Insurers and Real Estate Credit

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Abstract

Life insurance companies hold about $650 billion in commercial mortgages in the United States, yet little is known about their role as suppliers of real estate credit. Using regulatory data covering the universe of mortgage loans held by U.S. life insurers, we show that insurers complete this market, dominating long-maturity, low-leverage lending. We then show that aggregate macroeconomic shocks, specifically changes in interest rates, transmit differently through insurers than through banks. When rates rise, banks cut lending and raise loan rates, while insurers expand lending and reduce loan spreads, without loosening loan-to-value ratios. Insurers' expansion is concentrated in shorter-maturity loans, a segment otherwise dominated by banks. We find that two reinforcing mechanisms explain insurers' response. Rising rates generate inflows into guaranteed-return annuity products and narrow the duration gap embedded in insurers' long-dated liabilities, lowering the shadow cost of holding shorter-duration mortgage assets. At the same time, bank retrenchment shifts part of the residual borrower demand toward insurers. We isolate credit supply by exploiting cross-sectional variation in insurers' liability and asset durations, local exposure to bank retrenchment, and granular time-varying fixed effects. Our findings imply that bank-centered analyses may misstate the contraction in real estate credit when rates rise, and that monetary tightening reallocates credit not only across intermediaries, but also across maturities and borrowers.

Keywords: life insurers, real estate, mortgages, private credit, monetary policy, NBFIs.

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1. Introduction

Commercial real estate is one of the largest asset classes in the American economy. The office towers, warehouses, neighborhood shops, and multifamily apartment buildings in which firms produce, employees work, and households live are financed by over $5 trillion of mortgage debt, making commercial property the second-largest collateralized credit market in the U.S. after housing.[1] The market also serves an extraordinarily heterogeneous set of borrowers, ranging from local owners of single shops to institutional sponsors of office towers. Loan sizes span less than a million dollars to several hundred million, while financing needs differ in risk, maturity, and refinancing horizon. Serving such heterogeneous demand plausibly requires more than one kind of balance sheet (Diamond, 1991, Holmström and Tirole, 1997, Hanson et al., 2015). Yet the supply side of this market remains remarkably understudied. What evidence exists comes from banks[2], while the other dominant portfolio lender—life insurance companies—has remained largely a black box.

There are two important reasons to open this black box. The first is a striking shift in what assets insurers hold. Traditionally viewed as exposed to real estate in securitized form, life insurers now hold more than three times as much in direct commercial mortgages as in commercial mortgage-backed securities. Despite this growth, we lack a basic account of what type of loans insurers originate, to whom, on what terms, and the economics that make mortgages attractive within the broader expansion of private credit on insurer balance sheets. The second is that real estate is among the most interest-rate sensitive sectors of the economy, and a change in rates simultaneously affects every intermediary's balance sheet. It is therefore crucial to know how mortgage credit supply responds to monetary policy, how insurers' response differs from that of other lenders, and what mechanisms explain potential differences.

Using regulatory filings that record every mortgage loan held by U.S. life insurers, we provide a comprehensive loan-level account of insurers' real estate lending and the first evidence on how insurers' credit supply responds to monetary policy. We proceed in three steps. First, we show that life insurers are among the largest direct suppliers of commercial real estate credit. Within lenders that hold loans on balance sheet, i.e., insurers and banks, insurers account for more than 20% of credit overall and nearly two-thirds at long maturities, thereby completing the market for long-horizon credit. Second, using high-frequency monetary policy surprises, we find that banks and insurers respond in opposite directions to rate changes. When rates rise, banks *cut* lending while

[1] Financial Accounts of the United States, tables L.219 and L.220. Commercial real estate is also a recurring focus of regulators: both the Federal Reserve's Financial Stability Report and the Financial Stability Oversight Council single out commercial real estate as a salient vulnerability for the financial system.

[2] For example, Glancy and Kurtzman (2024), Jiang et al. (2025), Hinzen et al. (2025). These and related studies sit within the broader literature on bank credit supply (e.g., Kashyap and Stein, 2000, Drechsler et al., 2017), which studies bank lending in general rather than commercial real estate in particular.

insurers *expand* originations – particularly for short-maturity loans – and do so at lower spreads. Third, we show that this reallocation reflects two reinforcing mechanisms. On the balance sheet side, rising rates draw inflows into fixed-guarantee annuities and simultaneously shrink the effective duration of insurers' liabilities, lowering the shadow cost of holding shorter-duration assets. On the competition side, bank retrenchment shifts residual borrower demand toward non-bank lenders, with insurers capturing a part of it. We provide direct empirical evidence for both the channels.

Taken together, our findings change how one should think about credit supply in real estate markets. Whether the financial system has a "spare tire" when bank credit contracts is a long-standing question (Greenspan, 1999). Our evidence shows that, following monetary tightening, insurers absorb part of the displaced demand without loosening observable collateral standards, while shifting lending toward shorter maturities. This carries two key implications. For monetary policy, bank-focused estimates may misstate the contraction in mortgage credit because insurers offset part of the decline in bank lending by expanding credit and reducing spreads. For financial stability, this reallocation shifts private real estate credit exposure from banks toward insurers, a migration that has attracted growing regulatory attention (Financial Stability Oversight Council, 2023, Financial Stability Board, 2025, IMF, 2024, Brown et al., 2024, Acharya et al., 2026). More broadly, when heterogeneous intermediaries serve the same market, the transmission of macroeconomic shocks depends on how household savings flow across institutions, the balance sheet risks each intermediary manages, and how they compete.

Our analysis exploits regulatory data covering the universe of commercial mortgage loans held by U.S. life insurers. The data span about 75,000 originations by 372 insurer entities over 2014-2024. For each loan, we observe the investment date, amount, contractual rate, maturity, collateral value, property type, and property location. From these records, we construct new originations, associated loan-to-value ratios, maturities, and spreads over maturity-matched Treasury yields. We link the loans to insurers' asset portfolios and liability structures, county-level mortgage-market data, and monetary policy surprises. A key feature of the data is their geographic granularity, which reveals not only which insurers lend but where they lend, down to the property's ZIP Code.

We start by documenting three broad facts in the first part of the paper. First, mortgage loans are a core and rapidly growing component of life insurer portfolios. Aggregate non-securitized ("whole" loan) holdings have more than tripled since 2004, from about $250 billion to nearly $800 billion. Commercial mortgages account for most of this growth and for around 90% of a typical insurer's mortgage originations. Across the industry, whole loans now represent more than 17% of general account assets.[3] In contrast, insurers' holdings of mortgage-backed securities have

[3]The NAIC's Capital Markets Bureau reports closely comparable industry totals in its year-end 2024 special report on mortgage loans (https://content.naic.org/sites/default/files/capital-markets-special-reports-cml-cre-ye2024.pdf).

remained broadly flat since the global financial crisis. These figures place life insurers among the largest balance sheet providers of commercial real estate credit in the U.S., second only to banks.[4]

Second, insurers specialize in the long end of the mortgage market. Among the commercial real estate loans held by banks and insurers in 2019, insurers held more than half of loans with over 5 years of remaining maturity, and nearly two-thirds of those maturing in over 15 years. They also lend conservatively against collateral. The median loan-to-value ratio on an insurer commercial mortgage is 0.55, below the bank median of 0.64. These patterns indicate that insurers complete the market for commercial real estate credit by supplying longer-horizon, lower-leverage contracts.

Third, insurers earn an economically large compensation for holding whole loans over tradable commercial mortgage-backed securities (CMBS). Comparing assets purchased by the same insurer in the same year and within the same maturity range, we find that commercial whole loans earn about 100 basis points (bps) more than agency CMBS and 50 bps more than non-agency CMBS. The larger premium over agency securities is consistent with compensation for both credit risk and illiquidity. The remaining premium over non-agency securities more naturally reflects the illiquidity of whole loans and the operational complexity of originating and monitoring them.

In the second part of the paper, we study how insurers' mortgage lending responds to aggregate macroeconomic shocks, in particular, to changes in interest rates. Real estate is among the most rate-sensitive sectors of the economy, and a change in rates simultaneously affects every intermediary's balance sheet. Existing studies show that bank credit supply *declines* when rates rise (e.g., Jiménez et al. (2012), Drechsler et al. (2017, 2022)).[5] Whether insurers display a similar or contrarian response is therefore central to understanding the transmission of monetary policy to real estate markets. We measure monetary policy using high-frequency surprises to the ten-year Treasury yield around Federal Open Market Committee (FOMC) announcements. We find that a one-standard-deviation contractionary surprise is associated with about a 5% *rise* in insurer mortgage originations. Notably, the additional lending comes at lower spreads over maturity-matched Treasury yields, with no accompanying increase in loan-to-value ratios. This joint response of quantities and prices points to an outward shift in insurer credit supply, rather than an increase in borrower demand or a relaxation of collateral standards.

The contrast with banks matters because it revises a standard reading of monetary transmission. A bank-centered analysis would imply an unambiguous contraction in mortgage credit supply when rates rise. With insurers in the picture, tighter policy reallocates lending across intermediaries, and the same shock that leads banks to retreat partly draws insurers in. Insurers' lower-leverage lending, however, suggests that this reallocation may also occur across borrower types.

[4]Prominent examples of insurer-financed properties include the Empire State Building (by MetLife during the Great Depression in the 1930s) and the Mall of America (by TIAA in the late 1980s).

[5]Using Call Report data, we independently confirm this, both in the aggregate and for CRE specifically.

Importantly, insurers' credit expansion is heterogeneous by loan maturity. Following a contractionary surprise, insurers expand originations and cut spreads in shorter-dated mortgages (maturities up to 10 years). In contrast, longer-dated lending declines and spreads do not change meaningfully. This finding is informative because insurers dominate the long end of the market. Yet as rates rise, they expand in the segment where their preexisting share is smaller rather than in the one they already dominate. Monetary policy therefore reallocates credit not only across intermediaries but also across contract types. Moreover, the pattern we document is difficult to explain with a uniform increase in investable funds or an overall change in credit demand.

In the third part of the paper, we develop and empirically test a framework to interpret our findings. An increase in interest rates can affect insurer mortgage lending through two distinct channels. The first is a *balance sheet* channel, which shifts insurers' supply of mortgage credit. Higher rates can increase inflows into guaranteed-return insurance products and, for insurers with long and convex liabilities, narrow negative duration gaps. The resulting relaxation of duration exposure, coupled with inflows, lowers the shadow cost of acquiring relatively short-duration, higher-yielding assets. This channel predicts higher insurer lending and lower spreads, particularly among insurers whose long-duration liabilities are backed by relatively short-duration asset portfolios.

The second is a *market channel* arising from bank retrenchment. When banks reduce mortgage credit as rates rise, some borrowers seek financing from non-bank lenders, shifting outward the residual demand faced by insurers. This channel also predicts an increase in insurer lending. However, its pricing implications differ from those of the balance sheet channel. Reduced bank competition may allow insurers to charge higher spreads due to market power. The two channels therefore reinforce each other in quantities but may work in opposite directions on spreads.

We test the balance sheet channel using cross-sectional differences in insurers' exposure to duration mismatch. On the liability side, we classify insurers as having long-duration obligations based on their product mix and the presence of variable annuities with minimum-return guarantees. On the asset side, we compute the duration of each insurer's portfolio from its holdings of government and corporate bonds, and mortgage-backed securities.[6] We then compare insurers with different duration exposures financing properties in the same ZIP code and year. ZIP code-by-year fixed effects absorb any unobservable time-varying changes at the ZIP code level, including changes in local credit demand, real estate activity, and economic conditions. Further, insurer-by-ZIP code fixed effects absorb any persistent differences in regions served by each insurer.

The evidence follows the ordering predicted by the duration mechanism. Insurers with long-duration liabilities expand commercial mortgage originations more strongly following a contractionary surprise. We interpret this response as reflecting both inflows into guaranteed-return prod-

[6]We exclude mortgages when computing asset duration to avoid a mechanical relation between asset duration and mortgage lending intensity. We find consistent results when including them.

ucts and a greater ability to allocate toward shorter-duration assets when rates rise.[7] The sharper test of the gap mechanism is the role of asset duration: among insurers with similar long-duration liabilities, the lending response declines as asset duration rises, consistent with higher rates relaxing the duration constraint most for insurers with the widest *ex ante* gaps.

In particular, for a long-liability insurer with the median asset duration, a one-standard-deviation contractionary surprise raises originations by about 15% relative to other insurers lending in the same ZIP code and year. Loan-level estimates point the same way. Long-liability insurers originate larger loans and charge lower spreads than other insurers lending in the same place at the same time, and the spread decline weakens toward zero as asset duration rises. The quantity and price response support the duration mechanism at both the insurer and loan level.

Next, we test the market channel, which requires variation in bank retrenchment across local markets. We measure county-level exposure to bank retrenchment using deposit betas (Drechsler et al., 2017), which capture banks' funding-side exposure to monetary tightening rather than local borrower conditions. We then compare the same insurer's lending across ZIP codes within a year, such that the comparison is driven by where banks pull back rather than by insurer characteristics. Our results line up with the market channel: as policy rates rise, insurers expand originations more in counties served by banks with more rate-sensitive funding. In particular, following a one-standard-deviation contractionary surprise, insurers expand originations by 8 percentage points more in a county at the 90th percentile of deposit-beta exposure than in one at the 10th percentile.

Finally, we show that the two mechanisms reinforce each other. In specifications that include both the mechanisms, the interactions of monetary policy shock with deposit-beta exposure and with the long-duration liability indicator are each positive and significant. That is, insurers expand lending both where banks retrench and when their own balance sheets permit. The pricing evidence completes the picture. For insurers that we do not classify as having long duration liabilities, bank retrenchment places mild, statistically insignificant upward pressure on spreads, as the market channel alone would suggest. By contrast, insurers with long-duration liabilities expand lending while cutting spreads. This joint result reconciles the aggregate quantity and spread evidence. Insurers become marginal lenders where banks withdraw, but their willingness to supply credit, rather than market power over displaced borrowers, dominates the pricing response.

Related literature. Our paper contributes to and connects four main strands of the literature: the intermediation of real estate credit, insurers' private asset holdings, monetary policy transmission, and the role of insurer balance sheets in shaping asset market outcomes.

