A Tale of Two Cities: The Rural-Urban Divide in Banking*

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Abstract

Bank branches in counties with a high rural population offer certificate of deposit (CD) rates of up to 18% higher than banks in counties that are more urban. There is a strong association between rural CD rates and lack of trust in financial markets. Furthermore, the effect is stronger in low-education rural counties. This association remains after controlling for aspects such as size, competition, economies of scale, and an exogenous supply shock to bank capital. Finally, I show that higher CD rates in rural counties are passed through to rural borrowers in the form of higher loan rates. Overall, my findings highlight an important link between trust in financial markets and its effect on saving and borrowing rates.

JEL Codes: G530, N20, O160.

*Thank you to my committee, Amiyatosh Purnanandam, Uday Rajan, Emmanuel Yimfor, Gwen Yu, and Terri Friedline for helping me through this process. Thank you to the Mitsui Life Center for funding the Ratewatch data purchase and for financial support from the Ross Business School DEI award.

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1 Introduction

Financial intermediation critically depends on the intermediary's ability to enable risk-sharing across different agents in an economy. As such, economic forces that improve risk-sharing are of first-order importance to policy makers and academic researchers. In the typical Diamond and Dybvig (1983) model, consumers split the surplus from sharing their liquidity risk via a bank. Further, government deposit guarantees can achieve optimal consumer surplus by preventing runs and ensuring that depositor liquidity needs are met.

Does the presence of deposit insurance guarantee participation and risk-sharing across all consumers? Or are there significant impediments to participation for different populations, even when deposit insurance is ubiquitous? A 2019 FDIC report entitled "How America Banks" found that "Don't trust banks" was cited by approximately one-third of unbanked households as the main reason for not having an account and was the second-most cited main reason" (Federal Deposit Insurance Corporation, 2019). A lack of participation by consumers clearly impedes optimal risk-sharing. Trust in banks and financial markets in general has been an important topic during the 2008 financial crisis and in terms of improving financial participation (Sapienza and Zingales, 2012).

This trust is most important in disenfranchised communities, who are more likely to benefit from higher participation in financial markets. These communities have been described as politically and culturally alienated from mainstream America (Bishop (2016), Kaufman (2019)). This alienation manifests as both decreased political and financial participation. In particular, an important dimension that has not been studied is the impact of trust on rural areas in the United States. These areas are at risk for low financial participation because of a lack of trust in financial institutions in their communities.

Studying banking in rural settings is important because of the unique needs of these populations. Rural Americans constitute about 15% of the population but are disadvantaged compared to urban America. A 2018 Census report showed that median household income in rural counties was $44,000 compared to almost $50,000 in urban counties. (United States Census, 2018) This income gap is also correlated with a number of other factors, such as education and health. In 2019, 34.7% of the urban population had a bachelor's degree or higher compared with only 21% of the rural population. Similarly, urban populations outstrip their rural counterparts in access to hospitals and disease management. Since 2005, 180 rural hospitals have closed (Ellison, 2021), forcing rural

residents to drive sometimes hours to receive routine and emergency medical care. At the same time, rural areas also have more problems with disease (National Rural Health Association, 2021). The Centers for Disease Control and Prevention (CDC) notes that rural Americans are more likely to die from heart disease, cancer, stroke and accident than their urban counterparts (Centers for Disease Control, 2017).

The widespread disparities in socioeconomic outcomes across rural and urban populations raise an important question about participation in financial markets: Is the rural population engaged in formal financial markets to the same extent as the urban population? In this paper, I study this question using the topics of deposits paid by banks in rural versus urban markets. I document the segmentation of rural and urban banking markets, and I test the impact of trust on rural certificate of deposit (CD) rates. In particular, I use the CD market to understand the differences between rural and urban banking.

The CD market is unique and well suited for studying the rural-urban divide because CDs in the United States are insured up to $250,000 per depositor. Therefore, CD prices are not based on credit worthiness of the depositor. Rather, in a world with deposit insurance and full information, CD prices should be the same across all banks. Second, CDs are a common product for both urban and rural retailing banking customers, with which most depositors are familiar. CD rates should follow a typical term structure, including a maturity-matched, risk-free rate. In a frictionless market, these rates should be the same in urban and rural counties because the low-rate depositors could simply take their money to a bank branch in a high-rate area and receive a better rate. All CDs, even those from risky banks, should have the same rate.

To test this, I use the RateWatch data set, which contains advertised CD rates at the bank, denomination, and maturity levels for over 8,000 banks in the United States from 2001 to 2019. This data provides an ideal setting to test the impact of socioeconomic factors on bank-rate setting. Furthermore, this setting also covers a wide range of years and geographic locations, allowing me to isolate the effects of several competing explanations.

I first show that CD term structure is upward sloping with maturity, and that the maturity matched Treasury yield has a coefficient of about 27%, suggesting that banks do not pass through all of the corresponding risk-free rate to depositors, which is similar to the result in Drechsler, Savov, and Schnabl (2017). Further, my most important finding is that, despite the popular notion

that rural areas are left behind, CD rates are actually 17% higher in rural areas, suggesting that depositors in rural areas actually receive a much better deal than urban depositors. The result is robust to the inclusion of state and year fixed effects. I find that the effect is across banks, rather than within bank, suggesting that banks that tend to locate in rural areas set their CD rates higher than banks in urban areas.

Then I use the variation in trust in banks, as measured by the consumer opinion analytics firm, Gallup, to show that the effect is stronger in rural areas during low-trust years, suggesting that rural depositors were more distrustful of banks during the Great Recession. I use the variation in financial sophistication across rural areas to show that the effects are stronger in rural areas where depositors are less financially sophisticated. The result is that low-sophistication rural counties during the Great Recession experienced a 5% increase in CD rates compared with their most sophisticated urban counterparts. This triple interaction is robust to a variety of controls, including size of the bank and local income growth, indicating that the rural CD rate premium is explained by differences in financial sophistication and trust in markets.

I test a variety of alternative channels that could potentially be driving my result. First, I show that my result is not explained by differences in bank size, local competition, local income growth, bank overhead, and bank deposit size across rural and urban markets. Second, I show that my results are not driven by higher impatience of rural depositors, which would manifest itself via increased CD rates for longer maturity CD's. Rather, I show that, compared with urban depositors, rural depositors are actually more patient than their urban counterparts: the difference in CD rates is a level difference rather than a slope. Finally, I use the shale oil boom in (Gilje, Loutskina, and Strahan, 2016) as an exogenous shock to the supply of local capital and investigate whether it has an effect on CD rates. I find that relaxation of financial constraints does not impact CD rates in oil-boom-shocked counties.

In the last section of the paper, I test the impact of higher CD rates on local lending markets. Using RateWatch loan data for four common products (personal unsecured credit, 30-year mortgages, new auto loans, and business loans), and I find evidence suggesting that rural banks charge higher loan rates than urban banks. However, controlling for the CD rate eliminates the result, suggesting that rural banks pass through high CD rates in the form of higher loan rates.

My paper is tied to prior research into deposit rate setting. Papers like Hannan (1991), Ben-

David, Palvia, and Spatt (2017), and Gambacorta (2008) attempt to explain deposit rates as functions of market structure and loan demand. Drechsler, Savov, and Schnabl (2017) show that bank deposit rates do not move in tandem with Fed funds rates. Although these papers further the literature on deposit rates in general, there are no papers on the rural and urban divide in CD rates.

My paper is also loosely tied to literature on discrimination in financial markets. Because rural depositors represent a disadvantaged population, literature related to discrimination in deposit and credit markets for retail borrowers is applicable to my study. For example, Butler, Mayer, and Weston (2021) finds that minorities face higher rejection rates for auto loans, along with higher rates when approved. This discrimination often targets consumers with low financial sophistication. Gurun, Matvos, and Seru (2016) shows that subprime lenders target consumers with low financial sophistication when selling higher priced mortgages. Begley and Purnanandam (2021) find that consumer complaints are higher in areas with larger minority shares. (Bartlett, Morse, Stanton, and Wallace, 2019) show that the cost of increased interest rates paid by minority borrowers compared with credit-risk-matched non-minority borrowers is on the order of $450 million annually. Carlin (2009) explains why such targeting of financially unsophisticated consumers persists; violations of the law of one price occur when firms target low sophistication consumers with complex prices. Such complex prices make it difficult for consumers to understand product offerings and allow firms in competitive markets to price above marginal cost and extract rents.

In light of these papers, my results appear paradoxical because disadvantaged rural areas receive higher CD rates that urban CD investors, especially during times of financial crisis. However, I show that the cost of these high CD rates is borne by rural borrowers.

Finally, my paper is related to the literature of trust in financial markets. Sapienza and Zingales (2012) show that lack of trust is correlated with lower investments in the stock market and related to financial crises. Similar literature in marketing shows that trust in the banking system is most impacted by integrity, with transparency, customer orientation, and competence also positively correlated with trust (van Esterik-Plasmeijer and van Raaij, 2017). Further research shows that personal experiences of a bank failure impact trust in banks in general, and that these declines in sentiment are long-lasting (van der Cruijsen, de Haan, and Jansen, 2016).

My results speak to the growing divide between rural and urban America, specifically as it

relates to banking segmentation. My work highlights an important aspect of financial market integration that is overlooked in traditional literature. In traditional banking models, participation in depository institutions is beneficial to all individuals. However, the gains from this surplus are likely unevenly distributed in the real world. Banking policies related to equity, especially when it comes to wealth building and access to finance, are becoming a more important topic in national discourse. If the goal of policy makers is to help make the banking system more fair and equitable, then understanding the causes of differential rate setting across banks in rural areas is an important piece of the puzzle.

2 Data

My data comes from several sources. First, I use the Ratewatch.com CD rates from the United States between 2001 and 2019. I pair this with FDIC Summary of Deposit and Call Report data from the same years. I specifically focus on CD deposits and loan rates. I also use the 2010 Census estimate for the percent of population considered rural or urban. This designation is based on criteria developed by the Census and is available every 10 years, with the latest version being part of the 2020 Census and not yet publicly available. The classification includes an estimate of total population in each county that lives in a rural or urban area.

In Table 1, I show information about the CD data. After screening for the most common maturities, I am left with over 7 million observations at the CD, bank, branch, and month and year levels. For each observation, I have information related to the denomination and the maturity-matched, risk-free rate. For banks that report rates multiple times a month, I average the reported CD rate for each combination of maturity and denomination.

[Table 1 about here]

As shown above, my sample contains over 7 million CD rate observations for almost 9,000 banks across 17,000 branches. The data span 2,700 counties. The average bank in my sample has a deposits-to-assets ratio of 0.81, and CD capital accounts for approximately 26% of assets for banks in my sample. On average, counties in the sample are 36% rural. At the 75th percentile, almost 60% of a county's population is considered rural.

In Figure 1, I show the average difference between the highest 10% of CD rates and the lowest 10% of CD rates for a CD with a one-year maturity and a denomination of between $10k and $25k. The result shows a persistent difference between the two, with a larger gap as rates get closer to 0% in the latter half of the sample.

[Figure 1 about here]

Thus, the data represent a large and robust picture of CD rates in the United States during the past 20 years. The data also spans a large set of geographic locations, representing both very urban and very rural banks.

2.1 CDs as Investments

CDs, or time deposits, are a common investment product for many retail depositors. In exchange for having access to the depositor's funds for a set period of time, banks promise depositors a return that is slightly higher than a savings or checking account. For instance, a 6-month CD may pay 1% interest, whereas a checking account may pay only 0.5%. However, in return, the depositor does not have access to the funds for 6 months. Depositors who cash in their CDs early face prepayment penalties that are usually a function of the CDs interest rate. Most CDs have maturities of 6, 12, 24, and 60 months, with 12 months being the most common CD maturity in my sample.

CDs are considered good investments for consumers who want to keep relatively liquid funds and earn a higher return than a savings account but with lower risk than the stocks or bonds (Gran, 2020). Finally, CDs held at FDIC insured banks are insured up to $250,000 per depositor, making CD investment virtually free of default risk for most retail investors.

According to the 2019 Survey of Consumer Finances, about 10% of respondents owned CDs. Of those who own CDs, the average number of CDs was 3, and the 50th percentile CD amount was $60,000. Seventy-five percent of people who reported owning CDs owned only one CD, and at the 95th percentile, consumers still used only 3 banks for their CD investments. Of those who owned CDs, about 63% were held by commercial banks.

The advantages of using CD rates to study rural and urban deposit markets are many. First, because CDs are purchased with the explicit intention that the money not be used for the depositor for a set amount of time, CDs do not suffer from the same liquidity pressures as a typical checking or

savings account. Second, compared to other account types like money markets or checking accounts, CDs have discrete maturities that make them ideal for testing consumer impatience and APY term structure. Third, as an insured product, CDs should not be subject to any kind of monitoring or credit concerns on the part of the consumers. Banks with risky balance sheets should offer the same rate as banks using safe investments. Finally, CDs, as shown above, are a ubiquitous product, with which most retail depositors are familiar.

2.2 Rural Areas

Every 10 years, the United States Census releases an estimate of population considered rural at the county level. The definition of "rural" is based on several factors related to land characteristics, population density, and distance to major urban centers. As of the 2010 Census, approximately 17% of United States residents were classified as living in rural areas.

[Figure 2 about here]

In Figure 2, I show the percent rural population of the United States by county compared with the average APY of a one-year CD with denominations between $10k and $25k. The majority of the rural population in the United States is concentrated in the Great Plains, with some areas along the Appalachian mountains also being highly rural. With the exception of northern areas like Maine, the APY and rural population maps appear to greatly overlap.

In Table 2, I divide United States counties into 4 quartiles, with the leftmost column being most urban and the rightmost column being most rural. As the table shows, rural areas tend to be more white than urban areas. They also tend to lag urban areas on most measures of well-being. Rural areas have lower education, have lower mean and median income, and are also older than urban areas.

