \beta 1[\text{Recession}]_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y is deposit growth in Panel 2a, deposit rate among single-state banks in Panel 2b, and the growth in total mortgage and small business lending in Panel 2c. $1[\text{Recession}]$ is an indicator for a county-recession, t denotes the current year, and k denotes the number of years before/after recession, ranging from -3 to +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. County-clustered standard errors are reported in parentheses.

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

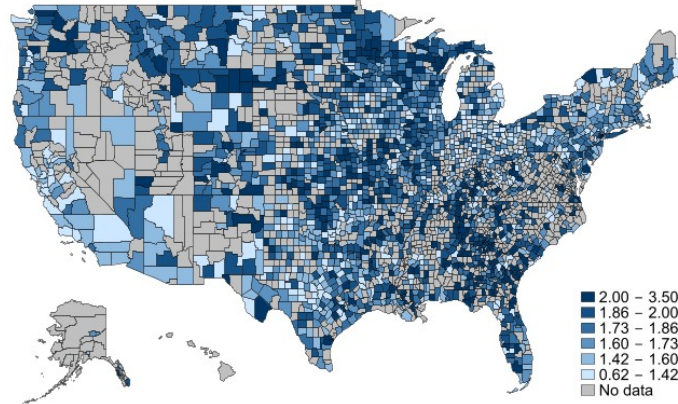


Notes: This figure presents a heatmap of the average deposit rate (12-month, \$10K CDs) in each county from 2001 to 2020. Using deposit rate data from RateWatch, we construct a panel at the bank–county–month level. For each county and month, we compute the average deposit rate across banks, and then calculate the annual county deposit rate as the average of these monthly values within each year. We present the time-series average of these annual county deposit rates. The analysis is restricted to single-state banks. The intensity of the blue shading represents the quantile range of the deposit rate.

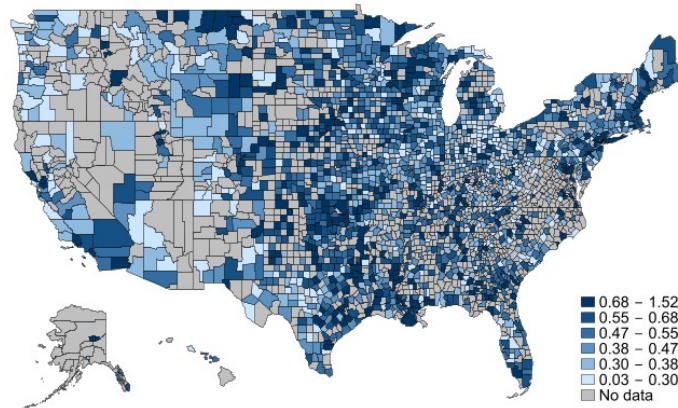
Figure 4: Deposit Rate Across Counties and Time



(a) 2006



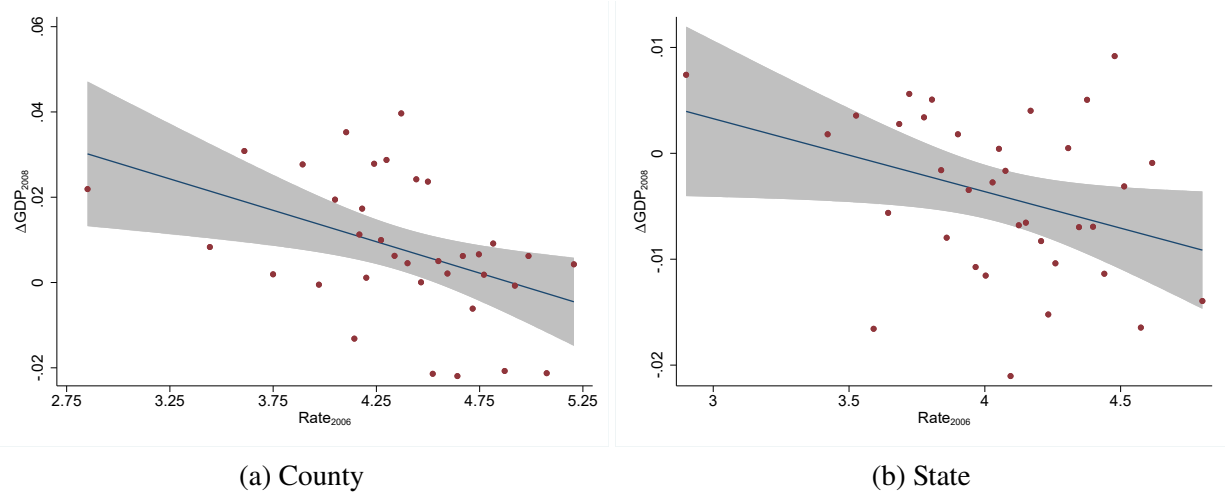
(b) 2009



(c) 2017

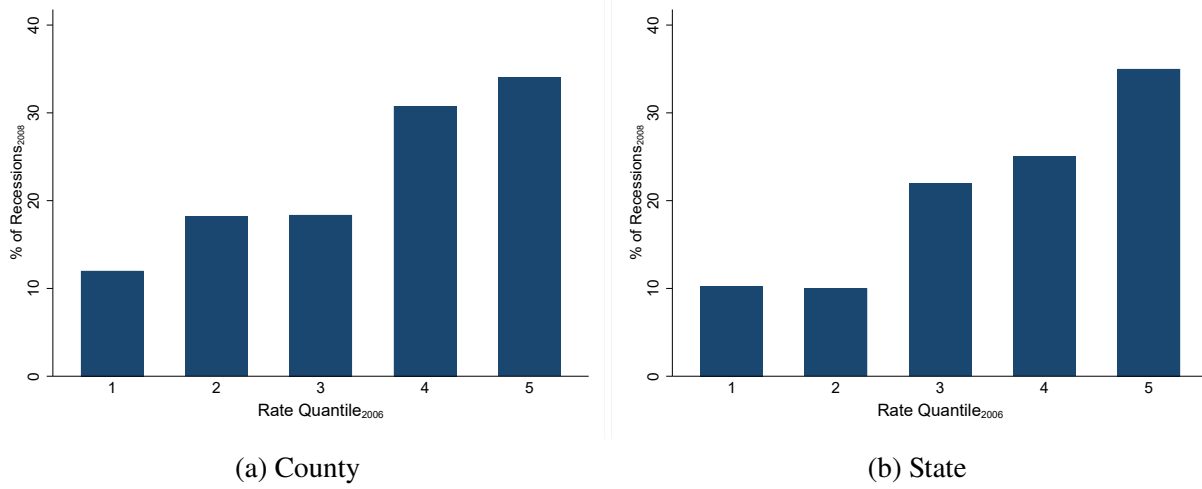
Notes: This figure uses RateWatch data to present a heatmap of county deposit rates (12-month, \$10K CDs). Figure 4a presents county deposit rates in 2006; Figure 4b presents county deposit rates in 2009; Figure 4c presents county deposit rates in 2017. The intensity of the blue shading represents the quantile range of the deposit rate. Using deposit rate data from RateWatch, we construct a panel at the bank–county–month level. For each county and month, we compute the average deposit rate across banks, and then calculate the annual county deposit rate as the average of these monthly values within each year. The analysis is restricted to single-state banks. The intensity of the blue shading represents the quantile range of the deposit rate.

Figure 5: 2006 Deposit Rates Predict 2008 GDP Growth



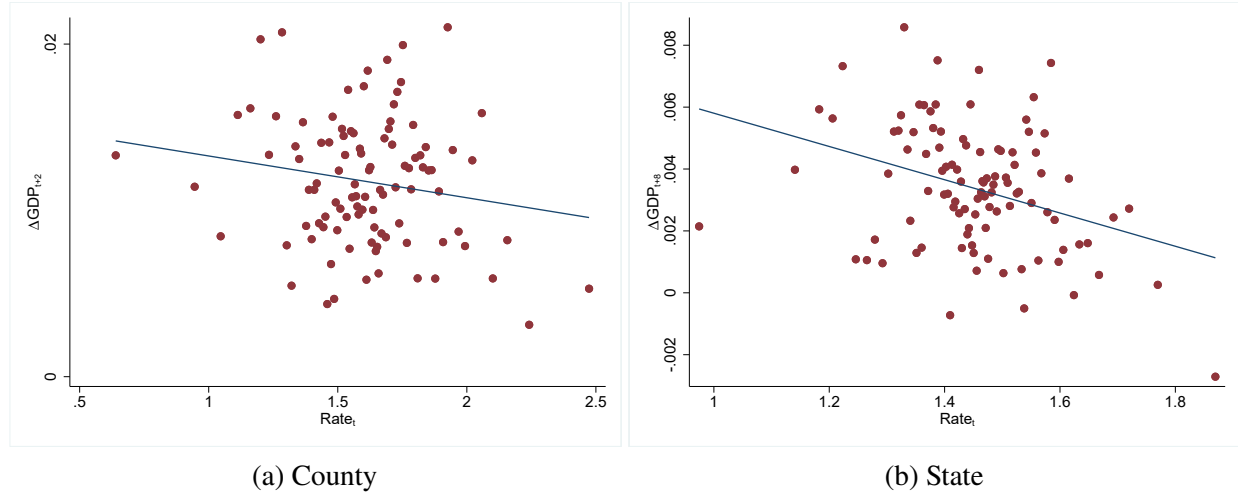
Notes: This figure illustrates the binned bivariate averages (“binscatter”) of the 2008 GDP growth rates at the county and state levels plotted against the 2006 deposit rates at the county and state levels. Figure 5a presents the binscatter (35 bins) of the annual county GDP growth in 2008 against the annual county deposit rates in 2006 for metro counties. Figure 5b 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 against 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 $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The analysis is restricted to single-state banks.

Figure 6: 2006 Deposit Rates Predict 2008 Recessions



Notes: This figure presents bar graphs of the percent of metro 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 6a and Figure 6b, respectively. The deposit rate is the rate on the 12-month certificate of deposit of at least \$10,000. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across banks for each county in each month is computed. The annual county deposit rate is the county deposit rate in the last reporting month of each year. The analysis is restricted to single-state banks. A county (state) is in a recession if its GDP growth between two consecutive years (quarters) is below -2%.

Figure 7: Deposit Rates Predict Future GDP Growth



Notes: This figure illustrates the binned bivariate averages (“binscatter”) of GDP growth rates at the county and state levels plotted against the deposit rates at the county and state levels. Figure 7a presents the binscatter (1000) of the annual county GDP growth in year $t + 2$ against the annual county deposit rates in t , after absorbing county and year fixed effects. Figure 7b presents the binscatter (35 bins) of the quarterly state GDP growth in quarter-year $t + 8$ against the quarterly state deposit rates in quarter-year t after absorbing state and quarter-year fixed effects. The red dots represent the bins, the blue line graphs the GDP growth. 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 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	0.4875	1.1750	2.4750	1.6203	1.3603
Annual Deposit Rate	39,732	0.4500	1.0815	2.2500	1.5194	1.2744
Annual GDP Growth	59,127	-2.2974	1.2247	4.5548	1.2544	7.8028
Quarterly State Deposit Rate	4,135	0.4610	1.0281	2.4228	1.5497	1.3008
Quarterly State GDP Growth	3,213	-0.2359	0.4504	1.1118	0.3694	1.7483

Notes: The table summarizes the key measures of bank deposit rates, as well as GDP growth. The columns, left to right, denote the variable of interest, number of observations, 25th percentile value, median, 75th 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 sample period is from 2001 through 2020. The analysis is restricted to single-state banks.