First, our paper contributes to the literature on commercial real estate (CRE) credit and its

[7] We show that at the sector level, individual annuity premiums rise with interest rates. At the insurer level, those we classify as having long-duration liabilities capture a disproportionate share of these inflows.

intermediation. Existing work documents systematic differences between balance-sheet CRE loans and securitized instruments, as well as segmentation across intermediaries and borrower types (Ghent and Valkanov, 2016, Black et al., 2020, Glancy et al., 2022). More recent work examines CRE exposures and credit supply primarily through the lens of banks, including loan extensions and distress, bank fragility and regional-bank exposures, and the post-pandemic work-from-home shock (Peek and Rosengren, 2000, Crosignani and Prazad, 2024, Glancy and Kurtzman, 2024, Anenberg et al., 2025, Jiang et al., 2025, Hinzen et al., 2025).[8] Our work broadens the focus from banks and static segmentation to how major balance-sheet lenders respond to aggregate shocks. Using the universe of U.S. life insurers' mortgage holdings and loan-level pricing, we show that segmentation is state dependent. Following contractionary monetary policy shocks, banks retrench while insurers expand lending and reduce spreads, particularly at shorter maturities. We further identify the forces behind insurers' expansion and show that they may support lending where bank credit supply contracts. Relative to Brown et al. (2024), who ask whether CRE exposures threaten insurer stability, we show how insurer lending itself shapes the CRE credit market.

Second, our paper contributes to understanding the growing role of life insurers in private and directly originated credit. Recent research documents the shift toward private credit and the increasing role of insurers and private equity-owned entities in these markets (Kirti and Sarin, 2024, Meisenzahl et al., 2025, Huber et al., 2026, Sen et al., 2025, Gschossmann et al., 2026). We add to this strand by focusing on direct mortgage lending, a large and important component of insurers' portfolios. We show that insurers' role in private credit reflects not only secular portfolio reallocation, but also credit supply that varies systematically with interest rates and competing intermediaries' lending capacity.

Third, our results contribute to the literature on monetary policy transmission through banks and non-banks. A large literature shows that monetary tightening contracts bank credit supply (Kashyap and Stein, 2000, Jiménez et al., 2012, Drechsler et al., 2017), while a growing literature shows that some non-bank intermediaries expand as bank funding conditions tighten (Chen et al., 2018, Xiao, 2020, Elliott et al., 2019, 2024, Cucic and Gorea, 2025). In mortgage markets, existing work has focused largely on wholesale-funded shadow banks operating through originate-to-distribute models (Buchak et al., 2018, Agarwal et al., 2023, Sarto and Wang, 2026). We identify a distinct insurer channel of monetary policy transmission to real estate credit. Unlike the shadow banks emphasized in this literature, life insurers retain whole mortgages on balance sheet and fund themselves primarily with insurance liabilities. Thus, the specific mechanisms we emphasize for insurers extend beyond relative funding costs to the distinct balance sheet risks that each intermediary manages, and to the competitive dynamics of a market where major lenders co-exist.

[8] Relatedly, Gupta et al. (2026) study the effects of working from home on commercial property values, and Koijen et al. (2025) analyze the impact of investor composition on CRE transactions and prices.

Finally, and closely related, our findings add to the literature on how insurers' distinctive balance sheets shape asset demand and their role as suppliers of capital. Prior work shows that insurers' liability structures and funding conditions affect their investment portfolios (Koijen and Yogo, 2015, Chodorow-Reich et al., 2021, Coppola, 2025, Bhardwaj et al., 2025). In particular, exposure to interest rate risk and duration mismatch significantly affect their bond holdings, derivatives positions, and product mix (Domanski et al., 2017, Ozdagli and Wang, 2019, Koijen and Yogo, 2022, Sen, 2023, Kaufmann et al., 2024, Khetan et al., 2023, Li and Wenning, 2026, Li, 2025, Kirti and Singh, 2025). We are the first to highlight insurers' direct mortgage lending as an economically important margin that responds to interest rate changes. We show that insurers' liability structure determines an altogether distinct channel through which macroeconomic and regulatory shocks transmit to real estate markets.

2. Key Facts on Insurers' Mortgage Lending

2.1. Data Sources, Coverage, and Summary Statistics

2.1.1. Security-level Mortgage Loan Holdings

We study life insurers' intermediation in real estate markets using regulatory data covering the universe of U.S. life insurers' mortgage loan holdings. Our primary data source is the National Association of Insurance Commissioners (NAIC) statutory filings, specifically Schedule B (mortgage loans), accessed through S&P Global Market Intelligence. These filings provide a comprehensive record of insurers' mortgage portfolios and enable a detailed examination of both the volume and characteristics of mortgage lending.[9]

NAIC filings are reported at the level of individual loans. For each loan we observe the investment date, amount, maturity, contractual interest rate, appraised collateral value, loan type (commercial, residential, farm), property type (e.g., multifamily, office, retail), and property ZIP code. These fields allow us to compute underwriting measures such as loan-to-value (LTV) ratios and maturities, classify loans by purpose and property segments, and map lending activity with geographic precision down to the ZIP code or county level.

We observe year-end snapshots of all outstanding mortgage loans reported by insurers on their balance sheets. From these annual outstanding holdings, we construct insurers' quarterly and yearly *new originations*, defined as loans whose original investment date falls within a given quarter or year. Focusing on new originations isolates active lending decisions, removing mechanical changes in outstanding balances arising from maturity, prepayments, impairments, or other dispositions.

[9]Studies that use these regulatory data to analyze other aspects of insurer balance sheet include Ge and Weisbach (2021), Ge (2022), Kubitza (2023), Sen (2023), Fetzer, Guin, Netto, and Saidi (2024), Kirti and Singh (2025), Damast, Kubitza, and Sørensen (2025), Sen, Sharma, and Viceira (2025).

Our sample period spans 2014 through 2024. We restrict attention to this period because some of the key loan-level variables, such as ZIP codes, are unavailable for prior years. Over this period, 372 insurer entities originated at least one loan.

Measurement of key variables. From the loan-level records, we construct several mortgage characteristics that are central to our analysis. First, we compute each loan's maturity, defined as the difference between the maturity date and the origination date, expressed in years. Second, we measure exposure to interest rate risk using each loan's modified duration, i.e. the percentage change in the loan's value for a given change in yield. Computing duration requires a cash flow schedule, which the filings do not report directly. We therefore track each loan's reported book value across successive annual filings, infer its amortization rate from the observed path, and combine this with the loan's interest rate and maturity to construct its cash flows.[10,11] We construct duration for bonds analogously, since bonds account for the bulk of insurers' remaining fixed-income assets. Appendix A provides additional details on the calculation of asset durations.

Third, to analyze originations at a geographic level, we map the borrower ZIP codes to county identifiers. We use the SSA-to-FIPS crosswalk from the NBER and the HUD USPS ZIP code crosswalk from the U.S. Department of Housing and Urban Development to convert 5-digit ZIP codes into county FIPS codes.[12] Fourth, we calculate loan spreads as the difference between a loan's effective interest rate and a maturity-matched Treasury yield on the same date as the original investment date. Fifth, we calculate each loan's LTV ratio as the book value of the mortgage divided by the reported value of the land and building securing the loan. This provides us with a measure of underwriting conservatism.

Monetary policy shock data. We measure monetary policy surprises using the high-frequency datasets of Bauer and Swanson (2023) and Acosta et al. (2025), which record changes in Treasury yields and interest rate futures over 30-minute windows around FOMC announcements. Our baseline shock is the change in the ten-year Treasury yield, which we term *MPS*. For robustness, we use the changes in thirty-year Treasury yield. Since announcement dates do not align with reporting periods, we sum all announcement-level surprises within each quarter or year.

Supporting data. We obtain insurer balance sheet fundamentals, including their size, risk-based capital (RBC) ratios, surplus ratios, and product offerings from NAIC statutory filings. We source listed insurers' stock prices from Bloomberg to calculate their sensitivity to yield changes. Bond yields and swap rates are also obtained from Bloomberg.

[10] Mortgage effective duration can be shorter than contractual duration because of prepayment risk (Hanson, 2014). We abstract from prepayment in constructing duration because doing so requires modeling borrower prepayment behavior. Our measure may therefore overstate the effective duration of some loans.

[11] Consistent with Glancy et al. (2022), we find that nearly all loans held by insurers carry fixed rates.

[12] These crosswalk data can be accessed at NBER and HUD.

2.1.2. Summary Statistics

Table 1 reports summary statistics for newly originated loans. Panels A and B cover commercial and residential mortgages respectively. Panel C reports insurer-quarter characteristics, and Panel D the quarterly interest rate series. Three key findings emerge.

First, commercial real estate (CRE) and residential real estate (RRE) loans starkly differ along multiple dimensions. For example, the average CRE loan is worth $10.5 million and is secured by property appraised at $23.9 million, against $292,000 and $469,000 for RRE. CRE loans also have lower LTV ratios and maturities, with an average LTV ratio of 0.54 and maturity of 13 years, against 0.68 and 26 years for RRE.[13] The RRE figures track the broader market closely: Doerr and Fuster (2025) report an average loan size of roughly $270,000 and an average maturity of 27 years for mortgages reported under the Home Mortgage Disclosure Act between 2018 and 2022, consistent with the standardization of 30-year mortgages. We discuss CRE maturity and LTV ratios in detail in Section 2.3.

Second, interest rates on mortgage loans are substantially higher than U.S. Treasury yields of comparable maturities, i.e., spreads as defined above are large. CRE loans carry an average rate of 4.62%, or 216 basis points over a maturity-matched Treasury, and RRE loans 5.70%, or 253 basis points. Further, CRE loans carry a sizeable premium over otherwise comparable securitized instruments (e.g., commercial mortgage-backed securities or CMBS), which we decompose into illiquidity and credit risk premium in Section 2.4.

Third, Panel C shows that CRE lending comprises the lion's share of insurers' mortgage lending in terms of amounts. For the average insurer, the CRE share of originated amounts equals about 90%, and at least three quarters of insurer-quarters involve no residential origination at all. We therefore focus on CRE lending throughout, while noting trends that may be specific to RRE loans.[14] Geographically, Figure A1 shows that insurers' CRE holdings are spread across the U.S. roughly in proportion to the stock of commercial property.

2.2. Fact 1: mortgage loans are a core asset in insurers' portfolios

Mortgage loans (non-securitized or "whole" loans) are one of the largest asset classes on life insurers' balance sheets, second only to bonds. Panel (a) in Figure 1 plots aggregate holdings since 2004. Whole loan holdings roughly tripled over the period, from about $250 billion to nearly $800 billion, while holdings of mortgage-backed securities (MBS) have been broadly flat near $450 billion since the financial crisis. Whole loans overtook MBS around 2015, and insurers now hold close to twice as much mortgage credit in whole loan form as in securitized form. Panel (b) shows that this growth

[13] Table A1 summarizes the maturity distribution of CRE loans by major property types.
[14] See Zawacki (2024) and Melnyk et al. (2025) for an overview of recent trends in insurers' RRE exposure.

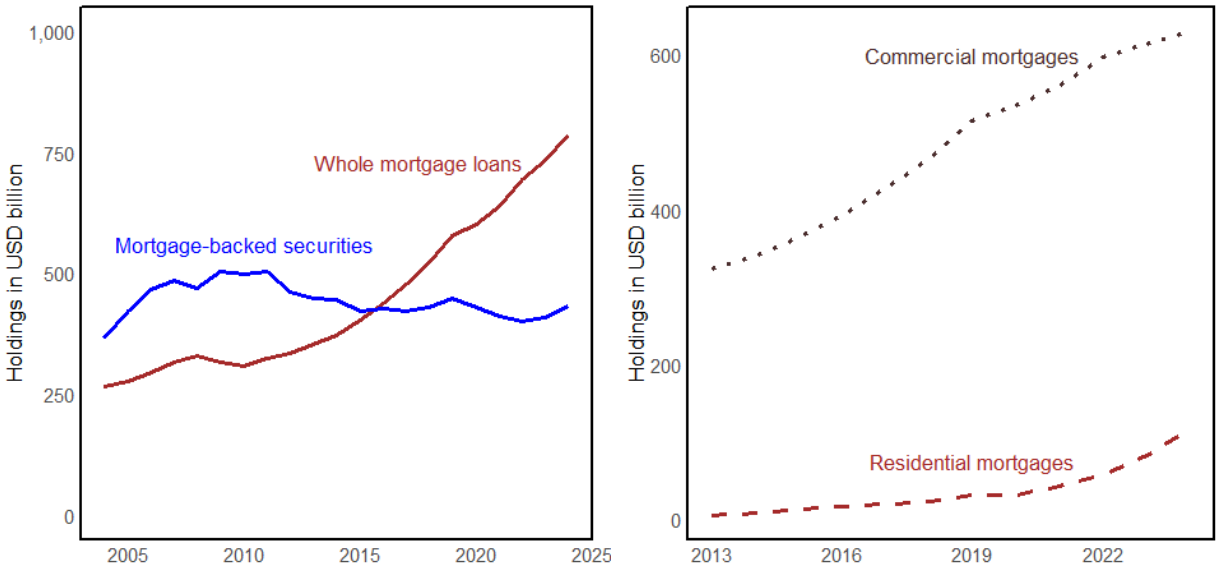
Table 1: Summary Statistics

Panel A: Loan-level (Commercial)	Mean	SD	p25	p50	p75	N
Amount ($ thousand)	10,470.18	19,305.83	939.47	3,372.78	10,400.00	75,464
Interest rate (%)	4.62	1.67	3.75	4.33	5.12	75,459
Spread (vs treasury)	2.16	1.61	1.49	1.94	2.49	74,812
Loan-to-value (LTV) ratio	0.54	0.18	0.46	0.58	0.67	75,304
Maturity (years)	12.78	8.13	6.00	10.00	20.00	75,464
Property value ($ thousand)	23,937.36	46,741.27	1,805.59	7,390.00	23,000.00	75,464
Appraisal time (days)	121.88	400.28	15.00	38.00	64.00	69,628
Panel B: Loan-level (Residential)	Mean	SD	p25	p50	p75	N
Amount ($ thousand)	291.94	306.95	103.22	197.27	359.47	472,815
Interest rate (%)	5.70	2.35	4.00	5.88	7.51	472,779
Spread (vs treasury)	2.53	2.20	1.62	2.83	3.74	420,312
Loan-to-value (LTV) ratio	0.68	0.29	0.57	0.72	0.79	472,698
Maturity (years)	26.07	8.92	25.00	30.00	30.00	472,815
Property value ($ thousand)	468.93	527.05	163.21	306.00	560.00	472,815
Appraisal time (days)	630.26	1,237.58	46.00	92.00	260.00	461,197
Panel C: Insurer-quarter-level	Mean	SD	p25	p50	p75	N
Total assets ($ million)	36,592.30	69,813.36	1,226.42	7,459.26	30,381.63	7,846
Total liabilities ($ million)	34,418.67	66,153.31	1,107.25	6,659.57	28,518.02	7,846
Surplus ratio	0.11	0.11	0.05	0.07	0.13	7,846
Mortgage originations (all) ($ million)	126.16	333.95	4.59	19.39	91.39	7,907
– Commercial (CRE)	105.75	248.63	3.66	17.47	83.20	7,907
– Residential (RRE)	20.41	147.90	0.00	0.00	0.00	7,907
CRE as a fraction of total originations	0.89	0.29	1.00	1.00	1.00	7,907
RBC ratio	10.07	12.14	7.20	8.67	11.03	7,457
Panel D: Interest rates (quarterly)	Mean	SD	p25	p50	p75	N
US Treasury Yield (10Y)	2.49	1.00	1.79	2.31	2.99	44
Δ US Treasury Yield (10Y)	0.03	0.35	-0.20	0.00	0.27	44
Monetary Policy Shock (10Y)	0.00	0.05	-0.02	0.00	0.03	44
Monetary Policy Shock (30Y)	0.00	0.04	-0.02	0.00	0.02	44