[Table 2 about here]

Rural and urban areas do not just differ along education and income dimensions. Rather, rural areas tend to suffer from persistent health and social problems. First, rural areas have long suffered from population decline. Although these trends briefly reversed in 2016, the growth of rural areas has been modest compared to urban areas (ERS, 2019). Second, rural areas lag urban in salary and

wage growth, with urban areas growing at more than three times the rate of rural areas (United States Department of Agriculture, 2019). This has resulted in so-called "rural brain drain," whereby fewer college students remain in their small towns after completing their degrees (CBS News, 2019).

Furthermore, rural areas suffer from medical problems at much higher rates than urban areas. Rural areas have a higher prevalence of obesity (34.2 percent) than urban areas (28.7%)Centers for Disease Control (2018). More rural Americans suffer from chronic diseases. In 2016, almost 27% of rural Americans suffered from two or more chronic disease compared to 23% of urban Americans (Rural Health Information Hub, 2017). Even recently, COVID-19 deaths in rural areas have overtaken their urban counterparts, with rural residents more likely to suffer from severe COVID-19 (USDA ERS, 2021).

At the same time, hospital availability and access are declining. Rural areas have fewer primary care physicians per capita than urban areas (National Rural Health Association, 2021), and over 180 rural hospitals have closed since 2005 (Ellison, 2021). Even for rural residents who receive hospital care, outcomes are often worse than similar patients who live in urban settings. For instance, rural patients are more likely die from coronary artery bypass surgery than urban residents. They also had longer lengths of stay (Dao, Chu, Springer, Hiatt, and Nguyen, 2010).

Finally, rural areas are also increasingly distrustful of government. According to a 2016 survey of rural Americans conducted by Gallup and the Institute for Advanced Studies in Culture at the University of Virginia, distrust in institutions is larger in rural areas. According to the study's authors, "'Alienation rates are twice as likely to be very high in the most rural areas as in the denser cities; three-and-a-half times more likely if you have only a high school diploma than a graduate degree; and four times more likely if you are in the lowest income bracket than if you belong in the highest income bracket"' (Bishop, 2016). Recent sociological studies in rural communities reinforce this result, showing that rural distrust is widespread and directed at government programs (Ashwood, 2018).

These differences contribute to a large and persistent rural-urban divide in America and make my later results—that CD rates are actually higher in rural areas—even more counter-intuitive.

2.3 Rural Banking in the United States

Very little research has been done related to rural household bank utilization. However, the 2019 FDIC report entitled, "How America Banks," almost 90% of rural households and almost 80% of urban residents made at least one visit to a bank branch in the last year. Urban households are slightly more likely to be unbanked (6.2% in rural areas versus 8.1% in urban areas). Slightly more urban households use bank credit compared to other retail credit products like credit cards (69.2% versus 64.6%) (Federal Deposit Insurance Corporation, 2019).

In 2019, internet banking in both urban and rural households was common. "Even groups with lower use of mobile banking, such as older, working-age disabled, and rural households, exhibited large increases in use of mobile banking as the primary method. For example, among rural households, 24.3 percent used mobile banking as the primary method in 2019, compared with 11.2 percent in 2017" (Federal Deposit Insurance Corporation, 2019). In both urban and rural households, over 80% of individuals owned a smartphone or had home access to internet.

This survey suggests that depositor access to banking in rural markets, although different from urban, is similar in scope. However, as shown above, rural trust in political institutions is much lower than in urban areas.

2.4 Bank Market Segmentation in the United States

The total size of the deposit market in the United States in 2019 was $25 trillion. Of this, approximately $2 trillion is located in banks with the majority of their deposits in rural areas. Thus, the approximately 15% of the US population that is considered rural owns approximately 8% of the total US deposits. Furthermore, the CD market is slightly more weighted to rural markets. In 2019, the total CD market was $2 trillion, of which about 11% was deposited in banks located in substantially rural areas.

In Table 3, I summarize the differences between banks in rural and urban markets during the years in my sample. Using Summary of Deposit data, I first measure the relative size of a bank's presence given its branch locations and its relative deposits at each branch. For instance, a bank with 25% of its deposits located in a branch with 30% rural population and 75% of its deposits located in a branch with 65% rural population would be considered 56% rural (.25(.3)+.75(.65)=.5625). I then summarize banks according to the decile of rural population into which they fall. There are

145,000 year-bank-level observations for almost 11,000 unique banks in the United States between 2001 and 2019. Each decile contains 14,500 bank-year observations.

[Table 3 about here]

Columns 1 and 2 shows the decile and the average percent of population considered rural, based on the bank's footprint. Column 3 shows the average number of branches for banks in this decile. Columns 4 through 6 show the average deposits by branch and by bank and the average total assets. Column 7 shows the average percent deposits for banks in that decile, and Column 8 shows the ratio of CD capital compared to assets.

This table speaks to the market segmentation between rural and urban banks. The first decile contains smaller, predominantly urban banks that cater to wealthier populations. These large banks have fewer branches but a large asset base and a large amount of deposits by branch. Deciles 2 through 5 contain large banks with more branches, more assets, and a slightly higher reliance on deposits. These deciles contain banks such as Wells Fargo and JP Morgan Chase, which have a large geographic network of bank branches (averaging 4,360 branches and 3,785 branches, respectively) that are located in both urban and suburban areas but largely avoid rural counties. However, there are still a large number of banks in highly urban areas that feature smaller branch networks and thus lower the average number of banks in those deciles. As the banks become more rural (deciles 6 through 10), the number of branches drops significantly, along with the per-branch deposits and the total deposits and assets. Furthermore, the reliance on deposit capital and CD capital as a percent of assets increases monotonically. Larger banks such as Wells Fargo and JP Morgan Chase have much lower reliance on deposit capital (an average of 66% and 33%, respectively). Smaller banks, such as the First Savannah Savings Bank of Savannah, Illinois and The Farmer's State Bank of Dwight, Kansas, have a much higher reliance on deposit capital 89% and 88%, respectively.

Table 3 shows that banks are segmented with respect to rural and urban markets. The reliance on deposits is strictly increasing as rural population increases. Further, large bank branching networks are inversely related to rural depositors. The result is that rural banks, which serve a proportionately more disadvantaged customer than urban banks, have smaller networks of branches and higher reliance on these customers. Further information about rural and urban banking markets, along with Census designations for rural population, can be found in the data appendix.

3 Basic Determinants of CD Rates

As mentioned above, one of the benefits of testing CD deposit rates is that CDs exhibit a term structure, much like a more traditional debt instrument. This suggests that CD pricing should follow a typical term structure. In the specification below, retail CD rates are a function of the relevant risk-free rate (the maturity matched Treasury yield) and time to maturity:

$$\text{Log CD APY}_{i,j,k,t} = \alpha + \beta_1 \text{Maturity Matched Treasury Yield}_{k,t} + \beta_2 \text{Maturity}_{i,j,k,t} + \beta_3 \text{Rural County}_i + \epsilon_{i,j,k,t} \quad (1)$$

In the Equation 1, i refers to an individual branch, j refers to the bank, k refers to a particular maturity of CD, and t refers to the month and year at which the CD Annual Percentage Yield (APY) is observed. The risk-free rate is maturity-matched Treasury yield for each CD, for each month and year in the sample. *Maturity* is a dummy variable for the length of time until the CD matures. I retain CDs with the most common lengths of maturity: 6 month, 12 month, 24 month, and 60 month. The coefficient on *Maturity* can be read as the relative increase in yield that a retail banking customer might expect to earn over the maturity-matched Treasury rate, based on the maturity for a given CD. *Rural County* is a county-level measure of the percent of population considered rural. Errors are clustered at the county level.

Table 4 below shows the basic results of this analysis using an OLS framework where the unit of observation is branch-month-year-maturity. The first column shows the basic regression with just term structure and the maturity-matched treasury rate. Coefficients on maturity are relative to the 6-month CD rate and show that CDs exhibit term structure. On average, the 12-month CD offers about 15% to 24% more yield than a 6-month CD. Similarly, the 24- and 60-month CDs offer additional yields of about 42% and 75% percent, respectively, depending on the specification.

[Table 4 about here]

Column 2 shows the same result but with year fixed effects. Here the coefficient on the maturity-matched treasury drops by about half, and the R-squared increases from 0.42 to 0.75, suggesting a time-varying component to CD rates. This echoes the graph in Figure 1, which shows a declining rate over time. For this reason, all future specifications will include a year fixed effect.

The coefficient on the maturity-matched treasury yield also demonstrates that banks do not pass through the full treasury rate to consumers. Rather, my results are similar to Drechsler, Savov, and Schnabl (2017). Only about a quarter of the Treasury rate is passed through to consumers in CD rates.

In Columns 3 through 4, I show specifications including a control for the percent of population that is considered rural. Column 3 shows the result using only a year fixed effect. In this specification, the coefficient on *Rural County* is positive and significant, suggesting that there is a 21% increase in CD rates in rural areas. The average CD APY in my sample is 1.8%, suggesting that an equivalent rural CD would yield 2.18%.

Column 4 shows the results when controlling for year and state fixed effects. Here too, the coefficient on *Rural County* is positive and significant. State fixed effects do not dramatically change the coefficient, suggesting that, even when state-level CD rates are taken into account, CD prices are relatively unchanged. Rural areas receive a 17.6% higher CD rate compared to urban areas.

Finally, Column 5 shows the result with the addition of bank fixed effects. The coefficient on *Rural County* is not significant, suggesting that the result is not observed within-bank. Rather, the difference in CD rates in rural areas is the result of different banks operating in different markets. This is consistent with the results in Table 3, wherein rural and urban markets are highly segmented.

My results show that there is a relationship between CD rates and county-level rural population, which suggests that banks modify their CD rates depending on the market in which they compete. This result is not explained by other demographic variables in poor urban areas, such as race or income. Rather, my result is driven by rural areas as compared to urban areas as a whole. The result for CD rates also holds for other account types. In Table A4 in the data appendix, I show that both interest-bearing checking accounts and money market accounts pay between 7% and 30% more in rural areas compared to urban areas. Refer to the data appendix for the full regressions.

4 Consumer Sophistication and Rural Deposits

Having established that CD rates are 17.6% higher in rural areas than in urban areas, I now turn to understanding the reasons for this disparity. I begin by conjecturing that my results are driven by distrust in or lack of knowledge about the financial system on the part of rural depositors.

As noted above, multiple streams of literature have documented trust gaps between rural and urban areas. Although trust in financial systems has been studied from a macro level (Stevenson and Wolfers (2011), Sapienza and Zingales (2012)), distrust of banks in particular, especially in rural areas, is not well researched. This distrust may be related to lack of financial sophistication, which causes a lack of knowledge related to FDIC insurance coverage. It may also be a distrust in financial institutions in general.[1]

If trust does drive banking decisions, then one might expect that less trusting individuals would require larger CD returns. Therefore, one should expect to see that, overall, financial sophistication is correlated with higher CD rates but that in rural areas, this relationship reverses, and highly sophisticated rural areas are characterized by lower CD rates compared to unsophisticated rural areas.

Because trust in banks is not directly observable at the county level, I use evidence of changes in the overall level of retail trust in banks. This evidence comes from the Gallup Confidence in Institutions poll, which has been conducted annually since 1973. The poll asks the following question: "Now I am going to read you a list of institutions in American society. Please tell me how much confidence you, yourself, have in each one—a great deal, quite a lot, some or very little?"

[Figure 3 about here]

The institutions listed include church, the Supreme Court, Congress, organized labor, police, big business, and banks, among others. Participants may select from 6 answers: "great deal," "quite a lot," "some," "very little," "none," and "no opinion." I sum the percentage of respondents who answered that they trusted banks a "great deal" or "quite a lot." Figure 3 shows the average level of trust based on that metric. As Figure 3 shows, trust in banks was highest before the financial crisis in 2008. As of 2019, trust in banks has still not returned to pre-crisis levels.[2]

To test the role of trust in financial markets on CD rates, I use the following regression:

[1] Figure A3 in the data appendix shows several logos for banks that appear in the sample. Each of these logos contains slogans that relate to the safety and stability of the bank, despite the fact that all of the banks are covered by FDIC deposit insurance.

[2] The full survey results can be found here: https://news.gallup.com/poll/1597/Confidence-Institutions.aspx

$$\text{Log CD APY}_{i,j,k,t} = \alpha + \beta_1 \text{Log Treasury Yield}_{k,t} + \beta_2 \text{Maturity}_{i,j,k,t} + \beta_3 \text{Rural County}_i + \beta_4 \text{Low Trust Year}_i + \beta_5 \text{Rural County}_i \text{x} \text{Low Trust Year}_i + \epsilon_{i,j,k,t} \quad (2)$$

Log CD APY is the log of the CD rate for branch i at bank k, for maturity j at month and year t. *Log Treasury Yield* is the log of the maturity matched Treasury yield for a given maturity CD at a given month and year in the sample. *Maturity* is an indicator variable for maturity. *Rural County* is a dummy variable that takes the value of 1 if the percent of population considered rural is about the 75th percentile for all counties in the sample. *Low Trust Year* is a dummy that takes the value of 1 in years in which the Gallup survey of trust in banks is below median and 0 otherwise. Based on Gallup responses, *Low Trust Year* takes the value of 1 from 2009 to 2016. All specifications contain state and year fixed effects, and errors are clustered at the county level. For brevity, I have suppressed coefficients for *Log Treasury Yield* and *Maturity*.

