When Insurers Withdraw: Lenders' Response to Climate-Driven Homeowners Insurance Non-Renewals

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Abstract

Climate risk is increasingly reshaping U.S. homeowners insurance markets, with insurers responding to rising catastrophe exposure by tightening coverage and increasing policy non-renewals. This paper studies how deterioration in local insurance availability affects mortgage credit supply. I combine newly released county-level data on homeowners' insurance non-renewal rates from 2018–2023 with Home Mortgage Disclosure Act data and construct a bank–county–year panel to examine how lenders respond to local insurability stress. I interpret the non-renewal rate as an observable measure of insurance-market deterioration that weakens the collateral protection underlying mortgage lending. I find that higher lagged non-renewal rates are associated with significantly lower mortgage approval rates. These effects remain statistically significant and become larger after adding Labor Market Area×year fixed effects. By contrast, I find little evidence of a robust response in mortgage interest rates or loan size. The results are consistent with lenders responding to deteriorating insurance availability primarily through tighter screening and credit rationing rather than through broad repricing of mortgage credit. These findings suggest that reductions in insurance availability, beyond the commonly studied premium channel, can restrict mortgage credit access and may represent an important channel through which climate risk affects housing finance.

Keywords: Climate Risk; Homeowners Insurance; Mortgage Lending; Credit Supply; Housing Markets; Financial Stability

1 Introduction

The increasing frequency and cost of climate-related events—including hurricanes, floods, and wildfires—pose growing risks to the U.S. real estate market and the broader economy, while also reshaping homeowners' insurance markets.[1]. As insurers confront decades of rising catastrophe losses and higher reinsurance costs, they have increasingly moved beyond price-based adjustments alone. Rather than relying solely on smooth premium increases (Keys and Mulder, 2024; Ge et al., 2024), insurers are increasingly tightening coverage availability and non-renewing policies in high-risk areas (U.S. Senate Committee on the Budget, 2024). This withdrawal of protection raises an important and still largely unexplored question: *How does deterioration in homeowners' insurance availability affect mortgage credit supply?* In particular, do lenders respond by reducing approvals, repricing mortgage credit, or adjusting loan size when local insurance markets become less stable?

This shift from premiums increase toward non-renewal represents an important change in how risk is allocated within the housing finance system. In a normally functioning market, homeowners' insurance protects the homeowner's equity and, crucially, serves as a primary form of collateral protection for the lender. Because maintaining a valid policy is generally required for mortgage origination and secondary-market eligibility (e.g., through Fannie Mae or Freddie Mac), the risk of collateral damage or loss is partly transferred from borrowers and lenders to insurers. A premium increase changes the price of that transfer, but a non-renewal threatens the availability of the transfer itself.[2] Higher premiums change the cost of coverage, but non-renewals change its availability. Because continuous insurance coverage is typically required for origination and secondary-market eligibility, rising non-renewals can weaken collateral protection and increase the likelihood that lenders tighten credit supply.

In this paper, I show that rising homeowners' insurance non-renewal rates are associated with a contraction in mortgage credit supply. Specifically, I find that an increase in the lagged non-renewal rate is associated with a significant decline in mortgage approval rates, consistent with tighter lender screening standards. This relationship is robust across alternative specifications and persists after controlling for recent realized disaster losses and a rich set of county-level controls, suggesting that lenders respond to deterioration in the

[1]For detailed data on the rising frequency and economic impact of these events, see the NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2025). As of 2024, the U.S. has sustained over 403 separate weather and climate disasters since 1980 where overall damages reached or exceeded \$1 billion, with a total cumulative cost exceeding \$2.9 trillion. Available at: `https://www.ncei.noaa.gov/access/billions/`

[2]This distinction is consistent with Federal Insurance Office, *Analyses of U.S. Homeowners Insurance Markets, 2018–2022: Climate-Related Risks and Other Factors* (January 2025), which distinguishes increased insurance cost from reduced insurance availability and treats the nonrenewal rate as a metric related to insurance availability. The report further notes that higher nonrenewals can indicate tighter underwriting standards and that households in areas with higher nonrenewal rates may have more limited options for insurance coverage.

insurance markets itself rather than only to physical damage caused by natural disasters. By contrast, I find little evidence that banks systematically adjust loan size or mortgage interest rates on the loans they do originate. These findings point to a quantity-based rationing response rather than a broad price-based repricing of mortgage credit. More broadly, they suggest that as private insurers retreat from high-risk areas, reduced insurance availability may also restrict mortgage credit access, with important implications for housing finance and financial stability (Stiglitz and Weiss, 1981).

Historically, the interaction between insurance availability and mortgage credit has been difficult to study due to the scarcity of granular property insurance data that can be linked to mortgage records. While mortgage outcomes are observable at the loan level via HMDA, insurance data are typically only available through state-level regulatory filings, which obscure local market dynamics. I address this empirical gap by utilizing a novel dataset from a 2024 U.S. Senate Budget Committee investigation, which provides rare county-level information on homeowners' insurance non-renewals across all 50 states and the District of Columbia. Although individual policy-level data remain largely inaccessible to most researchers due to insurer confidentiality and fragmented state-level reporting, this county-year panel (2018–2023) allows for a significantly more granular analysis than was previously possible.

Using these records, I construct the county non-renewal rate ($NRR_{c,t}$) as the ratio of non-renewed policies to total policies in force. This measure is economically meaningful because it captures the availability margin of insurance—a discrete supply constraint that is fundamentally different from smooth price adjustments. While premium increases represent a change in the cost of risk transfer, a non-renewal signals a withdrawal of protection that directly threatens the collateral requirements necessary for mortgage origination and secondary-market eligibility. By aggregating HMDA loan-level records to the bank-county-year level, I can observe how lenders adjust their credit supply in direct response to these local insurability shocks. I interpret the NRR as a broad, observable measure of local insurability stress, reflecting a confluence of climate risks, reinsurance costs, and regulatory constraints.

I first analyze the relationship between local insurance availability and bank credit supply by examining how the lagged county non-renewal rate, $NRR_{c,t-1}$, is associated with mortgage approval outcomes. My baseline analysis uses a bank–county–year panel with bank×year fixed effects, which helps isolate the credit-supply channel by comparing how the same lender reallocates credit across counties facing different levels of insurance-market stress. This specification absorbs time-varying bank-level shocks common across counties served by the same institution, such as changes in strategy, liquidity, or risk appetite. I find a statistically and economically significant negative relationship between $NRR_{c,t-1}$ and mortgage approvals. A one-percentage-point increase in $NRR_{c,t-1}$ is associated with a 0.353 percentage-point decline in the share of dollars approved and a 0.326 percentage-point decline in the share of applications approved. These patterns remain statistically significant after controlling for local economic conditions and for realized disaster losses due to natural disasters, suggesting that lenders respond not only to realized physical damage, but also to deterioration in the local insurance backstop itself.

To further assess whether this relationship reflects broader regional conditions, I estimate a stricter specification that adds Labor Market Area (LMA)$\times$year fixed effects. This approach absorbs shocks common to local commuting zones in a given year, making the estimates less likely to reflect broad regional economic trends. The negative relationship remains and is somewhat larger in magnitude: a one-percentage-point increase in $NRR_{c,t-1}$ is associated with a 0.392 percentage-point decline in the share of dollars approved and a 0.376 percentage-point decline in the share of applications approved. These preliminary findings suggest that lenders view insurance non-renewals as a meaningful signal of local insurability stress and respond by tightening mortgage credit supply.

I next examine whether local insurance-market stress is associated with the pricing of approved mortgage credit. In contrast to the approval results, the estimates for interest rates provide little evidence of a meaningful pricing response to higher non-renewal rates. In the baseline specification with bank$\times$year fixed effects, a one-percentage-point increase in $NRR_{c,t-1}$ is associated with only a -0.007 percentage-point decline in the interest rate, and the estimate is small in magnitude and only marginally significant. Once I further absorb local mortgage-market conditions using Labor Market Area (LMA)$\times$year fixed effects, the coefficient becomes slightly positive, at 0.004, and is statistically insignificant. This sign reversal and loss of statistical significance indicate that the pricing estimate is not robust to the inclusion of LMA$\times$year fixed effects, suggesting that rising insurance non-renewals are not systematically associated with a change in mortgage interest rates. Combined with the decline in approval rates documented above, this pattern is more consistent with a quantity-based tightening in credit supply than with a broad repricing of risk on the loans that are originated.

I also study whether lenders adjust on the intensive margin by changing the size of the loans they originate. Using the logarithm of loan amount as the dependent variable, I find that the estimated effect on loan size is stable in magnitude (\$-0.002\$) but is only statistically significant in the baseline model. The loss of significance in the more saturated specification indicates that the result is not robust to the inclusion of LMA$\times$year fixed effects. Overall, these results suggest that intensive-margin adjustments are economically negligible compared with the more pronounced contraction in approval rates.

Finally, I examine whether these lender-level contractions translate into broader aggregate shifts at the county level. While the bank–county–year results indicate a tightening in mortgage approvals, I find little evidence that higher non-renewal rates significantly reduce total mortgage volume or aggregate dollars approved at the county level. This contrast suggests that the effects of insurance-market deterioration are more visible in lender-level credit allocation than in aggregate local outcomes. Consistent with this interpretation, I find that the response is more pronounced among larger banks—which may have greater capacity to reallocate credit across diverse geographic footprints—and remains present even in counties with zero prior disaster losses. These results suggest that deterioration in insurance availability fundamentally alters how lenders allocate credit across local markets, even when those adjustments do not result in a measurable decline in aggregate county-level mortgage activity.