Notes: This table reports summary statistics for U.S. life insurers' mortgage loan originations over 2014–2024. Panels A and B are at the loan level, covering commercial real estate (CRE) and residential real estate (RRE) mortgages respectively; Panel C is at the insurer-quarter level; and Panel D is at the quarterly level. Spread is the loan rate less the yield on a maturity-matched U.S. Treasury. Appraisal time is the number of days between the collateral appraisal and loan origination. Surplus ratio is capital and surplus over total assets, where capital and surplus is the statutory measure of insurer net worth. Risk-based capital (RBC) ratio is total adjusted capital over authorized control level RBC. Monetary policy shock is the change in the ten-year or thirty-year Treasury yield over a 30-minute window around FOMC announcements, summed within each quarter. Yields, yield changes, and shocks are in percentage points.

is driven by CRE lending: CRE loans account for roughly $630 billion of the latest total, compared to $150 billion for RRE, though RRE lending has picked up noticeably since 2021.[15,16]

Figure 1: Insurers' Mortgage Holdings



(a) Mortgage-backed securities and whole loans

(b) Types of whole loans

Notes: This figure plots U.S. life insurers' aggregate mortgage holdings at book value, in billions of U.S. dollars. Panel (a) compares holdings of mortgage-backed securities with holdings of whole mortgage loans originated or purchased directly by insurers. Panel (b) decomposes whole loan holdings into commercial and residential mortgages (excluding farm loans). Holdings are measured at year-end and aggregated across all life insurers filing statutory financial statements. Data are from NAIC statutory filings, Schedule B for whole loans and Schedule D Part 1 for mortgage-backed securities.

Exposure to real estate credit is broad-based rather than concentrated on a few insurers. Table 2 lists the twenty largest life insurance groups by general account investments, together with their mortgage holdings at year-end 2022. Mortgage loans represent between 9% and 25% of total investments for these groups. For most groups, the position is almost entirely CRE, with Metropolitan, Brighthouse, and Apollo reporting significant RRE holdings as well. Across all life insurers, mortgage loans account for over 17% of general account assets.

Correspondingly, life insurers are one of the most important suppliers of commercial real estate credit. Our calculations suggest that, relative to banks, insurers hold over 20% of CRE mortgage debt outstanding in the United States. Insurers have also long been active in CRE lending,

[15] Figure A2 reports annual origination volumes and loan counts.

[16] The recent pickup in RRE whole loans is particularly large among insurers affiliated with alternative asset managers, notably Athene (Apollo Global Management) and Forethought Life Insurance (Global Atlantic Financial Group, now owned by KKR). We thank Derek Wenning for helpful conversations in this regard.

historically financing the construction and acquisition of major commercial properties.[17]

Table 2: Insurer Group-level Mortgage Holdings

	All Mortgage Loans		Commercial Real Estate Loans			
	$ billion	Share	$ billion	Share	LTV	Remaining Maturity
Metropolitan Group	54.3	0.21	29.4	0.11	0.56	4.5
Northwestern Mutual Group	50.3	0.18	49.9	0.18	0.53	6.8
TIAA Family Group	37.1	0.13	34.7	0.12	0.55	5.3
New York Life Group	34.7	0.12	33.8	0.11	0.54	5.9
American International Group	32.5	0.15	28.7	0.13	0.56	7.7
Prudential of America Group	26.8	0.14	23.2	0.12	0.54	5.4
Global Atlantic Group	24.3	0.25	16.3	0.17	0.45	5.5
Mass Mutual Life Ins. Group	20.1	0.09	19.6	0.09	0.51	5.4
Pacific Life Group	19.0	0.16	17.8	0.15	0.53	8.3
Apollo Global Mgmt. Group	18.6	0.15	10.3	0.08	0.48	6.8
Allianz Ins. Group	17.6	0.15	15.6	0.14	0.55	8.2
Nationwide Corporate Group	16.2	0.17	16.1	0.17	0.60	7.8
Lincoln National Group	15.5	0.13	14.4	0.12	0.45	9.9
Brighthouse Holdings Group	15.3	0.18	9.9	0.12	0.55	5.5
Principal Financial Group	13.7	0.17	13.6	0.17	0.47	8.6
Equitable Holdings Group	13.2	0.16	10.4	0.12	0.59	7.1
State Farm Group	12.5	0.14	12.5	0.14	0.46	7.6
John Hancock Group	12.1	0.11	11.6	0.11	0.55	10.5
Dai-ichi Life Holdings Group	11.7	0.15	11.7	0.15	0.53	8.8
Jackson National Group	11.5	0.17	9.4	0.14	0.41	5.9

Notes: This table reports mortgage loan holdings for the largest 20 U.S. life insurance groups, ranked by the size of their general account investment portfolios, as of year-end 2022. Groups in the table are ordered by aggregate mortgage holdings. First two columns cover all mortgage loans, while the remaining columns restrict attention to commercial real estate (CRE) loans. Holdings are book values in billions of U.S. dollars, and are expressed as a share of the group's total investments. LTV is the loan-to-value ratio and Maturity is the remaining term to maturity in years; both are within-group averages weighted by loan balance. Amounts are aggregated across all entities within an insurance group. Data are from NAIC statutory filings.

Acquisition channels. Our data do not record how loans reach insurers' balance sheets, but conversations with insurer portfolio managers provide useful insights. In commercial mortgages, insurers are primary-market lenders. Deals arrive through brokers and mortgage banking firms, but the insurer underwrites, prices, and funds each loan. CRE portfolios, therefore, reflect insurers' own lending standards. Servicing is handled in-house or through contracted servicers. In residential

[17]For example, the Empire State Building in New York City (by Metropolitan Life), the John Hancock Center in Chicago (by John Hancock Life Insurance), and the Mall of America in Minnesota (by Teachers Insurance and Annuity Association).

mortgages, insurers almost exclusively purchase loans in the secondary market, mainly from the lenders that originated them.[18]

2.3. Fact 2: insurers are the dominant lenders in long-maturity contracts

Insurers dominate the long end of the CRE loan market. Figure 2 splits lending by remaining maturity and reports insurers' share of combined insurer and bank holdings in each bucket.[19] In 2019, insurers held over half of CRE loans with more than five years of remaining maturity, and nearly two-thirds of those maturing beyond fifteen years. Glancy et al. (2022) report a similar pattern, with life insurers originating nearly 80% of CRE loans with maturity beyond eleven years. Long-horizon commercial mortgage contracts are thus primarily made by insurers. Importantly, such maturity segmentation is specific to CRE: Figure A3 shows that CRE originations span all maturities, while residential mortgages cluster at 30 years.

Loans made by insurers typically have lower LTV ratios than loans made by banks. In 2022, their median LTV ratio was 0.55 for CRE and 0.70 for RRE, below the corresponding bank medians of 0.64 and 0.80 (Figure A4). The distributions also show pronounced bunching at 0.70 for CRE and 0.75 for RRE, with little mass above. Insurers appear to lend against a generally binding collateral ceiling.[20]

2.4. Fact 3: whole loans earn significant premia over MBS

Whole loans and commercial mortgage-backed securities (CMBS) provide insurers with two ways of obtaining commercial real estate exposure, but the two instruments differ in liquidity and underwriting requirements. CMBS trade in secondary markets, whereas whole loans are difficult to sell quickly. Further, whole loans are operationally more complex and require insurers to originate, underwrite, and monitor individual borrowers. Whole loans therefore expose insurers more directly to both illiquidity and credit risk, including the substantial idiosyncratic risk in individual property values (Sagi, 2021, Giacoletti, 2021).

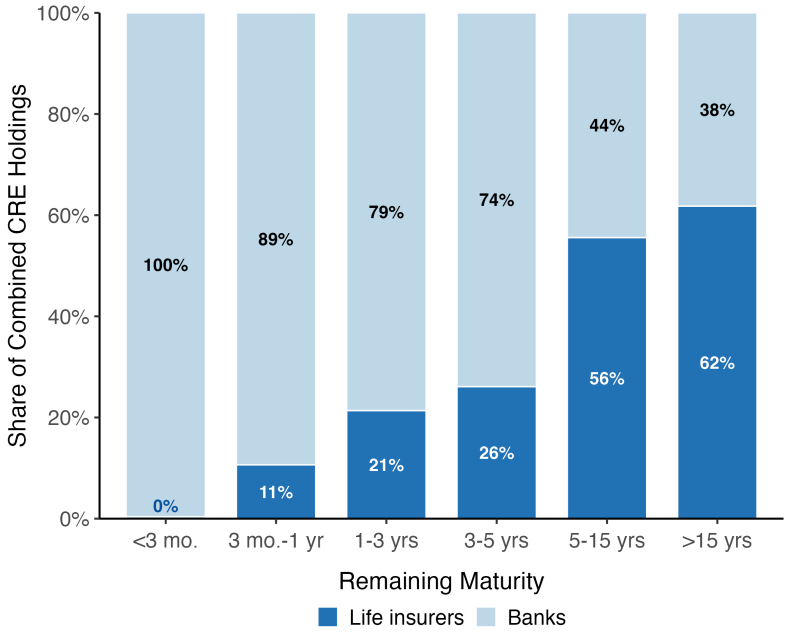
We use the granularity of our data to assess how insurers are compensated for these risks. Specifically, we compare rates on newly originated commercial mortgages with yields on CMBS purchased by the same insurer in the same year, and for similar maturities. Table A2 shows that

[18] Based on loan values and county-level conforming loan limits, we estimate that over 90% of residential loans are conforming, i.e., eligible for purchase by government-sponsored enterprises.

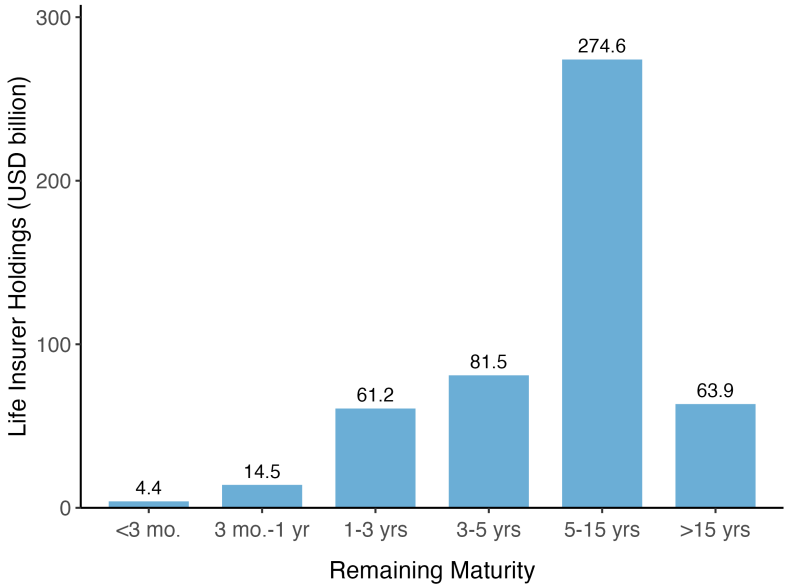
[19] We construct bank holdings from the FDIC Call Reports, summing loans secured by nonfarm nonresidential properties and by multifamily residential properties to match the scope of the insurer data. We measure maturity using Call Report repricing buckets, which are the closest available bank counterpart to insurers' contractual maturities. Appendix B provides additional details.

[20] The LTV ratio may not be a sufficient statistic for the riskiness of a loan, but it is a useful benchmark (e.g., Becker and Ivashina (2015) show that insurers reach for yield *within* broad categories of bond ratings).

Figure 2: Commercial Real Estate Mortgages by Maturity Groups



(a) Estimated share of combined holdings by lender type



(b) Life insurer holdings by remaining maturity

Notes: This figure compares life insurers' and banks' holdings of commercial real estate (CRE) mortgage loans across maturity and repricing groups in 2019. Panel (a) reports, within each group, the share of combined life insurer and bank holdings accounted for by each lender type. For life insurers, the groups are based on contractual remaining maturity. Bank holdings are classified using reported repricing-frequency buckets as the closest available proxy. Panel (b) reports life insurers' outstanding CRE mortgage holdings in each remaining-maturity group, in billions of U.S. dollars. Holdings are measured at year-end and aggregated across all reporting entities. Life insurer data are from NAIC statutory filings, Schedule B, and bank data are from Call Reports.

whole loans earn about 100 bps per year more than agency CMBS and 50 bps more than non-agency CMBS. Because agency CMBS benefit from government guarantees against credit losses, while non-agency CMBS do not, the larger premium relative to agency CMBS is consistent with compensation for both credit and illiquidity risk. By contrast, the premium relative to non-agency CMBS is more naturally interpreted as compensation for the additional illiquidity and monitoring demands of whole loans.[21]

Taken together, these facts show that insurers complete the market for real estate credit in ways distinct from banks, earning significant compensation for the illiquidity and credit risk they retain. Next, we examine how insurer lending evolves in response to changes in interest rates – a key financial risk faced by major financial intermediaries. We contrast insurer responses with those of banks, and investigate the mechanisms underlying the differences.