[Table 5 about here]

The results of this test are shown in Table 5. In Column 1, I show the variables for *Rural County* and *Low Trust Year* without the interactions. These results show that, controlling for low-trust years and low-income does not explain the rural CD premium. The coefficient on *Low Trust Year* is highly significant and negative, showing that CD prices across all banks in my sample declined precipitously during the Great Recession, even controlling for year fixed effects. In Column 2, I include the interaction between *Low Trust Year*x*Rural County*. The interaction term is significant, with rural counties receiving an approximately 9% higher CD during low-trust years rate than non-rural counties. The coefficient on *Rural County* is still significant and of similar magnitude as in Column 1.

The results from Table 5 show that the coefficient on *Rural County* is significant, even controlling for low trust years. Further, during low trust years, the interaction term is positive and significant, suggesting that rural areas are demand even higher CD rates during the Great Recession.

A natural question based on the above results is why rural depositors receive larger CD rates during low trust years. To further understand this dichotomy, I test the double and triple interactions between *Low Trust Year*, *Low Education*, and *Rural County*. My motivation for these tests

is to understand the role that lack of education plays in CD rate setting. If education is a proxy for financial sophistication, then lack of education should drive the rural premium during low-trust years. In other words, counties with low levels of financial sophistication may demand higher CD rates as a result of increasing distrust in the financial markets.

The regression I use to test this interaction is shown below:

$$\begin{aligned}\text{Log CD APY}_{i,j,k,t} = \alpha + \beta_1 \text{Log Treasury Yield}_{k,t} + \beta_2 \text{Maturity}_{i,j,k,t} + \\ \beta_3 \text{Rural County}_i + \beta_4 \text{Low Education}_i + \beta_5 \text{Low Trust Year}_i + \\ \beta_6 \text{Rural County}_i \text{x} \text{Low Education}_i + \\ \beta_7 \text{Rural County}_i \text{x} \text{Low Trust Year}_i + \\ \beta_7 \text{Low Education}_i \text{x} \text{Low Trust Year}_i + \\ \beta_8 \text{Rural County}_i \text{x} \text{Low Trust Year}_i \text{x} \text{Low Education}_i + \epsilon_{i,j,k,t} \quad (3)\end{aligned}$$

Low Education is a dummy variable that takes the value of 1 for counties with above 25th percentile high school non-completion rates, according to the American Community Survey, and 0 otherwise. This variable can be thought of as measuring financial sophistication. Recall from Table 2 that approximately 20% of adults have a bachelor's degree or higher. In rural counties, this number drops to 15%. Furthermore, rural counties have slightly higher high school dropout rates. Seventeen percent of the rural population did not finish high school versus 15% in urban areas.

[Table 6 about here]

In Column 1, I interact *Low Education* and *Rural County* and *Low Trust* and *Rural County*. The coefficient on *Rural County* is significant and similar to those in Table 5. The interaction term on *Low Trust* and *Rural County* is also similar to that in Table 5. The coefficient on *Low Education* is positive and significant, demonstrating that low-education counties receive 4.5% higher CD rates than high education counties. The interaction on *Low Education* and *Rural County* is negative and significant, suggesting that, in general, rural counties with low education receive lower CD rates than urban counties with higher education.

The result on the triple interaction in Column 2 is highly significant and 11.7%, suggesting that rural counties with less education have higher CD rates during low-trust years. My results not only

show that rural areas have a much higher mean CD rate compared to urban areas, they also exhibit higher CD rates in areas with low education during times of declining trust in financial markets.

For my results to be explained by causes other than rural trust, these factors must perturb only low education rural counties at the exact same time as the financial crisis. In Table 7, I check for alternative explanations that might come closest to explaining my results. My results could be driven by factors such as bank size, differences in economies of scale in rural and urban banks, competition, or the size of a bank's deposit network. I control for common measures for these variables using three different specifications based on bank size.

First, the most likely explanation for my results is that income in low education rural counties was lower during the Great Recession than in the rest of the United States. If this is the case, then lower incomes should correlate with higher CD rates if banks are capital constrained. I test this using *Income Change*, which I define as the log annual difference in median household income by county. (Note that log median income is not available for every county prior to 2009 because 2009 is the first year that 5-year American Community Survey data is available. Thus, my sample size is smaller in this table.) This variable measures the relative impact of the Great Recession on household demand for CDs. If my results were driven by differential economic burden associated with the Great Recession, then the coefficient on *Income Change* would be significant, but the coefficient on the triple interaction would not be significant. However, although *Income Change* predicts a negative impact on CD rates in all specifications, the coefficient on the triple interaction is still positive and significant.

[Table 7 about here]

Second, I control for the *Deposits to Assets* ratio. It could be that low-education rural areas feature banks that are more heavily reliant on deposit capital. During the crisis, these banks were capital constrained and thus were required to raise CD rates. If this story were true, then we would expect to see the coefficient on *Deposits to Assets* be positive and significant, while the coefficient on the triple interaction is not significant. As in Table 7, all of the coefficients on *Deposits to Assets* are negative and significant, suggesting that, in general, banks with higher reliance on deposit capital actually offer lower rates. This is especially true with smaller banks. However, the inclusion of *Deposits to Assets* does not change the coefficient on the triple interaction, suggesting that my result cannot be explained by *Deposits to Assets*.

Similarly, local competition, as measured via *HHI*, and the bank's overhead as a percent of assets do not change CD rates in low-education rural counties during the Great Recession. Finally, bank size, as measured by *Log Deposits* and *Squared Deposits*, does not change the coefficient on the triple interaction.

Taken together, my results show that, during low-trust years, banks in highly rural, low-education areas pay approximately 9% more than banks outside of these areas during high-trust times, even after controlling for local economic conditions, bank size, local competition, and bank reliance on deposits.

For robustness, I use log median income as the measure of financial sophistication and rerun the above tests. Information on this test can be found in the data appendix.

5 Consumer Impatience

Another potential explanation for this result is that rural depositors have a higher discount rate, which forces banks to pay more in deposits than their urban counterparts. In this theory, lower assets in rural areas lead to a higher discount rate on the part of rural depositors. Similar situations have been described in Bernheim, Ray, and Yeltekin (2015), Schilbach, Schofield, and Mullainathan (2016), and Bernheim, Ray, and Yeltekin (2015). This drives up the rate of return required by rural depositors, who require additional compensation for losing access to liquidity services when investing in a CD.

If this theory is correct, then rural depositors should demand more of a premium as the maturity of the CD increases because the higher maturity CDs require additional patience on the part of the rural consumer. To test this, I first graph the term premium for the full sample versus rural CDs of the sample denomination. As shown in Figure 4, the rural CD premium is a level rather than a slope.

[Figure 4 about here]

I formally test this in Table 8. In this table, I interact rural with the maturity dummy. Coefficients on both maturity and maturity interacted with rural are relative to the 6-month CD. At the top of Column 1, the coefficients on *Maturity* follow the same upward sloping term structure as

in Table 4. However, the coefficients on the interaction term are negative and downward sloping, indicating that compared to urban CD investors.

[Table 8 about here]

Coefficients for the interaction between rural counties and CD maturity are monotonically decreasing as maturity increases. Rather than demonstrating that rural depositors lack patience, my results show that rural depositors are actually more patient than their urban counterparts. This suggests that the difference in term structures between urban and rural communities is both a level and a slope suggesting that rural areas are, on average, offering higher CD rates, and that this difference is slowly increasing as one moves further out on the term structure.

5.1 Supply Shock to Local Capital

A final potential explanation for higher CD rates at rural banks is that local capital for rural banks is scarce relative to the bank's needs, which results in higher CD rates at rural banks. In Figure 5, I show the average capital structure of banks by type. By far the largest source of capital for all banks in the sample is deposits. Large banks rely less on deposits, and, in general, smaller banks rely more on deposits. For all small banks (rural and urban), about 5% of the liabilities are compared with other sources of capital, including federal funds, trading liabilities, subordinated notes, and other borrowed money. Large banks, by contrast, hold about three times as much of non-deposit capital on their books compared with small banks.

[Figure 5 about here]

If CD rates are driven by expensive local capital, then one would expect that the exogenous influx of deposit capital would lower CD rates. Oil and gas production revenue, which is typically paid to farmers and ranchers, who own the land and its associated mineral rights, has been well documented in the financial literature as an exogenous shock to local capital. In particular, Gilje (2019) and Gilje, Loutskina, and Strahan (2016) use the oil fracking boom starting in 2003 to test banks' internal capital markets and to test county-level economic outcomes after shale booms. I use the same empirical design as Gilje (2019) and Gilje, Loutskina, and Strahan (2016) to test the impact of the shale boom on CD rates.

I restrict my sample to the seven states mentioned in Gilje (2019): Texas, Louisiana, Oklahoma, Arkansas, West Virginia, North Dakota, and Pennsylvania. I also restrict the sample to the same years used in their analysis: 2001 to 2010. I drop 2004 because it is the boom year. My main differences in differences specification is as follows:

$$\begin{aligned}\text{Log CD APY}_{i,j,k,t} = \alpha + \beta_1 \text{Maturity Matched Treasury}_{k,t} + \\ \beta_2 * \text{Maturity}_{i,j,k,t} + \beta_3 \text{Exposed}_i + \\ \beta_4 \text{Post-Boom}_t + \beta_5 \text{Exposed}_i \text{Post-Boom}_t + \epsilon_{i,t} \quad (4)\end{aligned}$$

Exposed is a dummy that takes the value of 1 if the branch in question is located within the county in which a boom happened. Here the control group consists of all counties in the above-listed states that are not exposed to the oil boom, and the treatment group is all counties listed as exposed. *Post-Boom* is a dummy that takes the value of 1 for years after 2004, when the boom happened. The other variables follow the same format as in the above tables. My results are below in Table 9.

[Table 9 about here]

In Column 1, I show the baseline specification for the same sample period as is used in Gilje (2019). The results are similar to Table 4. *Rural County* is considered to the be top 75th percentile of counties in the seven-state sample. Here, rural counties have a CD rate that is 7.5% higher than urban counties. In Column 2, I show the impact of the oil boom on exposed counties. The coefficient on the triple interaction is not significant. In fact, the only significant variables are those on the term structure and the rural dummy.

If scarce local capital drives my result, then banks located in rural areas serving low-education populations and experiencing an oil boom would have had an influx of deposits, leading to lower CD rates. However, my results do not indicate a change in CD rates as the result of an exogenous influx of capital.

6 Rural Loan Rates

Having established that CD rates are higher in rural areas and that low-education rural counties had higher CD rates during the Great Recession, I now test the connection between higher CD rates

and loan rates. To test this, I use four different common loan types: a 30-year fixed rate, $175k mortgage, a 60-month new car loan, a $50k business loan, and a personal unsecured line of credit. These common types of loans comprise almost 650,000 observations in the loan data sample.

To test the impact of CD rates on loan rates, I use the following specification:

$$\text{Log Loan Rate}_{i,t} = \alpha + \beta_1 \text{Type of Loan}_{i,t} + \beta_2 \text{Log CD Rate}_{i,t} + \beta_3 \text{Rural County}_i + \beta_4 \text{Low Education}_i + \epsilon_{i,t} \quad (5)$$

Log Loan Rate$_{i,t}$ is the log of the interest rate on the loan (i) at time t. The main variable of interest is *Rural County*. I also control for the *Log CD Rate* at the branch at which the loan rate is quoted.

The results are shown in Table 10. Coefficients in *Auto*, *30 Yr Mortgage*, and *Business* are relative to the rate for a personal unsecured loan and are thus negative because personal unsecured loans carry a higher log APY. Column 1 contains year fixed effects only. Column 2 contains year and state fixed effects, and Column 3 contains year, state, and bank fixed effects. In all 3 columns, the coefficient on *Rural County* is significant. However, controlling for *Log CD APY* reduces the coefficient by 20%, suggesting that the log CD rate is correlated with the log loan rate. The error terms for all specifications are clustered at the county level.

[Table 10 about here]

In Table 11, I test the triple interaction between *Rural County*, *Low Education*, and *Low Trust Years*. Coefficients for loan type are suppressed. In Column 1, I test the triple interaction. In Column 2, I control for the log to the CD rate. My results show that log CD rate predicts a higher loan rate. However, there is no difference in CD rates in low-education rural counties in low trust years.

[Table 11 about here]

My results in Table 10 suggest that high local CD rates are tied to high loan rates; banks pass through the cost of higher CD rates to local loan customers. My results in Table 11 show that this is not a function of trust in low-education rural counties. Rather, the effect is explained by the log CD rate offered by the bank.

7 Conclusion

Despite rural areas being disproportionately disadvantaged compared to urban areas, the literature has overlooked rural finance. My paper is the first to examine rural and urban differences in banking markets, specifically as they relate to the CD market. Contrary to what one might expect given rural America's economic disadvantages, I document that CD rates are actually 17.6% higher in rural areas and that the result exists between banks and not within banks.

I show that lack of financial sophistication, as proxied by education, predicts higher CD rates in rural banks during low-trust years, suggesting a trust-based explanation for the rural CD rate premium. I test several competing explanations. I find that local income growth, bank size, competition, and bank overhead do not explain the difference in CD rates in low financial sophistication rural areas during the Great Recession. As a competing explanation, I also test whether rural depositor patience differs compared to urban depositors, and I find that rural depositors exhibit a higher level of patience compared to urban depositors. I also test whether rural banks are subject to costly external finance, which drives up CD rates in low-education counties. However, I do not find evidence for this channel impacting CD rates in rural counties.

Lastly, I test the welfare implications of higher CD rates on rural borrowers. My results show that banks with higher CD rates increase loan rates by 3.7% and that, even controlling for the log CD rate, rural areas advertise loan rates approximately 1.7% higher than urban areas. The result is that rural CD rates are passed through to rural borrowers in the form of higher loan rates.

My results are important to discussions about fairness in access to finance. Rural areas, which are left behind by traditional financial research, represent approximately 15% of the United States population and only about 8% of deposit capital. My results suggest that low financial sophistication consumers in rural markets drive higher CD rates during low trust years. Future research into financial sophistication and trust in markets should take into account this urban and rural divide when crafting policy designed to enfranchise depositors, especially during times of economic crisis.