2 Literature Review

A central insight from the catastrophe-risk literature is that limits to insurability can shape credit-market outcomes by weakening collateral protection and increasing lenders' exposure to tail risk. Garmaise and Moskowitz (2009) develop a model in which catastrophe risk interacts with incomplete insurance markets to depress lending against catastrophe-exposed real estate, and they provide empirical evidence consistent with credit tightening when risk cannot be efficiently transferred. More broadly, this work emphasizes that capacity constraints, correlated losses, and imperfect risk-sharing can generate discrete changes in both the pricing and the availability of coverage (Froot, 2001). In standard credit-market models with asymmetric information, lenders need not respond to higher risk primarily through interest-rate increases; instead, they may tighten non-price terms and ration credit when screening becomes more valuable or when risk is difficult to price (Stiglitz and Weiss, 1981).

A different empirical literature studies how climate risk and disaster exposure are capitalized into housing-market outcomes, primarily through price-based channels. Prior work documents that climate exposure is reflected in property values and local demand (Bernstein et al., 2019; Baldauf et al., 2020; Murfin and Spiegel, 2020). Complementary research shows that mortgage-market institutions and securitization can mediate climate-risk transmission to credit allocation (Ouazad and Kahn, 2019). More recently, researchers have used mortgage-linked data to quantify how insurance costs rise with disaster risk and how those costs affect borrower outcomes (Keys and Mulder, 2024; Ge et al., 2024). Related studies show that increases in homeowners' insurance premiums can reduce housing transactions and affect mortgage outcomes (Eastman et al., 2025; Collier et al., 2024). While this evidence establishes that insurance prices matter for housing markets and mortgage performance, it provides more limited evidence on how lenders respond when insurance availability itself deteriorates.

A closely related strand examines how insurers manage climate exposure by tightening underwriting standards, increasing non-renewals, and exiting markets. This work emphasizes that non-renewals and exits often reflect discrete constraints on coverage supply—shaped by reinsurance capacity, regulation, and correlated tail risk—rather than simply higher prices for a continuous insurance contract (You et al., 2024; Sastry et al., 2024; Oh et al., 2025; Taylor et al., 2025). Consistent with this view, evidence from California highlights policy non-renewal dynamics and increased reliance on insurer-of-last-resort arrangements and other availability backstops in wildfire-exposed areas (Taylor et al., 2025; You et al., 2024). Because continuous homeowners' insurance coverage is a requirement for origination and secondary-market eligibility, rising non-renewals can directly increase closing risk and collateral uncertainty, creating incentives for lenders to tighten credit even without repricing. A core open question is how these availability shocks transmit to mortgage credit supply: in particular, whether and how lenders tighten approvals and originations when coverage becomes harder to secure or less stable, even holding local economic conditions and realized disaster losses fixed.

My paper contributes to these strands of the literature by introducing a direct, granular measure of local insurance availability and linking it to mortgage lending outcomes. By utilizing county-level homeowners' insurance non-renewal rates (NRR) as an indicator of insurability stress, I am able to isolate the availability margin of insurance from the more commonly studied price channel. While rising premiums represent a marginal increase in the cost of risk transfer, non-renewals represent a discrete supply constraint that threatens the very eligibility of a property for mortgage origination and securitization. I document that higher $NRR_{c,t-1}$ is followed by significant declines in mortgage approval rates at the bank–county–year level, even after accounting for local economic conditions. Importantly, these contractions occur with little evidence of systematic changes in interest rates or changes in average loan size. This pattern suggests that insurance availability shocks trigger a quantity-based rationing response by lenders—consistent with models of credit screening under institutional uncertainty (Stiglitz and Weiss, 1981)—rather than a simple repricing of credit in response to higher insurance costs.

These findings also speak to broader evidence on how lenders respond to localized shocks and climate-related risk. Existing work shows that banks reallocate credit across regions following natural disasters, reflecting internal constraints and portfolio rebalancing (Cortés and Strahan, 2017). Related research documents that climate exposure can shape lending and financing costs through broader balance-sheet and cost-of-capital channels (Painter, 2020; Meisenzahl, 2023). In contrast to disaster-shock studies that emphasize realized damage and post-event disruption, my setting focuses on a forward-looking erosion of collateral protection through insurance-market withdrawal, even absent a contemporaneous catastrophe. In contrast, my results highlight an availability-based mechanism that is particularly salient for mortgage markets: because continuous insurance coverage is effectively a requirement for origination and securitization, deterioration in insurance availability can restrict mortgage credit access even when pricing responses are muted.

The remainder of the paper proceeds as follows. Section 3 provides institutional background on the mortgage and homeowners' insurance markets. Section 4 describes the data and empirical design. Section 5 presents the main results and robustness analyses. Then, Section 8 discusses policy implications and Section 7, endogeneity concerns. Section 9 concludes.

3 Institutional Background

3.1 Mortgage Market and Homeowner Insurance

In the U.S., approximately 61% of owner-occupied homes are encumbered by a mortgage.[3] Mortgages are originated by bank and non-bank lenders, which generally require borrowers to obtain homeowners insurance at origination and maintain coverage for the life of the mortgage. In the event of a covered loss, insurance pays claims that help repair or replace damaged property, protecting both the homeowner's equity and the lender's collateral.

Homes are exposed to physical risks such as fire, wind, theft, and other hazards. Most standard homeowners policies cover many common perils but typically exclude flood and earthquake losses, which often require separate coverage. Homeowners insurance therefore serves as a primary mechanism for transferring property risk from households and lenders to insurers, reducing the likelihood that collateral value is severely impaired after a disaster. A standard U.S. homeowners policy (often an HO-3) is typically written for a one-year term and renewed annually. In the United States, homeowners insurance is regulated primarily at the state level. (Keys and Mulder, 2024) escrow-based sample find that the average annual premiums were $2,530 in 2023, although premiums vary widely by location and risk.

Because continuous coverage is a condition of the mortgage contract and secondary-market eligibility, lenders and servicers monitor insurance status and require borrowers to provide proof of coverage. When coverage lapses, servicers can impose force-placed insurance to protect collateral, typically at a higher cost and with

[3] See United States Census Bureau, `https://data.census.gov/table/ACSDP1Y2022.DP04?q=tenure`

more limited coverage than standard policies. As a result, disruptions in insurance availability can affect mortgage outcomes not only through higher housing costs, but also through increased uncertainty about whether properties can be insured on terms that satisfy underwriting and servicing requirements.

3.2 Homeowners Insurance Non-Renewals

A homeowners insurance non-renewal occurs when an insurer declines to offer a new policy term at expiration, in contrast to cancellation, which terminates coverage mid-term. Insurers may non-renew for property-level underwriting reasons (e.g., roof condition or unrepaired hazards), claims history, or portfolio decisions that reduce exposure to particular regions or perils. New county-level data released by the U.S. Senate Budget Committee for 2018–2023—compiled from nearly two dozen insurers covering roughly 65% of the homeowners market (249 million policies)—show that non-renewal rates are highest and rising fastest in counties with greater exposure to climate-related hazards (e.g., wildfire and hurricane risk). The same analysis reports a positive association between rising non-renewals and higher premiums (U.S. Senate Committee on the Budget, 2024).

For mortgaged households, the immediate concern following a non-renewal notice is avoiding a lapse in coverage that could violate loan terms. Borrowers typically seek replacement coverage in the private market and, when private coverage is unavailable or unaffordable, may turn to residual-market options such as state FAIR plans and, in Florida, Citizens Property Insurance Corporation. These transitions can raise housing costs, change the scope of covered perils, and increase the likelihood of temporary coverage gaps, all of which are relevant for lender underwriting and ongoing collateral protection.

3.3 Residual Markets

When private insurance capacity contracts, households increasingly rely on state-mandated residual property markets—most prominently Fair Access to Insurance Requirements (FAIR) Plans and, in Florida, Citizens Property Insurance Corporation. These programs are designed as insurers of last resort to preserve basic insurability and, for mortgaged borrowers, continued loan compliance. However, residual-market policies are often more expensive and less comprehensive than standard admitted-market homeowners coverage. FAIR Plans commonly provide limited, catastrophe-oriented protection—often centered on dwelling coverage, with contents and liability coverage optional, restricted, or subject to lower limits—reflecting the higher-risk pool they serve. In Florida, Citizens is statutorily structured to be less competitive than the private market, and its permitted annual rate increases can mechanically raise premiums over time.

For mortgage lenders, rising reliance on residual markets (e.g., a higher FAIR Plan share) and elevated non-renewal rates may provide salient signals of insurability stress. This stress can affect credit risk through two channels: it may raise the borrower's housing-cost burden (and thus default risk), and it may increase the likelihood that collateral value is impaired if adequate coverage becomes unavailable or increasingly incomplete. Moreover, residual-market designs can amplify tail risk because they may rely on financing mechanisms such as assessments or surcharges following large catastrophic losses. My empirical analysis tests whether lenders respond to these signals by tightening credit supply ex ante to avoid these risks.

4 Data Sources

This study combines multiple datasets to examine the relationship between homeowners' insurance non-renewals and mortgage lending outcomes in the context of climate-related risk. The primary unit of observation is a bank–county–year panel (Bank × County × Year), constructed by aggregating HMDA loan-level records and merging them to county-year insurance and socioeconomic measures.