3. Interest Rates and Lending

This section shows that insurers' mortgage originations rise and their loan spreads fall when monetary policy tightens, the opposite of banks' response. We establish this result by estimating the response of origination quantities and loan spreads to monetary policy surprises, for insurers and banks in turn. Then, motivated by Fact 2 above, we analyze asymmetry in insurers' response by the maturity of CRE loans to assess how borrowers are impacted differentially as policy rates move.

3.1. Overall Response

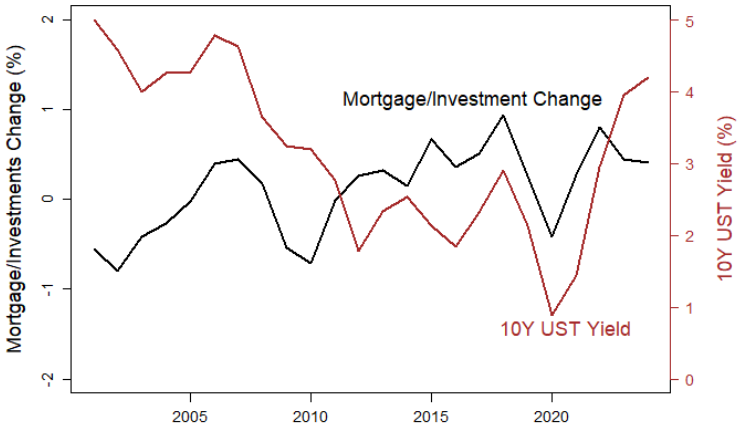
3.1.1. Life Insurers

We start by showing that life insurers' mortgage originations and loan spreads respond strongly to interest rate changes. For originations, we use quarterly new mortgage lending from NAIC Schedule B, measured by dollar volume. For spreads, we use the contractual interest rate on newly originated loans and subtract the maturity-matched Treasury yield at the time of acquisition. We regress both outcome variables on our measure of monetary policy shocks.

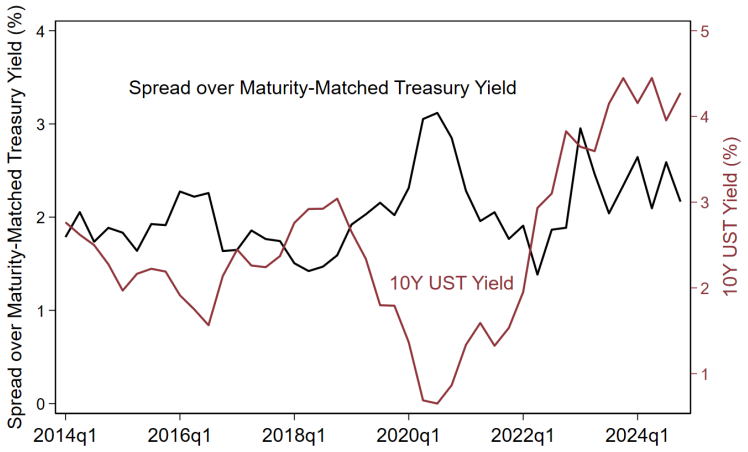
Figure 3 first provides descriptive evidence that insurers' mortgage originations rise and loan spreads fall as the 10-year Treasury yield rises. Panel (a) plots insurer mortgage lending together with the 10-year Treasury yield, while panel (b) plots the volume-weighted average spreads on newly originated mortgages. Mortgage lending tends to rise as long rates increase, whereas spreads

[21] Insurers' liability structures have also become better suited to bearing illiquidity risk. Funding-agreement-backed securities, among the most run-prone insurer liabilities, experienced substantial withdrawals during the financial crisis and declined from $170 billion in 2007 to $60 billion by 2013 (Foley-Fisher et al., 2020). The COVID-19 disruption in 2020 is a case in point. Insurers raised about $90 billion in a single quarter through Federal Home Loan Bank advances and variation margin rather than by selling assets.

Figure 3: Mortgage Investments and Spreads vs. Interest Rates



(a) Change in mortgage holdings relative to total investments



(b) Mortgage loan spreads over maturity-matched Treasury yields

Notes: This figure plots changes in insurers' mortgage holdings and mortgage loan spreads alongside the 10-year U.S. Treasury yield. Panel (a) plots the annual change in mortgage holdings scaled by total investments (black, left axis) and the 10-year Treasury yield (red, right axis). Panel (b) plots the quarterly loan-amount-weighted average spread on newly acquired mortgage loans over maturity-matched Treasury yields (black, left axis) and the 10-year Treasury yield (red, right axis). The mortgage spread is calculated as the loan yield less the Treasury yield of comparable maturity. Yields and spreads are expressed in percentage points.

move in the opposite direction.[22] Figure A5 provides consistent evidence using changes in rates.

[22]Spreads may mechanically comove negatively with Treasury yields if mortgage rates are set before origination and therefore adjust to market rates with a lag. Using appraisal time as a proxy for the length of the origination pipeline, Table A3 finds no evidence that this mechanism drives the descriptive pattern. That is, the spread response to monetary policy shocks is not more negative for loans with appraisal times exceeding 90 days, for which stale pricing should be most pronounced. We nevertheless address potential price staleness directly in the formal analyses.

To analyze these aggregate time-series patterns in more detail, we estimate the following model at the insurer (i)-quarter (t) level:

$$y_{i,t} = \beta\, MPS_{t-1} + \gamma' X_{i,t} + \theta_i + \varepsilon_{i,t}, \tag{1}$$

where the dependent variable is either the log dollar volume of new originations or the spread over the maturity-matched Treasury yield. Our baseline monetary policy shock, MPS, is the surprise to the 10-year Treasury yield, aggregated to the quarterly frequency. We use the lagged shock to allow for the time between the pricing and closing of a mortgage, and to mitigate simultaneity concerns. The vector $X_{i,t}$ includes the cumulative change in the 10-year Treasury yield over the preceding eight quarters, which controls for the predictable component of MPS (de Fraisse et al., 2026), insurer balance-sheet characteristics (total assets, surplus ratio, and capital ratio), loan characteristics (loan-to-value ratio, maturity, and appraisal time), and two lags of the outcome variable to absorb any persistence. In spread regressions, $X_{i,t}$ also includes contemporaneous changes in the Treasury yield, which can mechanically affect spreads if the contractual interest rate in our data updates with a lag. The most saturated specification includes insurer fixed effects (θ_i) that absorb time-invariant insurer characteristics. Standard errors are clustered at the insurer level.

Table 3 reports the results. Panel A considers all mortgages, while Panel B restricts the sample to CRE mortgages. Across the progressively more saturated specifications in columns (1)–(3), the coefficient on the lagged monetary policy shock is positive and statistically significant at the 1% level: insurers originate more loans following a contractionary monetary policy surprise. Columns (4)–(6) show that loan spreads over maturity-matched Treasury yields decline following the same shock. The combination of higher originations and tighter spreads is consistent with an outward shift in insurer credit supply.

The magnitude of the quantity response is economically meaningful. A one-standard-deviation increase in MPS raises quarterly mortgage originations by about 4.7% $\left(e^{0.921\times0.05} - 1\right)$. For a more intuitive benchmark, the specification using changes in the 10-year Treasury yield in Table A5 implies that a 100 bps increase in the yield is associated with 21.7% higher originations. Of course, these insurer-level regressions cannot fully rule out contemporaneous changes in loan demand, an issue we revisit in the following section.

Originations increase across all CRE property types, with the largest increases for industrial, multifamily, and retail segments (see Figure A6). Spreads also decline across all property types, most sharply for these three segments. Turning to insurer characteristics, Table A4 shows that the increase in originations is stronger among insurers with lower risk-based capital ratios, while the interactions with insurer size, surplus ratios, and swap use are not statistically significant.

Table A5 and Table A6 show that the baseline patterns are robust to alternative rate measures

Table 3: Monetary Policy, Mortgage Originations, and Loan Spreads

	Originations (log $)			Spreads (%)		
Panel A: All loans	(1)	(2)	(3)	(4)	(5)	(6)
MPS (lagged)	0.859***	0.914***	0.921***	-0.663**	-0.694***	-0.677***
	(0.297)	(0.296)	(0.278)	(0.263)	(0.252)	(0.248)
N	5,756	5,559	5,198	5,737	5,542	5,181
Loan controls	N	Y	Y	N	Y	Y
Insurer controls	N	N	Y	N	N	Y
Insurer FE	N	N	Y	N	N	Y
Adj. R^2	0.80	0.80	0.83	0.75	0.77	0.79
Panel B: CRE loans	(1)	(2)	(3)	(4)	(5)	(6)
MPS (lagged)	0.739**	0.692**	0.670**	-0.788***	-0.887***	-0.821***
	(0.318)	(0.312)	(0.296)	(0.250)	(0.248)	(0.234)
N	5,322	5,105	4,791	5,304	5,089	4,775
Loan controls	N	Y	Y	N	Y	Y
Insurer controls	N	N	Y	N	N	Y
Insurer FE	N	N	Y	N	N	Y
Adj. R^2	0.77	0.78	0.82	0.76	0.78	0.80

Notes: This table reports insurer-quarter regressions of mortgage originations and loan spreads on the lagged 10-year monetary policy shock. Columns (1)–(3) use log dollar originations as the dependent variable, while columns (4)–(6) use the median spread over the maturity-matched Treasury yield. Panel A includes all mortgage loans, and Panel B restricts the sample to commercial real estate mortgage loans. All specifications include two lags of the dependent variable and the cumulative change in the 10-year Treasury yield over the preceding eight quarters. The spread regressions additionally control for the contemporaneous change in the 10-year Treasury yield. Loan controls include loan-to-value ratio, maturity, and appraisal time. Insurer controls include insurer assets, surplus ratio, and risk-based capital ratio. Standard errors clustered by insurer are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

and specifications. The origination response holds using the contemporaneous 10-year MPS, the change in 10-year Treasury yield, the 30-year MPS, and the "monetary event" shock of Acosta et al. (2025), which measures the yield change over a window spanning both the FOMC statement and the subsequent press conference. Likewise, our inference is robust to using Driscoll-Kraay standard errors, which allow for cross-sectional dependence induced by a common quarterly shock.

Origination results also hold when lending is measured as the *change* in log dollar volume or as the log *number* of loans, and under Poisson pseudo-maximum-likelihood estimation, which retains insurer-quarters with zero originations. Finally, changes in originations scaled by assets respond positively as well, though this is not our preferred measure because interest rate changes also impact the denominator through asset valuations.

Table A7 shows that our spread results are robust to using contemporaneous 10-year MPS,

the 30-year MPS, or the monetary event shock, and when spreads are amount-weighted or first-differenced. They also hold in the subsample of loans with appraisal times below 90 days, where staleness in contractual rates is least likely to be a concern. In contrast, Table A6 shows no corresponding increase in LTV ratios, suggesting that higher originations are not accompanied by looser collateral standards.

3.1.2. Banks

We contrast the lending behavior of insurers in response to monetary policy shocks with that of banks. A large literature documents that contractionary monetary policy shocks reduce banks' credit supply. Higher rates induce deposit outflows and tighten funding conditions, while declining bank net worth and weaker capital positions constrain banks' ability to lend (Drechsler et al., 2017, Jiménez et al., 2012). We follow Drechsler et al. (2017, 2022) and construct a quarterly panel of commercial banks from U.S. Call Reports over 2014Q1–2023Q4. The sample contains about 185,000 bank-quarter observations across roughly 5,700 banks. We estimate the following model at the bank-quarter level:

$$\Delta y_{b,t} = \beta\, MPS_{t-1} + \gamma' X_{b,t-1} + \theta_b + \varepsilon_{b,t}, \tag{2}$$

where the dependent variables are year-on-year log changes in total loans and CRE loans, or changes in their corresponding implied loan rates. Because the Call Reports record outstanding loan balances (stocks) rather than new originations (flows), we use log change as the closest bank counterpart to insurers' origination volumes. The vector $X_{b,t-1}$ includes the log of total assets and the equity ratio. We include bank fixed effects and cluster standard errors at the bank level.[23]

Table 4 reports the results. Following a contractionary monetary policy surprise, banks' loan growth declines (columns 1–2 in Panels A and B). In the specification with bank fixed effects and controls, a one percentage point surprise lowers year-on-year growth in total loans by about 15% and in CRE loans by about 19%. In the same specification, lending rates rise by 5 basis points (bps) for total loans and 6 bps for CRE loans (column 4).[24] While the bank-quarter-level analysis cannot fully absorb confounding credit-demand effects, our estimates are consistent with the established bank lending channel of monetary policy.

[23] Our sample includes commercial banks (charter type 200) with non-missing real estate loan growth. We construct CRE loans as total real estate lending net of one-to-four family residential mortgages. Implied loan rates equal annualized interest income in each loan category divided by the corresponding lagged quarterly balance.

[24] Scaled to the one-standard-deviation shock used for interpreting insurers' response, total loan growth falls by about 0.8%, commercial loan growth by about 1%, and lending rates rise by about 0.3 basis points. Banks' lower elasticities compared to insurers may reflect adjustment off a much larger base of outstanding loans.

Table 4: Monetary Policy, Bank Lending and Loan Rates

	Δ Loans		Δ Loan rate	
Panel A: All loans	(1)	(2)	(3)	(4)
MPS (lagged)	-0.132***	-0.159***	0.102***	0.048**
	(0.006)	(0.006)	(0.023)	(0.024)
N	186,577	180,791	186,577	180,791
Bank controls	N	Y	N	Y
Bank FE	N	Y	N	Y
Panel B: CRE loans	(1)	(2)	(3)	(4)
MPS (lagged)	-0.190***	-0.206***	0.122***	0.055**
	(0.006)	(0.006)	(0.027)	(0.028)
N	186,515	180,731	185,468	179,714
Bank controls	N	Y	N	Y
Bank FE	N	Y	N	Y

Notes: This table reports estimates of Equation 2 at the bank-quarter level, using the lagged monetary policy shock on 10-year Treasury yields. It shows results for year-on-year log changes in quarterly-average loan balances (columns 1–2) and first-differenced loan rates (columns 3–4) for all loans (Panel A) and CRE loans (Panel B). Standard errors clustered at the bank level are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

3.2. Asymmetric Response by Maturity

We next ask whether insurers' response varies across loan maturities. This comparison is informative because insurers can adjust their exposure both in the aggregate and within an asset class. Moreover, as shown in Fact 2, insurers dominate long-maturity CRE lending, while banks have a larger footprint at shorter maturities. A stronger response at the short end would therefore suggest that rising rates draw insurers into a segment typically served by banks.