References

Alesina, Alberto, and Eliana La Ferrara, 2000, The Determinants of Trust, Working Paper 7621 National Bureau of Economic Research Series: Working Paper Series.

Ashwood, Loka, 2018, *For-Profit Democracy: Why the Government Is Losing the Trust of Rural America*. (Yale University Press).

Bartlett, Robert, Adair Morse, Richard Stanton, and Nancy Wallace, 2019, Consumer-Lending Discrimination in the FinTech Era, Working paper, w25943 National Bureau of Economic Research.

Begley, Taylor A, and Amiyatosh Purnanandam, 2021, Color and Credit: Race, Regulation, and the Quality of Financial Services, *Journal of Financial Economics* p. 43.

Ben-David, Itzhak, Ajay Palvia, and Chester Spatt, 2017, Banks' Internal Capital Markets and Deposit Rates, *Journal of Financial and Quantitative Analysis* 52, 1797–1826 Publisher: Cambridge University Press.

Bernheim, B. Douglas, Debraj Ray, and Şevin Yeltekin, 2015, Poverty and Self-Control, *Econometrica* 83, 1877–1911 _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA11374.

Bishop, Bill, 2016, Politics & Elections: Alienation Rates Higher in Rural Areas than in Cities, *The Daily Yonder*.

Butler, Alexander W., Erik J. Mayer, and James Weston, 2021, Racial Discrimination in the Auto Loan Market, SSRN Scholarly Paper ID 3301009 Social Science Research Network Rochester, NY.

Calvet, Laurent E., John Y. Campbell, and Paolo Sodini, 2009, Measuring the Financial Sophistication of Households, *American Economic Review* 99, 393–398.

Carlin, Bruce I., 2009, Strategic price complexity in retail financial markets, *Journal of Financial Economics* 91, 278–287.

CBS News, 2019, Rural America's "brain drain": How student debt is emptying small towns, www.cbsnews.com/news/rural-americas-brain-drain-how-student-debt-is-emptying-small-towns/.

Centers for Disease Control, 2017, About Rural Health, .

Centers for Disease Control, 2018, More obesity in U.S. rural counties than in urban counties, .

Dao, Tam K., Danny Chu, Justin Springer, Emily Hiatt, and Quang Nguyen, 2010, Depression and geographic status as predictors for coronary artery bypass surgery outcomes, *The Journal of Rural Health: Official Journal of the American Rural Health Association and the National Rural Health Care Association* 26, 36–43.

Diamond, Douglas W., and Philip H. Dybvig, 1983, Bank Runs, Deposit Insurance, and Liquidity, *Journal of Political Economy* 91, 401–419 Publisher: The University of Chicago Press.

Drechsler, Itamar, Alexi Savov, and Philipp Schnabl, 2017, The Deposits Channel of Monetary Policy*, *The Quarterly Journal of Economics* 132, 1819–1876.

Ellison, Ayla, 2021, Why rural hospital closures hit a record high in 2020, *Becker's Hospital Review*.

ERS, USDA, 2019, Rural Population Trends, .

Federal Deposit Insurance Corporation, 2019, How America Banks: Household Use of Banking and Financial Services, .

Gambacorta, Leonardo, 2008, How do banks set interest rates?, *European Economic Review* 52, 792–819.

Gilje, Erik P., 2019, Does Local Access to Finance Matter? Evidence from U.S. Oil and Natural Gas Shale Booms, *Management Science* 65, 1–18.

Gilje, Erik P., Elena Loutskina, and Philip E. Strahan, 2016, Exporting Liquidity: Branch Banking and Financial Integration, *The Journal of Finance* 71, 1159–1184.

Gran, Ben, 2020, Putting Your Money Into A CD? 9 Questions To Ask First, Section: Banking.

Gurun, Umit G., Gregor Matvos, and Amit Seru, 2016, Advertising Expensive Mortgages, *The Journal of Finance* 71, 2371–2416 _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jofi.12423.

Hannan, Timothy H, ; Berger Allen N., 1991, The rigidity of prices: Evidence from the banking industry, *Journal of Reprints for Antitrust Law and Economics 27* pp. 245–254.

Kaufman, Chelsea N., 2019, Rural political participation in the United States: alienation or action?, *Rural Society* 28, 127–143 Publisher: Routledge _eprint: https://doi.org/10.1080/10371656.2019.1645429.

National Rural Health Association, 2021, About Rural Health Care, https://www.ruralhealthweb.org/about-nrha/about-rural-health-care.

Rural Health Information Hub, 2017, Chronic Disease in Rural America Overview, www.ruralhealthinfo.org/topics/chronic-diseaseurban-comparison.

Sapienza, Paola, and Luigi Zingales, 2012, A Trust Crisis, *International Review of Finance* 12, 123–131.

Schilbach, Frank, Heather Schofield, and Sendhil Mullainathan, 2016, The Psychological Lives of the Poor, *American Economic Review* 106, 435–440.

Stevenson, Betsey, and Justin Wolfers, 2011, Trust in Public Institutions over the Business Cycle, *American Economic Review* 101, 281–287.

United States Census, 2018, Differences in Income Growth Across U.S. Counties, www.census.gov/library/stories/2018/12/differences-in-income-growth-across-united-states-counties.html.

United States Department of Agriculture, 2019, Rural Education, www.ers.usda.gov/topics/rural-economy-population/employment-education/rural-education/.

USDA ERS, 2021, Rural Residents Appear to be More Vulnerable to Serious Infection or Death From Coronavirus COVID-19, www.ers.usda.gov/amber-waves/2021/february/rural-residents-appear-to-be-more-vulnerable-to-serious-infection-or-death-from-coronavirus-covid-19/.

van der Cruijsen, Carin, Jakob de Haan, and David-Jan Jansen, 2016, Trust and Financial Crisis Experiences, *Social Indicators Research* 127, 577–600.

van Esterik-Plasmeijer, Pauline W.J., and W. Fred van Raaij, 2017, Banking system trust, bank trust, and bank loyalty, *International Journal of Bank Marketing* 35, 97–111 Publisher: Emerald Publishing Limited.

8 Tables and Figures

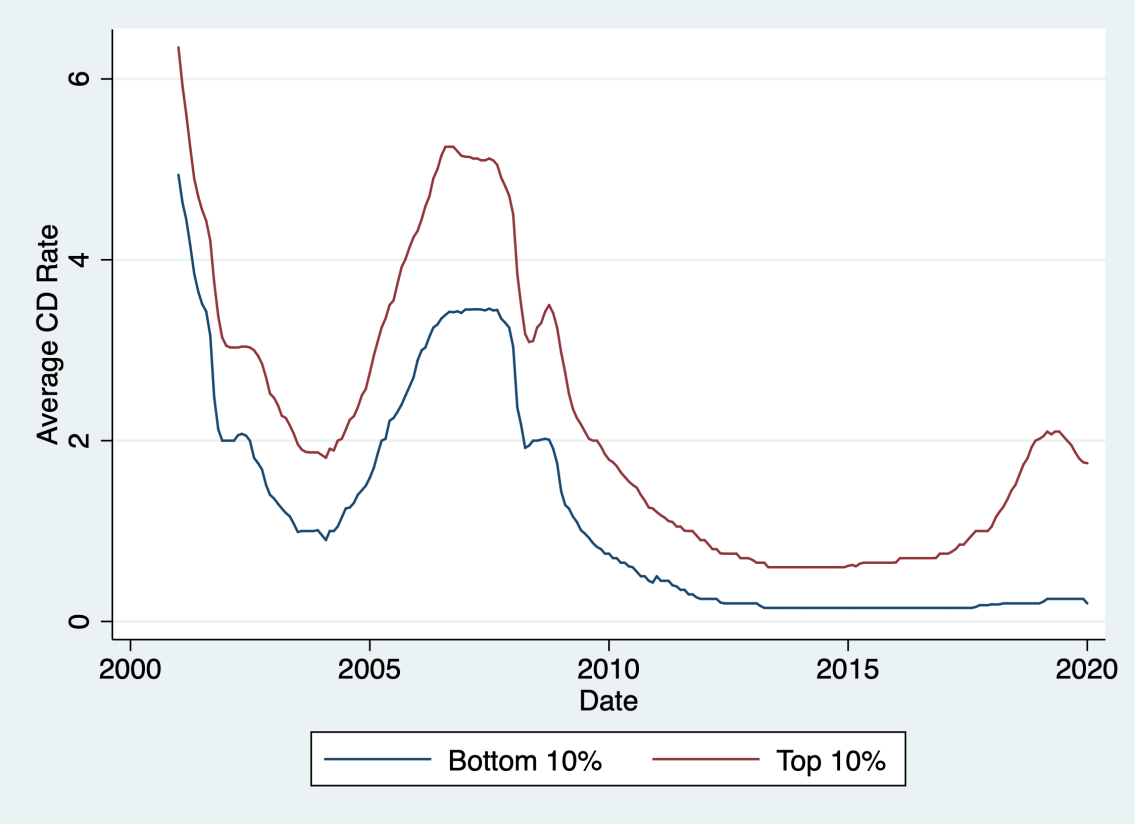

Figure 1. This figure shows the difference in average CDs for the top 10% and the bottom 10% of CD rates in the sample for CDs with a denomination of between $10k and $25k and a maturity of one year.

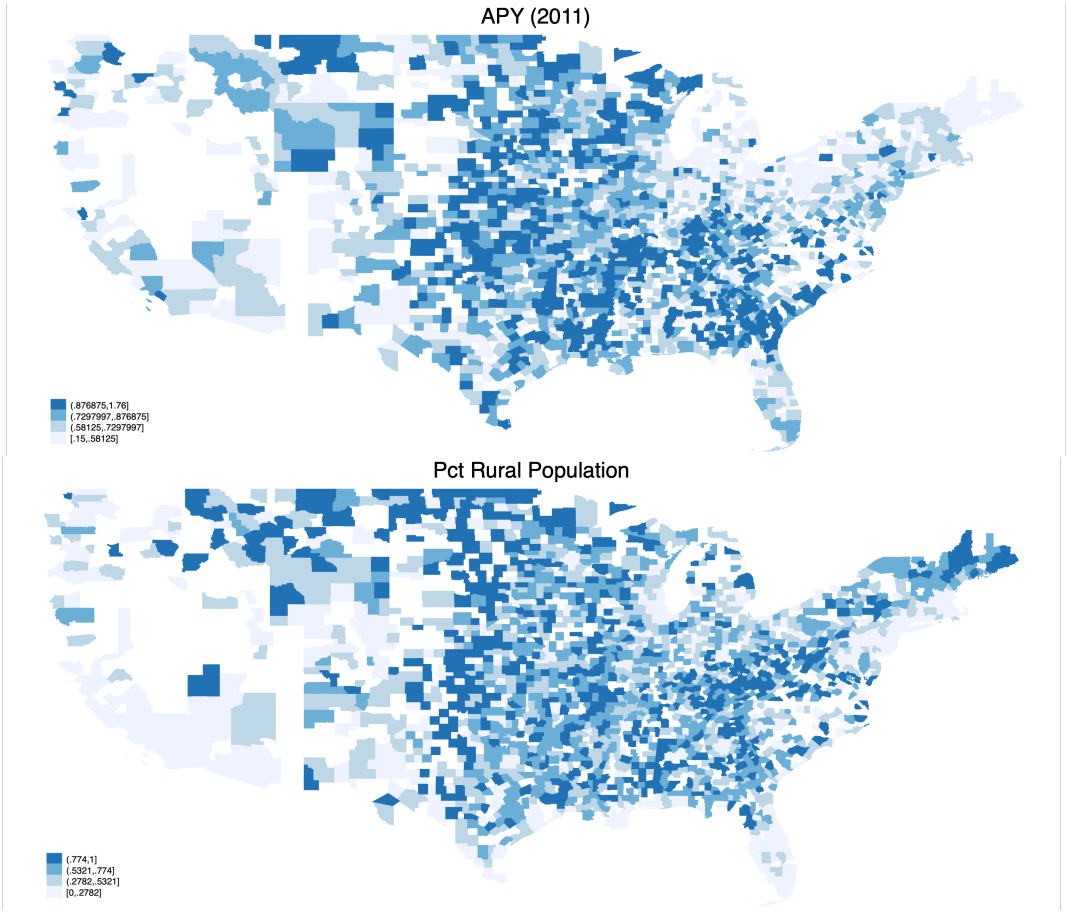

Figure 2. This figure shows the average CD APY for a \$10k to \$25k one-year CD for the United States in 2011 versus the percent rural population. Darker areas represent counties with higher CD APY and higher percentage rurall population, respectively.