4.1 Homeowners' Insurance Non-Renewals

The primary insurance dataset originates from a U.S. Senate Budget Committee investigation (2024), which compiled county-level information on homeowners' insurance non-renewals across all 50 states and the District of Columbia.[4] The data span 2018–2023 and cover roughly 249 million policies issued by firms accounting for about 65 percent of the national homeowners' insurance market. Unlike premium measures available through regulatory filings, insurer-initiated non-renewal counts had not previously been publicly available at a national level. Non-renewals are particularly informative because they capture discrete reductions in coverage availability, reflecting insurers' reassessment of underwriting risk, reinsurance costs, and regulatory constraints.

The dataset exhibits substantial geographic and temporal heterogeneity. Counties in states traditionally viewed as highly exposed to climate risk—such as Florida, California, and Louisiana—display elevated non-renewal rates, with sharp increases in recent years. At the same time, non-renewal activity also rises in regions not typically characterized as climate frontiers, including parts of southern New England, North

[4] https://www.budget.senate.gov/chairman/newsroom/press/new-data-reveal-climate-change-driven-insurance-crisis-is-spreading

Carolina, Oklahoma, and the Mountain West. I construct the county non-renewal rate as

$$NRR_{c,t} = \frac{\text{Non-Renewals}_{c,t}}{\text{Policies in Force}_{c,t}} \times 100,$$

and exclude counties with fewer than 50 total policies in force to avoid distortions from very small insurance markets.

4.2 Mortgage Lending Data

I obtain loan-level mortgage application data from HMDA for 2018–2023, accessed through the Consumer Financial Protection Bureau (CFPB). To ensure comparability across lenders and markets, I restrict the sample to conventional, first-lien mortgages for owner-occupied, site-built single-family properties and focus on home purchase applications, excluding refinancing and home improvement. Applications with invalid or missing county identifiers, negative housing-age values, or implausible interest rates are dropped. County codes are standardized to five-digit FIPS to enable consistent merging with county-year insurance and control variables.

Within this filtered sample, I retain both originated loans (action taken = 1) and denied applications (action taken = 3) to compute approval outcomes. I aggregate loan-level records to the bank–county–year level using the lender identifier (LEI), constructing approval rates (by dollars and by application count), average borrower characteristics (e.g., debt-to-income), and denial reason shares. For specifications that use interest rates, the outcome is computed from originated loans. To ensure within-bank geographic variation, I restrict the final panel to lenders operating in at least two counties in a given year.

4.3 Control Variables

I control for a set of county-level characteristics capturing local economic and housing-market conditions. These include the unemployment rate, population, median household income, poverty rate, population density, minority share, and educational attainment (from the American Community Survey), as well as the FHFA House Price Index (HPI). I additionally control for local disaster damages using county-level realized losses from the Federal Reserve Bank of New York's "Losses from Natural Disasters" dataset, which provides annual estimates of direct damages from natural disasters based on NOAA Storm Events and related processing (Federal Reserve Bank of New York, 2026).

In specifications that model mortgage pricing, I further control for the composition of originated lending at the bank–county–year level, including debt-to-income (DTI), loan-to-income ratios, loan-to-value (LTV), the conforming share, and average loan size, property value, and borrower income (in logs), which proxy for borrower risk and product mix.

Units and transformations: Unless otherwise noted, approval rates, interest rates, and non-renewal rates (NRR) are measured in percentage points, so coefficients can be interpreted as percentage-point changes in outcomes per one percentage-point increase in NRR. Log variables use $\log(x)$ where indicated. Loan amounts are reported in thousands of 2020 dollars.

5 Results

5.1 Descriptive Statistics

Table 1 reports summary statistics for the main variables used in the analysis at the county-year, bank-year, and bank–county–year levels. Panel A shows meaningful heterogeneity in local insurance-market conditions and county characteristics. The average county-year non-renewal rate (NRR) is 0.82 percent, with a standard deviation of 0.56 percentage points, indicating substantial variation in insurance availability across counties and over time. The maximum county-year non-renewal rate reaches 5.06 percent, suggesting that while most counties experience relatively modest non-renewal activity, some areas face considerably more severe insurance-market stress. County characteristics also vary widely. The average unemployment rate is 4.48 percent, median household income is 55.63 thousand dollars, and the minority share averages 18.22 percent. Disaster losses are highly skewed, with a mean of roughly 6.72 million dollars but a maximum exceeding 15.8 billion dollars, consistent with rare but severe climate-related events. Panel A also highlights broad cross-county differences in demographic and housing-market conditions that are relevant for mortgage demand and credit risk. Average population is approximately 111.650 people, though the large standard deviation reflects the inclusion of both sparsely populated rural counties and dense urban counties. The average poverty rate is 14.58 percent, and the owner-occupied share of housing with a mortgage averages 51.74 percent. These statistics underscore the importance of controlling for local socioeconomic and housing-market conditions when estimating how lenders respond to insurance-market deterioration.

Panel B summarizes the bank-year characteristics. The average lender in the sample has mean total assets of approximately 20.45 billion dollars, though the large standard deviation indicates substantial dispersion in banks' total assets. Banks are, on average, well capitalized, with an equity-to-assets ratio of 0.11, and rely heavily on deposit funding, with deposits averaging 0.83 of assets. Panel C reports the main bank–county–year mortgage outcomes. Approval rates are high on average, at 93.77 percent by dollars approved and 93.41 percent by number of applications, but still display meaningful variation across lender–county–year observations. The average mortgage interest rate is 4.44 percent, the mean loan amount is about 293.91 thousand dollars, and the average property value is 383.21 thousand dollars. Borrowers in the sample have average income of 127.12 thousand dollars, an average DTI of 34.25, and an average loan-to-value ratio of 0.79. The conforming share is high, averaging 0.92, indicating that most originations fall within standard secondary-market limits.

Table 2 provides additional descriptive evidence on the evolution of state-level insurance non-renewal rates from 2018 through 2023. Three broad patterns stand out. First, non-renewal activity becomes more pronounced toward the end of the sample, especially in 2022 and 2023. This pattern is also visible in Figure 1, Panel B, which shows that total non-renewals decline through 2020 and then rise sharply over 2021–2023, reaching their highest level in 2023. Florida records the highest rates in the nation, increasing from 0.79 percent in 2018 to 3.00 percent in 2022 and remaining at 2.99 percent in 2023. Louisiana also exhibits a pronounced increase, rising from 0.49 percent in 2018 to 1.80 percent in 2023. California, another state widely associated with climate-related insurance strain, rises from 0.94 percent in 2018 to 1.72 percent in 2023. These patterns are consistent with growing stress in insurance markets exposed to wildfire, hurricane, and other catastrophe-related risks.

Second, the increase in non-renewals is not confined to the most commonly discussed climate-risk states. States such as North Carolina, Massachusetts, Mississippi, Oklahoma, Rhode Island, and Connecticut also show relatively elevated non-renewal rates by 2023. For example, North Carolina rises to 1.79 percent, Massachusetts to 1.45 percent, and Oklahoma to 1.45 percent. By contrast, some states such as Minnesota and Pennsylvania remain comparatively low throughout the sample, with 2023 non-renewal rates of only 0.32 percent and 0.37 percent, respectively. This geographic dispersion suggests that insurance-market withdrawal is not limited to a narrow set of coastal or wildfire-prone areas, but instead reflects a broader pattern of deteriorating insurability across diverse regional markets.

Third, the county-level map in Figure 1, Panel A, shows that this pattern is highly localized within states. Elevated non-renewal rates are especially visible in Florida, parts of the Gulf Coast, coastal areas of the Carolinas, California, and selected counties in the Plains and Mountain West. This within-state heterogeneity is important for the empirical design because it indicates that banks operating across counties may face very different local insurance conditions even within the same broader regional environment. That cross-county variation motivates the empirical strategy that exploits within-bank differences across counties facing different levels of local non-renewal activity.

5.2 Baseline Results: Approval Rates

I begin by documenting the relationship between homeowners' insurance non-renewals and mortgage approval outcomes at the bank–county–year level. The empirical specification is:

$$\mathit{ApprovalRate}_{i,c,t} = \beta\,\mathrm{NRR}_{c,t-1} + \mathbf{X}'_{c,t-1}\gamma + \mu_{i\times t} + \varepsilon_{i,c,t}, \tag{1}$$

where $ApprovalRate_{i,c,t}$ is the approval rate, measured either by dollars value or by volume of loans approved, for bank i in county c and year t, and the main explanatory variable is the lagged county-level homeowners' insurance non-renewal rate, $\text{NRR}_{c,t-1}$.

The vector $\mathbf{X}_{c,t-1}$ includes lagged county characteristics that capture local economic conditions, demographics, and housing-market fundamentals: unemployment rate, log(Population), log(Median Household Income), minority share, house price growth, college-educated share, log(Disaster Losses), poverty rate, and owner-occupied housing with a mortgage. The baseline specifications include bank×year fixed effects, $\mu_{i\times t}$, which absorb all bank-level shocks common across counties served by the same institution in a given year. Standard errors are two-way clustered by bank and county in Columns (1) and (2).