Table 2: County Economic Activity and Deposit Rate

Panel A: GDP Growth						
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0026 (0.0032)	-0.0069** (0.0034)	-0.0135*** (0.0042)	-0.0048 (0.0038)	-0.0035 (0.0036)	0.0000 (0.0043)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,578	4,292	4,029	3,775	3,513	3,258
R^2	0.2668	0.2757	0.2795	0.2711	0.2687	0.2739
Panel B: Employment Growth						
$\Delta \ln(\text{Employment})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0023 (0.0016)	-0.0055*** (0.0016)	-0.0094*** (0.0018)	-0.0088*** (0.0017)	-0.0059*** (0.0017)	-0.0025 (0.0016)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,638	4,347	4,079	3,820	3,553	3,291
R^2	0.6299	0.6468	0.6648	0.6743	0.6870	0.6964
Panel C: Business Formation						
$\ln(\text{Applications})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0018 (0.0144)	-0.0160 (0.0162)	-0.0320* (0.0164)	-0.0359** (0.0181)	-0.0341* (0.0189)	-0.0377* (0.0202)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	3,923	3,640	3,378	3,112	2,851	2,591
R^2	0.9933	0.9935	0.9935	0.9935	0.9938	0.9937
Panel D: Wage Growth						
$\Delta \ln(\text{Annual Wages})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0012 (0.0025)	-0.0064*** (0.0023)	-0.0116*** (0.0024)	-0.0098*** (0.0025)	-0.0037 (0.0026)	-0.0003 (0.0027)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,638	4,330	4,056	3,795	3,533	3,271
R^2	0.4836	0.5104	0.5244	0.5252	0.5290	0.5177

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 six-year ($k = 1, 2, 3, 4, 5, 6$) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, employment growth in Panel B, natural-log of the number of new business applications in Panel C, and the wage growth in Panel D. *Rate* denotes the average bank deposit rate. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.71%, average employment growth is 0.71%, average log-transformed # of applications is 3.23%, and average wage growth of 3.53% 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: County Economic Activity and Deposit Rate with GDP Lags

$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0057 (0.0035)	-0.0092*** (0.0035)	-0.0142*** (0.0041)
$\Delta \ln(\text{GDP})_{t-1}$	-0.0060*** (0.0023)	-0.0090*** (0.0027)	-0.0094*** (0.0020)
$\Delta \ln(\text{GDP})_{t-2}$	-0.0089*** (0.0026)	-0.0085*** (0.0019)	-0.0024 (0.0019)
$\Delta \ln(\text{GDP})_{t-3}$	-0.1365*** (0.0316)	-0.0614*** (0.0207)	-0.0345 (0.0314)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	3,488	3,231	2,980
R^2	0.3055	0.3018	0.3038

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 six-year ($k = 1, 2, 3, 4, 5, 6$) annual lead indicators of economic activity. The regression specification is the following: $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} + \beta_2 \cdot \Delta \ln(\text{GDP})_{c,t-1} + \beta_3 \cdot \Delta \ln(\text{GDP})_{c,t-2} + \beta_4 \cdot \Delta \ln(\text{GDP})_{c,t-3} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta \ln(\text{GDP})$ denotes GDP growth. *Rate* denotes the average bank deposit rate. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.71% 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: County Deposit and Lending Activity around Wells Fargo Active Enforcement

Panel A: Deposit Growth				
$\Delta \ln(\text{Deposits})$	(1)	(2)	(3)	(4)
WF County $\times$ Post	-0.0108*** (0.0017)	-0.0108*** (0.0018)	-0.0106*** (0.0017)	-0.0104*** (0.0018)
WF County	0.0153*** (0.0014)		0.0153*** (0.0014)	
Post	0.0313*** (0.0009)	0.0309*** (0.0009)		
County FIPS FE		✓		✓
Year FE			✓	✓
N	22,833	22,833	22,833	22,833
R^2	0.0422	0.1216	0.2914	0.3703
Panel B: Deposit Rate				
Rate	(1)	(2)	(3)	(4)
WF County $\times$ Post	0.0641*** (0.0196)	0.0642*** (0.0196)	0.0588*** (0.0195)	0.0570*** (0.0194)
WF County	0.0050 (0.0074)		0.0048 (0.0074)	
Post	0.6209*** (0.0114)	0.6185*** (0.0113)		
County FIPS FE		✓		✓
Year FE			✓	✓
N	22,833	22,833	22,833	22,833
R^2	0.1689	0.2917	0.5877	0.7086

Notes: This table presents the relation between deposit growth, deposit rates, and small business lending in counties with a Wells Fargo around the Wells Fargo Active Enforcement. The table presents the results from estimating the following OLS model:

$$Y_{c,t} = \beta_1 \cdot 1_{\text{WF County},c} \times \text{Post}_t + \alpha_c + \alpha_t + \epsilon_{c,t}$$

where Y is deposit growth in Panel A and deposit rate in Panel B, $1_{\text{WF County}}$ is an indicator for whether the county had a Wells Fargo in 2017, and Post is an indicator for the post-enforcement period, after 2017. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we build a bank $\times$ county $\times$ month panel and compute the average rate across single-state banks in each county. The annual rate is based on the last reporting month of the year. The sample period is from 2012 through 2023. County clustered standard errors are reported in parentheses.

Table 5: County Economic Activity around Wells Fargo Active Enforcement: OLS

Panel A: Small Business Lending				
<i>ln</i> (SBL)	(1)	(2)	(3)	(4)
WF County $\times$ Post	-0.0877*** (0.0215)	-0.0656*** (0.0141)	-0.0872*** (0.0216)	-0.0649*** (0.0141)
WF County	1.9952*** (0.0806)		1.9950*** (0.0806)	
Post	0.3675*** (0.0143)	0.3337*** (0.0102)		
County FIPS FE		✓		✓
Year FE			✓	✓
<i>N</i>	22,833	22,833	22,833	22,833
<i>R</i> ²	0.2328	0.9723	0.2371	0.9763
Panel B: GDP Growth				
$\Delta \ln(\text{GDP})$	(1)	(2)	(3)	(4)
WF County $\times$ Post	-0.0042** (0.0018)	-0.0041** (0.0019)	-0.0043** (0.0018)	-0.0042** (0.0019)
WF County	0.0115*** (0.0016)		0.0115*** (0.0016)	
Post	0.0072*** (0.0012)	0.0073*** (0.0013)		
County FIPS FE		✓		✓
Year FE			✓	✓
<i>N</i>	22,833	22,833	22,833	22,833
<i>R</i> ²	0.0048	0.0989	0.0440	0.1380

Notes: This table presents the relation between small business lending and GDP growth in counties with a Wells Fargo around the Wells Fargo Active Enforcement. The table presents the results from estimating the following OLS model:

$$Y_{c,t} = \beta_1 \cdot 1_{\text{WF County},c} \times \text{Post}_t + \alpha_c + \alpha_t + \epsilon_{c,t}$$

where Y is log-small business lending in Panel A and GDP growth in Panel B, $1_{\text{WF County}}$ is an indicator for whether the county had a Wells Fargo in 2017, and Post is an indicator for the post-enforcement period, after 2017. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we build a bank $\times$ county $\times$ month panel and compute the average rate across single-state banks in each county. The annual rate is based on the last reporting month of the year. The sample period is from 2012 through 2023. County clustered standard errors are reported in parentheses.

Table 6: Deposit and Credit Growth and Bank Rate Changes

Panel A: Insured Deposit Growth							
$\Delta \ln(\text{Insured})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
ΔRate_t	-0.0007 (0.0015)	-0.0054** (0.0022)	-0.0118*** (0.0020)	0.0049*** (0.0017)	0.0149*** (0.0021)	0.0071*** (0.0013)	0.0019 (0.0016)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	234,296	238,782	243,571	243,714	238,978	234,508	230,172
R^2	0.0484	0.0549	0.0537	0.0533	0.0568	0.0596	0.0610
Panel B: Uninsured Deposit Growth							
$\Delta \ln(\text{Uninsured})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
ΔRate_t	0.0031 (0.0041)	0.0070 (0.0052)	-0.0219*** (0.0048)	-0.0044 (0.0052)	0.0162*** (0.0046)	0.0044 (0.0055)	-0.0048 (0.0068)
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
Panel C: Loan Growth							
$\Delta \ln(\text{Loans})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
ΔRate_t	-0.0029 (0.0020)	-0.0004 (0.0022)	0.0067*** (0.0021)	0.0062*** (0.0017)	0.0015 (0.0013)	0.0016 (0.0010)	0.0018* (0.0011)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	212,897	217,267	221,913	222,368	218,083	213,718	209,460
R^2	0.0225	0.0222	0.0217	0.0226	0.0261	0.0306	0.0316

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

Table 7: GDP Growth and Deposit Growth

Panel A: Deposit Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
$\Delta \ln(\text{Deposits})$	-0.0004 (0.0012)	-0.0020*** (0.0007)	-0.0000 (0.0008)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1589	0.2496	0.1918

Panel B: Deposit Rate and Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0032 (0.0037)	-0.0074* (0.0039)	-0.0199** (0.0085)
$\Delta \ln(\text{Deposits})$	-0.0004 (0.0012)	-0.0019*** (0.0007)	0.0001 (0.0008)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1590	0.2506	0.1961

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 $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \Delta \ln(\text{Deposits})_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$. The regression specification in Panel B is $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} + \beta_2 \cdot \Delta \ln(\text{Deposits})_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$. $\Delta \ln(\text{GDP})$ denotes GDP growth, Rate denotes the average bank deposit rate, and $\Delta \ln(\text{Deposits})$ denotes deposit growth. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.71% for metro counties 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 8: County Economic Activity and Deposit Rates after Accounting for Credit

Panel A: Small Business Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0032 (0.0037)	-0.0076* (0.0039)	-0.0198** (0.0084)
$\Delta \ln(\text{SBL})$	0.0054* (0.0029)	0.0029* (0.0016)	-0.0023 (0.0021)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1619	0.2506	0.1966
Panel B: Mortgage Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0031 (0.0037)	-0.0076* (0.0039)	-0.0197** (0.0084)
$\Delta \ln(\text{Mortgages})$	0.0060* (0.0032)	0.0027 (0.0021)	0.0012 (0.0022)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1604	0.2498	0.1961
Panel C: Total Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	-0.0032 (0.0037)	-0.0076* (0.0039)	-0.0198** (0.0084)
$\Delta \ln(\text{Total})$	0.0067** (0.0033)	0.0033* (0.0019)	0.0008 (0.0018)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1608	0.2501	0.1961