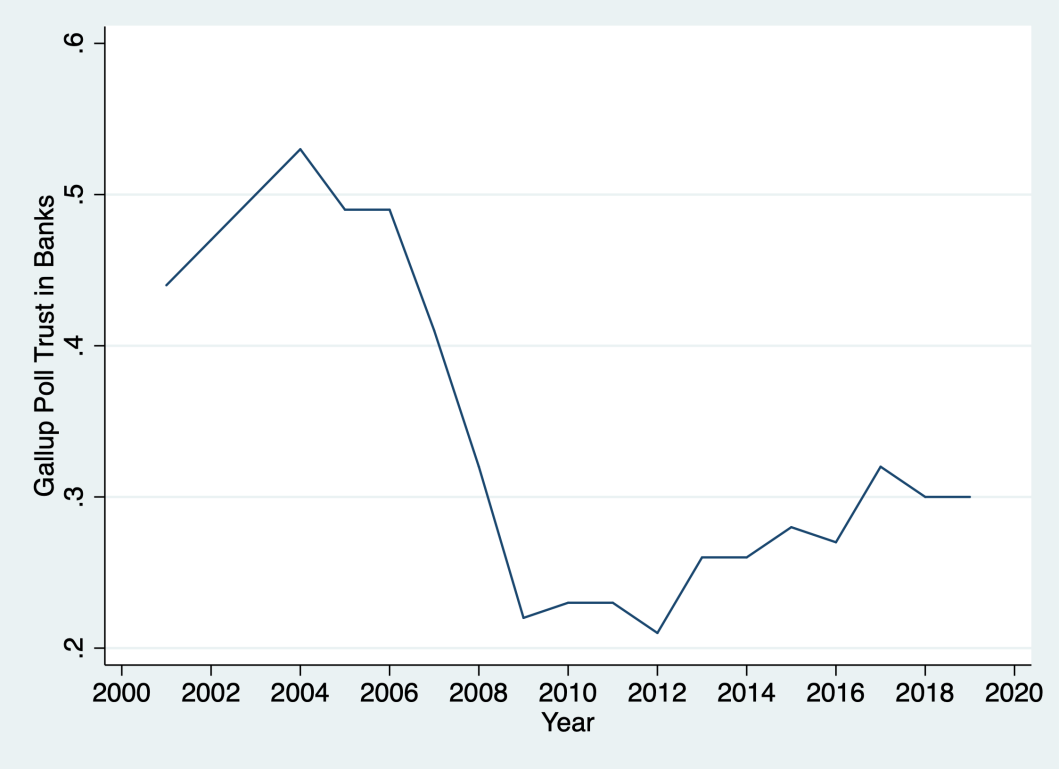

Figure 3. This figure shows the average consumer trust in banks, as measured by the annual Gallup Trust in Institutions survey.

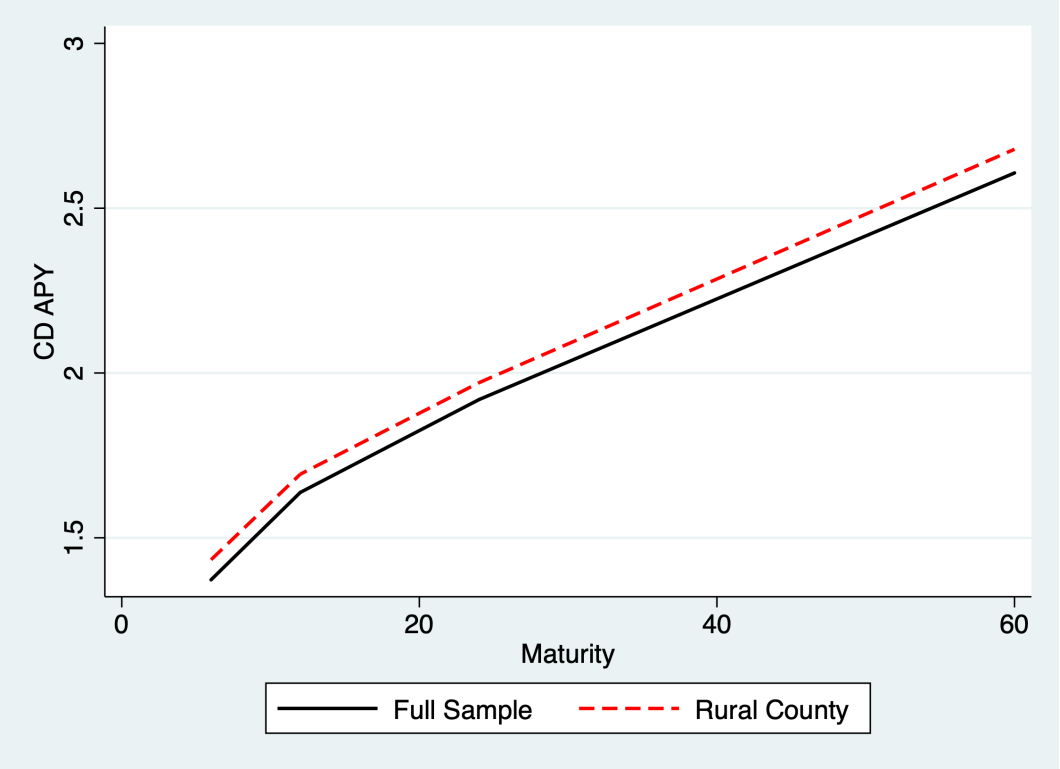

Figure 4. This figure shows the term structure of rural counties compared to the whole sample.

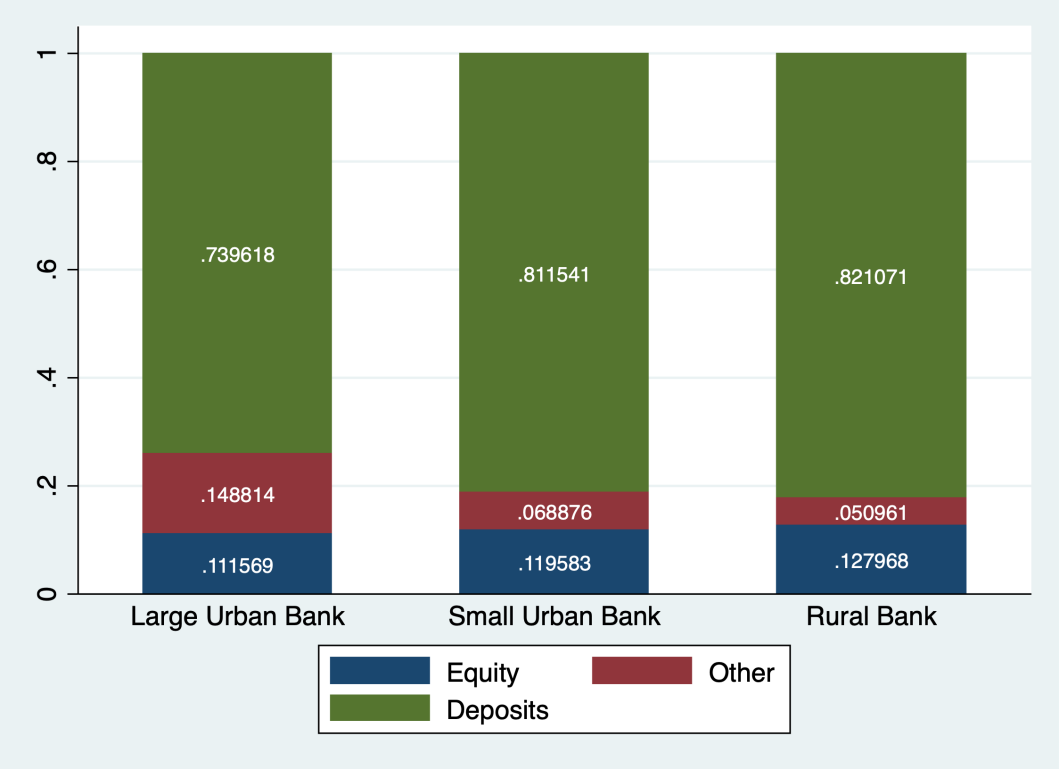

Figure 5. This figure shows the average liability structure for banks based on their location and lending structure. The first bar shows banks with more than 100 branches. The second bar shows banks with fewer than 100 branches and located in areas with less than 40% rural population. The two rightmost bars show banks located in areas with more than 40% rural population. The third bar contains all banks with above-mean percent agricultural loans in their portfolio. The fourth bar contains the remainder of banks in rural areas.

TABLE 1. This table contains summary information. I retain information for only those CDs that have maturity of 6, 12, 24, and 60 months. I also only retain banks that can be matched by bank identification number. The Gallup poll is conducted annually.

Variable	Number of Observations
Total CD Observations	7,722,031
Banks	8,808
Branches	17,001
Counties	2,776
Unique CD's	7,286,169

Banks:	Mean	25th	Median	75th
Log Assets	13.78	11.72	12.76	15.17
Deposits/Assets	0.8064	0.7614	0.8261	0.8709
CD Capital/Assets	0.2617	0.1802	0.2946	0.4053
Non-Interest Expense/Assets (% Overhead)	0.0190	0.0101	0.0174	0.0251

Counties:	Mean	25th	Median	75th
% Rural Population	0.3592	0.0766	0.2906	0.5891
Less than High School Education	.1402	0.0950	0.1280	0.1690
Bachelor's Education	0.2497	0.1670	0.2300	0.3090

CDs:	Mean	25th	Median	75th
CD APY	1.71	0.05	1.35	2.58
CD Maturity (in months)	23.04	6	12	24

Gallup Poll:	Mean	25th	Median	75th
Trust in Banks	0.34	0.25	0.30	0.47

TABLE 2. This table shows average demographic characteristics for counties in the sample in 2011. I divide the sample into quartiles based on the percent of rural population, with Quartile 1 being the least rural, and Quartile 4 being the most rural. Reported numbers are averages of county-level Census summary statistics.

	Quartile 1 (most urban)	Quartile 2	Quartile 3	Quartile 4 (most rural)
Percent Rural Population	15	45	71	99
Number Counties	807	805	804	805
Percent White	78	85	85	87
Percent <High School Education	14	15	17	18
Percent Bachelor's Education	27	19	15	16
Percent Age 25 to 55	40	39	39	38
Percent Ages 55+	24	28	29	33
Mean Income	$65,872	$57,380	$53,406	$52,993
Median Income	$50,526	$44,775	$41,789	$41,372

TABLE 3. This table contains summary statistics for rural and urban banks. Decile Rural is based on the weighted average of the percent rural population in each county in which the bank is located, with 1 being least rural, and 10 being most rural. The number of branches is the average number of branches for banks in this decile. Average deposits by branch are averaged for each decile. Total assets are listed in thousands and averaged by decile. Average percent deposits to assets are computed for each bank and then averaged across all deciles. Percent CD Capital is the percent of CD capital to total assets.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Decile	Pct Rural	Number	Avg Deps (thou)		Avg Total	Avg Deps	Pct CD
Rural	Depositors	Branches	by Branch	by Bank	Assets (thou)	to Assets	Capital
1	<1	6.8	593,699	1,659,006	3,204,832	76	34
2	4	24.5	351,325	3,547,841	6,001,853	78	32
3	11	36.7	80,208	3,353,890	5,238,322	81	32
4	22	17.5	60,931	857,930	1,151,045	82	32
5	33	10.0	51,025	441,669	568,752	83	34
6	43	7.8	59,668	326,568	417,770	83	35
7	52	6.0	37,625	209,466	256,002	83	35
8	61	4.4	39,343	147,478	178,928	84	37
9	72	4.0	35,462	127,836	154,196	84	38
10	94	2.5	31,428	72,502	87,766	84	39

TABLE 4. This table shows the OLS regression results for a basic term structure model and various county-level demographic measures. *Rural County* is a dummy that takes the value of 1 when the percent rural population in the county is above the 75th percentile and 0 otherwise. Errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY	(3) Log CD APY	(4) Log CD APY	(5) Log CD APY
Log Maturity Matched Treasury Yield	0.574***	0.275***	0.276***	0.276***	0.278***
	(149.08)	(97.18)	(97.10)	(96.66)	(97.50)
12 Months	0.157***	0.245***	0.245***	0.245***	0.243***
	(75.96)	(118.54)	(118.40)	(118.54)	(118.59)
24 Months	0.210***	0.442***	0.443***	0.445***	0.447***
	(59.46)	(124.97)	(124.97)	(125.64)	(128.88)
60 Months	0.324***	0.752***	0.755***	0.766***	0.790***
	(57.31)	(124.15)	(123.74)	(124.07)	(130.04)
Rural County			0.211***	0.176***	0.00231
			(18.62)	(17.76)	(0.42)
Observations	7,285,383	7,285,383	7,285,383	7,285,383	7,285,382
R^2	0.425	0.748	0.754	0.766	0.857
Year FE	N	Y	Y	Y	Y
State FE	N	N	N	Y	Y
Bank FE	N	N	N	N	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 5. This table tests the impact of low trust years on log CD rates. *Rural County* is a dummy variable that takes the value of 1 if the county have above 75th percentile rural population and 0 otherwise. *Low Trust Year* is a dummy defined as 1 when the Gallup Trust in Institutions Poll is below mean and 0 otherwise. *Low Education* a dummy variable that takes the value of 1 when the percent of adults without a high school diploma is above the 25th percentile. Errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY
Rural County	0.176***	0.132***
	(17.76)	(15.29)
Low Trust Year	-1.989***	
	(-195.72)	
Low Trust Year=1		-2.011***
		(-187.25)
Low Trust Year=1 × Rural County		0.0904***
		(10.44)
Observations	7,285,383	7,285,383
R^2	0.766	0.767
Year FE	Y	Y
State FE	Y	Y
Maturity Matched Treasury Control	Y	Y
CD Maturity Control	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 6. This table tests the impact of rural education on log CD rates during low trust years. *Rural County* is a dummy variable that takes the value of 1 if the county have above 75th percentile rural population and 0 otherwise. *Low Trust Year* is a dummy defined as 1 when the Gallup Trust in Institutions Poll is below mean and 0 otherwise. *Low Education* a dummy variable that takes the value of 1 when the percent of adults without a high school diploma is above the 25th percentile. All specifications contain year and state fixed effects, and errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY
Rural County	0.162***	0.210***
	(7.72)	(9.37)
Low Trust Year=1	-2.009***	-2.008***
	(-181.57)	(-147.05)
Low Trust Year=1 × Rural County	0.0899***	-0.00595
	(10.40)	(-0.27)
Low Education=1	0.0269*	0.0269**
	(1.93)	(2.01)
Low Education=1 × Rural County	-0.0405*	-0.0989***
	(-1.73)	(-4.10)
Low Trust Year=1 × Low Education=1		-0.000421
		(-0.03)
Low Trust Year=1 × Low Education=1 × Rural County		0.117***
		(4.68)
Observations	7,284,124	7,284,124
R^2	0.767	0.767
Year FE	Y	Y
State FE	Y	Y
Maturity Matched Treasury Control	Y	Y
CD Maturity Control	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 7. This table tests controls that might explain the impact of rural education on log CD rates during low trust years. *Rural County* is a dummy variable that takes the value of 1 if the county have above 75th percentile rural population and 0 otherwise. *Low Trust Year* is a dummy defined as 1 when the Gallup Trust in Institutions Poll is below mean and 0 otherwise. *Low Education* a dummy variable that takes the value of 1 when the percent of adults without a high school diploma is above the 25th percentile. Column 1 contains the full sample. Column 2 contains banks with less than 1,000 branches. Column 3 contains banks with less than 7 branches, which is the median number of branches in the sample.