A key feature of the empirical design is that the main explanatory variable is the lagged non-renewal rate, $NRR_{c,t-1}$, rather than the contemporaneous rate. This timing helps separate lenders' subsequent credit-supply responses from mechanical contemporaneous correlations between insurance withdrawals and mortgage outcomes. In addition, the baseline specifications control directly for realized natural disaster losses and a rich set of lagged county characteristics. Combined with the inclusion of bank×year fixed effects, the coefficient on $NRR_{c,t-1}$ is therefore identified from within-bank differences across counties facing different levels of prior insurance-market stress in the same year, rather than from bank-wide shifts in lending or contemporaneous disaster shocks.

Table 3 reports the results. Columns (1) and (2) show a negative and statistically significant association between insurance-market deterioration and mortgage approvals. A one-percentage-point increase in $\text{NRR}_{c,t-1}$ is associated with a 0.353 percentage-point decline in the approval rate measured by total value of dollars approved and a 0.326 percentage-point decline in the approval rate by loan volume. Both coefficients are statistically significant at the 1% level, and their similarity suggests that the results are consistent with a broad tightening in approval decisions.

The county-level controls are generally consistent with this interpretation. Higher unemployment is associated with lower approval rates in both specifications, and more populous counties also exhibit significantly lower approval rates conditional on the fixed effects and other controls. Minority share is negatively related to approvals, while the college-educated share is strongly positively related to both approval measures. House price growth is weakly negatively associated with approval rates, although the estimate is only marginally significant in the amount-based specification and not statistically distinguishable from zero in the count-based specification. By contrast, disaster losses and poverty are not precisely estimated once the full set of controls and fixed effects is included.

Columns (3) and (4) in Table 3 impose a more demanding specification by adding LMA$\times$Year fixed effects in addition to bank$\times$year fixed effects. Standard errors in these columns are two-way clustered by bank and LMA. This specification absorbs shocks common to a labor market area in a given year, allowing identification to come from within-bank comparisons across counties that face different lagged non-renewal rates even after netting out broader regional conditions.

The results of this stricter specification remain negative and statistically significant. A one-percentage-point increase in $\text{NRR}_{c,t-1}$ is associated with a 0.392 percentage-point decline in the approval rate by dollar amount and a 0.376 percentage-point decline in the approval rate by loan volume. These estimates are somewhat larger in magnitude than those in Columns (1) and (2), indicating that the baseline relationship is not explained by time-varying regional conditions common to counties within the same labor market area.

This stricter fixed-effects design strengthens the interpretation of the results by absorbing shocks shared across counties in the same labor market area and year. The persistence of the negative relationship under this more saturated specification suggests that the baseline association is not driven by broader regional demand conditions or local macroeconomic trends, but is consistent with lenders tightening approval behavior more in counties with weaker insurance-market conditions.

Overall, the evidence in Table 3 shows a stable and economically meaningful negative association between prior insurance non-renewals and subsequent mortgage approval rates at the bank–county–year level. The fact that the estimates remain statistically significant and become somewhat larger after adding LMA$\times$year fixed effects indicates that the relationship is not simply reflecting omitted regional trends, but instead captures within-bank reallocation in mortgage approval behavior across counties exposed to different levels of insurance stress.

5.3 Mortgage Interest Rate

I next examine whether local insurance-market stress is associated with the pricing of approved mortgage credit. To do so, I estimate specifications analogous to equation (1) , replacing the dependent variable with the average mortgage interest rate.

The baseline specification is:

$$InterestRate_{i,c,t} = \beta\,\text{NRR}_{c,t-1} + \mathbf{X}'_{c,t-1}\gamma + \mathbf{W}'_{i,c,t}\theta + \mu_{i\times t} + \varepsilon_{i,c,t}, \tag{2}$$

where $InterestRate_{i,c,t}$ denotes the average mortgage interest rate for bank i in county c and year t. The vector $\mathbf{X}_{c,t-1}$ is defined in the previous subsection and $\mathbf{W}_{i,c,t}$ includes borrower and loan controls. The main specification also includes bank×year fixed effects, $\mu_{i\times t}$, which absorb all time-varying bank-level shocks common across counties served by the same institution in a given year. Standard errors are two-way clustered by bank and county.

To account for broader regional shocks, I also estimate a specification that includes labor market area (LMA)×year fixed effects:

$$InterestRate_{i,c,t} = \beta\,\mathrm{NRR}_{c,t-1} + \mathbf{X}'_{c,t-1}\gamma + \mathbf{W}'_{i,c,t}\theta + \mu_{i\times t} + \lambda_{\ell\times t} + \varepsilon_{i,c,t}, \tag{3}$$

where $\lambda_{\ell\times t}$ denotes LMA×year fixed effects for labor market area ℓ in year t. This specification therefore absorbs both time-varying institution-level shocks and shocks common to all counties within the same labor market area in a given year. Standard errors are two-way clustered by bank and LMA.

The estimates from equations (2) and (3) are reported in Table 4. In column (1), which includes bank×year fixed effects, the coefficient on $\mathrm{NRR}_{c,t-1}$ is -0.007 and statistically significant at the 5% level. In column (2), which additionally includes LMA×year fixed effects, the coefficient becomes 0.004 and is not statistically distinguishable from zero. The estimates do not provide consistent evidence that higher insurance non-renewal rates are associated with higher(or lower) mortgage interest rates. The baseline specification shows a small negative association, but this relationship does not remain once LMA×year fixed effects are added. Relative to the approval-rate results, these findings suggest that the relationship between insurance-market stress and mortgage outcomes appears more stable for approval decisions than for mortgage pricing.

More broadly, Table 4 indicates that the association between $\mathrm{NRR}_{c,t-1}$ and mortgage interest rates is sensitive to the fixed-effects structure. Once broader labor-market-area-by-year shocks are absorbed, the estimate is small and statistically insignificant. This pattern is consistent with the view that any pricing response is limited or not robust across specifications, in contrast to the more persistent negative relationship observed for mortgage approval rates in the previous section.

5.4 Loan Size

To finalize the Bank–County–Year aggregation, I examine whether local insurance-market stress is associated with a change in the size of approved mortgage credit. To do so, I estimate specifications analogous to equations (1), replacing the dependent variable with the logarithm of average mortgage loan amount at the bank–county–year level. Because loan size is observed only for originated mortgages, these specifications are estimated on the subset of bank–county–year observations with at least one originated loan.

The baseline specification is:

$$\log(\text{LoanAmount}_{i,c,t}) = \beta\,\text{NRR}_{c,t-1} + \mathbf{X}'_{c,t-1}\gamma + \mathbf{W}'_{i,c,t}\theta + \mu_{i\times t} + \varepsilon_{i,c,t}, \tag{4}$$

where $\text{LoanAmount}_{i,c,t}$ denotes the average mortgage loan amount for bank i in county c and year t. The vector $\mathbf{X}_{c,t-1}$ includes county-level controls, and $\mathbf{W}_{i,c,t}$ includes borrower and loan controls as well as the mortgage interest rate. The specification also includes bank×year fixed effects, $\mu_{i\times t}$, which absorb time-varying bank-level shocks common across counties served by the same institution in a given year. Standard errors are two-way clustered by bank and county.

To account for broader regional shocks, I also estimate a specification that includes labor market area (LMA)×year fixed effects:

$$\log(\text{LoanAmount}_{i,c,t}) = \beta\,\text{NRR}_{c,t-1} + \mathbf{X}'_{c,t-1}\gamma + \mathbf{W}'_{i,c,t}\theta + \mu_{i\times t} + \lambda_{\ell\times t} + \varepsilon_{i,c,t}, \tag{5}$$

where $\lambda_{\ell\times t}$ denotes LMA×year fixed effects for labor market area ℓ in year t. Standard errors are two-way clustered by bank and LMA.

The estimates from equations (4) and (5) are reported in Table 5. In column (1), the coefficient on $\text{NRR}_{c,t-1}$ is -0.002 and statistically significant at the 1% level. In column (2), the coefficient remains -0.002, but it is no longer statistically distinguishable from zero once LMA×year fixed effects are included. These estimates provide limited evidence of a robust relationship between local insurance-market stress and average mortgage loan size. The baseline specification shows a small negative association, but this result does not remain statistically significant in the more demanding specification with LMA×year fixed effects.

Relative to the approval-rate results shown previously, the association between insurance non-renewals and loan size appears appears to be modest and and not robust across specifications, especially when compared with the more persistent negative relationship observed for mortgage approval rates.

5.5 Aggregate Mortgage Activity at the County Level

To assess whether the contraction in approval rates documented at the bank–county–year level translates into broader local mortgage-market effects, I next estimate county-level specifications using aggregate mortgage activity as the outcome. In particular, I examine whether higher homeowners' insurance non-renewal rates are associated with changes in the total volume of originated loans and in the total dollar value of approved mortgage lending at the county level. The estimating equation is:

$$Y_{c,t} = \beta \, \mathrm{NRR}_{c,t-1} + \mathbf{X}'_{c,t-1}\gamma + \mu_c + \tau_t + \varepsilon_{c,t}, \tag{6}$$

where $Y_{c,t}$ is either $\log(\text{Total Loans}_{c,t})$ or $\log(\text{Aggregate Dollars}_{c,t})$ and $\mathbf{X}_{c,t-1}$ includes the same set of lagged county controls used in the baseline analysis. In alternative specifications, I replace year fixed effects with LMA×year fixed effects to absorb broader local economic shocks shared across counties in the same labor market area.