Notes: This table presents the relation between county deposit rates and economic activity in metro counties, after controlling for credit growth. The regression specification is the following: $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} + \beta_2 \cdot \Delta \ln(\text{Credit})_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta \ln(\text{GDP})$ denotes GDP growth, Rate denotes the average bank deposit rate, and $\Delta \ln(\text{Credit})$ 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 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.71% for metro counties 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 9: Horse Race: State Deposit Rate vs. Other Leading Indicators

Panel A: Univariate				
$\Delta \ln(\text{GDP})$	12 Qtrs Ahead	12 Qtrs Ahead	12 Qtrs Ahead	12 Qtrs Ahead
Rate	-0.0081*** (0.0024)			
$\ln(\text{Auto Sales})$		-0.0117** (0.0057)		
$\ln(\text{UI Claims})$			0.0036 (0.0021)	
$\ln(\text{Job Openings})$				-0.0108*** (0.0037)
State FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
N	2,020	2,020	2,020	2,020
R^2	0.2530	0.2542	0.2498	0.2562
Panel B: Multivariate				
$\Delta \ln(\text{GDP})$	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead	
Rate	-0.0024 (0.0030)	-0.0063* (0.0033)	-0.0077*** (0.0024)	
$\ln(\text{Auto Sales})$	-0.0020 (0.0036)	-0.0037 (0.0036)	-0.0067 (0.0045)	
$\ln(\text{UI Claims})$	-0.0031 (0.0022)	-0.0004 (0.0020)	0.0017 (0.0020)	
$\ln(\text{Job Openings})$	-0.0038 (0.0033)	-0.0093*** (0.0031)	-0.0087*** (0.0027)	
State FE	✓	✓	✓	
Year FE	✓	✓	✓	
N	2,428	2,224	2,020	
R^2	0.2279	0.2477	0.2630	

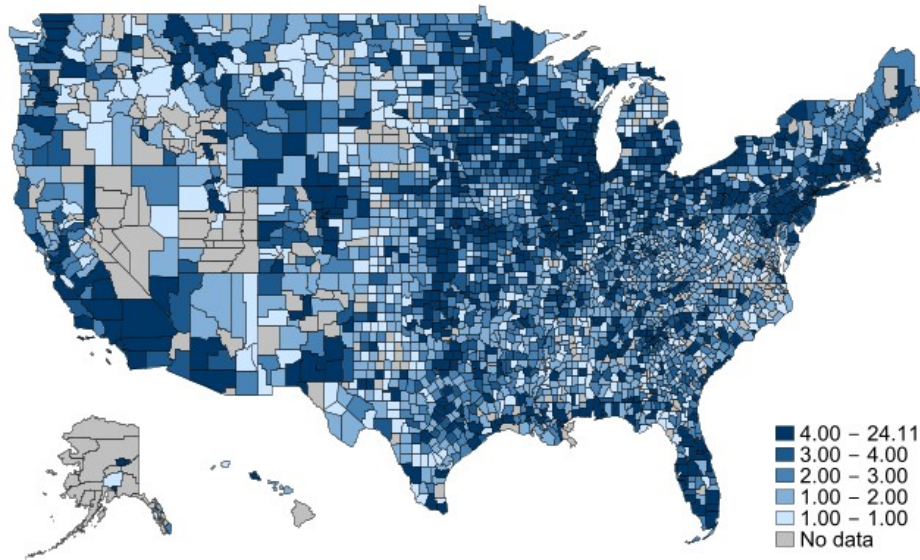
Notes: This table presents the relation between state deposit rates and economic activity. Panel A presents the results from estimating an OLS model of the change in economic activity in state s in quarter-year $t + 12$ as a function of the average deposit rate within a county at quarter-year t . We consider twelve-quarter lead indicators of economic activity. The regression specification is the following: $\Delta \ln(\text{GDP})_{s,t+12} = \beta_1 \cdot X_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t}$ where $\Delta \ln(\text{GDP})$ 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: $\Delta \ln(\text{GDP})_{s,t+k} = \beta_1 \cdot \text{Rate}_{s,t} + \beta_2 \cdot \ln(\text{Auto Sales})_{s,t} + \beta_3 \cdot \ln(\text{UI Claims})_{s,t} + \beta_4 \cdot \ln(\text{Job Openings})_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t}$ where $\Delta \ln(\text{GDP})$ 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. Average GDP growth is 0.37% for states from 2005Q1 through 2017Q4. The independent variables are standardized. The sample period is from 2005Q1 through 2017Q4. State clustered standard errors are reported in parentheses.

Internet Appendix

Deposit Rates as Regional Economic Indicators

Rajkamal Iyer¹ Shohini Kundu² Nikos Paltalidis³

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



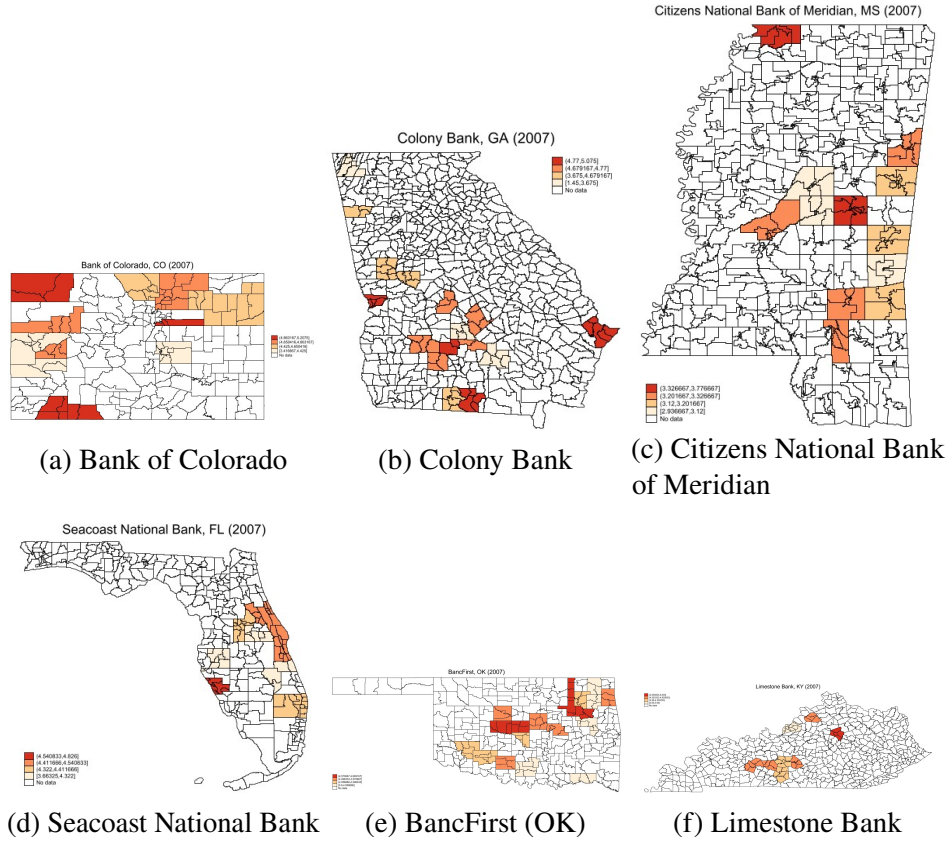
Notes: This figure presents a heatmap of the average number of banks that offer 12-month certificates of deposit of at least \$10,000 in each county from 2001 to 2020. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the total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

¹Rajkamal Iyer is at Imperial College and CEPR. email: r.iyer@imperial.ac.uk

²Shohini Kundu is at the Anderson School of Management, University of California Los Angeles. email: shohini.kundu@anderson.ucla.edu

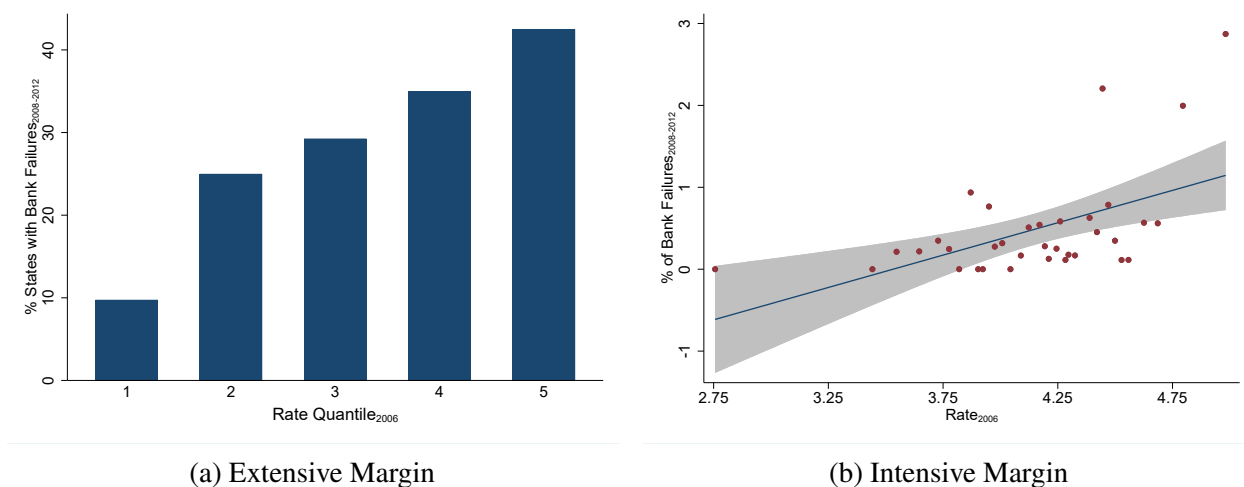
³Nikos Paltalidis is at the Ecole de Management Léonard De Vinci. email: nikos.paltalidis@devinci.fr

Figure A.2: Bank Deposit Rates: 2007



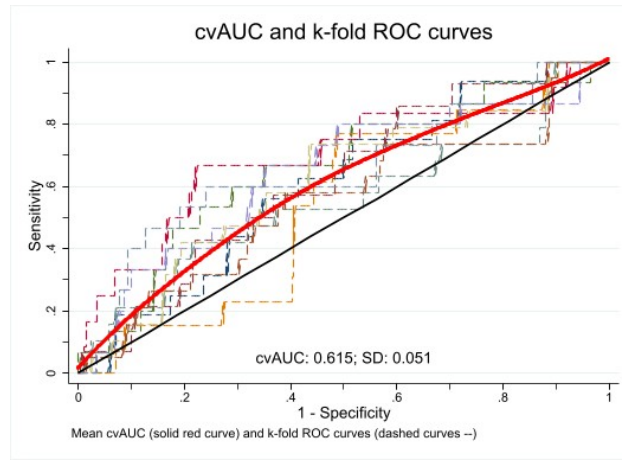
Notes: This figure uses RateWatch data to present a heatmap of county deposit rates (12-month, \$10K CDs) in 2007. Using the deposits rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the annual bank deposit rate in each county is computed as 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, Colony Bank, Citizens National Bank of Meridian Bank, Seacoast National Bank, BancFirst, and Limestone Bank. 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 A.3: Deposit Rates Predict Bank Failures