	(1) Full Sample	(2) No Big Banks	(3) <7 Branches
Low Education=1 × Low Trust Year=1 × Rural County=1	0.0972***	0.0923***	0.0810**
	(3.25)	(3.01)	(2.31)
Income Change	-0.141***	-0.104**	-0.0493
	(-2.93)	(-2.13)	(-0.84)
Deposits to Assets	-0.605***	-0.379***	-0.324***
	(-11.37)	(-6.95)	(-4.71)
% Overhead	-3.247***	-3.068***	-2.620***
	(-9.02)	(-8.17)	(-5.01)
HHI	0.0559	0.0247	-0.00243
	(1.50)	(0.61)	(-0.05)
Log Deposits	0.239***	0.155***	-0.0875*
	(15.65)	(5.40)	(-1.91)
Squared Deposits	-0.0120***	-0.00861***	0.00366**
	(-23.98)	(-8.15)	(2.00)
Observations	4,651,751	3,990,786	2,209,671
R^2	0.772	0.755	0.746
Year FE	Y	Y	Y
State FE	Y	Y	Y
Maturity Matched Treasury Control	Y	Y	Y
CD Maturity Control	Y	Y	Y
Rural Control	Y	Y	Y
Education Control	Y	Y	Y
Trust Control	Y	Y	Y
Rural x Education Control	Y	Y	Y
Rural x Trust Control	Y	Y	Y
Trust x Education Control	Y	Y	Y

t statistics in parentheses

TABLE 8. This table tests the impact of CD maturity on log CD APY in rural areas. *Rural County* is a dummy variable that takes the value of 1 if the county have above 75th percentile rural population and 0 otherwise. Maturities are listed relative to the 6 month maturity. Errors are clustered at the county level, and the regression contains state and year fixed effects.

	(1) Log CD APY
Log Maturity Matched Treasury Yield	0.277***
	(95.86)
12 Months	0.254***
	(101.13)
24 Months	0.465***
	(106.39)
60 Months	0.790***
	(102.84)
Rural County=1	0.228***
	(18.43)
12 Months × Rural County=1	-0.0361***
	(-9.03)
24 Months × Rural County=1	-0.0842***
	(-12.79)
60 Months × Rural County=1	-0.106***
	(-9.21)
Observations	7,285,383
R^2	0.767
Year FE	Y
State FE	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 9. This table tests the impact of access to external finance on CD APY. *Rural County* is a dummy variable that takes the value of 1 if the county have above 75th percentile rural population and 0 otherwise. *Oil Boom County* is a dummy if the CD rate is offered in a county which experienced a shale oil boom. *Post-Boom* is a dummy that receives the value of 1 for years after 2004, when the oil boom occurred. All columns contain year and state fixed effects. Errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY
Log Maturity Matched Treasury Yield	0.335***	0.335***
	(60.11)	(60.00)
12 Months	0.0959***	0.0959***
	(41.50)	(41.53)
24 Months	0.168***	0.168***
	(49.10)	(48.93)
60 Months	0.291***	0.291***
	(55.23)	(55.46)
Rural County=1	0.0788***	0.0607***
	(8.56)	(5.64)
Oil Boom County		-0.0266
		(-1.34)
Post-Boom=1 × Oil Boom County		0.00604
		(0.38)
Post-Boom=1 × Rural County=1		0.0203
		(1.56)
Rural County=1 × Oil Boom County		0.0276
		(1.17)
Post-Boom=1 × Rural County=1 × Oil Boom County		0.00428
		(0.16)
Observations	770,030	770,030
R^2	0.758	0.758
Year FE	Y	Y
State FE	Y	Y
Maturity Matched Treasury Control	Y	Y
CD Maturity Control	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 10. This table shows the OLS regression results for a basic term structure model and various county-level demographic measures. Column 1 reports only the term structure model, with a maturity matched treasury yield as the risk-free rate. Column 2 reports the same specification but with year fixed effects. Columns 3 and 4 control for percent rural population at the county level. Errors are clustered at the county level.

	(1) Log Loan APY	(2) Log Loan APY	(3) Log Loan APY
Auto	-0.672***	-0.672***	-0.672***
	(-111.18)	(-111.19)	(-111.20)
30 Yr Mortgage	-0.815***	-0.814***	-0.814***
	(-140.55)	(-140.99)	(-140.93)
Business	-0.657***	-0.658***	-0.658***
	(-79.56)	(-80.71)	(-80.65)
Rural County	0.0211***	0.0170***	0.0164***
	(3.69)	(2.97)	(2.81)
Log CD APY		0.0365***	0.0365***
		(7.96)	(7.98)
Low Education			0.00391
			(0.68)
Observations	649,169	649,159	649,159
R^2	0.746	0.747	0.747
Year FE	Y	Y	Y
State FE	Y	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 11. This table shows the OLS regression results for a basic term structure model and various county-level demographic measures. Column 1 reports only the term structure model, with a maturity matched treasury yield as the risk-free rate. Column 2 reports the same specification but with year fixed effects. Columns 3 and 4 control for percent rural population at the county level. Errors are clustered at the county level.

	(1) Log Loan APY	(2) Log Loan APY
Rural County	0.0183*	0.0145
	(1.71)	(1.35)
Low Trust Year=1	-0.516***	-0.421***
	(-59.28)	(-28.57)
Low Trust Year=1 × Rural County	0.00380	0.00250
	(0.27)	(0.18)
Low Education=1	0.00917*	0.00900
	(1.66)	(1.62)
Low Education=1 × Rural County	-0.00513	-0.00408
	(-0.44)	(-0.35)
Low Trust Year=1 × Low Education=1	-0.0151**	-0.0142**
	(-2.06)	(-1.98)
Low Trust Year=1 × Low Education=1 × Rural County	0.0153	0.0133
	(0.97)	(0.85)
Log CD APY		0.0363***
		(7.89)
Observations	649,169	649,159
R^2	0.746	0.747
Year FE	Y	Y
State FE	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Data Appendix

Here I summarize the data on CD and deposit rates in the United States from 2001 to 2020. I also include multiple robustness checks for results from the main paper.

A. Data

Since the 1950s, the Census has collected data on urban and rural living in the United States. According to the Census website, "The Census Bureau delineates urban areas after each decennial census by applying specified criteria to decennial census and other data. 'Rural' encompasses all population, housing, and territory not included within an urban area."

Further delineation of what constitutes a rural or urban area can be found in Federal Register document number 75 FR 52173. The criteria for determination of rural or urban status is based on a number of factors, including things such as population, population density, location of major shopping center, and distance to wetlands or water, among others.

This data is delineated in three variables: rural, inside urbanized clusters, and urban clusters. Inside urbanized clusters and urban clusters are mutually independent, and together they constitute the "urban" population. I sum those two variables and create a percentage of total population that is considered rural by the Census.

For most of the analysis, I use the 2010 Census estimates, which occur in the middle of my sample. There are about 3,200 counties in the United States for which this measure is available.

As one might expect, rural population is heavily correlated with other demographic variables. In Table A1, I have highlighted the correlation between rural population and other commonly used demographic measures: percent white, less than high school education, bachelor's education, and log median income.

[Table A1 about here]

The table shows that rural population is negatively correlated with bachelor's education and log median income, and positively correlated with race and low education. Low education is correlated with low income and race. Furthermore, a bachelor's education is highly correlated with income. The average percentage rural population in US counties is 54%, with a standard deviation of 32%.

In Figures A1 and A2, I show maps of the United States with the share of population achieving less than a high school diploma, the share of the population having a bachelor's degree or higher,

the average percent of population that is white, and the log median income.

[Figure A1 about here]

[Figure A2 about here]

These maps show that educational achievement is loosely tied to geography, with the southern half of the United States being less educated than the northern half. Furthermore, the counties with the largest percentage of white population tend to be located in the northern half of the United States. Median income, however, is highest in areas with larger cities and does not follow the same north and south pattern.

B. Bank Logos

In the main paper, I show that a shock to trust during the financial crisis increases CD rates in low-sophistication rural counties. Figure A3 shows that many rural banks actually advertise based on both trust and financial stability. The Farmer's & Merchants Bank features a logo that suggests that it is the strongest bank in California. The Normangee State Bank advertises "rock solid" banking in its logo. The Highlands Community Bank advertises its services as "banking you can trust." Finally, many small banks include a variation of "Member FDIC" under their logo, as did the First National Bank of Moose Lake. Although these logos are anecdotal, they suggest that trust in the financial system is not universal in rural areas.

[Figure A3 about here]

C. Robustness Tests

In this section, I conduct various robustness tests based on the results in the main paper.

C.I. Small Bank Effects

In Column 5 of Table 4, I show that the rural CD premium does not exist within bank but is instead between banks. Because many rural banks consist of only a few banks, a natural concern is that

the bank fixed effects in Column 5 will cancel out within-bank variation, falsely driving a null result in the sample.

To check this, I first I show the number of branches across all banks in the United States by the decile of rural deposits at each bank. As in the main paper, I calculate the weighted average deposits of a bank's deposits based on the percent of depositors for each branch that are located in a rural area. I then classify banks based on their decile of rural deposits. I show the results in Table A2, where the first decile is the most urban and the 10th decile is the most rural.

[Table A2 about here]

As the table shows, rural banks have the smallest footprint of all banks in my sample. Although at the 50th percentile, most banks in urban settings have at least four branches, highly rural banks only have two.

In Table A3 below, I show the result of a specification that includes only banks with two or more branches reporting CD rates in the sample. Column 1 has been reproduced from Table 4 for convenience. Column 2 contains the same specification as in Column 1 but without state fixed effects. For these tests, I drop state fixed effects because many rural states do not exhibit much variation in the percent rural population, which may cause state fixed effects to drop those counties. Column 3 shows only banks with branches in two or more counties. Column 4 contains banks with branches in 14 or more counties. All specifications contain state, year, and bank fixed effects, and all errors are clustered at the county level.

[Table A3 about here]

In Column 1, the result is as mentioned in the main paper; once controlling for bank fixed effects, banks offer higher CD rates in more rural counties. In Column 2, I show that excluding state fixed effects does not change the result in Column 1. In Column 3, I show that branches with two or more counties reporting do not alter CD rates if one of the branches in located in a more rural area. In Column 4, the coefficient on *Rural County* is significant, suggesting that, for large banks with branches in multiple counties, there is a small rural CD rate premium. Because there are very few banks in rural areas with 13 or more branches, I conclude that, especially for smaller banks, there is no evidence that CD rates are higher in rural areas compared to urban areas.

C.II. Other Retail Deposit Rates

In Table A4, I test the impact of rural population on deposit rates for two other common products: interest-bearing checking accounts, and money market accounts. These accounts are also popular amongst retail bankers, with the caveat that, contrary to CD products, these accounts do not feature defined maturities. Therefore, customers trade a lower rate for instant access to their funds.

I have over 870,000 observations for money market accounts, with an average rate of 1.25% and a standard deviation of 0.86%. For interest-bearing checking accounts, I have almost 830,000 observations with an average rate of 0.57% and a standard deviation of 0.56%.

I use the following specification:

$$\text{Log APY}_{i,j,t} = \alpha + \beta_1 \text{Treasury rate}_{k,t} + \beta_2 \% \text{ Rural Population}_i + \epsilon_{i,j,k,t} \tag{6}$$

In the above, i refers to an individual branch, j refers to the bank, and t refers to month and year. The risk-free rate is the 6-month Treasury yield for each month and year. Note that, because these accounts do not have defined maturities, there is no control for the maturity as in the main result. Finally, *Rural County* is a county-level measure of the percent of population considered rural. Errors are clustered at the county level.

[Table A4 about here]

The results are shown in Table A4. In Columns 1 and 3, I show the rate regression without controlling for rural population. The coefficients are both positive and highly significant. Further, both coefficients are approximately 27% to 29%, which is similar to the 27% coefficient on the *Log Maturity Matched Treasury Yield* in Table 4. In Columns 2 and 4, the coefficients on *Log Maturity Matched Treasury Yield* are unchanged from Columns 1 and 3. However, the coefficient on *Rural County* is positive and significant. For checking accounts, the APY is 29.9% higher in rural counties compared to urban counties. For money market accounts, the APY for rural counties is 7.73% higher than in urban counties. All specifications contain state and bank fixed effects and are clustered at the county level.

These results show that CD rates are not the only account type that exhibits a rural premium. Rather, the rural and urban divide in banking is evident in many common consumer depository account types.

C.III. Alternate Measures of Financial Sophistication

In Tables 5 and 6, I show that CD rates in rural areas are largely explained by declines in trust following the financial crisis and that low-education rural counties comprise the bulk of the result. In this section, I conduct the same regressions by using log median income as a proxy for financial sophistication. The selection of income is based on Alesina and La Ferrara (2000), who shows that income is related to trust in people and community, and Calvet, Campbell, and Sodini (2009), who find that financial sophistication is higher correlated with household wealth.