Table 6 reports the results. In contrast to the bank-level approval results, the county-level estimates provide little evidence that higher non-renewal rates are associated with a measurable decline in aggregate mortgage activity. Columns (1) and (2), which use log(Total Loans) as the dependent variable, show coefficients of -0.005 and -0.021, respectively, both of which are small in magnitude and statistically insignificant. Similarly, Columns (3) and (4), which use log(Aggregate Dollars) as the dependent variable, also yield statistically insignificant estimates, with coefficients of 0.032 and -0.028. Across both outcome measures, the point estimates are not only imprecisely estimated but also unstable in sign once LMA×year fixed effects are introduced.

The results from Table 6 provide evidence that the effects of insurance-market deterioration are more visible in lender-level credit allocation than in aggregate county-level mortgage volume. In the bank–county–year specifications, the evidence indicates that individual lenders reallocate credit away from counties with higher non-renewal risk and toward counties with lower non-renewal risk within their own portfolios. By contrast, the county-level estimates show little evidence that this within-bank reallocation translates into a measurable decline in aggregate mortgage activity at the county level. One possible explanation is that the pullback by some lenders may be offset by continued lending from others. For this reason, the county-level results should not be interpreted as contradicting the earlier approval-rate findings; rather, they suggest that the effects of rising non-renewals are more clearly reflected in how credit is allocated across counties within lenders than in total mortgage activity observed at the county level.

5.6 Aggregate Effect on House Prices

I next examine whether local insurance-market deterioration is associated with broader housing-market outcomes by estimating the relationship between lagged non-renewals and annual house price appreciation. If rising non-renewals weaken local housing demand or reduce credit availability sufficiently, one possible implication is slower house price growth in affected counties. To evaluate this possibility, I estimate the following specification:

$$\Delta HPI_{c,t} = \beta\,\mathrm{NRR}_{c,t-1} + \mathbf{X}'_{c,t-1}\gamma + \delta\,HPI_{c,t-1} + \mu_c + \tau_t + \varepsilon_{c,t}, \tag{7}$$

where $\Delta HPI_{c,t}$ denotes the annual change in the House Price Index in county c and year t, As before, I also consider a more demanding specification that replaces year fixed effects with LMA×year fixed effects.

Table 7 presents the results. Column (1), which includes county and year fixed effects, yields a positive coefficient of 0.214, significant at the 10 percent level. However, this relationship weakens once broader local conditions are more fully absorbed. In Column (2), which includes county and LMA×year fixed effects, the coefficient declines to 0.150 and is no longer statistically significant. The loss of significance in the more saturated specification indicates that the initial association is not robust to controlling for local time-varying shocks shared across counties within the same labor market area.

Overall, the results from Table 7 do not provide evidence that rising insurance non-renewals are systematically associated with lower county-level house price growth over this sample period. More importantly for the interpretation of the paper, these findings reinforce the earlier conclusion that the primary response to insurance-market deterioration appears in lender screening and approval behavior rather than in a broad and immediate decline in aggregate local house prices. In that sense, the mortgage-market effects documented in the bank-level analysis appear to operate first through credit allocation rather than through an obvious county-level adjustment in overall lending aggregates or house price growth.

6 Heterogeneity by Bank Size

The baseline results indicate that higher homeowners' insurance non-renewal rates are associated with lower mortgage approval rates, with little evidence of systematic adjustment in loan size or pricing. I next examine whether this relationship differs across banks depending on size (Total Assets). Table 8 shows that the negative effect of NRR_{t-1} on mortgage approvals is significantly stronger for larger banks. The interaction between NRR_{t-1} and centered log assets is negative and highly statistically significant in both specifications. In Column (1), which uses the approval rate by volume as the dependent variable, the interaction coefficient is -0.176; in Column (2), which uses the approval rate by dollar value, the corresponding estimate is -0.163. These results indicate that as bank size increases, the sensitivity of approval rates to local insurance-market deterioration becomes more negative. In other words, larger banks appear to contract mortgage approvals more aggressively in counties experiencing greater non-renewal activity.

Figure 3 illustrates this pattern by plotting the estimated slope on NRR_{t-1} across deciles of bank size. The estimates are close to zero and statistically indistinguishable from zero for the smallest size deciles, but they become increasingly negative for larger banks, especially in the top deciles of the size distribution. By the highest deciles, the implied effect of non-renewals on approval rates is substantially larger in magnitude, consistent with a much stronger credit-supply response among large institutions. This pattern aligns with the interpretation that larger banks may have greater capacity to reallocate lending across markets and therefore respond more strongly to local insurability stress. More broadly, the heterogeneity by size helps reconcile the earlier findings: the effect of non-renewals is clearly visible in lender-level approval decisions, but it is concentrated among larger institutions and therefore may not translate into an equally clear decline in aggregate county-level lending.

7 Endogeneity Concerns

A remaining concern is that the negative association between homeowners' insurance non-renewal rates and mortgage approvals may still reflect other local factors correlated with both insurance-market stress and credit outcomes, rather than a distinct insurance-availability channel. In particular, one may worry that rising non-renewals are simply proxying for recent natural disaster losses, differences in county population size—for example, if the results are driven disproportionately by smaller counties—or broader local weather conditions and climate-related shocks that independently affect mortgage lending. This section examines whether the relationship between NRR_{t-1} and mortgage approvals merely reflects these alternative channels.

7.1 Cost of Natural Disasters

A natural concern is that the estimated relationship between homeowners' insurance non-renewal rates and mortgage approvals may simply reflect the effect of recent natural disasters rather than a distinct insurance-availability channel. This concern is already partially addressed in the baseline specifications, which include log(Disaster Losses) among the county-level controls. By controlling directly for the realized cost of natural disasters, the main regressions distinguish the effect of local insurance-market deterioration from the effect of recent physical damage itself. Moreover, if non-renewal rates were simply capturing the direct effect of recent natural disasters, one would expect their explanatory power to weaken substantially, if not disappear, in county–year observations with zero prior disaster losses. More broadly, prior work suggests that banks do not typically respond to disasters by withdrawing credit from affected areas. Instead, banks often reallocate funding across their internal networks and expand lending in disaster-affected counties by drawing liquidity from other markets (Cortés and Strahan, 2017). This mechanism operates in the opposite direction of the pattern documented in my baseline results, which further reduces the likelihood that the negative coefficient on NRR_{t-1} is merely capturing disaster-driven lending disruptions.

To address this concern more directly, Table 9 re-estimates the baseline approval-rate specifications on a restricted subsample of county–year observations with zero prior natural disaster losses. In this sample, the estimated relationship between insurance non-renewals and mortgage approvals remains negative and statistically significant. Column (1) shows that a one-percentage-point increase in NRR_{t-1} is associated with a 0.7274 percentage-point decline in the approval rate by dollar value, while Column (2) shows a 0.6355 percentage-point decline in the approval rate by volume. Both estimates are statistically significant at conventional levels and are, if anything, larger in magnitude than the corresponding baseline estimates. The persistence of the results in a sample with no prior recorded disaster losses indicates that the relationship between higher non-renewals and lower mortgage approvals does not depend on the presence of recent realized natural disaster damage. This further supports the interpretation that NRR_{t-1} captures a distinct dimension of local insurance-market stress that affects lender approval behavior above and beyond the direct cost of natural disasters.

7.2 Weather Conditions

Another concern is that the estimated relationship between homeowners' insurance non-renewal rates and mortgage approvals may simply reflect underlying weather conditions rather than a distinct insurance-market channel. This concern is particularly relevant in settings where counties face similar broad climate exposure, yet differ in their institutional or market outcomes. To assess this possibility, I examine a sample of counties located along California's border with neighboring states. These counties are geographically close and therefore share similar broad weather and climate conditions, but they differ in whether they are located inside California or just across the state line. If non-renewal rates were driven only by weather conditions, one would expect relatively little systematic difference between counties on either side of the border once common border-region factors are absorbed.

Table 10 shows that this is not the case. The coefficient on CA_border is positive and highly statistically significant, indicating that California border counties exhibit substantially higher homeowners' insurance non-renewal rates than matched border counties in neighboring states. The estimated coefficient of 1.223 implies that, within these border groups and after controlling for year fixed effects, California counties have non-renewal rates that are more than one percentage point higher on average. Figure 4 illustrates the sample construction and highlights the close spatial proximity of the counties included in the comparison. Because these counties are adjacent or near-adjacent across state borders, the sharp difference in non-renewal rates is difficult to attribute solely to simple weather variation. Instead, the evidence suggests that non-renewals reflect a broader insurance-market process that can vary even across counties facing similar weather conditions. This supports the interpretation that NRR_{t-1} captures more than local climate or weather exposure alone and instead contains distinct information about the withdrawal of insurance availability.

7.3 Small County Population

A last concern is that the baseline results may be driven disproportionately by smaller counties, where mortgage activity is thinner and local insurance-market measures may be more volatile. To examine this possibility, Table 11 interacts the lagged non-renewal rate with the centered log of lagged county population. If the negative relationship between NRR_{t-1} and mortgage approvals were primarily concentrated in low-population counties, one would expect the interaction term to be positive and statistically significant, indicating that the effect becomes weaker as county population rises. Instead, the estimates provide little support for that interpretation.