To perform this analysis, we divide CRE mortgages into those with original maturities of at most ten years and those with longer maturities, and then re-estimate Equation 1 by interacting the monetary policy shock with an indicator for each maturity group.

Table 5 shows that the effects observed for insurers on both quantities and prices are concentrated in mortgage originations with maturities of at most ten years. For new mortgage originations with maturities above ten years, the interaction coefficient is negative and more than offsets the baseline positive response. The spread results follow the same pattern. Spreads decline significantly on shorter-maturity mortgages following a contractionary shock, whereas the decline is substantially weaker on longer-maturity mortgages. Thus, insurers' expansion following monetary tightening is concentrated in the shorter-maturity segment in which banks are traditionally more

Table 5: Asymmetric Response by Maturity Group

	Originations (log $)			Spreads (%)		
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (lagged)	1.237***	1.227***		-1.161***	-1.148***	
	(0.324)	(0.336)		(0.260)	(0.258)	
Maturity >10Y × MPS (lagged)	-1.989***	-2.024***	-1.887***	0.827**	0.772**	0.935**
	(0.480)	(0.482)	(0.472)	(0.336)	(0.348)	(0.378)
N	6,343	6,322	6,322	6,326	6,305	6,305
Loan and Insurer controls	Y	Y	Y	Y	Y	Y
Insurer FE	Y	N	N	Y	N	N
Insurer×Maturity group FE	N	Y	Y	N	Y	Y
Time FE	N	N	Y	N	N	Y
Adj. R^2	0.79	0.80	0.81	0.79	0.79	0.80

Notes: This table reports insurer-quarter-maturity group regressions of commercial real estate mortgage originations and loan spreads on the lagged 10-year monetary policy shock and its interaction with an indicator for loan maturities greater than 10 years. Columns (1)–(3) use log dollar originations as the dependent variable, while columns (4)–(6) use the median spread over the maturity-matched Treasury yield. The omitted maturity group consists of loans with maturities of 10 years or less. All specifications include two lags of the dependent variable, the cumulative change in the 10-year Treasury yield over the preceding eight quarters, and loan and insurer controls. Loan controls include loan-to-value ratio, maturity, and appraisal time. Insurer controls include insurer assets, surplus ratio, and risk-based capital ratio. Spread regressions additionally control for the contemporaneous change in the 10-year Treasury yield. Standard errors clustered by insurer are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

important, rather than occurring uniformly across maturities. Figure A7 summarizes the overall and maturity-specific responses of originations and spreads.

Our evidence so far points to a systematic difference in how insurer and bank lending responds to monetary policy. As rates rise, bank lending contracts, whereas insurers increase originations and compress spreads, particularly on shorter-maturity CRE mortgages. The next section examines the mechanisms that allow insurers to become marginal lenders in a rising-rate environment and why mortgages are especially well suited to this expansion.

4. Mechanism

The previous section established two empirical regularities about life insurers' provision of mortgage credit. First, insurers *expand* mortgage originations as interest rates rise, in contrast to banks, and do so almost entirely in shorter-tenor ($\leq$ 10Y) loans. Second, the spreads insurers charge, measured over maturity-matched Treasury yields, *fall* as rates rise. A rising quantity at a falling price points to an outward shift in insurer credit supply.

Two potentially interacting forces can produce these patterns. The first is the distinctive structure of insurers' balance sheets. The second is the retrenchment of banks from mortgage markets. Section 4.1 combines both in a conceptual framework. Section 4.2 documents the first link in the balance sheet channel, showing how rates affect annuity flows. Sections 4.3 and 4.4 then test the balance sheet and market channels in the cross-section of insurers and lenders, respectively.

4.1. Conceptual Framework

We frame insurer CRE lending as a supply–demand problem in which interest rates move both curves. We lay out the primary mechanisms affecting each curve, and assess their impact on equilibrium loan amounts and spreads. We organize the candidate mechanisms into two groups: (i) a *balance-sheet* channel, which acts on insurers' scale of investable funds and own valuation of their asset, thereby shifting the supply of mortgage credit, and (ii) a *market* channel, which acts on competition within the mortgage market and shifts the residual demand for credit insurers face.

Balance sheet channel. Life insurers' balance sheets are structured differently from those of other financial intermediaries. Their liabilities are long-dated savings and annuity promises rather than short-term deposits, and their asset portfolio is built to back those promises. Rising rates affect insurer balance sheets through two margins, both distinct from the bank lending channel – the scale of investable funds and the composition of the portfolio.

The first margin is the scale of investable funds, which rises with inflows into guaranteed-return products. When long-term rates rise, insurers can credibly offer higher returns on products such as multi-year guaranteed annuities (MYGAs) and fixed-indexed annuities. For example, Kotronis et al. (2025) show that for European insurers, higher term premia increase household inflows into guaranteed-return life insurance products. The resulting expansion of the liability book must be invested, and CRE competes for the marginal dollar as a high-yielding asset. This margin therefore predicts a broad increase in insurers' CRE allocations as rates rise, which our findings in Section 3 support. Flows alone, however, do not predict which specific loans insurers choose to acquire.

The second margin is the composition of the portfolio and operates through the relaxation of the duration gap as a constraint on asset allocation. A duration gap is the difference between the interest rate sensitivity of a firm's assets and its liabilities, with the latter scaled by leverage. Most life insurers operate with structurally negative duration gaps because they issue long-dated savings and annuity promises whose duration exceeds that of the assets backing them, and whose value is more convex in the level of rates (e.g., variable annuities with guaranteed returns). A larger gap exposes net worth to interest rate fluctuations. For example, a rate decline raises the present value of liabilities by more than that of assets, eroding capital. Duration mismatch also carries a

regulatory cost through risk-based capital (RBC) requirements. Insurers therefore seek to limit the gap by holding long-duration assets, including Treasuries, or by hedging the risk using derivatives. Shorter-duration assets, by contrast, carry a shadow cost because they widen the mismatch. This shadow cost is largest when rates are low and the gap is widest.

When rates rise, liability duration declines more rapidly than asset duration and the gap narrows.[25] The shadow cost of short-duration assets falls, creating capacity to acquire them. Insurers' expansion in CRE lending is concentrated among shorter-maturity loans (Section 3.2), which is what a relaxation of the duration constraint predicts for the maturity composition of new lending. Figure A8 supports this reading: CRE mortgages with maturities of $\leq$10 years have a duration of approximately four years, substantially below that of insurers' liabilities and other fixed-income assets (even without accounting for prepayment risk as in Hanson (2014)).

Together, these forces imply that higher rates shift insurers' supply of mortgage credit outward, particularly among those with more negative *ex ante* duration gaps. Holding borrower demand fixed, the resulting increase in credit supply should compress loan spreads.

Market channel (bank retrenchment). A second force directs insurers' additional lending capacity specifically towards mortgage markets. As interest rates rise, banks reduce credit supply, consistent with both the existing evidence discussed above and our findings. Bank retrenchment in turn prompts borrowers to seek mortgage financing from non-bank lenders, creating opportunities for insurers to step in. The substitution may not be one-for-one, however, because insurers can absorb only those loan structures that satisfy their underwriting constraints. The share of displaced demand reaching insurers thus depends on the degree of overlap between the segments served by the two lenders (Glancy et al., 2022).

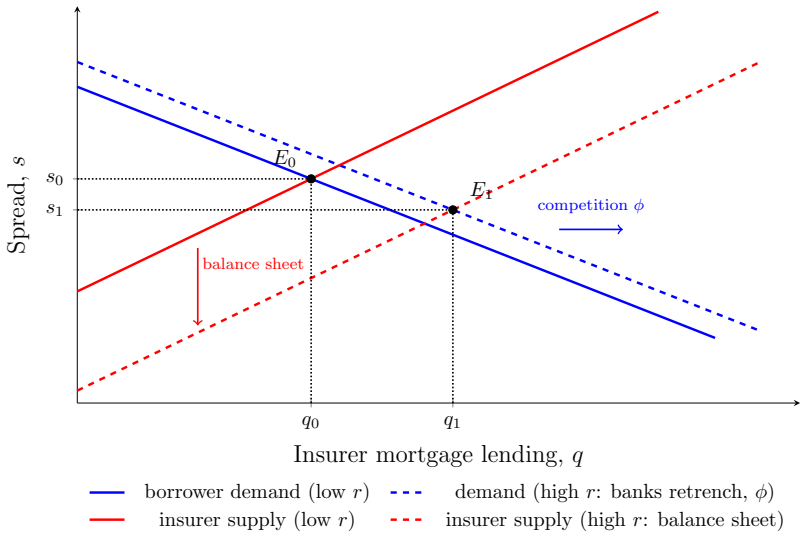
The structure of mortgage markets is central for this mechanism to operate. The balance sheet channel described above could raise insurers' demand for other high-yielding shorter-duration assets, including corporate bonds. But the two markets differ in who else holds the asset. In corporate bonds, life insurers are the largest investors, followed by P&C insurers, mutual funds, pension funds, banks, households, and non-profits, with no other single investor class holding a dominant share (Koijen and Yogo, 2023, Bretscher et al., 2026). Because corporate bond ownership is diversified, a rise in rates does not lead any one large investor to withdraw and leave a gap for insurers to fill. In CRE mortgages, by contrast, lending is concentrated, and the retrenchment of one lender opens up a large share of the market for others.

The bank retrenchment channel predicts that insurer lending quantities should expand most where bank credit supply contracts. The impact on loan spreads is more ambiguous. A reduction

[25] For example, Domanski et al. (2017) show that falling long-term rates widen insurers' negative duration gaps, while Kubitza et al. (2025) find that higher rates shorten liability duration through policy surrenders.

in bank competition may allow insurers to lend at higher spreads by capturing residual borrower demand. At the same time, competition among different insurers seeking the same loans can attenuate the price impact. Thus, bank retrenchment may generate a sizable quantity response even with modest changes in spreads.

Figure 4: Equilibrium Quantity and Price of Insurer Mortgage Credit



Notes: This figure illustrates how an increase in interest rates affects the equilibrium quantity and price of mortgage credit supplied by insurers. The downward-sloping curves represent residual demand for insurer mortgage credit, and the upward-sloping curves represent insurer credit supply. Higher interest rates shift insurer supply outward by relaxing insurers' duration-gap constraints. They may also shift residual demand outward as banks retrench from mortgage lending, with ϕ capturing the strength of substitution toward insurers. The initial equilibrium is $E_0 = (q_0, s_0)$, and the post-rate-increase equilibrium is $E_1 = (q_1, s_1)$, where s denotes the mortgage spread. Both mechanisms increase insurer mortgage lending, implying $q_1 > q_0$. The effect on spreads is theoretically ambiguous and depends on the relative magnitudes of the supply and demand shifts. The figure depicts the case in which the supply shift dominates, so that $s_1 < s_0$.

Predictions. Figure 4 summarizes how the two channels affect insurer mortgage lending and spreads. Both channels predict an increase in loan *quantities*: the outward shift in insurer credit supply and the increase in residual demand created by bank retrenchment raise equilibrium lending. Thus, q increases unambiguously from q_0 to q_1. The implications for spreads, however, differ across channels. The balance sheet channel lowers spreads by expanding insurer credit supply, whereas the market channel may put upward pressure on spreads by shifting residual borrower demand toward insurers, with ϕ denoting the strength of that substitution. A net decline in spreads from s_0 to s_1 arises when the balance-sheet-driven supply expansion dominates the effect of bank retrenchment.

In Cournot terms, the market channel is a strategic-substitutes response. When banks contract, the residual demand facing insurers expands and their best response is to lend more, given their own "production technology". The two channels together resemble a capacity-then-pricing game in

the spirit of Kreps and Scheinkman (1983), in which interest rates set lenders' capacities before they compete on spreads. Quantities rise unambiguously, while the sign of the spread response depends on whether reduced bank competition or insurers' lower shadow cost of lending dominates.

Higher interest rates may also reduce the aggregate demand for mortgage credit, lowering both equilibrium quantities and spreads. Our empirical tests that follow seek to absorb common shifts in credit demand and identify changes in credit supply from two cross-sectional comparisons – across insurers with differential exposure to the duration-gap mechanism, and across lender types operating in the same mortgage markets.

4.2. Interest Rates and Annuity Flows

The first margin of the balance sheet channel operates through the scale of investable funds. This subsection verifies that higher rates draw household savings into insurers' rate-sensitive products, expanding the pool of funds to be invested.

Products: Rate sensitivity in life insurance flows is concentrated in savings-oriented annuity products that compete with bank deposits and other fixed-income securities for households' savings. The clearest case is the *multi-year guaranteed annuity* (MYGA), which promises a fixed crediting rate over a three to ten year term and is therefore a near-substitute for a certificate of deposit or a Treasury note of comparable maturity. Insurers fund these contracts at prevailing yields, allowing the credited rate to rise with the curve. Since deposit rates adjust slowly and incompletely (Drechsler et al., 2017), higher rates widen the relative return offered by annuities. *Fixed-indexed annuities* (FIAs) are sensitive for a related reason. The insurer allocates most of the premium to a fixed income portfolio sufficient to guarantee principal and invests the residual in equity index options. Higher rates shrink the portion required for the guarantee, enlarging the option budget and allowing the insurer to raise capped return thresholds at unchanged downside risk.

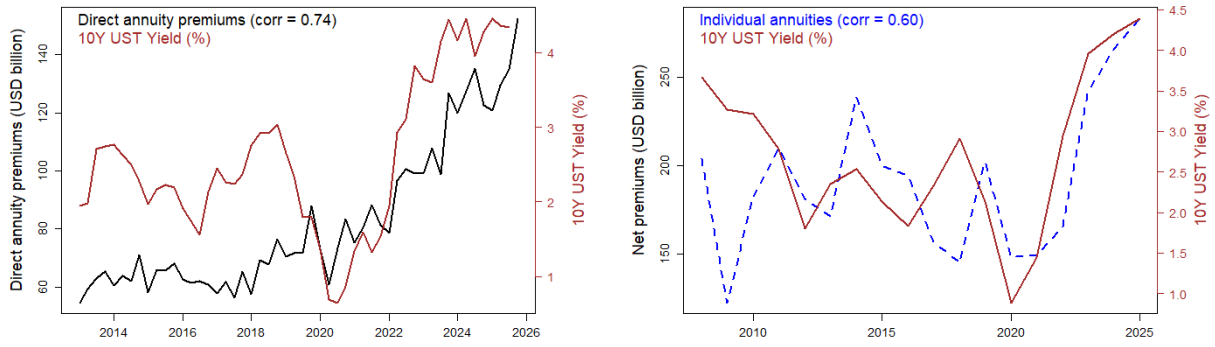
Two large product categories lack this mechanism and serve as placebos. *Group annuities* are institutional pension risk transfer transactions, negotiated in lumpy deals and governed by plan sponsors' calendars rather than by households' reallocation. *Individual life insurance* is purchased for protection and estate motives, for which the crediting rate is not the key margin of adjustment.