Table A5 contains the results of the triple interaction using log median income as a proxy for financial sophistication. As in the main table, the coefficient on *Rural County* is positive and significant. The coefficient on the triple interaction is positive and significant, demonstrating that low-income rural counties received 20% higher CD rates during the Great Recession than high income urban counties. As in Table 5, all errors are clustered at the county level, and all specifications contain year and state fixed effects. I suppress coefficients for maturity and log maturity matched Treasury rate.

[Table A5 about here]

My results show a persistent relationship between low financial sophistication, as measured by either log median income or low high school completion rates, and rural CD rates.

In Table A6, I test the triple interaction term against multiple controls including bank size, local income growth, bank overhead, competition, and deposit size. As in Table 7, Column 1 contains the full sample. Column 2 contains only banks with less than 1,000 branches. Column 3 contains only banks with less than 7 branches.

[Table A6 about here]

In all specifications, the triple interaction is positive and significant, suggesting that, even when controlling for major alternative explanations, rural areas with low income received higher CD rates during the Great Recession.

C.IV. Continuous Definition of Rural

In this section, I use a continuous measure of the rural variable as a robustness test. Recall from Table A1 that the average county has 57% of the population living in areas considered rural, and

the standard deviation is 32%.

In Table A7, Columns 1 and 2 are reproduced for convenience. In Columns 3 through 5, I show that the rural and urban divide is not a function of defining rural as a discrete variable. Rather, the result is also driven by a continuous definition of rural.

[Table A7 about here]

In Table A8, I reproduce my main result using this alternative definition of rural population. My results show that the addition of a continuous definition of rural does not change the significance or magnitude of the coefficients on my main trust result. Rather, using the standard deviation of 0.32, $0.32 \times 0.319 = .10$, which is the coefficient on *% Rural Population* in Column 1, is similar to the coefficient on *Rural County* in Table 5.

Furthermore, the coefficient on the interaction term in Column 2 is also significant and positive, as in Table 5, suggesting that low-trust years result in higher CD rates in rural counties.

[Table A8 about here]

In Table A9, I show the interaction of *Low Trust Year*, *Low Education*, and *% Rural Population*, as in Table 6 in the main paper. Column 1 contains interactions between *% Rural Population* and *Low Education* and *% Rural Population* and *Low Trust Years*. Column 2 contains the triple interaction. The main difference between Table A9 and Table 6 is the coefficient on *% Rural Population* and *Low Trust Years*. In the main table, it is significant and positive. In this table, it is not significant; when using a continuous variable, the bulk of the effect is seen in the triple interaction term rather than the double interaction. My results in Table A9 show that low sophistication rural counties during low trust years receive higher CD rates than their more sophisticated and more urban counterparts.

[Table A9 about here]

In Table A10, I use log median income as a proxy for financial sophistication rather than education. Again, the results are similar to Table A5, which show that low-income rural counties also experience an increase in CD rates during low trust years.

[Table A10 about here]

In Table A11, I replicate Table 7 using a continuous definition of *% Rural Population*. As in Table 7, the coefficients on the triple interaction are all positive and highly significant, suggesting that my results are robust to a variety of specifications.

[Table A11 about here]

Finally, in Table A12, I replicate the results from Table A6 using a continuous definition of rural. As shown in the above tables, the coefficients on *% Rural Population* are still significant and of the same magnitude as the coefficients in Table A6.

[Table A12 about here]

D. Figures and Tables

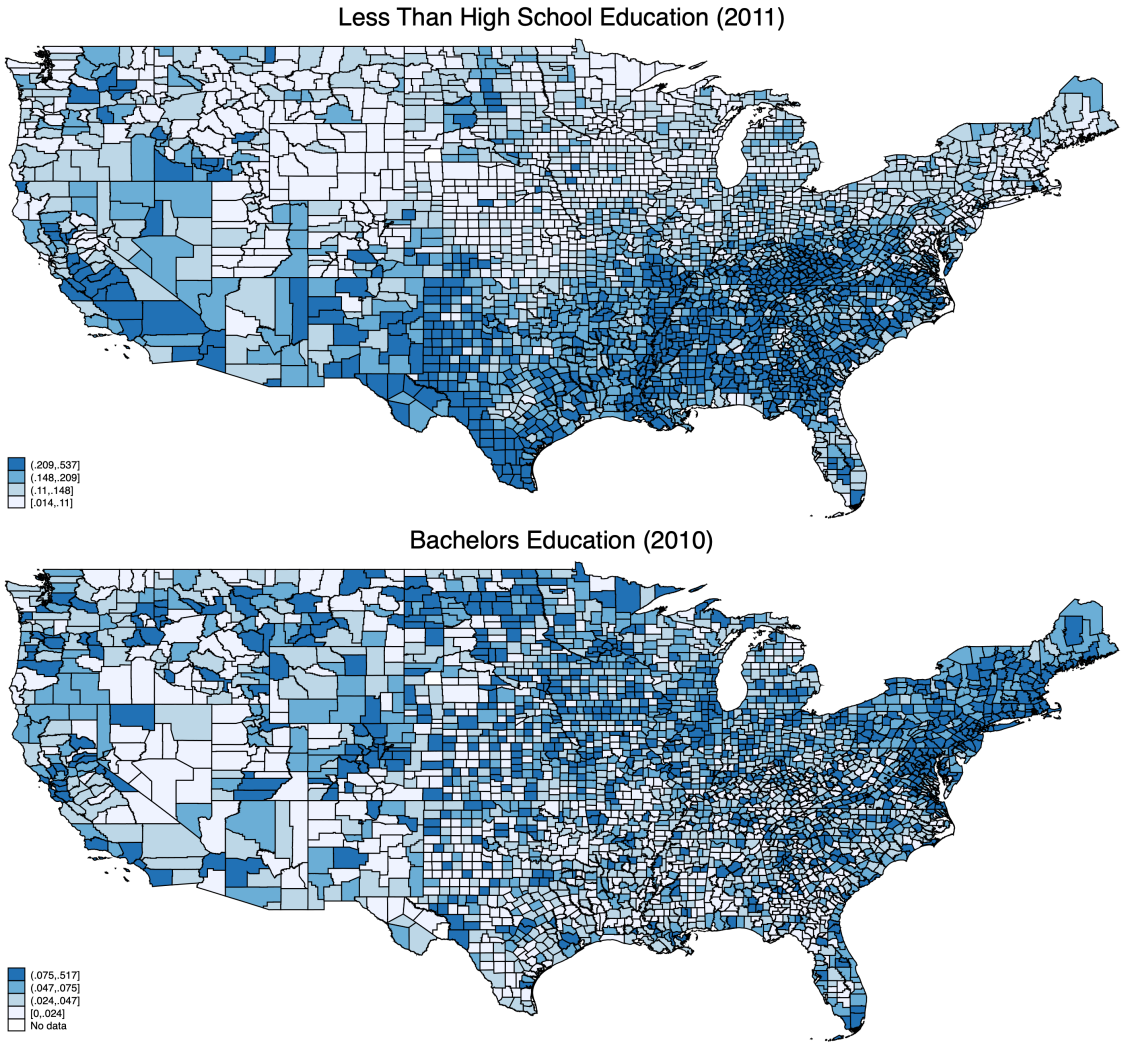

Figure A1. The first map shows the percent of population holding less than a high school diploma and the percent of population holding a bachelor's degree or higher in 2010 at the county level. In the first map, darker areas indicate counties with higher levels of low educational attainment. In the second map, darker areas indicate counties with higher levels of education.

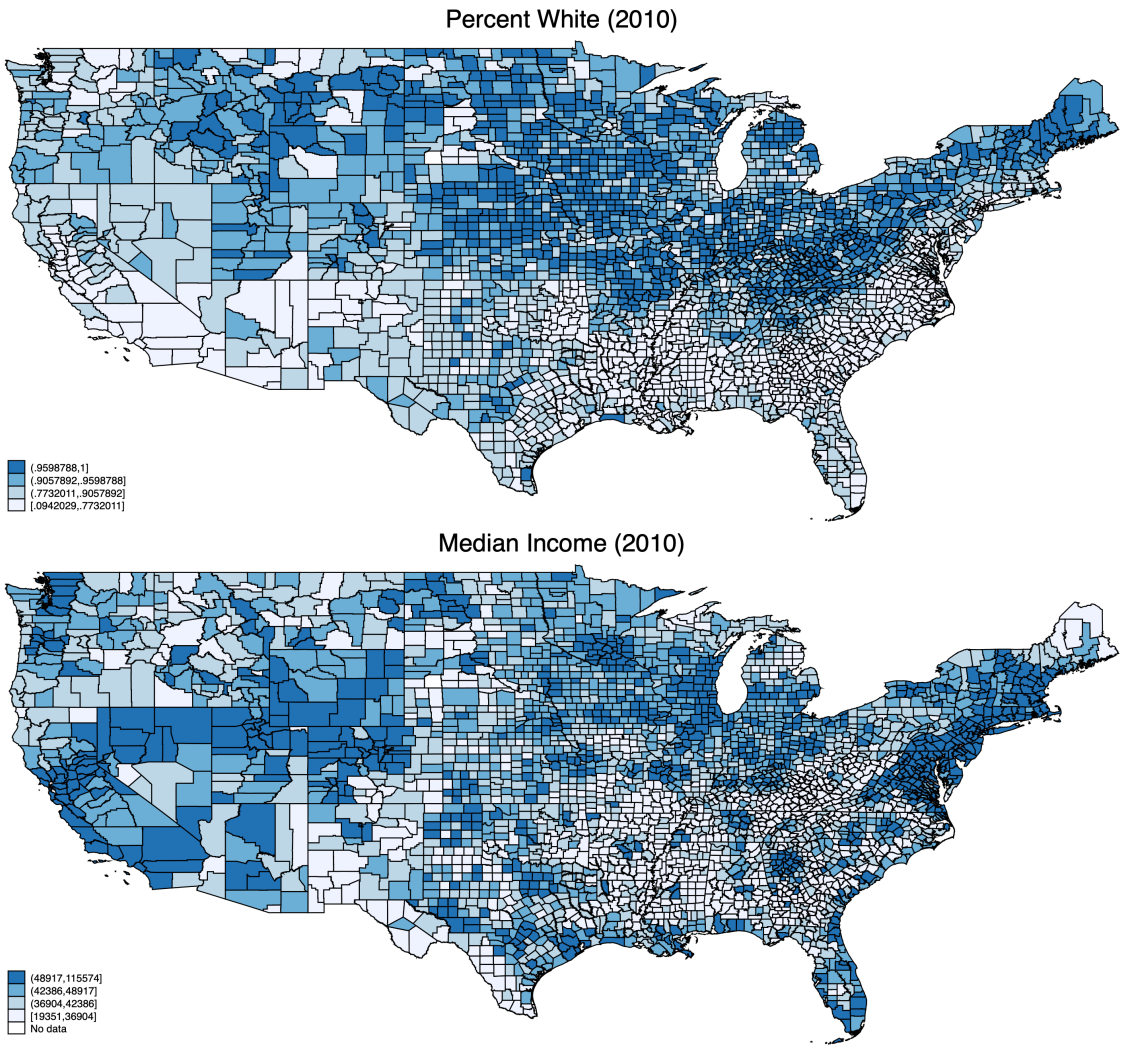

Figure A2. The first map shows the percent of population that is white in 2010 at the county level. The second map shows the median income at the county level in 2010. In both maps, darker areas indicate counties with more white population and higher median income, respectively.

Figure A3. This figure shows logos of four rural banks in the sample.

TABLE A1. Correlation Matrix

The top of this table shows the correlation between percent white, median income, less than high school education, bachelor's education, and percent rural population at the county-level using 2011 data.

	Percent White	**Log Median Income**	**<HS Education**	**Bachelor's Education**	**Pct Rural Population**
Percent White	1.0000				
Log Median Income	0.1753	1.0000			
<HS Education	-0.3358	-0.6929	1.0000		
Bachelor's Education	0.0100	0.5755	-0.5834	1.0000	
Pct Rural Population	0.1991	-0.2183	0.1011	-0.4886	1.0000
Mean	0.8470	10.7064	0.1736	0.1900	0.5752
Standard Deviation	0.1523	0.07885	0.2409	0.0859	0.3204

TABLE A2. Number of Branches

This table shows the number of branches by rural decile. Decile Rural is based on the weighted average of the percent rural population in each county in which the bank is located, with 1 being least rural and 10 being most rural.

Decile Rural	25th	50th	75th	Max
1	1	2	5	1,054
2	2	4	8	6,100
3	2	4	9	6,466
4	2	4	9	2,248
5	2	4	8	737
6	2	4	7	360
7	2	3	6	226
8	2	3	5	114
9	2	3	5	79
10	1	2	3	24

TABLE A3. This table tests bank fixed effects on banks that have branches in more than one county. Column 1 contains all observations, regardless of branch locations and is reproduced from Table 4. Column 2 contains banks with branch CD rate observations in more than one county. Column 3 contains banks with branches in 14 or more counties. All regressions contain state, year, and bank fixed effects. All errors are clustered at the county level.

	(1) Full Sample	(2) Full Sample	(3) 2+ Counties	(4) 14+ Counties
Log Maturity Matched Treasury Yield	0.278***	0.278***	0.376***	0.432***
	(97.50)	(97.57)	(85.03)	(70.01)
12 Months	0.243***	0.243***	0.219***	0.245***
	(118.59)	(118.65)	(67.83)	(45.94)
24 Months	0.447***	0.447***	0.434***	0.535***
	(128.88)	(128.94)	(74.30)	(59.42)
60 Months	0.790***	0.790***	0.752***	0.904***
	(130.04)	(130.27)	(75.36)	(59.17)
Rural County	0.00231	0.00235	0.00595	0.0131*
	(0.42)	(0.43)	(1.06)	(1.78)
Observations	7,285,382	7,285,382	3,058,819	1,528,857
R^2	0.857	0.857	0.876	0.887
Year FE	Y	Y	Y	Y
State FE	Y	N	N	N
Bank FE	Y	Y	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A4. This table tests log APY for checking and money market accounts using the log 6-month Treasury yield and controlling for rural population. Columns 1 and 3 contain the base specification. Columns 2 and 4 control for the percent of population considered rural in the county in which the branch is located. All regressions contain state and year fixed effects. All errors are clustered at the county level.