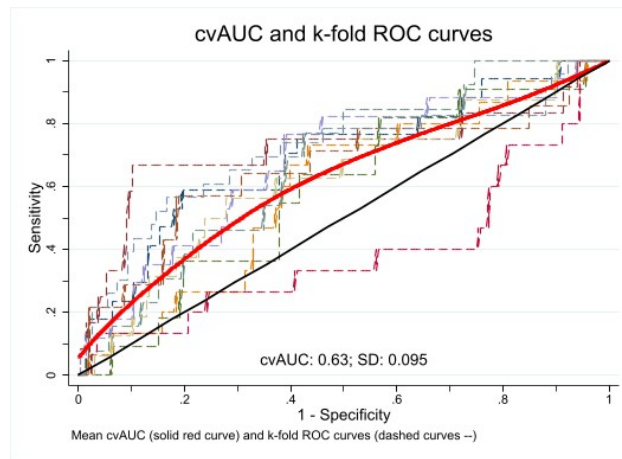


Notes: The figures present the relation between deposit rates and financial risk at the state level. Figure A.3a and Figure A.3b present the association between state deposit rates in 2006 and bank failures between 2008 and 2012. Figure A.3a presents a bar graph of the percent of states that experienced a bank failure between 2008 and 2012, categorized by the rate quintile of deposit rates across state-quarters in 2006. Figure A.3b 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 $\times$ 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 analysis is restricted to single-state banks.

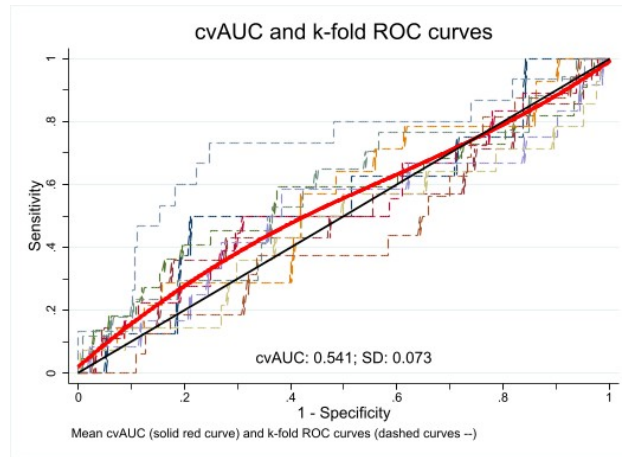
Figure A.4: Out-of-Sample Estimation: Deposit Rates Predict State Recessions



(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: $\text{logit}(p_{s,t+k}) = \beta_0 + \beta_1 \text{Rate}_{s,t} + \epsilon_{s,t}$ where $\text{logit}(p) = \ln\left(\frac{p}{1-p}\right)$ denotes the log of the odds ratio, Rate denotes the average bank deposit rate. We assume that $\epsilon_{s,t}$ is well-behaved. We consider up to 12-quarter ($k = 4, 8, 12$) lead indicators of state recessions. A state is in a recession if its GDP growth between two consecutive quarters is below -2%. The cross-validated AUCs are averaged from each fold. 10 folds are used to produce these figures. Figure A.4a, Figure A.4b, and Figure A.4c reports the cross-validated AUCs using the 4-quarter, 8-quarter, 12-quarter forecast classifiers. The likelihood of a state being in a recession is 5.18% from 2005Q1 through 2020Q4. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks.

Table A.1: Variation in Branch Deposit Rates Across Banks

	(1)	(2)	(3)	(4)	(5)	(6)
	Bank	County	County×Year	Bank×Year	County× Year, Bank	County× Year, Bank×Year
R^2	0.1920	0.2096	0.9497	0.9277	0.9547	0.9601
N	6,719	6,642	3,018	6,719	3,014	2,865

Notes: This table reports the R^2 and number of observations from regressing the 12-month certificate of deposit rate at the Branch $\times$ Bank $\times$ Year level on bank fixed effects (column 1), county fixed effects (column 2), county $\times$ year fixed effects (column 3), bank $\times$ year fixed effects (column 4), county $\times$ year and bank fixed effects (column 5), and bank $\times$ year and county $\times$ year fixed effects (column 6). Using the deposits rate data from RateWatch, we construct a panel at the branch $\times$ month-year level. The annual branch deposit rate is the branch 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 that report deposit rates for at least 5 branches each year.

Table A.2: Placebo Test: Deposit Rates Reflect Localized Funding Conditions in Metro Counties

Panel A: GDP Growth						
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0007 (0.0042)	-0.0052 (0.0050)	-0.0101* (0.0053)	-0.0160*** (0.0058)	-0.0053 (0.0075)	0.0023 (0.0054)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
<i>N</i>	1,479	1,311	1,178	1,061	942	837
<i>R</i> ²	0.3285	0.3486	0.3549	0.3532	0.3654	0.3759
Panel B: Employment Growth						
$\Delta \ln(\text{Employment})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0013 (0.0034)	-0.0025 (0.0028)	-0.0058* (0.0032)	-0.0024 (0.0029)	-0.0021 (0.0032)	0.0019 (0.0027)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
<i>N</i>	1,509	1,337	1,201	1,081	958	851
<i>R</i> ²	0.6275	0.6463	0.6637	0.6900	0.7114	0.7204
Panel C: Business Formation						
$\ln(\text{Applications})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0223 (0.0196)	-0.0208 (0.0257)	-0.0092 (0.0226)	0.0154 (0.0209)	0.0392* (0.0198)	0.0432* (0.0227)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
<i>N</i>	1,154	1,007	880	767	658	564
<i>R</i> ²	0.9950	0.9951	0.9950	0.9950	0.9954	0.9953
Panel D: Wage Growth						
$\Delta \ln(\text{Annual Wages})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0011 (0.0043)	-0.0064* (0.0036)	-0.0071* (0.0038)	-0.0056 (0.0039)	-0.0010 (0.0042)	0.0060* (0.0036)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
<i>N</i>	1,509	1,326	1,180	1,059	938	833
<i>R</i> ²	0.5859	0.6168	0.6284	0.6509	0.6647	0.6649

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 six-year ($k = 1, 2, 3, 4, 5, 6$) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, employment growth in Panel B, natural-log of the number of new business applications in Panel C, and wage growth in Panel D. *Rate* denotes the average bank deposit rate for non-metro counties (1993 USDA ERS Rural-Urban Continuum Codes ≥ 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 of deposit rates at the bank $\times$ month-year level. We replace each bank's deposit rate in metro counties with its average deposit rate across non-metro counties. Then, the average deposit rate across banks for each county in each month is computed, so the within-county variation is driven purely by bank composition. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.71%, average employment growth is 0.71%, average log-transformed # of applications is 3.23%, and average wage growth of 3.53% 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. **A.6**

Table A.3: Placebo Test: Deposit Rates Reflect Localized Funding Conditions in Non-Metro Counties

Panel A: GDP Growth						
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0025 (0.0053)	0.0018 (0.0054)	-0.0030 (0.0055)	-0.0036 (0.0067)	0.0020 (0.0064)	-0.0010 (0.0062)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	2,418	2,087	1,844	1,634	1,438	1,263
R^2	0.1914	0.1937	0.2054	0.2075	0.2112	0.1854
Panel B: Employment Growth						
$\Delta \ln(\text{Employment})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0016 (0.0023)	0.0033 (0.0025)	-0.0006 (0.0032)	-0.0013 (0.0033)	-0.0009 (0.0028)	-0.0020 (0.0031)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	2,442	2,108	1,864	1,653	1,454	1,277
R^2	0.4637	0.4827	0.4949	0.5029	0.5219	0.5331
Panel C: Business Formation						
$\ln(\text{Applications})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0039 (0.0159)	-0.0126 (0.0189)	-0.0145 (0.0194)	-0.0342 (0.0228)	-0.0500** (0.0232)	-0.0528** (0.0227)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	1,907	1,627	1,402	1,214	1,030	871
R^2	0.9936	0.9938	0.9937	0.9941	0.9946	0.9949
Panel D: Wage Growth						
$\Delta \ln(\text{Annual Wages})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0068** (0.0033)	0.0039 (0.0036)	-0.0031 (0.0047)	-0.0021 (0.0050)	-0.0056 (0.0040)	-0.0041 (0.0042)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	2,442	2,083	1,829	1,604	1,401	1,227
R^2	0.4045	0.4332	0.4364	0.4390	0.4617	0.4546

Notes: This table presents the relation between county deposit rates and economic activity in non-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 six-year ($k = 1, 2, 3, 4, 5, 6$) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, employment growth in Panel B, natural-log of the number of new business applications in Panel C, and wage growth in Panel D. Rate denotes the average bank deposit rate across metro counties (1993 USDA ERS Rural-Urban Continuum Codes < 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 of deposit rates at the bank $\times$ month-year level. We replace each bank's deposit rate in non-metro counties with its average deposit rate across metro counties. Then, the average deposit rate across banks for each county in each month is computed, so the within-county variation is driven purely by bank composition. The annual county deposit rate is the county deposit rate in the last reporting month of each year. Average GDP growth is 1.71%, average employment growth is 0.71%, average log-transformed # of applications is 3.23%, and average wage growth of 3.53% 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 A.4: County Economic Activity, Deposit Rate, and Share of Multi-state Banks

$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0004 (0.0034)	-0.0072** (0.0036)	-0.0138*** (0.0040)	-0.0091** (0.0038)	-0.0027 (0.0035)	0.0006 (0.0043)
$1_{\text{Share of Multi-state Banks} \leq P25} \times \text{Rate}$	0.0014 (0.0030)	0.0044 (0.0032)	0.0065** (0.0030)	0.0066** (0.0027)	0.0047 (0.0033)	0.0013 (0.0039)
$1_{P25 < \text{Share of Multi-state Banks} \leq P50} \times \text{Rate}$	-0.0026 (0.0018)	-0.0010 (0.0018)	0.0023 (0.0015)	0.0033** (0.0015)	0.0023 (0.0016)	0.0005 (0.0016)
$1_{P50 < \text{Share of Multi-state Banks} \leq P75} \times \text{Rate}$	-0.0002 (0.0023)	-0.0001 (0.0020)	0.0004 (0.0016)	0.0009 (0.0016)	0.0008 (0.0017)	0.0003 (0.0016)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,466	4,192	3,937	3,690	3,436	3,187
R^2	0.2765	0.2832	0.2894	0.2828	0.2766	0.2764