Empirically establishing these patterns requires flow data at the product level, but statutory reporting is coarser. Exhibit 1 of the statutory statements reports premiums and annuity considerations by line of business but does not separately identify MYGAs, FIAs, and traditional deferred annuities, so we cannot isolate the most rate-sensitive contracts directly. We therefore use two series that trade off frequency against granularity. Direct annuity considerations, available quarterly, reflect business written with policyholders, are unaffected by ceded reinsurance, and capture origination rather than retention. Annual line-of-business detail distinguishes individual annuities,

group annuities, and individual life, enabling the placebo comparison at lower frequency.

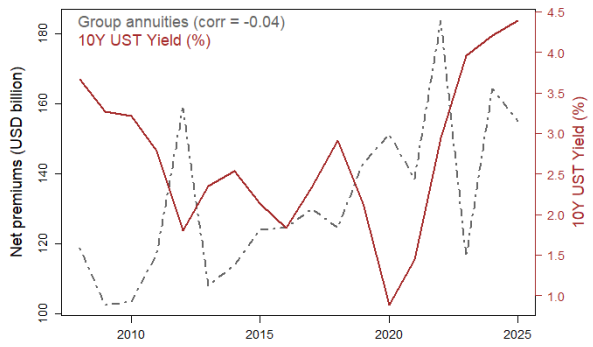
Figure 5 plots aggregate flows in each category against the 10-year Treasury yield. The two rate-sensitive categories track the yield closely, with correlations of 0.74 for quarterly direct annuity considerations and 0.60 for annual individual annuity premiums, while the two placebos show no such comovement. Because both flows and yields are persistent, Figure A9 repeats the exercise in growth rates, and finds a similar pattern across products. In the next section, we show that insurers with the most rate-sensitive annuity flows are also those with the largest duration gaps, and that their mortgage lending responds most strongly to rate changes.

Figure 5: Interest Rates and Annuity Flows

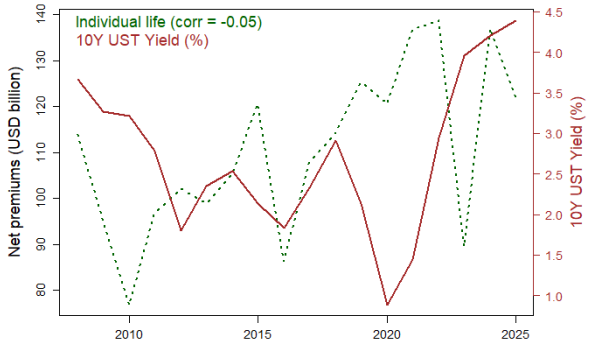


(a) Direct annuity considerations (quarterly)

(b) Individual annuities (annual)



(c) Group annuities (annual)



(d) Individual life (annual)

Notes: This figure plots aggregate premium inflows to U.S. life insurers, by product line, alongside the 10-year U.S. Treasury yield. Panel (a) shows quarterly direct annuity considerations. Panels (b)–(d) show annual net premiums for individual annuities, group annuities, and individual life. Flows are in USD billion (left axis). The 10Y yield is in percent (right axis), averaged within each period. Each legend reports the contemporaneous correlation between the two series.

4.3. Empirical Test for the Balance Sheet Channel

Insurers whose liabilities have longer *ex ante* duration than the assets in their portfolios should expand mortgage lending disproportionately when interest rates rise. We test that prediction on the cross-section of insurers.

4.3.1. Data and Empirical Strategy

Measurement of Duration Gap. The central challenge in testing the balance-sheet channel is that insurer-level duration gaps are not directly observable to the econometrician. Statutory filings do not report the market value or interest-rate sensitivity of liabilities, and hedging through derivative overlays further obscures net exposures. We therefore classify insurers by their *ex ante* exposure to the duration-gap mechanism, exploiting cross-sectional differences in the composition of their liabilities as well as assets.

Liability side. The duration of an insurer's liabilities is determined largely by its product mix. Protection-oriented products, such as term life and group insurance, generate relatively short-dated obligations. By contrast, long-dated savings promises such as whole life policies, and fixed and fixed-indexed annuities, extend over decades and dominate the liability books of savings-oriented insurers. The longest and most convex exposures arise from variable annuities (VAs) sold with minimum-return guarantees: the guarantee is an option written to the policyholder whose value and duration rise sharply as rates fall, making these liabilities substantially more rate-sensitive than their contractual maturities alone would suggest (e.g., Koijen and Yogo (2022), Sen (2023), Li and Wenning (2026)). Insurers tilted toward these products are those for whom rising rates generate higher annuity flows and compress duration gaps, enabling investment into shorter-duration assets.

We construct an indicator $Long_i$ that captures insurers with long-duration liabilities at the start of our sample period. Following the literature, we classify insurers that offered VAs with minimum-return guarantees on or before the start of our sample as having long-duration liabilities (i.e., $Long_i = 1$). For the remaining insurers, we use liability durations measured in 2013 (or the earliest available year thereafter) and classify those with above-median duration as having long-duration liabilities.[26] Table A8 validates our classification by showing that the stock prices of insurers with long-duration liabilities are significantly more sensitive to interest rate changes. Furthermore, such insurers are more frequent users of interest rate swaps and are larger in terms of total assets.

Importantly, we confirm that the rate-driven inflows documented above accrue disproportionately to insurers we classify as having long-duration liabilities. The first reason is that these insurers are far more likely to offer the products through which such flows arrive. Table A8 shows that nearly all of them offer individual annuities, whereas one-fifth of insurers with shorter-duration liabilities

[26] Huber (2022) calculates liability durations for insurers excluding the variable annuity component. We thank the author for making these data publicly available.

do not, a difference significant at the 1% level. Likewise, nearly 90% of individual annuity flows by volume are associated with long-duration liability insurers. The second reason is that, for these insurers, the sensitivity of annuity flows to rates is itself higher, potentially because the two groups serve different clienteles. To show this, we regress direct annuity considerations on lagged monetary policy surprises interacted with the long-duration liability indicator. Table A9 finds that long-duration liability insurers receive larger inflows following a contractionary surprise, both in raw dollars and scaled by lagged assets.

Asset side. Long-duration liabilities alone do not imply a large duration gap. An insurer that backs long-dated promises with equally long-dated assets is well matched, whereas one holding a shorter-duration portfolio against the same liabilities bears substantial mismatch. Variation on the asset side is therefore important for identifying exposure to the mechanism.

Unlike liabilities, asset durations can be computed directly from observable holdings. We calculate the modified duration of each security in insurers' portfolios, including government bonds, corporate bonds, and mortgage-backed securities, and aggregate to the insurer-year level using book-value weights. Note that we exclude whole mortgage loans from the baseline asset duration to avoid a mechanical relation between asset duration and mortgage lending intensity, but find results robust to including them. The resulting firm-level asset durations display non-trivial dispersion: the interquartile range runs from seven to eleven years, with a median of nine years. These differences reflect both differential access to long-duration assets in the markets insurers participate in (Du et al., 2023) and portfolio and hedging choices shaped by yield targets and regulatory capital treatment (Ellul et al., 2011, Berends et al., 2013).

We emphasize that cross-sectional variation in liability and asset durations may well reflect deeper differences across insurers in business models or risk management practices. Duration gaps are not randomly assigned but are outcomes of insurers' own choices. An insurer more willing to bear interest rate risk may both run a larger gap and offer more rate-sensitive products. Our measurement does not aim to isolate such a primitive. It captures a feature of life insurance balance sheets that sets insurers apart from other portfolio lenders and that our framework predicts should govern how mortgage lending responds to rates. Exploiting this feature in the cross section lets us test that prediction while holding credit demand and other market-wide conditions fixed.

Empirical Strategy. We test whether insurers with larger *ex ante* duration gaps expand mortgage lending more when monetary policy tightens. The identifying variation is cross-sectional: we compare insurers with different duration exposures lending in the same location at the same time, holding local credit demand fixed. To this end, we exploit the geographic granularity of our data

and aggregate CRE originations to the insurer (i)–borrower ZIP code (z)–year (t) level.[27] We estimate:

$$\log(\text{Originations}_{i,z,t}) = \beta_1 MPS_{t-1} \times Long_i + \beta_2 MPS_{t-1} \times D^A_{i,t-1} + \beta_3 MPS_{t-1} \times Long_i \times D^A_{i,t-1} + \gamma' X_{i,z,t} + \alpha_{i,z} + \tau_{z,t} + \varepsilon_{i,z,t}, \quad (3)$$

where MPS_{t-1} is the lagged monetary policy shock, $Long_i$ is the long-liability-duration indicator and $D^A_{i,t-1}$ is lagged asset duration. All constituent terms of the triple interaction are included. In the results tables, $Long_i$ and $D^A_{i,t-1}$ appear as *Long-duration liab.* and *Asset duration*, respectively.

The fixed effects implement the within-market comparison. ZIP-code×year fixed effects absorb observable and unobservable changes at the ZIP-code level, including shifts in credit demand, economic conditions, and real-estate activity (Khwaja and Mian, 2008, Jiménez et al., 2012). Insurer×ZIP-code fixed effects further absorb persistent differences in the types of borrowers served by a given insurer in a given location. The vector $X_{i,z,t}$ contains the loan-composition controls (median LTV ratio, maturity, and appraisal time) as well as interactions of the monetary policy shock with lagged insurer size, the surplus ratio, and the risk-based capital ratio, which ensure that the duration interactions do not proxy for size or capitalization. Some specifications additionally interact changes in the yield curve slope (10Y minus 2Y) with liability and asset duration, in order to account for the fact that liabilities and assets are exposed to different segments of the term structure. Standard errors are clustered at the insurer and ZIP-code levels.

The balance-sheet channel predicts that the lending response to tightening is strongest for insurers with long-duration liabilities (i.e., $\beta_1 > 0$) and short-duration assets (i.e., $\beta_3 < 0$).

4.3.2. Insurer-Zip Code-level Results

Table 6 reports the baseline estimates consistent with our framework. Panel A uses lagged 10Y monetary policy shocks and Panel B uses lagged 30Y monetary policy shocks. All four columns in both panels include insurer×ZIP-code and ZIP-code×year fixed effects and differ only in controls: column (1) includes none, column (2) adds yield-curve-slope interactions, column (3) adds loan-composition controls, and column (4) adds insurer balance-sheet controls. Across all specifications, the interaction between the monetary policy shock and the long-liability indicator is positive, while the triple interaction with asset duration is negative. The slope interactions display the same signs.

Our results in Table 6 suggest that insurers with longer-duration liabilities expand originations more strongly following a contractionary monetary policy surprise. We interpret this pattern as evidence of a balance-sheet mechanism operating through two margins; higher rates generate stronger annuity inflows and, through convexity, relax duration-gap constraints. The negative coefficient

[27] Given the large and lumpy nature of CRE loans, we construct the panel at an annual frequency to preserve sufficient cross-sectional variation at the ZIP code level.

on the triple interaction provides a sharper test of the latter margin, showing that the differential response of insurers with longer-duration liabilities declines as asset duration rises. Further, the positive slope interactions indicate that a steepening of the yield curve raises originations by long-liability insurers beyond the effect of level changes, as expected when assets and liabilities are exposed to different segments of the term structure. Table 7 shows consistent results using lagged changes in 10Y and 30Y Treasury yields as opposed to monetary policy shocks, indicating that the mechanism reflects both anticipated and unanticipated changes in long-term rates.

The implied magnitudes are economically meaningful.[28] Consider a long-duration liability insurer with the median asset duration of nine years. Using column (4) of Table 6, Panel A, a one-standard-deviation contractionary surprise at the 10-year maturity (10 basis points) raises its originations by about 15% ($e^{0.1\times(5.927-0.504\times9)}-1$) relative to other insurers lending in the same ZIP code and year. The Treasury yield-based estimates deliver a similar message. Column (4) of Table 7 implies that, for a 100 bps rise in the 10-year yield, the median insurer's originations increase by approximately 22% ($e^{1\times(0.974-0.086\times9)}-1$).

Table A11 standardizes asset duration to zero mean and unit variance to trace out these margins, and Figure A10 plots the implied differential sensitivity across the asset duration distribution. A long-duration liability insurer with mean asset duration responds to a one-standard-deviation contractionary surprise with about 20% higher originations, and this differential falls by about 15 percentage points for each standard deviation of asset duration. The expansion in lending is therefore driven by insurers with wider duration gaps.

One important consideration is that insurers may respond more strongly to persistent, cumulative changes in interest rates than to isolated annual shocks, since portfolio reallocations reflect slow-moving capital. Table A12 repeats the analysis using MPS cumulated over the preceding two years, at both the 10-year and 30-year maturities. The estimates remain positive on the liability interaction and negative on the triple interaction, with magnitudes comparable to the baseline.

Table A13 addresses two remaining concerns. Panel A restricts the sample to the pre-2022 period, confirming that the results are not driven by the single tightening cycle at the end of our sample. Panel B controls for insurers' use of interest rate swaps. Insurers can hedge duration mismatch off balance sheet by receiving fixed in swap markets, so our asset duration measure, constructed from on-balance-sheet holdings, may understate the effective duration of hedged insurers. The interaction of the MPS with swap usage is negative, and its inclusion only modestly affects the coefficient on MPS interacted with the long-liability indicator, which remains large and significant. The balance-sheet channel operates even after accounting for partial hedging through derivatives.

[28] Table A10 summarizes the key variables at an annual frequency for interpreting the magnitudes.