In both specifications, the coefficient on NRR_{t-1} remains negative and statistically significant, while the interaction between NRR_{t-1} and county population is economically small and statistically insignificant. In Column (1), the interaction coefficient is -0.057; in Column (2), it is essentially zero at -0.001. These estimates indicate that the effect of higher insurance non-renewals on mortgage approval rates does not vary meaningfully with county population. Although the coefficient on centered log population is negative in both specifications, there is no evidence that the sensitivity of approvals to NRR_{t-1} is concentrated in small counties. These results indicate that the baseline relationship is not an artifact of thin mortgage activity in sparsely populated counties, but instead reflects a broader link between insurance-market deterioration and lender approval behavior.

8 Policy Implications

Climate-driven deterioration in homeowners' insurance availability has implications that extend beyond the insurance sector itself. The central policy message of my findings is that insurance-market stress can affect mortgage credit access primarily through changes in lender screening and credit allocation rather than through broad changes in pricing. Across specifications, higher non-renewal rates are associated with lower mortgage approval rates, while the effects on interest rates and loan size are economically small and lack robustness . This pattern suggests that lenders respond to weakening insurance conditions by tightening approval standards, consistent with a quantity-based adjustment rather than a repricing of mortgage risk.

Importantly, these effects are most clearly observed at the lender level rather than in aggregate county-level mortgage activity. While approval rates decline, I find limited evidence of corresponding reductions in total mortgage volume at the county level. This suggests that insurance-market deterioration may induce a reallocation of credit across lenders, locations, or borrower types rather than a uniform contraction in local credit supply. In this sense, the primary impact of rising non-renewals may be on who receives credit, rather than on the overall amount of credit extended.

These findings have implications for how policymakers monitor and respond to climate-related financial risks. Because the adjustment occurs primarily through screening and selection, changes in mortgage credit conditions may not be immediately visible in standard aggregate indicators such as average interest rates or total lending volumes. Instead, shifts in approval rates or borrower composition may provide earlier signals of stress. Moreover, the evidence that larger banks exhibit stronger responses suggests that institutions with broader geographic exposure may play a key role in transmitting insurance-market shocks across regions.

The results highlight that homeowners' insurance availability is an important component of the institutional environment supporting mortgage lending. As private insurers withdraw from climate-exposed areas, the resulting stress may affect credit intermediation through changes in lender behavior, even in the absence of large movements in borrowing costs or aggregate lending. This suggests a role for greater coordination between insurance regulation, housing policy, and financial supervision, particularly in monitoring how insurance-market developments translate into changes in credit allocation and access.

9 Conclusion

This paper studies how deterioration in homeowners' insurance availability is associated with mortgage credit outcomes. Using newly available county-level data on insurer-initiated non-renewals from 2018–2023 and linking these measures to HMDA-based lending outcomes aggregated to the bank–county–year level, I show that higher lagged non-renewal rates are associated with lower mortgage approval rates. These relationships are economically meaningful and remain robust across specifications that absorb time-varying bank-level shocks with bank$\times$year fixed effects and broader regional conditions with LMA$\times$year fixed effects, as well as a rich set of lagged county controls. By contrast, I find little evidence of a robust response in mortgage interest rates or loan size which is more consistent with tighter screening and credit rationing than with a broad repricing of mortgage risk.

More broadly, the findings suggest that insurance-market deterioration can affect mortgage credit intermediation even when its effects are not immediately visible in aggregate county-level lending or in standard pricing measures. The evidence points to a lender-level adjustment in credit allocation, with larger banks appearing more responsive to local non-renewal risk, and the results are not explained solely by realized natural-disaster losses. This implies that the availability of homeowners' insurance matters for mortgage markets not only through borrower costs, but also through the reliability of the collateral protection that lending depends on. A natural next step is to strengthen identification using plausibly exogenous sources of insurance supply variation and to examine more directly how insurance-market stress changes the geographic allocation of mortgage credit and the types of borrowers who continue to receive it.

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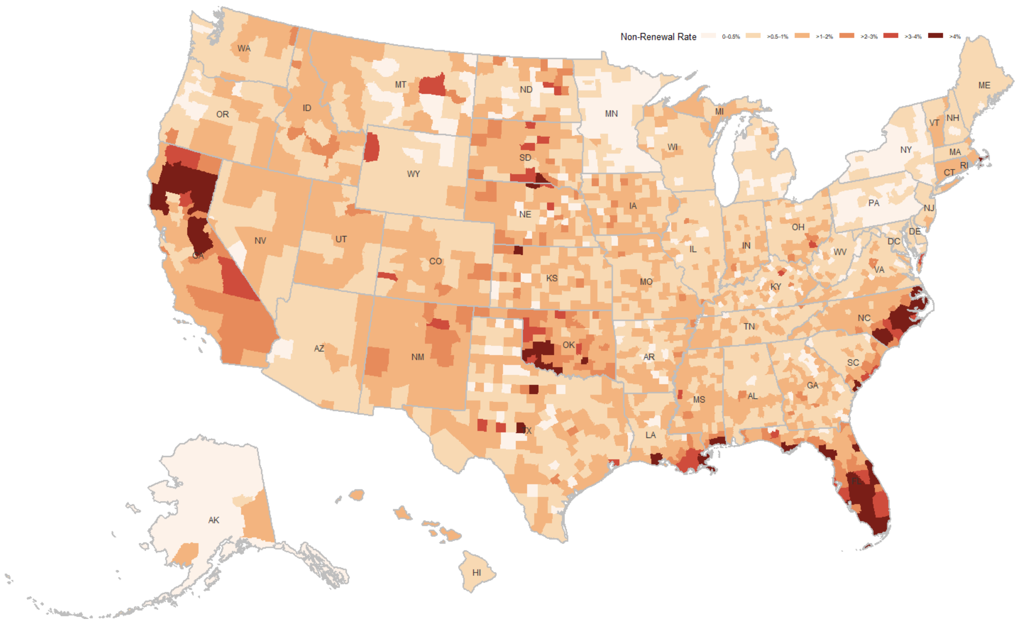
Appendix

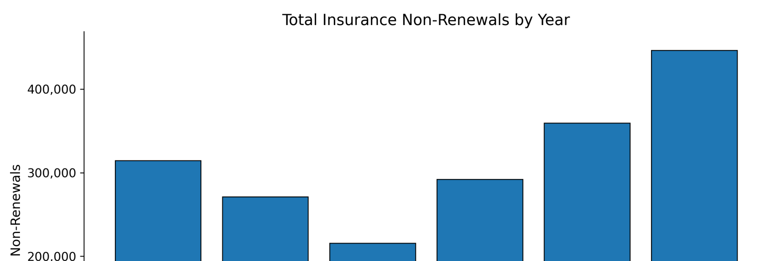
Figure 1: County-Level Insurance Non-Renewals and Aggregate Non-Renewal Trends

Panel A maps county-level homeowners' insurance non-renewal rates in 2023 across the United States. Counties are shaded according to the level of insurer-initiated non-renewals, with darker shading corresponding to higher non-renewal rates. The distribution shows considerable cross-county variation, with especially elevated rates in Florida, parts of the Gulf Coast, coastal areas of the Carolinas, California, and selected counties in the Plains and Mountain West. The map highlights that insurance-market withdrawal is not confined to a single state or peril, but is geographically widespread.

Panel A. Geographic Distribution of County-Level Homeowners' Insurance Non-Renewal Rates in 2023



Panel B. Total Homeowners' Insurance Non-Renewals by Year



Source: U.S. Senate Budget Committee.

Figure 2: State Farm General Insurance Company Announcement on California Non-Renewals

This figure reproduces a screenshot of State Farm General Insurance Company's March 20, 2024 public announcement regarding changes to its California property insurance business. The announcement states that the insurer would non-renew approximately 30,000 homeowners, rental dwelling, and other property insurance policies and would withdraw from offering commercial apartment policies through the non-renewal of roughly 42,000 such policies. State Farm attributes these actions to inflation, catastrophe exposure, reinsurance costs, and regulatory constraints. The announcement provides a concrete example of insurer-initiated contraction in insurance availability and illustrates the type of market withdrawal that motivates the use of non-renewal rates as a measure of local insurability stress.

Bloomington, IL, March 20, 2024

State Farm General Insurance Company: Update on California

Bloomington, IL, March 20, 2024 — State Farm General Insurance Company ("State Farm General") is working to ensure its long-term sustainability in California. In doing so, State Farm General has had to make some difficult but necessary decisions that will impact a portion of our California policyholders as follows:

- Non-renew approximately 30,000 homeowners, rental dwelling, and other property insurance policies (residential community association and business owners). (A rental dwelling policy insures rental home owners. Renters insurance is not affected.)
- Withdraw from offering commercial apartment policies with the non-renewal of all of those approximately 42,000 policies. (A commercial apartment policy insures apartment owners. Renters insurance is not affected.)

Source: State Farm General Insurance Company, "Update on California," March 20, 2024.