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 six-year ($k = 1, 2, 3, 4, 5, 6$) annual lead indicators of economic activity. The regression specification is the following: $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} \times 1_{\text{Share of Multi-state Banks} \leq P25} + \beta_2 \cdot \text{Rate}_{c,t} \times 1_{P25 < \text{Share of Multi-state Banks} \leq P50} + \beta_3 \cdot \text{Rate}_{c,t} \times 1_{P50 < \text{Share of Multi-state Banks} \leq P75} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta \ln(\text{GDP})$ denotes GDP growth. Rate denotes the average bank deposit rate, and $1_{\text{Share of Multi-state Banks} \leq P25}$, $1_{P25 < \text{Share of Multi-state Banks} \leq P50}$, and $1_{P50 < \text{Share of Multi-state Banks} \leq P75}$ denote whether the county's share of multi-state banks is in the first, second, or third quartiles, respectively. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.71% for metro counties 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 A.5: County Economic Activity and Deposit Rate: 2010-2015

Panel A: GDP Growth						
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0175 (0.0210)	-0.0549*** (0.0171)	-0.0169 (0.0169)	-0.0011 (0.0154)	0.0348** (0.0173)	-0.0037 (0.0174)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	1,456	1,437	1,424	1,415	1,406	1,168
R^2	0.2491	0.2441	0.2505	0.2659	0.4372	0.4876
Panel B: Employment Growth						
$\Delta \ln(\text{Employment})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0123 (0.0076)	-0.0185*** (0.0061)	-0.0221*** (0.0084)	-0.0137** (0.0064)	-0.0071 (0.0069)	0.0035 (0.0094)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	1,477	1,457	1,442	1,430	1,420	1,178
R^2	0.4623	0.4876	0.5107	0.5401	0.8095	0.8205
Panel C: Business Formation						
$\ln(\text{Applications})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0486 (0.0339)	-0.0152 (0.0403)	-0.1238*** (0.0453)	-0.1134*** (0.0386)	-0.1474*** (0.0552)	-0.2247*** (0.0697)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	1,477	1,457	1,442	1,430	1,420	1,412
R^2	0.9983	0.9981	0.9978	0.9979	0.9960	0.9943
Panel D: Wage Growth						
$\Delta \ln(\text{Annual Wages})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0155 (0.0119)	-0.0161* (0.0098)	-0.0123 (0.0142)	-0.0084 (0.0119)	0.0145 (0.0113)	0.0193 (0.0128)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	1,477	1,455	1,435	1,421	1,413	1,171
R^2	0.4035	0.4378	0.4563	0.4532	0.5275	0.5354

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 six-year ($k = 1, 2, 3, 4, 5, 6$) 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, employment growth in Panel B, natural-log transformed number of new business applications in Panel C, and wage growth in Panel D. *Rate* denotes the average bank deposit rate. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.83%, average employment growth is 1.40%, average log-transformed # of applications is 1.63%, and average wage growth of 3.65% 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 A.6: County Economic Activity, Deposit Rate, and Deposit Betas

Panel A: GDP Growth						
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0027 (0.0032)	-0.0071** (0.0034)	-0.0136*** (0.0042)	-0.0049 (0.0039)	-0.0036 (0.0036)	-0.0000 (0.0043)
Rate $\times$ Beta	-0.0055 (0.0043)	-0.0074 (0.0046)	-0.0066 (0.0047)	-0.0054 (0.0038)	-0.0064 (0.0041)	-0.0014 (0.0044)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,578	4,292	4,029	3,775	3,513	3,258
R^2	0.2672	0.2764	0.2802	0.2715	0.2694	0.2739
Panel B: Employment Growth						
$\Delta \ln(\text{Employment})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0024 (0.0016)	-0.0055*** (0.0016)	-0.0094*** (0.0018)	-0.0088*** (0.0017)	-0.0059*** (0.0017)	-0.0026 (0.0016)
Rate $\times$ Beta	-0.0038** (0.0018)	-0.0018 (0.0017)	-0.0001 (0.0018)	0.0003 (0.0019)	-0.0009 (0.0016)	-0.0024 (0.0015)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,638	4,347	4,079	3,820	3,553	3,291
R^2	0.6303	0.6469	0.6648	0.6743	0.6870	0.6966
Panel C: Business Formation						
$\ln(\text{Applications})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	0.0021 (0.0144)	-0.0155 (0.0163)	-0.0315* (0.0165)	-0.0354* (0.0183)	-0.0338* (0.0191)	-0.0374* (0.0203)
Rate $\times$ Beta	0.0118 (0.0250)	0.0127 (0.0250)	0.0223 (0.0238)	0.0287 (0.0249)	0.0263 (0.0240)	0.0257 (0.0239)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	3,923	3,640	3,378	3,112	2,851	2,591
R^2	0.9933	0.9935	0.9935	0.9935	0.9938	0.9937
Panel D: Wage Growth						
$\Delta \ln(\text{Annual Wages})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Rate	-0.0013 (0.0025)	-0.0064*** (0.0023)	-0.0116*** (0.0024)	-0.0098*** (0.0025)	-0.0038 (0.0026)	-0.0003 (0.0027)
Rate $\times$ Beta	-0.0046 (0.0031)	-0.0006 (0.0029)	-0.0004 (0.0028)	-0.0021 (0.0029)	-0.0049* (0.0025)	-0.0064** (0.0027)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,638	4,330	4,056	3,795	3,533	3,271
R^2	0.4840	0.5104	0.5244	0.5253	0.5295	0.5186

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 six-year ($k = 1, 2, 3, 4, 5, 6$) annual lead indicators of economic activity. The regression specification is the following: $Y_{c,t+k} = \beta_1 \cdot \text{Rate}_{c,t} + \beta_2 (\text{Rate}_{c,t} \cdot \text{Beta}_c) + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y denotes GDP growth in Panel A, employment growth in Panel B, natural-log transformed number of new business applications in Panel C, and wage growth in Panel D. Rate denotes the average bank deposit rate, Beta denotes the deposit beta that is computed from first regressing $\Delta \ln(\text{Deposits})_{b,c,t} = \alpha + \beta \cdot \Delta FFR_t + \epsilon_{b,c,t}$, where $\Delta \ln(\text{Deposits})$ represents deposit growth, and FFR represents the Fed Funds Rate. These deposit betas are aggregated at the county level by weighting the bank-by-county deposit betas according to the average bank deposit share in each county over the sample period: $\text{Beta}_c = \sum_b w_{b,c} \cdot \beta_{b,c}$. See table notes for Table 2 for a description of the sample. 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 A.7: Forecasting County Recessions

Panel A: Deposit Rates			
$1_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0202*** (0.0049)	0.0546*** (0.0053)	0.0481*** (0.0057)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0768	0.1028	0.0957
AUC	0.7009	0.7307	0.7240
Overall test statistic, χ^2	277.8121	384.2369	316.4925
p-value	0.0866	0.0000	0.0006
Panel B: GDP Growth Lags and Deposit Rates			
$1_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0251*** (0.0056)	0.0609*** (0.0057)	0.0509*** (0.0063)
$\Delta \ln(GDP)_{t-1}$	0.3604** (0.1401)	0.2601* (0.1375)	0.6119*** (0.1600)
$\Delta \ln(GDP)_{t-2}$	0.3215*** (0.1247)	0.1763 (0.1345)	0.2011* (0.1220)
$\Delta \ln(GDP)_{t-3}$	0.2673 (0.2430)	0.1394 (0.1385)	0.3775** (0.1545)
County FIPS FE	✓	✓	✓
N	3,293	3,039	2,790
pseudo R^2	0.0873	0.1154	0.1097
AUC	0.7106	0.7425	0.7369
Overall test statistic, χ^2	269.1455	352.0962	285.6236
p-value	0.0808	0.0000	0.0094

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: Panel A: $\text{logit}(p_{c,t+k}) = \beta_0 + \beta_1 \text{Rate}_{c,t} + \beta_2 \text{Rate}_{c,t} + \alpha_c + \epsilon_{c,t+k}$; and Panel B: $\text{logit}(p_{c,t+k}) = \beta_0 + \beta_1 \text{Rate}_{c,t} + \beta_2 \Delta \ln(GDP)_{c,t-1} + \beta_3 \Delta \ln(GDP)_{c,t-2} + \beta_4 \Delta \ln(GDP)_{c,t-3} + \alpha_c + \epsilon_{c,t+k}$ where $\text{logit}(p) = \ln(\frac{p}{1-p})$ denotes the log of the odds ratio, $\Delta \ln(GDP)$ denotes GDP growth, 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. The independent variable is standardized. The likelihood of a county being in a recession is 15.12% for metro counties from 2001 through 2020. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedasticity-robust standard errors are reported in parentheses.

Table A.8: Deposit Rates Predict County Recessions Better in Concentrated Markets

$1[Recession]_{t+2}$	Large Metro	Small Metro	Large Urban	Small Urban	Rural
$Rate_t$	0.0533*** (0.0051)	0.0546*** (0.0044)	0.0269*** (0.0073)	0.0170*** (0.0040)	-0.0087 (0.0064)
County FIPS FE	✓	✓	✓	✓	✓
N	4,037	6,554	3,191	13,553	5,685
pseudo R^2	0.1028	0.0950	0.0595	0.0618	0.0494
AUC	0.7307	0.7162	0.6710	0.6637	0.6444
Overall test statistic, χ^2	384.2455	579.1674	182.1187	880.7135	310.9590
p-value	0.0000	0.0000	0.6840	0.2797	0.9831

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) $t + 2$: $logit(p_{c,t+2}) = \beta_0 + \beta_1 Rate_{c,t} + \alpha_c \epsilon_{c,t+k}$. 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. A county is in a recession if its GDP growth between two consecutive years is below -2%. Columns (1)–(5) progressively restrict the sample based on 1993 USDA ERS Rural-Urban Continuum Codes: (1) metro areas with populations ≥ 1 million (codes 0–1); (2) metro areas 1 million (codes 2–3); (3) urban areas 20,000 (codes 4–5); (4) urban areas 20,000 (codes 6–7); and (5) rural areas 2,500 (codes 8–9). The independent variable is standardized. The likelihood of a county being in a recession is 15.12% for large metro counties, 17.23% for small metro counties, 20.10% for large urban counties, 27.47% for small urban counties, and 32.92% for rural counties from 2001 through 2020. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedasticity-robust standard errors are reported in parentheses.