Table 6: Mechanism – Balance Sheet Duration Gap (Monetary Policy Shocks)

	Originations (log $)			
Panel A: 10Y Monetary Policy Shock	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	5.002**	7.226***	6.605**	5.927***
	(2.292)	(2.694)	(2.622)	(2.238)
MPS (lagged) × Long-duration liab. × Asset duration	-0.438*	-0.608**	-0.527*	-0.504*
	(0.226)	(0.285)	(0.282)	(0.267)
Δ Slope × Long-duration liab.		1.133***	1.117***	1.370***
		(0.419)	(0.422)	(0.392)
Δ Slope × Long-duration liab. × Asset duration		-0.096**	-0.093**	-0.123***
		(0.044)	(0.044)	(0.042)
N	9,291	9,291	8,109	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.77
Panel B: 30Y Monetary Policy Shock	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	9.956***	10.882***	10.754***	10.320***
	(3.293)	(3.394)	(3.147)	(2.899)
MPS (lagged) × Long-duration liab. × Asset duration	-0.936***	-1.006***	-0.958***	-0.959***
	(0.338)	(0.373)	(0.356)	(0.354)
Δ Slope × Long-duration liab.		0.681**	0.663*	0.906**
		(0.340)	(0.384)	(0.358)
Δ Slope × Long-duration liab. × Asset duration		-0.059	-0.056	-0.084**
		(0.036)	(0.040)	(0.038)
N	9,291	9,291	8,109	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.78	0.78

Notes: This table reports insurer-ZIP-code-year regressions of log CRE mortgage originations on monetary policy shocks (MPS), an indicator for insurers with long-duration liabilities, lagged asset duration, and their interactions. Panel A uses the lagged 10-year MPS and Panel B the lagged 30-year MPS. Columns (2)–(4) add interactions of the change in the yield-curve slope with the long-duration indicator and asset duration. Loan controls include loan-to-value ratio, maturity, and appraisal time. Insurer controls include assets, surplus ratio, and risk-based capital ratio, entered in levels and interacted with the shock. All specifications include insurer-by-ZIP-code and ZIP-code-by-year fixed effects. Lower-order terms implied by the interactions are included but not reported. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table 7: Mechanism – Balance Sheet Duration Gap (Treasury Yields)

	Originations (log $)			
Panel A: 10Y Treasury Yield	(1)	(2)	(3)	(4)
Δ Treasury (lagged) × Long-duration liab.	1.028**	1.248***	1.198**	0.974**
	(0.466)	(0.471)	(0.477)	(0.414)
Δ Treasury (lagged) × Long-duration liab. × Asset duration	-0.096**	-0.114**	-0.112**	-0.086*
	(0.047)	(0.049)	(0.050)	(0.046)
Δ Slope × Long-duration liab.		0.953***	0.973***	1.109***
		(0.328)	(0.333)	(0.329)
Δ Slope × Long-duration liab. × Asset duration		-0.083**	-0.087**	-0.100***
		(0.034)	(0.035)	(0.035)
N	9,291	9,291	8,109	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.77
Panel B: 30Y Treasury Yield	(1)	(2)	(3)	(4)
Δ Treasury (lagged) × Long-duration liab.	1.159**	1.239**	1.220**	1.040**
	(0.521)	(0.515)	(0.520)	(0.492)
Δ Treasury (lagged) × Long-duration liab. × Asset duration	-0.109**	-0.115**	-0.115**	-0.094*
	(0.053)	(0.054)	(0.055)	(0.054)
Δ Slope × Long-duration liab.		0.568*	0.608*	0.763**
		(0.312)	(0.345)	(0.330)
Δ Slope × Long-duration liab. × Asset duration		-0.048	-0.055	-0.069**
		(0.032)	(0.035)	(0.035)
N	9,291	9,291	8,109	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.77

Notes: This table reports insurer-ZIP-code-year regressions of log CRE mortgage originations on U.S. Treasury yield changes, an indicator for insurers with long-duration liabilities, lagged asset duration, and their interactions. Panel A uses the lagged 10-year yield change and Panel B the lagged 30-year yield change. Controls and fixed effects follow Table 6, with insurer controls interacted with the respective yield change. Lower-order terms implied by the interactions are included but not reported. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

4.3.3. Loan-level Results

We now estimate loan-level counterparts to Equation 3. The dependent variable is the log loan *amount* or the *spread* over the maturity-matched Treasury yield on loan l originated by insurer i in ZIP code z and year t. Loan-level analysis allows us to separate the intensive margin of lending from the number of loans and, importantly, to analyze pricing. If the expansion in originations reflects a supply response, it should show up not only in larger loans but also in lower spreads. The regressions include insurer×ZIP-code and ZIP-code×property-type×year fixed effects, thereby comparing loans backed by the same property type in the same local market and year, while controlling for persistent insurer-location specialization and absorbing property-type-specific shocks. Depending on the specification, we control for property value, the LTV ratio, and appraisal time, as well as interactions of the MPS with the yield-curve slope and with insurer balance-sheet characteristics.

Table 8 reports the results. With log loan amount as the dependent variable, Panel A shows a positive differential response of loan size among long-duration liability insurers, which decreases with asset duration. In the most saturated specification in column (4), the interaction between the shock and the long-duration liability indicator is 8.078 and the triple interaction with asset duration is −0.754, both statistically significant at the 1% level. Thus, the increase in total originations in Table 6 is also visible at the intensive margin. Among long-duration liability insurers, those with shorter asset portfolios originate larger loans following a tightening shock.

Panel B of Table 8 shows the opposite pattern for spreads. The interaction with long liabilities is negative and the triple interaction with asset duration is positive. Long-duration liability insurers with shorter asset portfolios thus compress spreads by more after a contractionary shock, and the effect weakens as asset duration rises, consistent with our supply interpretation.[29]

Maturity split. Table 9 splits the sample by original loan maturity and shows that the results are concentrated entirely in loans with maturities of *up to ten years*. For these loans, long-duration liability insurers with shorter asset books originate larger loans at lower spreads following a contractionary shock, while loans with longer maturities show no differential response in either size or pricing. This split provides a sharper test of the balance-sheet mechanism, with large economic magnitudes. For a long-duration liability insurer with the median asset duration of nine years, a one-standard-deviation contractionary surprise compresses spreads on these shorter-maturity loans by about 11 basis points relative to other insurers lending in the same ZIP code and year, or about 4% of the average spread on insurers' short-tenor CRE loans.

Table A14 reports two further checks. The loan-size and spread results are robust to using lagged changes in the 10-year Treasury yield, and to using monetary policy shocks cumulated over

[29] In contrast, we do not find that long-duration liability insurers increase loan-to-value ratios on new loans.

Table 8: Mechanism – Balance Sheet Duration Gap at Loan Level

Panel A	Loan size (log $)			
	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	8.905***	9.755***	10.373***	8.078***
	(2.447)	(3.200)	(3.155)	(2.444)
MPS (lagged) × Long-duration liab. × Asset duration	-0.765***	-0.897***	-0.898***	-0.754***
	(0.241)	(0.343)	(0.329)	(0.282)
N	17,284	17,331	17,284	16,507
Loan controls	Y	N	Y	Y
Insurer controls	N	N	N	Y
Slope controls	N	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Property Type×Time FE	Y	Y	Y	Y
Adj. R^2	0.78	0.69	0.78	0.77
Panel B	Spreads (%)			
	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	-2.093*	-2.484*	-2.912**	-2.713**
	(1.064)	(1.416)	(1.360)	(1.359)
MPS (lagged) × Long-duration liab. × Asset duration	0.181	0.265*	0.287*	0.302*
	(0.110)	(0.155)	(0.148)	(0.157)
N	16,969	17,016	16,969	16,218
Loan controls	Y	N	Y	Y
Insurer controls	N	N	N	Y
Slope controls	N	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Property Type×Time FE	Y	Y	Y	Y
Adj. R^2	0.41	0.38	0.41	0.39

Notes: This table reports loan-level regressions of CRE mortgage loan size (Panel A) and spreads over the maturity-matched Treasury yield (Panel B) on the lagged 10-year monetary policy shock (MPS), an indicator for insurers with long-duration liabilities, asset duration, and their interactions. Loan controls include property value, loan-to-value ratio, and maturity. Slope controls interact the change in the yield-curve slope with the long-duration indicator and asset duration. Insurer controls include assets, surplus ratio, and risk-based capital ratio, entered in levels and interacted with the shock. All specifications include insurer-by-ZIP-code and ZIP-code-by-property-type-by-year fixed effects. Lower-order terms implied by the interactions are included but not reported. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table 9: Mechanism – Balance Sheet Duration Gap at Loan Level by Maturity

Panel A: Loans up to 10 year maturity	Loan size (log $)		Spreads (%)	
	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	12.994***	8.378**	-11.010***	-12.812***
	(4.569)	(4.035)	(3.883)	(4.133)
MPS (lagged) × Long-duration liab. × Asset duration	-1.214***	-0.714*	1.064***	1.299***
	(0.454)	(0.405)	(0.375)	(0.413)
N	8,325	7,849	8,192	7,726
Loan controls	Y	Y	Y	Y
Insurer controls	N	Y	N	Y
Slope controls	Y	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Property Type×Time FE	Y	Y	Y	Y
Adj. R^2	0.73	0.72	0.32	0.28
Panel B: Loans over 10 year maturity	Loan size (log $)		Spreads (%)	
	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	0.879	5.895	-1.098	-1.339
	(7.273)	(5.962)	(0.872)	(1.080)
MPS (lagged) × Long-duration liab. × Asset duration	0.175	-0.665	0.126	0.165
	(0.752)	(0.703)	(0.099)	(0.143)
N	7,131	6,916	6,995	6,789
Loan controls	Y	Y	Y	Y
Insurer controls	N	Y	N	Y
Slope controls	Y	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Property Type×Time FE	Y	Y	Y	Y
Adj. R^2	0.80	0.80	0.66	0.69

Notes: This table repeats the loan-level analysis of Table 8, splitting the sample by original loan maturity. Panel A uses loans with maturities of up to ten years and Panel B loans with longer maturities. Within each panel, columns (1)–(2) use log loan size and columns (3)–(4) the spread over the maturity-matched Treasury yield as the dependent variable. Controls and fixed effects follow Table 8. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

the preceding two years.

Taken together, the cross-insurer, loan-level, and maturity evidence points to a balance-sheet supply response. Following a contractionary monetary policy surprise, insurers expand short-maturity CRE lending most strongly when they combine long-duration liabilities with relatively short-duration assets. They do so through larger loans and lower spreads. These patterns are consistent with higher rates relaxing insurers' duration exposure and, combined with increased annuity flows, lowering the shadow cost of supplying shorter-duration mortgage credit.

4.4. Empirical Test for the Market Channel – Bank Retrenchment

The balance-sheet channel explains why insurers become more willing to hold higher-yielding short-duration assets when rates rise, but not why that capacity flows into mortgage markets in particular. As Section 3 shows, banks contract credit supply following monetary tightening, and their retrenchment creates lending opportunities for non-bank intermediaries, especially in regions that are more exposed to bank retrenchment. We test that mechanism in what follows.

Measurement. Identifying the impact of bank retrenchment on insurer lending requires a variable that captures a shift in banks' credit supply rather than a general decline in local demand. To this end, we measure regional exposure to bank retrenchment using the county-level deposit betas of Drechsler et al. (2017). The deposit beta captures how little of a policy rate increase banks pass through to their depositors. When policy tightens, depositors of high-beta banks move funds toward higher-yielding alternatives such as money market funds, draining the deposit base that funds bank lending. Deposit betas thus capture a funding-side exposure to monetary policy that is unrelated to local borrower conditions, and counties with higher deposit-beta exposure should experience a larger contraction in bank credit following contractionary monetary policy.[30]

Empirical design. We retain the insurer (i)–ZIP code (z)–year (t) panel from Section 4.3 and estimate:

$$\log(\text{Originations}_{i,z,t}) = \beta MPS_{t-1} \times DepositBetaExp_c + \delta MPS_{t-1} \times \log(BankOriginations_{c,y-1}) + \gamma' X_{i,z,t} + \alpha_{i,t} + \mu_{i,z} + \varepsilon_{i,z,t}, \quad (4)$$

where $DepositBetaExp_c$ is the deposit-beta exposure of the county c containing ZIP code z. All constituent terms of the interactions are included, with the main effect of deposit-beta exposure absorbed by the fixed effects. To control for level differences across regions and demand for mortgage

[30]The beta measures are available directly from Drechsler et al. (2017) at the county level. Table A15 validates the measure in our setting: bank CRE mortgage originations decline more following a contractionary monetary policy surprise in counties with greater deposit-beta exposure. Table A10 summarizes the measure.

credit, we include direct measures of bank CRE originations and total loan applications, both from HMDA (multifamily segment). The interaction with lagged bank originations further allows the insurer response to vary with the recent level of bank activity separately from banks' funding exposure. The vector $X_{i,z,t}$ additionally contains loan characteristics and interactions of the yield-curve slope with deposit-beta exposure. Standard errors are clustered at the insurer and county levels, since the treatment varies across counties rather than ZIP codes.

The identifying variation comes from comparing the same insurer's lending across ZIP codes in the same year, since deposit-beta exposure varies at the borrower county level. Insurer×year fixed effects ($\alpha_{i,t}$) absorb all observable and unobservable time-varying factors at the insurer level, including changes in an insurer's aggregate lending capacity, funding conditions, and balance sheet, and hence the direct balance sheet-driven response studied above. Insurer×ZIP-code fixed effects ($\mu_{i,z}$) further absorb persistent differences in an insurer's presence and borrower composition across local markets.[31]

Originations. Insurers lend more where banks are expected to retrench. Table 10 shows that the coefficient on the interaction between the monetary policy shock and county deposit-beta exposure is positive across all specifications. Column (1) includes insurer×year and insurer×ZIP-code fixed effects and controls for lagged bank originations. Column (2) adds yield-curve-slope interactions, column (3) adds total mortgage application amounts, and column (4) adds loan controls. The interaction coefficient is stable across columns, at 4.781 in the most saturated specification and statistically significant at the 5% level. This estimate implies that, following a one-standard-deviation contractionary surprise, insurers expand originations by about 8 percentage points more in a county at the 90th percentile of deposit-beta exposure than in a county at the 10th percentile. In sum, after a contractionary monetary policy surprise, insurers originate more CRE mortgages particularly in counties served by banks with more rate-sensitive funding, consistent with insurers filling part of the lending space vacated by banks as policy rates rise.