Table 1: Summary Statistics

Variable	Mean	SD	Min	Max	N
Panel A: County-Year Level					
NRR	0.82	0.56	0.03	5.06	17450
Unemployment Rate	4.48	1.89	1.30	23.20	17408
Population	111 650.72	346 270.20	377.00	10 073 906.00	17252
Median Household Income	55.63	14.61	20.79	153.99	17407
Minority Share	18.22	18.26	0.00	99.21	17408
Education Share	0.23	0.10	0.05	0.80	17408
Disaster Losses	6 724 717.39	166 099 568.55	0.00	15 833 138 012.35	17298
Poverty Rate	14.58	5.81	1.70	49.70	17407
Owner-Occupied (Mortgage)	51.74	11.61	6.74	84.82	17408
Total Loans (County)	217.47	651.35	1.00	14 343.00	20361
HPI Annual Change	7.95	6.57	−19.41	61.01	16013
Total Applications (County)	314.15	865.97	1.00	18 170.00	20361
Approval Rate (County)	0.87	0.09	0.20	1.00	20361
Panel B: Bank-Year Level					
Total Assets	20 446 310.56	155 645 241.07	35 558.14	3 106 883 555.62	5157
Equity/Assets	0.11	0.03	0.00	0.43	5157
ROA	0.01	0.01	−0.03	0.14	5157
Deposits/Assets	0.83	0.07	0.26	0.98	5157
Cost/Assets	0.03	0.02	0.00	0.46	5157
Panel C: Bank-County-Year Level					
Approval Rate (Amt)	93.77	13.61	1.50	100.00	335791
Approval Rate (Count)	93.41	13.32	10.00	100.00	335791
Interest Rate	4.47	1.39	0.95	15.88	335791
Loan Amount	293.91	185.44	12.93	1813.85	335791
Property Value	383.21	256.81	14.34	1888.05	335791
Borrower Income	127.12	83.83	7.00	630.24	335791
DTI	34.28	6.71	20.00	60.00	335566
Conforming Share	0.92	0.21	0.00	1.00	335791
Loan-to-Income Ratio	2.48	0.88	0.56	6.13	335791
LTV	0.79	0.13	0.03	1.96	335791

Table 2: State-Level Insurance Non-Renewal Rates (2018–2023)

Rank	**State**	**Non-Renewal Rate (%)**						
		2018	**2019**	**2020**	**2021**	**2022**	**2023**	**Average**
1	FL	0.79	1.02	0.97	1.29	3.00	2.99	1.77
2	NC	2.07	1.15	1.05	0.78	0.91	1.79	1.29
3	CA	0.94	1.03	0.85	1.12	1.33	1.72	1.17
4	CT	0.86	0.73	1.01	1.08	0.92	1.34	0.99
5	SD	0.88	1.18	0.78	1.00	0.99	1.12	0.99
6	LA	0.49	0.52	0.31	0.63	1.57	1.80	0.93
7	RI	0.70	0.87	0.79	0.96	0.80	1.38	0.93
8	MS	0.96	0.66	0.52	0.75	1.05	1.49	0.91
9	NM	0.97	0.94	0.63	0.72	0.93	1.27	0.91
10	MA	1.18	0.60	0.51	0.82	0.69	1.45	0.88
11	MO	0.99	0.74	0.66	0.83	0.86	0.94	0.84
12	NE	0.88	0.78	0.68	0.76	0.79	1.05	0.82
13	IA	0.96	0.67	0.49	0.88	0.84	1.06	0.82
14	VT	0.69	0.94	0.77	0.71	0.80	0.84	0.79
15	CO	1.10	0.74	0.52	0.74	0.77	0.86	0.78
16	IN	1.00	0.74	0.48	0.69	0.81	0.98	0.78
17	TN	0.98	0.83	0.53	0.72	0.68	0.96	0.78
18	AZ	1.16	0.68	0.58	0.62	0.79	0.80	0.77
19	HI	0.41	0.40	0.27	0.52	1.37	1.33	0.76
20	KS	0.81	0.66	0.59	0.79	0.87	0.85	0.76
21	ND	0.64	0.76	0.70	0.74	0.67	0.86	0.73
22	GA	1.16	0.67	0.46	0.55	0.68	0.86	0.73
23	AR	0.93	0.87	0.46	0.66	0.68	0.73	0.72
24	ID	0.77	0.83	0.52	0.58	0.76	0.87	0.72
25	AL	1.01	0.75	0.43	0.61	0.75	0.82	0.72
26	UT	0.72	0.69	0.48	0.63	0.75	1.06	0.72

Continued on next page

Table 2: State-Level Insurance Non-Renewal Rates (2018–2023)

Rank	**State**	**Non-Renewal Rate (%)**						
		2018	**2019**	**2020**	**2021**	**2022**	**2023**	**Average**
27	NJ	0.47	0.94	0.69	0.51	0.85	0.80	0.71
28	OK	0.72	0.40	0.41	0.56	0.69	1.45	0.70
29	NH	1.23	0.65	0.50	0.48	0.64	0.62	0.68
30	TX	0.81	0.64	0.46	0.64	0.68	0.83	0.68
31	OH	1.03	0.53	0.37	0.57	0.68	0.89	0.67
32	WI	0.81	0.58	0.44	0.79	0.59	0.77	0.66
33	VA	0.70	0.69	0.45	0.61	0.59	0.95	0.66
34	IL	0.54	0.62	0.53	0.73	0.64	0.66	0.62
35	SC	0.52	0.43	0.32	0.47	0.68	1.24	0.62
36	MT	0.61	0.53	0.38	0.42	0.66	1.02	0.61
37	WY	0.50	0.62	0.49	0.49	0.52	0.84	0.58
38	NV	0.63	0.53	0.39	0.50	0.55	0.85	0.58
39	AK	0.95	0.99	0.33	0.40	0.39	0.42	0.57
40	KY	0.60	0.56	0.36	0.54	0.62	0.77	0.57
41	OR	0.83	0.59	0.34	0.43	0.50	0.68	0.56
42	WA	0.42	0.54	0.47	0.46	0.53	0.69	0.52
43	DE	0.61	0.44	0.33	0.52	0.38	0.76	0.50
44	MD	0.50	0.55	0.36	0.39	0.41	0.65	0.47
45	WV	0.45	0.43	0.26	0.39	0.45	0.75	0.46
46	MI	0.46	0.40	0.28	0.49	0.48	0.58	0.45
47	ME	0.40	0.43	0.36	0.34	0.51	0.60	0.44
48	NY	0.39	0.35	0.26	0.39	0.50	0.58	0.41
49	MN	0.58	0.32	0.19	0.26	0.30	0.32	0.33
50	PA	0.29	0.28	0.26	0.26	0.29	0.37	0.29

Table 3: Impact of Insurance Non-Renewals on Mortgage Approval Rates at the Bank–County Level

Variable	Approval ($)	Approval (#)	Approval ($)	Approval (#)
	(1)	(2)	(3)	(4)
NRR_{t-1}	−0.353***	−0.326***	−0.392**	−0.376**
	(0.089)	(0.094)	(0.164)	(0.168)
Unemployment Rate_{t-1}	−0.142***	−0.155***	−0.161**	−0.194***
	(0.054)	(0.055)	(0.076)	(0.074)
$\log(\text{Population})_{t-1}$	−0.907***	−0.944***	−0.695***	−0.684***
	(0.125)	(0.134)	(0.121)	(0.117)
$\log(\text{Median Household Income})_{t-1}$	−2.418***	−1.962***	−2.387***	−1.665*
	(0.618)	(0.589)	(0.923)	(0.971)
Minority Share_{t-1}	−0.015***	−0.015**	−0.022*	−0.026**
	(0.006)	(0.007)	(0.012)	(0.011)
House Price Growth_{t-1}	−0.001*	0.000	−0.001	−0.001*
	(0.000)	(0.000)	(0.000)	(0.000)
College-Educated Share_{t-1}	4.041***	4.459***	4.658***	5.243***
	(0.743)	(0.733)	(1.296)	(1.203)
$\log(\text{Disaster Losses})_{t-1}$	−0.002	0.000	0.002	−0.012
	(0.012)	(0.012)	(0.018)	(0.016)
Poverty Rate_{t-1}	−0.012	−0.034	−0.020	−0.024
	(0.024)	(0.022)	(0.031)	(0.028)
Owner-Occupied $(\text{Mortgage})_{t-1}$	0.055***	0.053***	0.033**	0.029*
	(0.011)	(0.011)	(0.016)	(0.017)
Bank×Year FE	Yes	Yes	Yes	Yes
LMA×Year FE	No	No	Yes	Yes
Num.Obs.	240 086	240 086	237 349	237 349
R2 Adj.	0.127	0.144	0.137	0.156

This table reports estimates of the relationship between lagged homeowners' insurance non-renewals and mortgage approval outcomes. Columns (1) and (2) include Bank×Year fixed effects with standard errors two-way clustered by bank and county. Columns (3) and (4) include Bank×Year and LMA×Year fixed effects with standard errors two-way clustered by bank and LMA. All specifications include county-level controls. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Impact of Insurance Non-Renewals on Mortgage Interest Rates at the Bank–County Level

Variable	Interest Rate	Interest Rate
	(1)	(2)
NRR_{t-1}	−0.007**	0.004
	(0.004)	(0.007)
County Controls	Yes	Yes
Borrower/Loan Controls	Yes	Yes
Bank×Year FE	Yes	Yes
LMA×Year FE	No	Yes
Observations	239 940	237 204
Adjusted R^2	0.863	0.863

This table reports estimates of the relationship between lagged homeowners' insurance non-renewals and mortgage interest rates. Column (1) reports the baseline specification with Bank×Year fixed effects. Column (2) additionally includes Labor Market Area (LMA)×Year fixed effects. Controls include county-level economic variables, borrower characteristics (Income, DTI), and loan composition (LTV, Conforming Share). Standard errors are two-way clustered by bank and county in column (1), and by bank and LMA in column (2). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Impact of Insurance Non-Renewals on Mortgage Loan Size at the Bank–County Level