Table A.9: GDP Growth and State Deposit Rate

$\Delta \ln(\text{GDP})$	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead	16 Qtrs Ahead	20 Qtrs Ahead	24 Qtrs Ahead
Rate	-0.0015 (0.0018)	-0.0046*** (0.0017)	-0.0059*** (0.0017)	-0.0041** (0.0018)	-0.0019 (0.0021)	-0.0028* (0.0014)
State FE	✓	✓	✓	✓	✓	✓
Quarter-Year FE	✓	✓	✓	✓	✓	✓
N	3,244	3,091	2,887	2,685	2,481	2,277
R^2	0.6424	0.6607	0.6768	0.7150	0.7449	0.7576

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: $\Delta \ln(\text{GDP})_{s,t+k} = \beta_1 \cdot \text{Rate}_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t}$ where $\Delta \ln(\text{GDP})$ denotes GDP growth. Rate denotes the average bank deposit rate. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the 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 A.10: Deposit Rates Predict State Recessions

$1_{Recession}$	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead
Rate	0.0242*** (0.0034)	0.0262*** (0.0039)	0.0147*** (0.0039)
State FE	✓	✓	✓
N	3,040	2,836	2,632
pseudo R^2	0.0708	0.0786	0.0488
AUC	0.7260	0.7191	0.6747
Overall test statistic, χ^2	0.0754	0.0803	0.0492
p-value	0.0000	0.0002	0.3555

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) $t + k$: $\text{logit}(p_{s,t+k}) = \beta_0 + \beta_1 \text{Rate}_{s,t} + \beta_2 \text{Rate}_{s,t} + \alpha_s + \epsilon_{s,t+k}$ where $\text{logit}(p) = \ln(\frac{p}{1-p})$ 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 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the 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 likelihood of a state being in a recession is 5.18% from 2001 through 2020. The sample period is from 2005Q1 through 2020Q4. The analysis is restricted to single-state banks. Heteroskedasticity-robust standard errors are reported in parentheses.

Table A.11: Deposit and Credit Growth and Quartiles of Bank Rate Changes

Panel A: Insured Deposit Growth							
$\Delta \ln(\text{Insured})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$1_{P25 < \text{Dep Rate Change} \leq P50}$	-0.0001 (0.0007)	-0.0015* (0.0008)	-0.0035*** (0.0007)	-0.0015** (0.0008)	0.0031*** (0.0008)	0.0008 (0.0007)	0.0013** (0.0005)
$1_{P50 < \text{Dep Rate Change} \leq P75}$	-0.0007 (0.0006)	-0.0024*** (0.0008)	-0.0044*** (0.0010)	0.0000 (0.0008)	0.0053*** (0.0007)	0.0025*** (0.0005)	0.0009 (0.0008)
$1_{\text{Dep Rate Change} > P75}$	0.0016** (0.0007)	0.0000 (0.0009)	-0.0037*** (0.0009)	0.0044*** (0.0008)	0.0080*** (0.0009)	0.0045*** (0.0006)	0.0022*** (0.0007)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	234,296	238,782	243,571	243,714	238,978	234,508	230,172
R^2	0.0484	0.0549	0.0534	0.0536	0.0567	0.0597	0.0611

Panel B: Uninsured Deposit Growth							
$\Delta \ln(\text{Uninsured})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$1_{P25 < \text{Dep Rate Change} \leq P50}$	-0.0033 (0.0029)	0.0014 (0.0028)	-0.0036 (0.0030)	-0.0010 (0.0031)	0.0057** (0.0026)	-0.0056** (0.0028)	-0.0003 (0.0033)
$1_{P50 < \text{Dep Rate Change} \leq P75}$	0.0047* (0.0024)	0.0032 (0.0038)	-0.0061* (0.0036)	-0.0036 (0.0027)	0.0070** (0.0029)	0.0017 (0.0032)	-0.0031 (0.0037)
$1_{\text{Dep Rate Change} > P75}$	0.0032 (0.0025)	0.0032 (0.0025)	-0.0117*** (0.0031)	-0.0009 (0.0034)	0.0085*** (0.0025)	0.0019 (0.0028)	-0.0002 (0.0028)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	233,084	237,548	242,312	242,464	240,887	239,551	238,319
R^2	0.0689	0.0703	0.0699	0.0703	0.0703	0.0707	0.0708

Panel C: Loan Growth							
$\Delta \ln(\text{Loans})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$1_{P25 < \text{Dep Rate Change} \leq P50}$	-0.0012* (0.0006)	-0.0004 (0.0008)	0.0008 (0.0005)	0.0010 (0.0008)	-0.0004 (0.0006)	0.0003 (0.0005)	0.0009* (0.0005)
$1_{P50 < \text{Dep Rate Change} \leq P75}$	-0.0029*** (0.0008)	-0.0007 (0.0007)	0.0023*** (0.0008)	0.0016** (0.0007)	0.0000 (0.0006)	0.0005 (0.0005)	0.0010** (0.0005)
$1_{\text{Dep Rate Change} > P75}$	0.0017* (0.0009)	0.0028*** (0.0009)	0.0058*** (0.0010)	0.0052*** (0.0008)	0.0019*** (0.0007)	0.0018*** (0.0006)	0.0022*** (0.0005)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	212,897	217,267	221,913	222,368	218,083	213,718	209,460
R^2	0.0227	0.0223	0.0221	0.0229	0.0262	0.0306	0.0317

Notes: The table presents the coefficients estimated from the following regression for bank b at time t (quarter-year): $\Delta \ln(Y)_{b,t+k} = \beta_0 + \beta_1 1_{P25 < \text{Dep Rate Change} \leq P50,b,t} + \beta_2 1_{P50 < \text{Dep Rate Change} \leq P75,b,t} + \beta_3 1_{\text{Dep Rate Change} > P75,b,t} + \alpha_t + \epsilon_{b,t}$ where $\Delta \ln(\text{Deposits})_{b,t+k}$ denotes growth in insured deposits (Panel A), uninsured deposits (Panel B), and loans (Panel C). $1_{P25 < \text{Dep Rate Change} \leq P50}$, $1_{P50 < \text{Dep Rate Change} \leq P75}$, $1_{\text{Dep Rate Change} > P75}$ 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. 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 A.12: What Balance Sheet Characteristics Predict Deposit Rates?

Rate _{<i>t</i>}	(1)	(2)
Credit/Deposits _{<i>t</i>-1}	0.0444*** (0.0036)	0.0261*** (0.0074)
Cash/Assets _{<i>t</i>-1}		-0.0165*** (0.0033)
Dividends/Assets _{<i>t</i>-1}		-0.0059*** (0.0020)
Deposits/Assets _{<i>t</i>-1}		-0.0037 (0.0036)
Securities/Assets _{<i>t</i>-1}		-0.0189*** (0.0071)
ln(Assets) _{<i>t</i>-1}		-0.0102 (0.0068)
Bank FE	✓	✓
Year FE	✓	✓
<i>N</i>	94,259	94,259
<i>R</i> ²	0.9416	0.9416

Notes: The table presents the relation between deposit rates and bank characteristics. The regression specification is the following: $\text{Rate}_{b,t} = BX_{b,t-1} + \alpha_b + \alpha_t + \epsilon_{b,t}$ where Rate represents the average deposit rate of bank *b* in year *t*, *X* represents a vector of bank characteristics for bank *b* in year *t* - 1. This vector includes the average loan balance divided by total deposits, total cash holdings divided by total bank assets, total dividend on common stocks divided by total assets, total deposits divided by total assets, total securities divided by total assets, and the natural-log of total assets. 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 A.13: Changes in Bank Capital, NPL, and Quartiles of Bank Rate Changes

Panel A: Changes in Bank Capital							
Δ Tier 1 Ratio	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$1_{P25 < \text{Dep Rate Change} \leq P50}$	0.0004 (0.0004)	0.0002 (0.0003)	0.0000 (0.0004)	-0.0041 (0.0046)	-0.0070 (0.0070)	0.0033 (0.0031)	-0.0002 (0.0004)
$1_{P50 < \text{Dep Rate Change} \leq P75}$	0.0007*** (0.0002)	0.0001 (0.0005)	0.0001 (0.0005)	-0.0057 (0.0060)	-0.0028 (0.0028)	0.0011 (0.0011)	-0.0003 (0.0004)
$1_{\text{Dep Rate Change} > P75}$	0.0002 (0.0004)	-0.0002 (0.0005)	-0.0006 (0.0005)	-0.0026 (0.0024)	-0.0028 (0.0024)	0.0003 (0.0003)	-0.0012 (0.0011)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	164,542	167,796	171,189	173,701	172,491	171,237	170,091
R^2	0.0031	0.0031	0.0025	0.0006	0.0006	0.0006	0.0006
Panel B: Changes in Non-Performing Loan Ratio							
Δ NPL/Loans	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t-3	t-2	t-1	t	t+1	t+2	t+3
$1_{P25 < \text{Dep Rate Change} \leq P50}$	-0.0001 (0.0001)	0.0001 (0.0002)	-0.0001* (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	0.0001 (0.0001)
$1_{P50 < \text{Dep Rate Change} \leq P75}$	-0.0002 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0002** (0.0001)	0.0001 (0.0001)	-0.0001 (0.0001)	-0.0000 (0.0001)
$1_{\text{Dep Rate Change} > P75}$	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0002** (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	0.0000 (0.0001)	0.0001 (0.0001)
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓
N	175,929	179,216	182,623	186,097	186,097	182,738	179,333
R^2	0.0075	0.0075	0.0074	0.0074	0.0074	0.0074	0.0074

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

Table A.14: Deposit Rate Predicts Recessions after Accounting for Deposit Growth

Panel A: Deposit Growth			
$1_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
$\Delta \ln(\text{Deposit})$	-0.0183*** (0.0063)	0.0006 (0.0065)	0.0129* (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			
$1_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0212*** (0.0049)	0.0549*** (0.0053)	0.0477*** (0.0057)
$\Delta \ln(\text{Deposit})$	-0.0198*** (0.0063)	-0.0052 (0.0060)	0.0077 (0.0062)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0792	0.1030	0.0960
AUC	0.7025	0.7307	0.7237
Overall test statistic, χ^2	293.9763	386.6196	317.4426
p-value	0.0239	0.0000	0.0006

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 $\text{logit}(p_{c,t+k}) = \beta_0 + \beta_1 \cdot \Delta \ln(\text{Deposit})_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $\text{logit}(p) = \ln(\frac{p}{1-p})$. In Panel B, we estimate $\text{logit}(p_{c,t+k}) = \beta_0 + \beta_1 \cdot \Delta \text{Rate}_{c,t} + \beta_2 \cdot \Delta \ln(\text{Deposit})_{c,t} + \alpha_c + \epsilon_{c,t+k}$. $\text{logit}(p) = \ln(\frac{p}{1-p})$ denotes the log of the odds ratio, $\Delta \ln(\text{Deposits})$ 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 likelihood of a county being in a recession is 15.12% for metro counties from 2001 through 2020. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedasticity-robust standard errors are reported in parentheses.