	(1) Checking APY	(2) Checking APY	(3) MM APY	(4) MM APY
Log Risk Free Rate	0.273***	0.274***	0.299***	0.299***
	(84.71)	(84.99)	(125.68)	(125.81)
Rural County		0.299***		0.0773***
		(17.36)		(6.89)
Observations	823,931	823,931	871,409	871,409
R^2	0.410	0.424	0.454	0.456
Year FE	Y	Y	Y	Y
State FE	Y	Y	Y	Y
Bank FE	N	N	N	N

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A5. This table tests the impact of bank size, as measured by log number of bank branches, on log CD rates. *Rural County* is a dummy that takes the value of 1 if the percent of population considered rural in the county in which the CD rate is offered is above the 75th percentile and 0 otherwise. *Low Trust Year* is a dummy that takes the value of 1 when the Gallup poll measure of trust in banks is below median for the years 2001 to 2019 and 0 otherwise. *Low Income* is a dummy that takes the value of 1 when median county income is below the 75th percentile and 0 otherwise. All specifications contain year and state fixed effects, and errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY
Rural County	0.171***	0.244***
	(6.10)	(8.08)
Low Trust Year=1	-2.013***	-2.004***
	(-184.47)	(-137.85)
Low Trust Year=1 × Rural County	0.0915***	-0.0855***
	(10.40)	(-2.67)
Low Income=1	-0.00696	-0.00165
	(-0.53)	(-0.13)
Low Income=1 × Rural County	-0.0420	-0.126***
	(-1.43)	(-4.04)
Low Trust Year=1 × Low Income=1		-0.0127
		(-0.85)
Low Trust Year=1 × Low Income=1 × Rural County		0.197***
		(5.57)
Observations	7,285,383	7,285,383
R^2	0.767	0.767
Year FE	Y	Y
State FE	Y	Y
Maturity Matched Treasury Control	Y	Y
CD Maturity Control	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A6. This table tests the impact of bank size, as measured by log number of bank branches, on log CD rates. *Rural County* is a dummy that takes the value of 1 if the percent of population considered rural in the county in which the CD rate is offered is above the 75th percentile and 0 otherwise. *Low Trust Year* is a dummy that takes the value of 1 when the Gallup poll measure of trust in banks is below median for the years 2001 to 2019 and 0 otherwise. *Low Income* is a dummy that takes the value of 1 when median county income is below the 75th percentile and 0 otherwise. All specifications contain year and state fixed effects, and errors are clustered at the county level. Column 1 contains the full sample. Column 2 contains banks with less than 1,000 branches. Column 3 contains banks with less than 7 branches, which is the median number of branches in the sample.

	(1) Full Sample	(2) No Big Banks	(3) <7 Branches
Low Income=1 × Low Trust Year=1 × Rural County=1	0.133***	0.131***	0.104**
	(3.46)	(3.32)	(2.43)
Income Change	-0.147***	-0.106**	-0.0527
	(-3.03)	(-2.16)	(-0.90)
Deposits to Assets	-0.610***	-0.383***	-0.324***
	(-11.49)	(-7.01)	(-4.73)
% Overhead	-3.255***	-3.076***	-2.616***
	(-9.05)	(-8.21)	(-5.02)
HHI	0.0684*	0.0384	0.00161
	(1.84)	(0.96)	(0.03)
Log Deposits	0.238***	0.151***	-0.0892**
	(15.56)	(5.33)	(-1.96)
Squared Deposits	-0.0120***	-0.00846***	0.00374**
	(-23.92)	(-8.12)	(2.06)
Observations	4,651,751	3,990,786	2,209,671
R^2	0.772	0.755	0.746
Year FE	Y	Y	Y
State FE	Y	Y	Y
Maturity Matched Treasury Control	Y	Y	Y
CD Maturity Control	Y	Y	Y
Rural Control	Y	Y	Y
Income Control	Y	Y	Y
Trust Control	Y	Y	Y
Rural x Income Control	Y	Y	Y
Rural x Trust Control	Y	Y	Y
Trust x Income Control	Y	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A7. This table tests the basic relationship between log CD APY, term structure, and rural population. *% Rural Population* is the percent of population that is considered rural in the county in which the CD is offered. The *Log Maturity Matched Treasury Yield* is the log of a Treasury of the same maturity as the CD at that particular month and year in the sample. Coefficients on maturity are relative to the 6-month CD. Errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY	(3) Log CD APY	(4) Log CD APY	(5) Log CD APY
Log Maturity Matched Treasury Yield	0.574***	0.275***	0.276***	0.276***	0.278***
	(149.08)	(97.18)	(97.12)	(96.56)	(97.57)
12 Months	0.157***	0.245***	0.245***	0.245***	0.243***
	(75.96)	(118.54)	(118.27)	(118.39)	(118.57)
24 Months	0.210***	0.442***	0.442***	0.444***	0.447***
	(59.46)	(124.97)	(124.32)	(125.89)	(128.85)
60 Months	0.324***	0.752***	0.757***	0.767***	0.790***
	(57.31)	(124.15)	(123.46)	(125.12)	(130.03)
% Rural Population			0.353***	0.319***	-0.000960
			(18.35)	(21.25)	(-0.10)
Observations	7,285,383	7,285,383	7,284,124	7,284,124	7,284,123
R^2	0.425	0.748	0.757	0.768	0.857
Year FE	N	Y	Y	Y	Y
State FE	N	N	N	Y	Y
Bank FE	N	N	N	N	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A8. This table tests the impact of low trust years and rural population, as measured using a continuous variable, on log CD APY. *% Rural Population* is the percent of population that is considered rural in the county in which the CD is offered. *Low Trust Year* is a dummy that takes the value of 1 when the Gallup poll measure of trust in banks is below median for the years 2001 to 2019 and 0 otherwise. *Low Income* is a dummy that takes the value of 1 when median county income is below the 75th percentile and 0 otherwise. All specifications contain year and state fixed effects, and errors are clustered at the county level. Coefficients for maturity matched Treasury yield and CD maturity have been suppressed.

	(1) Log CD APY	(2) Log CD APY
% Rural Population	0.319***	0.242***
	(21.25)	(18.40)
Low Trust Year	-1.988***	
	(-194.79)	
Low Trust Year=1		-2.046***
		(-159.37)
Low Trust Year=1 × % Rural Population		0.159***
		(10.93)
Observations	7,284,124	7,284,124
R^2	0.768	0.769
Year FE	Y	Y
State FE	Y	Y
Maturity Matched Treasury Control	Y	Y
CD Maturity Control	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A9. This table tests the impact of financial sophistication in rural areas on CD rates during low-trust years. *% Rural Population* is the percent of population that is considered rural in the county in which the CD is offered. *Low Trust Year* is a dummy that takes the value of 1 when the Gallup poll measure of trust in banks is below median for the years 2001 to 2019 and 0 otherwise. *Low Income* is a dummy that takes the value of 1 when median county income is below the 75th percentile and 0 otherwise. All specifications contain year and state fixed effects, and errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY
% Rural Population	0.257***	0.339***
	(8.93)	(11.11)
Low Trust Year=1	-2.046***	-2.009***
	(-155.32)	(-121.25)
Low Trust Year=1 × % Rural Population	0.159***	-0.00489
	(10.96)	(-0.17)
Low Education=1	0.0112	0.0336*
	(0.61)	(1.84)
Low Education=1 × % Rural Population	-0.0203	-0.122***
	(-0.61)	(-3.57)
Low Trust Year=1 × Low Education=1		-0.0468**
		(-2.44)
Low Trust Year=1 × Low Education=1 × % Rural Population		0.206***
		(5.61)
Observations	7,284,124	7,284,124
R^2	0.769	0.769
Year FE	Y	Y
State FE	Y	Y
Maturity Matched Treasury Control	Y	Y
CD Maturity Control	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A10. This table tests the impact of financial sophistication, as measured by income, in rural areas on CD rates during low trust years. *% Rural Population* is the percent of population that is considered rural in the county in which the CD is offered. *Low Trust Year* is a dummy that takes the value of 1 when the Gallup poll measure of trust in banks is below median for the years 2001 to 2019 and 0 otherwise. *Low Income* is a dummy that takes the value of 1 when median county income is below the 75th percentile and 0 otherwise. All specifications contain year and state fixed effects, and errors are clustered at the county level.

	(1) Log CD APY	(2) Log CD APY
% Rural Population	0.243***	0.355***
	(6.91)	(9.62)
Low Trust Year=1	-2.050***	-1.990***
	(-158.29)	(-115.74)
Low Trust Year=1 × % Rural Population	0.158***	-0.110***
	(10.73)	(-2.73)
Low Income=1	-0.0451***	-0.00721
	(-2.61)	(-0.41)
Low Income=1 × % Rural Population	0.0163	-0.123***
	(0.42)	(-3.05)
Low Trust Year=1 × Low Income=1		-0.0853***
		(-4.19)
Low Trust Year=1 × Low Income=1 × % Rural Population		0.325***
		(6.85)
Observations	7,284,124	7,284,124
R^2	0.769	0.769
Year FE	Y	Y
State FE	Y	Y
Maturity Matched Treasury Control	Y	Y
CD Maturity Control	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A11. This table tests the impact of controls for local income change, deposits to assets, bank overhead, local market HHI, log deposits, and squared deposits on CD rates. *% Rural Population* is the percent of population that is considered rural in the county in which the CD is offered. *Low Trust Year* is a dummy that takes the value of 1 when the Gallup poll measure of trust in banks is below median for the years 2001 to 2019 and 0 otherwise. *Low Income* is a dummy that takes the value of 1 when median county income is below the 75th percentile and 0 otherwise. All specifications contain year and state fixed effects, and errors are clustered at the county level. Column 1 contains the full sample. Column 2 contains banks with less than 1,000 branches. Column 3 contains banks with less than 7 branches, which is the median number of branches in the sample.

	(1) Full Sample	(2) No Big Banks	(3) <7 Branches
Low Education=1 × Low Trust Year=1 × % Rural Population	0.153***	0.124***	0.104**
	(3.78)	(3.02)	(2.24)
Income Change	-0.142***	-0.108**	-0.0568
	(-2.94)	(-2.21)	(-0.97)
Deposits to Assets	-0.611***	-0.381***	-0.326***
	(-11.46)	(-6.97)	(-4.73)
% Overhead	-3.230***	-3.065***	-2.596***
	(-9.04)	(-8.20)	(-5.02)
HHI	0.0511	0.0302	-0.00600
	(1.33)	(0.72)	(-0.12)
Log Deposits	0.241***	0.154***	-0.0858*
	(15.80)	(5.41)	(-1.88)
Squared Deposits	-0.0121***	-0.00857***	0.00364**
	(-24.12)	(-8.17)	(2.00)
Observations	4,651,751	3,990,786	2,209,671
R^2	0.772	0.755	0.746
Year FE	Y	Y	Y
State FE	Y	Y	Y
Maturity Matched Treasury Control	Y	Y	Y
CD Maturity Control	Y	Y	Y
Rural Control	Y	Y	Y
Education Control	Y	Y	Y
Trust Control	Y	Y	Y
Rural x Education Control	Y	Y	Y
Rural x Trust Control	Y	Y	Y
Trust x Education Control	Y	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE A12. This table tests the impact of controls for local income change, deposits to assets, bank overhead, local market HHI, log deposits, and squared deposits on CD rates. *% Rural Population* is the percent of population that is considered rural in the county in which the CD is offered. *Low Trust Year* is a dummy that takes the value of 1 when the Gallup poll measure of trust in banks is below median for the years 2001 to 2019 and 0 otherwise. *Low Income* is a dummy that takes the value of 1 when median county income is below the 75th percentile and 0 otherwise. All specifications contain year and state fixed effects, and errors are clustered at the county level. Column 1 contains the full sample. Column 2 contains banks with less than 1,000 branches. Column 3 contains banks with less than 7 branches, which is the median number of branches in the sample.

	(1) Full Sample	(2) No Big Banks	(3) <7 Branches
Low Trust Year=1 × % Rural Population	-0.222***	-0.154***	-0.123***
	(-5.68)	(-3.71)	(-2.59)
Low Income=1 × Low Trust Year=1 × % Rural Population	0.181***	0.173***	0.151***
	(3.86)	(3.52)	(2.72)
Income Change	-0.144***	-0.106**	-0.0534
	(-2.98)	(-2.16)	(-0.92)
Deposits to Assets	-0.616***	-0.382***	-0.326***
	(-11.60)	(-6.99)	(-4.73)
% Overhead	-3.227***	-3.061***	-2.595***
	(-9.09)	(-8.24)	(-5.04)
HHI	0.0564	0.0348	-0.00625
	(1.49)	(0.84)	(-0.12)
Log Deposits	0.241***	0.152***	-0.0873*
	(15.75)	(5.40)	(-1.93)
Squared Deposits	-0.0120***	-0.00847***	0.00370**
	(-24.08)	(-8.20)	(2.04)
Observations	4,651,751	3,990,786	2,209,671
R^2	0.772	0.755	0.746
Year FE	Y	Y	Y
State FE	Y	Y	Y
Maturity Matched Treasury Control	Y	Y	Y
CD Maturity Control	Y	Y	Y
Rural Control	Y	Y	Y
Income Control	Y	Y	Y
Trust Control	Y	Y	Y
Rural x Income Control	Y	Y	Y
Rural x Trust Control	Y	Y	Y
Trust x Income Control	Y	Y	Y

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$