Variable	log(Loan Amount)	log(Loan Amount)
	(1)	(2)
NRR_{t-1}	−0.0025***	−0.0018
	(0.0006)	(0.0014)
County Controls	Yes	Yes
Borrower/Loan Controls	Yes	Yes
Interest Rate Control	Yes	Yes
Bank×Year FE	Yes	Yes
LMA×Year FE	No	Yes
Observations	239 940	237 204
Adjusted R^2	0.977	0.978

This table reports estimates of the relationship between lagged homeowners' insurance non-renewals and average mortgage loan size. Columns (1) and (2) use log(Loan Amount) as the dependent variable. Column (1) reports the baseline specification with Bank×Year fixed effects. Column (2) additionally includes Labor Market Area (LMA)×Year fixed effects. Controls include county-level economic variables, borrower characteristics (Income, DTI), loan composition (LTV, Conforming Share), and the mortgage interest rate. Standard errors are two-way clustered by bank and county in column (1), and by bank and LMA in column (2). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Impact of Insurance Non-Renewals on Mortgage Volume and Aggregated Dollars approved at the County-Level

Variable	log(Total Loans)		log(Aggregate Dollars)	
	(1)	(2)	(3)	(4)
NRR_{t-1}	-0.005	-0.021	0.032	-0.028
	(0.019)	(0.034)	(0.021)	(0.043)
County Controls	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
LMA×Year FE	No	Yes	No	Yes
Observations	14 026	5242	14 026	5242
Adjusted R^2	0.863	0.964	0.867	0.960

This table reports estimates of the relationship between lagged homeowners' insurance non-renewals (NRR_{t-1}) and two measures of county-level mortgage activity. Columns (1) and (2) use log(Total Loans) as the dependent variable; Columns (3) and (4) use log(Aggregate Dollars). All specifications include county-level economic controls. Standard errors are clustered by county in (1) and (3), and two-way clustered by county and LMA in (2) and (4). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Impact of Insurance Non-Renewals on House Price Index (HPI) Growth

Variable	HPI Annual Change	HPI Annual Change
	(1)	(2)
NRR_{t-1}	0.214*	0.150
	(0.119)	(0.186)
County Controls	Yes	Yes
Year FE	Yes	No
LMA×Year FE	No	Yes
Observations	12 242	5201
Adjusted R^2	0.480	0.769

This table reports estimates of the relationship between lagged homeowners' insurance non-renewals and annual House Price Index (HPI) growth at the county level. Columns (1) and (2) use HPI Annual Change as the dependent variable. Column (1) includes County and Year fixed effects. Column (2) includes County and Labor Market Area (LMA)×Year fixed effects. Controls include county-level economic variables. Standard errors are clustered by county in column (1), and two-way clustered by county and LMA in column (2). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

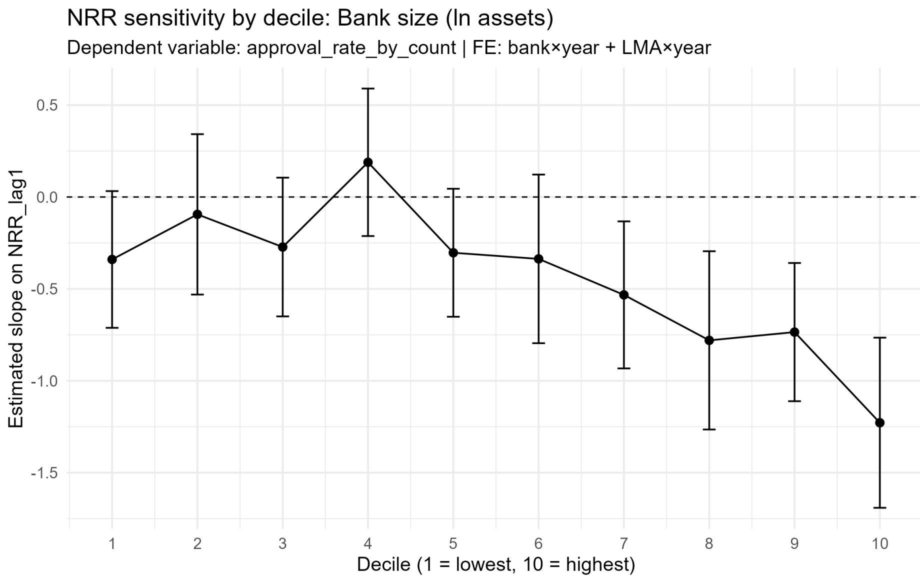


Figure 3: NRR Sensitivity by Decile: Bank Size

Table 8: Bank Size Heterogeneity in the Effect of Insurance Non-Renewals on Mortgage Approval Rates

Variable	Approval (#)	Approval ($)
	(1)	(2)
NRR_{t-1}	-0.342**	-0.361**
	(0.166)	(0.160)
$\text{NRR}_{t-1} \times \log(\text{Assets})^c$	-0.176***	-0.163***
	(0.042)	(0.036)
Bank×Year FE	Yes	Yes
LMA×Year FE	Yes	Yes
Observations	237 349	237 349
R^2	0.199	0.180

This table reports estimates of the interaction between lagged homeowners' insurance non-renewals (NRR_{t-1}) and bank size, measured by centered log total assets. Column (1) uses the approval rate by count as the dependent variable. Column (2) uses the approval rate by amount as the dependent variable. All specifications include Bank×Year and LMA×Year fixed effects, along with county-level controls. Standard errors are two-way clustered by bank (LEI) and LMA. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Mortgage Approvals in Counties with Zero Prior Disaster Losses

Variable	**Approval rate By Amount**	**By Count**
NRR_{t-1}	-0.7274*	-0.6355*
	(0.3001)	(0.2842)
County Controls	Yes	Yes
Bank Controls	Yes	Yes
Bank × Year FE	Yes	Yes
LMA × Year FE	Yes	Yes
Observations	79,916	79,916
R^2	0.199	0.216

This table examines the impact of homeowners' insurance non-renewal rates (NRR) on mortgage approval rates specifically in county-years where lagged natural disaster losses were zero. Column (1) uses approval rates weighted by loan amount, and Column (2) uses the raw count of approvals. County controls include unemployment, population, income, minority share, HPI, education, poverty, and mortgage occupancy. Standard errors are clustered by LMA and bank (lei). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

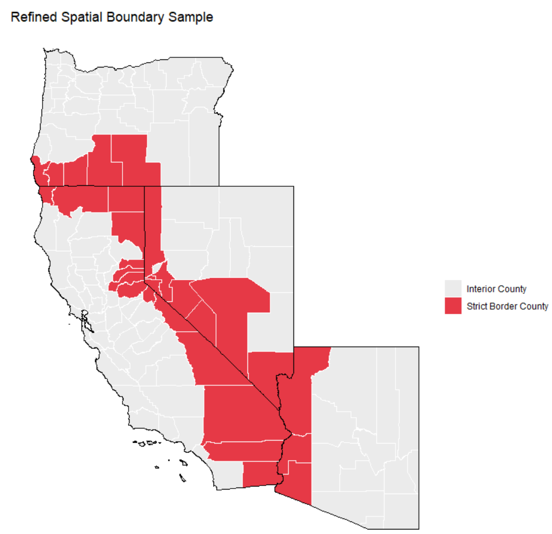


Figure 4: Cross Border discontinuity

Table 10: California Border Counties and Homeowners' Insurance Non-Renewal Rates

Variable	**NRR**
CA_border	1.223***
	(0.239)
Year FE	Yes
Border-Group FE	Yes
Observations	118
R^2	0.637

This table reports estimates of the relationship between a California border-county indicator and homeowners' insurance non-renewal rates. The dependent variable is the county-level non-renewal rate (NRR). The indicator CA_border equals one for counties located in California and zero for matched border counties in neighboring states. Standard errors are clustered by county. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Robustness: Effect of Insurance Non-Renewals by County Population

Variable	Approval (#)	Approval ($)
	(1)	(2)
NRR_{t-1}	-0.367*	-0.391*
	(0.171)	(0.164)
$\log(\text{Pop})^c_{t-1}$	-0.649***	-0.694***
	(0.138)	(0.136)
$NRR_{t-1} \times \log(\text{Pop})^c_{t-1}$	-0.057	-0.001
	(0.079)	(0.076)
County Controls	Yes	Yes
Bank×Year FE	Yes	Yes
LMA×Year FE	Yes	Yes
Observations	237 349	237 349
R^2	0.199	0.180

This table examines whether the effect of insurance non-renewals is driven by low-population counties. The variable $\log(\text{Pop})^c_{t-1}$ represents the centered log of the lagged county population. Column (1) uses the approval rate by count, and Column (2) uses the approval rate by amount. Standard errors are two-way clustered by bank (LEI) and LMA. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: Placebo Test: Effect of Insurance Non-Renewals on Losses from Natural Disasters

Variable	log(Losses)
NRR_{t-1}	0.150
	(0.117)
County Controls	Yes
Bank×Year FE	Yes
LMA×Year FE	Yes
Observations	238 231
R^2	0.806

This table reports a placebo test in which the dependent variable is log(Losses). All independent variables are lagged by one period. The specification includes county-level controls, Bank×Year fixed effects, and LMA×Year fixed effects. Standard errors are two-way clustered by bank (LEI) and LMA. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.