Table A.15: County Economic Activity and Credit Growth

Panel A: Small Business Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
$\Delta \ln(\text{SBL})$	0.0054* (0.0029)	0.0029* (0.0016)	-0.0024 (0.0021)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1617	0.2496	0.1924
Panel B: Mortgage Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
$\Delta \ln(\text{Mortgages})$	0.0060* (0.0033)	0.0028 (0.0021)	0.0017 (0.0022)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1603	0.2487	0.1919
Panel C: Total Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
$\Delta \ln(\text{Total})$	0.0067** (0.0033)	0.0034* (0.0019)	0.0011 (0.0019)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	4,578	4,292	4,029
R^2	0.1607	0.2490	0.1918

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: $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \Delta \ln(\text{Credit})_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta \ln(\text{GDP})$ denotes GDP growth, $\Delta \ln(\text{Credit})$ 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. Average GDP growth is 1.71% for metro counties 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 A.16: Deposit Rates Predict County Recessions Accounting for Credit Growth

Panel A: Small Business Lending Growth			
$1_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0225*** (0.0050)	0.0555*** (0.0053)	0.0487*** (0.0058)
$\Delta \ln(\text{SBL})$	-0.0302*** (0.0057)	-0.0102* (0.0058)	-0.0063 (0.0061)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0833	0.1036	0.0960
AUC	0.7096	0.7306	0.7241
Overall test statistic, χ^2	320.7028	384.4530	316.0254
p-value	0.0013	0.0000	0.0007
Panel B: Mortgage Lending Growth			
$1_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0193*** (0.0047)	0.0562*** (0.0054)	0.0486*** (0.0055)
$\Delta \ln(\text{Mortgages})$	-0.0312*** (0.0055)	0.0343*** (0.0062)	-0.0460*** (0.0056)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0847	0.1131	0.1097
AUC	0.7061	0.7452	0.7395
Overall test statistic, χ^2	295.7131	471.9410	412.0828
p-value	0.0203	0.0000	0.0000
Panel C: Total Lending Growth			
$1_{Recession}$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate	0.0195*** (0.0047)	0.0557*** (0.0054)	0.0488*** (0.0056)
$\Delta \ln(\text{Total})$	-0.0313*** (0.0057)	0.0313*** (0.0062)	-0.0461*** (0.0056)
County FIPS FE	✓	✓	✓
N	4,337	4,037	3,793
pseudo R^2	0.0844	0.1111	0.1092
AUC	0.7059	0.7428	0.7388
Overall test statistic, χ^2	295.0563	465.0323	405.6754
p-value	0.0216	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: $\text{logit}(p_{c,t+k}) = \beta_0 + \beta_1 \text{Rate}_{c,t} + \beta_2 \cdot \Delta \ln(\text{Credit})_{c,t} + \alpha_c + \epsilon_{c,t+k}$ where $\text{logit}(p) = \ln(\frac{p}{1-p})$ denotes the log of the odds ratio, Rate denotes the average bank deposit rate, $\Delta \ln(\text{Credit})$ 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 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. The independent variables are standardized. The likelihood of a county being in a recession is 15.12% for metro counties from 2001 through 2020. The sample period is from 2001 through 2020. The analysis is restricted to single-state banks. Heteroskedasticity-robust standard errors are reported in parentheses.

Table A.17: County Economic Activity and Deposit Rate in Low vs. High Credit Growth Counties

$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead	4 Years Ahead	5 Years Ahead	6 Years Ahead
Low Credit Growth $\times$ Rate	-0.0037** (0.0016)	-0.0038** (0.0015)	-0.0032*** (0.0012)	-0.0036*** (0.0012)	-0.0034** (0.0015)	-0.0031** (0.0015)
Rate	-0.0000 (0.0036)	-0.0040 (0.0037)	-0.0113** (0.0045)	-0.0011 (0.0041)	0.0001 (0.0038)	0.0031 (0.0044)
County FIPS FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
N	4,390	4,123	3,875	3,634	3,387	3,145
R^2	0.2615	0.2710	0.2747	0.2669	0.2663	0.2728

Notes: This table presents the relation between county deposit rates, credit growth 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 six-year ($k = 1, 2, 3, 4, 5, 6$) annual lead indicators of economic activity. The regression specification is the following: $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \text{Low Credit Growth}_c \times \text{Rate}_{c,t} + \beta_2 \cdot \text{Rate}_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta \ln(\text{GDP})$ denotes GDP growth, Low Credit Growth $\times$ Rate is the interaction of the county deposit rate and an indicator for counties with a three-year average total credit growth in the bottom quartile prior to a recession over the sample period, *Rate* denotes the average bank deposit rate. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.71% for metro counties 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 operating in metro counties that experienced at least one recession during the sample period. County clustered standard errors are reported in parentheses.

Table A.18: County Economic Activity and Residual Deposit Rates

Panel A: Small Business Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate Residual	-0.0009 (0.0008)	-0.0018** (0.0008)	-0.0029*** (0.0010)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	3,716	3,454	3,202
R^2	0.2495	0.2478	0.2521
Panel B: Mortgage Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate Residual	-0.0009 (0.0008)	-0.0019** (0.0008)	-0.0029*** (0.0010)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	3,716	3,454	3,202
R^2	0.2495	0.2478	0.2520
Panel C: Total Lending Growth			
$\Delta \ln(\text{GDP})$	1 Year Ahead	2 Years Ahead	3 Years Ahead
Rate Residual	-0.0009 (0.0008)	-0.0019** (0.0008)	-0.0029*** (0.0010)
County FIPS FE	✓	✓	✓
Year FE	✓	✓	✓
N	3,716	3,454	3,202
R^2	0.2495	0.2478	0.2520

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. 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: $\Delta \ln(\text{GDP})_{c,t+k} = \beta_1 \cdot \text{Rate Residual}_{c,t} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where $\Delta \ln(\text{GDP})$ 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 $\text{Rate}_{c,t} = \beta_1 \cdot \text{Credit Growth}_{c,t-1,t} + \beta_2 \cdot \text{Credit Growth}_{c,t-2,t-1} + \beta_3 \cdot \text{Credit Growth}_{c,t-3,t-2} + \beta_4 \cdot \text{Credit Growth}_{c,t-4,t-3} + \alpha_c + \alpha_t + \epsilon_{c,t}$. 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 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we construct a bank $\times$ county $\times$ month panel and compute the average county deposit rate each month. The annual rate is based on the last reporting month of the year. Average GDP growth is 1.71% for metro counties 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 A.19: Deposit Rates Predict State Recessions Accounting for Real Indicators

$1_{\text{Recession}}$	12 Qtrs Ahead	12 Qtrs Ahead	12 Qtrs Ahead	12 Qtrs Ahead
Rate	0.0349*** (0.0053)			
ln(Auto Sales)		0.0841*** (0.0269)		
ln(UI Claims)			-0.0384** (0.0196)	
ln(Job Openings)				0.0743*** (0.0212)
State FE	✓	✓	✓	✓
N	1,720	1,720	1,720	1,720
pseudo R^2	0.1363	0.0719	0.0653	0.0747
AUC	0.8069	0.6988	0.7002	0.7086
Overall test statistic, χ^2	197.5445	49.3590	50.3406	59.5572
p-value	0.0000	0.2340	0.2057	0.0478

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. We estimate $\text{logit}(p_{s,t+k}) = \beta_0 + \beta_1 \cdot \Delta X_{s,t} + \alpha_s + \epsilon_{s,t+k}$ where $\text{logit}(p) = \ln(\frac{p}{1-p})$. 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. A state is in a recession if its GDP growth between two consecutive years is below -2%. The independent variables are standardized. The likelihood of a state being in a recession is 5.18% from 2005Q1 through 2020Q4. The sample period is from 2005Q1 through 2017Q4. Heteroskedasticity-robust standard errors are reported in parentheses.

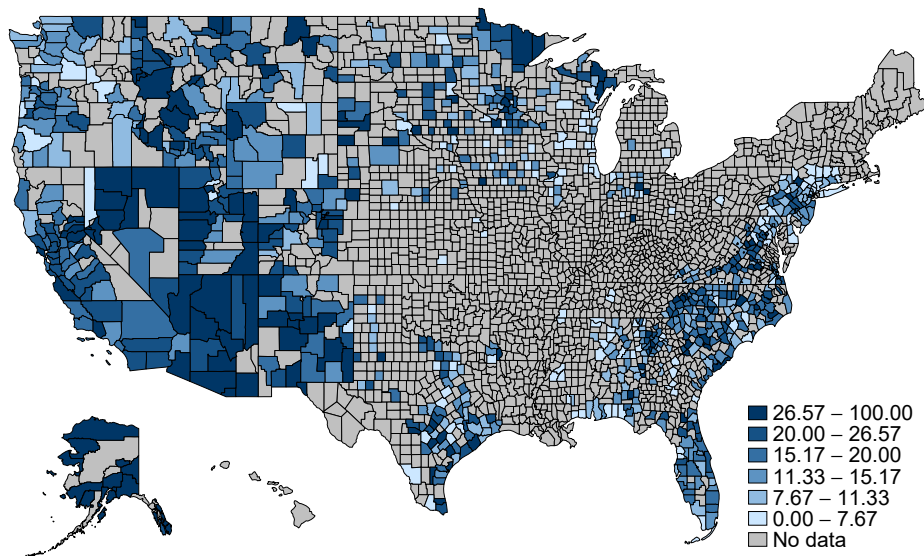
Table A.20: Deposit Rate Predicts State Recessions after Accounting for Real Indicators

$1_{Recession}$	4 Qtrs Ahead	8 Qtrs Ahead	12 Qtrs Ahead
Rate	0.0324*** (0.0047)	0.0428*** (0.0061)	0.0341*** (0.0063)
ln(Auto Sales)	-0.0256 (0.0377)	-0.0424 (0.0431)	0.0375 (0.0494)
ln(UI Claims)	0.0800*** (0.0235)	0.0704*** (0.0237)	0.0147 (0.0293)
ln(Job Openings)	0.0949*** (0.0320)	0.1174*** (0.0371)	-0.0043 (0.0381)
State FE	✓	✓	✓
N	2,064	1,892	1,720
pseudo R^2	0.1600	0.2195	0.1372
AUC	0.8324	0.8604	0.8075
Overall test statistic, χ^2	215.2556	215.1488	202.0207
p-value	0.0000	0.0000	0.0000

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. We estimate $\text{logit}(p_{s,t+k}) = \beta_0 + \beta_1 \cdot \text{Rate}_{s,t} + \beta_2 \cdot \ln(\text{Auto Sales})_{s,t} + \beta_3 \cdot \ln(\text{UI Claims})_{s,t} + \beta_4 \cdot \ln(\text{Job Openings})_{s,t} + \alpha_s + \epsilon_{s,t+k}$ where $\text{logit}(p) = \ln(\frac{p}{1-p})$, 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. A state is in a recession if its GDP growth between two consecutive years is below -2%. The independent variables are standardized. The likelihood of a state being in a recession is 5.18% from 2005Q1 through 2020Q4. The sample period is from 2005Q1 through 2017Q4. Heteroskedasticity-robust standard errors are reported in parentheses.

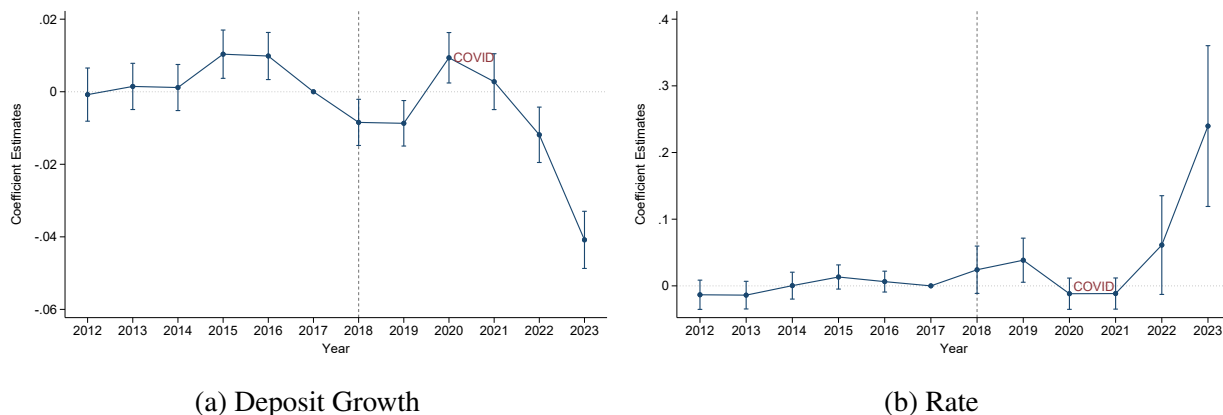
Case Study: Wells Fargo Additional Results

Figure B.1: Wells Fargo Deposit Share in 2017



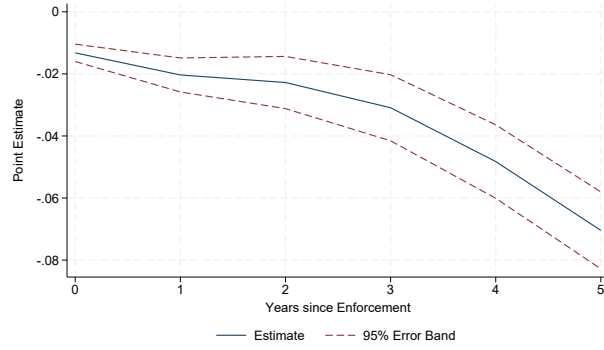
Notes: This figure presents a heatmap of Wells Fargo's share of deposits (%) in each county in 2017, using the FDIC's Summary of Deposits data. The intensity of the blue shading represents the quantile range of the deposit rate.

Figure B.2: County Deposit Growth and Deposit Rate around Active Enforcement

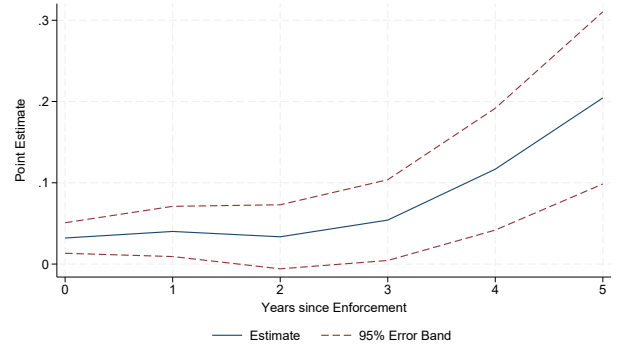


Notes: The figure presents the trend in county deposit growth and deposit rate in counties with a Wells Fargo. The regression specification is the following $Y_{c,t} = \sum_{k=-6, k \neq -1}^6 \beta_k \cdot 1_{WF \text{ County}, c} \times 1_{t=k+2018} + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y is the deposit growth ($\Delta \ln(\text{Deposits})$) in Panel B.2a and the deposit rate (Rate) in Panel B.2b of county c in year t , $1_{WF \text{ County}}$ is an indicator for whether a county had a Wells Fargo in 2017. The dashed line demarcates the pre and post periods. The deposit rate is the rate on the 12-month certificate of deposit of at least \$10,000. Using the deposit rate data from RateWatch, we construct a panel at the bank $\times$ county $\times$ month-year level. Then, the average deposit rate across single-state 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 2012 through 2023.

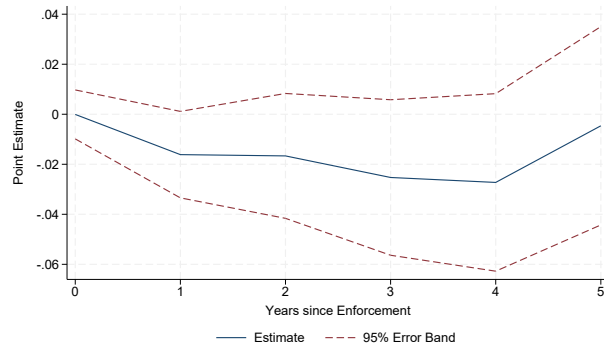
Figure B.3: Heterogeneous Dynamics in Response to Wells Fargo Active Enforcement: Jordà Linear Projections



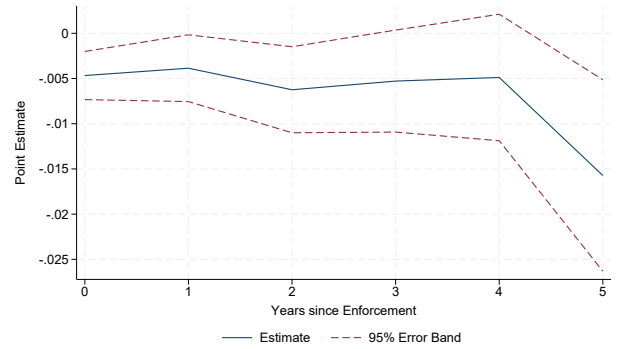
(a) Deposit Growth



(b) Rate



(c) Small Business Lending



(d) GDP Growth

Notes: The figure plots the coefficients and the associated 95% confidence intervals of the interaction term from the following Jordà (2005) style projection regression: $Y_{f,t+h} - Y_{f,t} = \beta_1 1_{WF\ County,c} \times Post_t + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y is deposit growth (Panel B.3a), deposit rate (Panel B.3b), log-small business lending (Panel B.3c), GDP growth (Panel B.3d), of county c in year t , and h denotes the steps (years) of the projection. The x-axis indicates the years since the shock. $1_{WF\ County}$ is an indicator for whether the county had a Wells Fargo in 2017, and $Post$ is an indicator for the post-enforcement period, after 2017. The sample period is from 2012 through 2023. The y-axis indicates the point estimate associated β_1 estimate. County clustered standard errors are reported in parentheses.

Table B.1: Bank Deposit Activity around Wells Fargo Active Enforcement

	(1)	(2)
	$\Delta \ln(\text{Deposits})$	Rate
WF County $\times$ Post	-0.0200*** (0.0033)	0.0123* (0.0068)
Bank $\times$ County FIPS FE	✓	✓
County FIPS $\times$ Year FE	✓	✓
N	261,009	25,449
R^2	0.3948	0.9262

Notes: This table presents the relation between bank deposit activity (excluding Wells Fargo) in counties with a Wells Fargo around the Wells Fargo Active Enforcement. The table presents the results from estimating following model: $Y_{b,c,t} = \beta_1 1_{\text{WF County},c} \times \text{Post}_t + \alpha_{c,t} + \alpha_{b,c} + \epsilon_{c,t}$ where Y is deposit growth in column (1) and deposit rate in column (2). $1_{\text{WF County}}$ is an indicator for whether the county had a Wells Fargo in 2017, and Post is an indicator for the post-enforcement period, after 2017. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we build a bank $\times$ county $\times$ month panel and compute the average rate across single-state banks in each county. The annual rate is based on the last reporting month of the year. The sample period is from 2012 through 2023. County clustered standard errors are reported in parentheses.

Table B.2: County Economic Activity in Regions with Low Wells Fargo Credit Participation

	(1)	(2)	(3)	(4)
	$\Delta \ln(\text{Deposits})$	Rate	$\ln(\text{SBL})$	$\Delta \ln(\text{GDP})$
WF County $\times$ Post	-0.0074*** (0.0019)	0.0567*** (0.0215)	-0.0454*** (0.0152)	-0.0033* (0.0019)
County FIPS FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
N	20,312	20,312	20,312	20,312
R^2	0.3741	0.7061	0.9740	0.1392

Notes: This table presents the relation between deposit activity in counties with a Wells Fargo around the Wells Fargo Active Enforcement, excluding counties where Wells Fargo's total share of small business and mortgage lending was above the 90th percentile in 2017. The table presents the results from estimating following model: $Y_{c,t} = \beta_1 1_{\text{WF County},c} \times \text{Post}_t + \alpha_c + \alpha_t + \epsilon_{c,t}$ where Y is deposit growth in column (1), deposit rate in column (2), small business lending in column (3), and GDP growth in column (4). $1_{\text{WF County}}$ is an indicator for whether the county had a Wells Fargo in 2017, and Post is an indicator for the post-enforcement period, after 2017. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we build a bank $\times$ county $\times$ month panel and compute the average rate across single-state banks in each county. The annual rate is based on the last reporting month of the year. The sample period is from 2012 through 2023. County clustered standard errors are reported in parentheses.

Table B.3: County Economic Activity around Wells Fargo Active Enforcement: 2SLS

	(1)	(2)
	2SLS	
	Second Stage	First Stage
Dep. Var:	$\Delta \ln(\text{GDP})$	Rate
$\widehat{\text{Rate}}$	-0.0731* (0.0406)	
WF County $\times$ Post		0.0570*** (0.0194)
County FIPS FE	✓	✓
Year FE	✓	✓
N	22,833	22,833
R^2		0.9763
KP LM Statistic		8.553
KP Wald F Statistic		2.872

Notes: This table presents 2SLS estimates of the relation between deposit rates and GDP growth in counties with a Wells Fargo around the Wells Fargo Active Enforcement, instrumenting county deposit rates with the interaction of Wells Fargo county exposure and the post-enforcement period. The table presents the results from estimating the following 2SLS model:

$$\text{Rate}_{c,t} = \beta_1 \cdot 1_{\text{WF County},c} \times \text{Post}_t + \alpha_c + \alpha_t + \epsilon_{c,t}$$

$$\Delta \ln(\text{GDP})_{c,t} = \beta_1 \widehat{\text{Rate}} + \alpha_c + \alpha_t + \epsilon_{c,t}$$

where $\Delta \ln(\text{GDP})$ is GDP growth, $\widehat{\text{Rate}}$ is the estimated deposit rate, $1_{\text{WF County}}$ is an indicator for whether the county had a Wells Fargo in 2017, and Post is an indicator for the post-enforcement period, after 2017. The deposit rate is the 12-month CD rate for deposits of at least \$10,000. Using RateWatch data, we build a bank $\times$ county $\times$ month panel and compute the average rate across single-state banks in each county. The annual rate is based on the last reporting month of the year. The Kleibergen-Paap LM statistic tests for underidentification, and the Kleibergen-Paap Wald F statistic tests for weak identification. The sample period is from 2012 through 2023. County clustered standard errors are reported in parentheses.