Table A16 examines both the balance sheet and the market mechanisms jointly. Because insurer×year fixed effects would absorb the interaction of the shock with the long-liability indicator, these specifications include insurer, year, and insurer×ZIP-code fixed effects. The interactions of the monetary policy shock with deposit-beta exposure and with the long-liability indicator are both positive and statistically significant across specifications, indicating that the balance-sheet and market channels each contribute to the expansion in originations, as predicted by our framework.

[31] This design limits concerns that the estimates reflect common insurer supply shocks or persistent sorting across locations. The remaining identifying assumption is that, conditional on the fixed effects and controls, deposit-beta exposure is not correlated with differential changes in local CRE credit demand. The deposit beta is useful in this respect because it captures banks' funding exposure to monetary tightening rather than local borrower conditions.

Table 10: Mechanism – Bank Retrenchment

	Originations (log $)			
	(1)	(2)	(3)	(4)
MPS (lagged) × Deposit beta exposure	3.917*	4.775**	4.772***	4.781**
	(2.164)	(1.840)	(1.773)	(2.001)
Bank originations (log)	-0.040	-0.040	-0.038	-0.032
	(0.030)	(0.031)	(0.032)	(0.035)
MPS (lagged) × Bank originations (log)	-0.218***	-0.219***	-0.398***	-0.360***
	(0.060)	(0.060)	(0.147)	(0.132)
Total application amount (log)			-0.021	-0.025
			(0.026)	(0.026)
MPS (lagged) × Total application amount (log)			0.214	0.269**
			(0.140)	(0.115)
N	16,194	16,194	16,194	14,550
Slope controls	N	Y	Y	Y
Loan controls	N	N	N	Y
Insurer×Time FE	Y	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
Adj. R^2	0.71	0.71	0.71	0.73

Notes: This table reports insurer-ZIP-code-year regressions of log CRE mortgage originations on the lagged 10-year monetary policy shock (MPS) interacted with county-level deposit-beta exposure and with lagged bank mortgage originations. Columns (2)–(4) add the interaction of the change in the yield-curve slope with deposit-beta exposure, columns (3)–(4) add total application amounts, and column (4) adds loan controls (loan-to-value ratio, maturity, and appraisal time). All specifications include insurer-by-year and insurer-by-ZIP-code fixed effects. All lower-order terms implied by the interactions are included. Standard errors two-way clustered by insurer and county, the level at which deposit-beta exposure varies, are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Spreads. Our framework indicates that the balance-sheet and market channels reinforce one another in quantities (originations), while working in opposite directions on spreads. Reduced bank competition alone may allow insurers to charge higher spreads, whereas an outward shift in credit supply should compress them. To separate the two, we estimate Equation 4 with loan spreads as the dependent variable and add the triple interaction of the monetary policy shock and deposit-beta exposure with the long-duration liability indicator introduced earlier. The triple interaction captures whether insurers with the strongest balance-sheet incentive to lend price differently from other insurers in the same retrenchment-exposed markets.

Table 11 reports the results. The interaction between the monetary policy shock and deposit-beta exposure is positive, as reduced bank competition alone would imply, though not statistically

significant. By contrast, the triple interaction with long-duration liabilities is negative, economically large, and statistically significant throughout. In the most saturated specification in column (4), the coefficient is −3.981, and the combined point estimate for long-liability insurers is −2.537. Where banks retrench, other insurers hold or raise spreads, while long-liability insurers compress them. In terms of economic magnitudes, following a one-standard-deviation contractionary surprise, a long-duration liability insurer compresses spreads by about 6 basis points more than other insurers in a county at the 90th percentile of deposit-beta exposure relative to one at the 10th percentile.

Table 11: Mechanism - Bank Retrenchment by Insurer Liability Duration

	Spreads (%)			
	(1)	(2)	(3)	(4)
MPS (lagged) × Deposit beta exposure	0.743	1.443	1.432	1.444
	(1.560)	(1.773)	(1.770)	(1.714)
MPS (lagged) × Deposit beta exposure × Long-duration liab.	-4.149*	-4.264*	-4.265*	-3.981*
	(2.325)	(2.308)	(2.300)	(2.293)
MPS (lagged) × Bank originations (log)	0.052	0.051	0.073	0.074
	(0.060)	(0.060)	(0.101)	(0.103)
MPS (lagged) × Total application amount (log)			-0.024	-0.024
			(0.080)	(0.081)
N	14,412	14,412	14,412	14,412
Slope controls	N	Y	Y	Y
Loan controls	Y	Y	Y	Y
Loan×MPS (lagged) controls	N	N	N	Y
Insurer×Time FE	Y	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
Adj. R^2	0.77	0.77	0.77	0.77

Notes: This table reports insurer-ZIP-code-year regressions of CRE mortgage loan spreads on the lagged 10-year monetary policy shock (MPS) interacted with county-level deposit-beta exposure, an indicator for insurers with long-duration liabilities, and their triple interaction. All specifications include loan controls and insurer-by-year and insurer-by-ZIP-code fixed effects. Columns (2)–(4) add the interaction of the change in the yield-curve slope with deposit-beta exposure, and column (4) additionally interacts loan controls with the MPS. All lower-order terms implied by the interactions are included. Standard errors two-way clustered by insurer and county, the level at which deposit-beta exposure varies, are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

The joint quantity and spread response is consistent with the two channels operating together. Bank retrenchment shifts residual demand toward insurers and creates room to lend, while the relaxation of duration exposure shifts the supply of credit by long-duration liability insurers outward. The positive quantity responses reflect both forces. The spread pattern indicates that, for long-

duration liability insurers, the supply shift more than offsets the upward pricing pressure that bank retrenchment alone would create, which helps explain why insurers' aggregate expansion occurs at lower spreads.

5. Conclusion

Life insurers are an important source of real estate credit, yet their role in mortgage markets remains poorly understood. Using regulatory data covering the universe of mortgage loans held by U.S. life insurers, we show that insurers are major suppliers of directly originated commercial real estate credit and that their lending responds differently to monetary policy than bank lending. Following contractionary monetary policy surprises, banks reduce lending and raise loan rates, while insurers expand originations and reduce spreads, particularly for shorter-maturity loans. We show that this response reflects both insurers' balance-sheet structure and changes in competing bank credit supply. Insurers with longer-duration liabilities respond more strongly to rate increases, while insurer lending expands more in markets where banks retrench. These findings establish insurers as an important margin of adjustment in real estate credit markets and show that monetary policy affects not only the quantity of credit supplied, but also the identity of the intermediary and the maturity of the loans originated.

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Appendix

"Insurers and Real Estate Credit"

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A. Asset Duration

This appendix describes our calculation of the modified asset duration at a security and insurer level. Modified duration measures the sensitivity of an asset's value to parallel shifts in the interest rate curve; specifically, the percentage change in a security's present value for a one-percentage-point parallel shift in its yield. We focus on major fixed income securities (corporate bonds, Treasury and other government bonds, commercial and residential mortgage-backed securities, and whole mortgage loans). Throughout, we ignore prepayment options and callability that, if exercised, may shorten the *effective* duration.

Data and fields. Modified duration is computed from a security's projected cash flows and a discount rate, which requires three inputs for each security: (i) the timing and size of remaining principal and interest or coupon payments (that determine the cash flow schedule), (ii) a yield at which to discount them, and (iii) the balance weight of each security within an insurer's portfolio for aggregation to insurer level.

We use security-level holdings from the annual NAIC statutory filings (Schedule D for bonds and mortgage-backed securities, Schedule B for whole mortgage loans). The filings report the outstanding book value, coupon, and maturity date needed for (i) and (iii) above directly, but not the amortization schedule that determines how the balance is paid down over time. Because the same security appears in consecutive annual filings, however, we observe the path of its outstanding book value over time and use it to recover the amortization structure as detailed below.

Two additional fields are relevant for our measurement. The security type (bond, commercial or residential MBS, commercial or residential mortgage) determines the assumed amortization structure when it cannot be recovered from the book-value path, and the original investment date distinguishes new purchases from the stock of existing holdings.

Amortization structure. We classify each security's amortization structure into one of three types (non-amortizing, level-principal, or level-payment) using its book-value path over consecutive annual filings together with its coupon or interest rate. A constant book value indicates a bullet

security. For a declining book value, the year-to-year reduction combined with the observed coupon allows us to distinguish a level-principal schedule (equal principal paydown each year) from a level-payment schedule (equal total payment, as in a standard mortgage). The classification matters because it determines how much of the principal is repaid over the life of the security versus at maturity, and hence the timing of cash flows that enter the duration calculation.

Where a security cannot be classified this way (because, for instance, it is observed for too few consecutive years), we assign the amortization type by the general amortizing structure of the relevant security class: bonds and commercial MBS are treated as non-amortizing, while whole mortgage loans and residential MBS are treated as level-payment amortizing. This imputation is consistent with the data. For example, among the securities we classify directly, 96% of bonds and 91% of commercial MBS are non-amortizing, while 92% of commercial mortgages and 77% of residential mortgages follow a level-payment schedule.

Cash flows and discounting. Given the amortization type, we use the current- and next-year book values together with the coupon to pin down the level payment or principal amount, and extend that schedule to the reported maturity date. This yields a projected schedule of principal and interest payments for each security, from which we compute modified duration. For the discount rate in (ii) above, we use the swap curve as of the reporting year-end, interpolated across maturities. In the baseline, all cash flows of a security are discounted at the swap yield matching its maturity. We find consistent results using an alternative method in which each cash flow is discounted at the yield matching its own time to payment.

Insurer-level duration. Insurer-year asset duration is the book-value-weighted average of security-level durations across the fixed-income holdings listed above (input (iii)). Because our outcome variable is mortgage lending, our baseline measure excludes whole mortgage loans from the portfolio, so that the duration measure is not mechanically related to the mortgage positions we study. Our results are consistent when including mortgages in insurer-level modified asset durations.

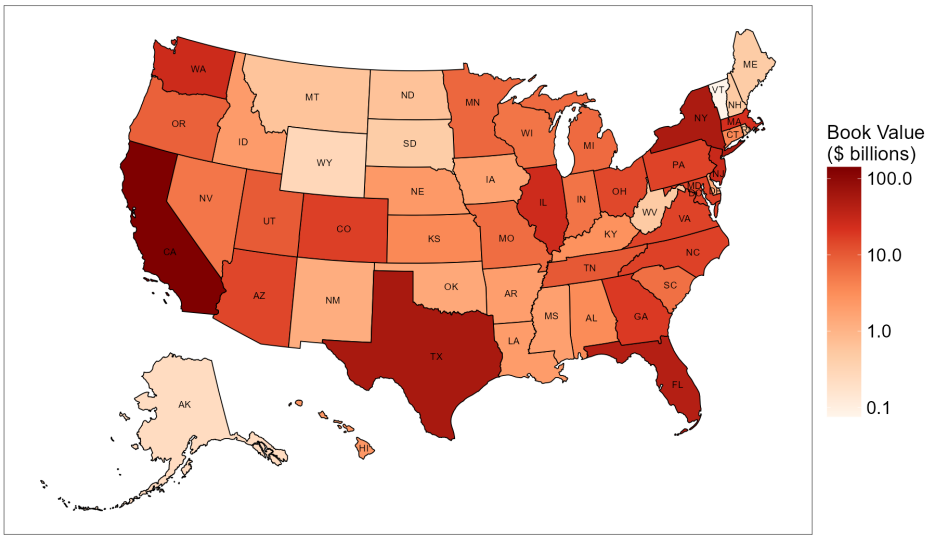
B. Bank CRE Repricing-Maturity

We describe the construction of the maturity distribution of banks' CRE loans, that we use to compute insurers' share of CRE lending by maturity bucket. Banks do not report loan-level maturities for CRE. We therefore approximate the distribution from aggregate regulatory schedules.

Construction. Banks' Call Reports provide a repricing-maturity schedule for their total non-residential loan portfolio, bucketed by time to repricing or maturity, but not for CRE loans separately. We take the bucket shares from this schedule and apply them to the CRE-only total (nonfarm non-residential plus multifamily loans) to obtain an approximate bank CRE distribution. We compute the equivalent distribution for insurers directly from contractual maturity dates in NAIC Schedule B data. We compute insurers' share in each bucket as their outstanding CRE loan balance divided by the combined balance of insurers and banks in that bucket.

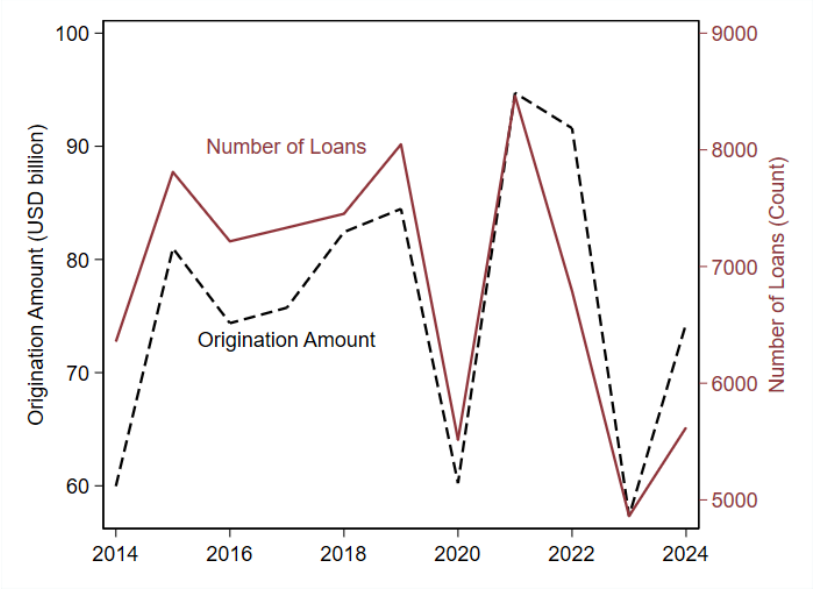
Two features of the construction are important to note. First, banks' non-residential schedule includes commercial and industrial loans, notably revolving credit lines that reprice within three months, which could inflate banks' short-maturity share relative to a pure CRE distribution. Because a large fraction of bank CRE is itself floating-rate, this overstatement is likely modest. Second, around 5% of insurer commercial mortgages have a missing maturity date in Schedule B and cannot be assigned to a bucket. We exclude them from the bucket totals, with no material effect on the aggregate insurer portfolio.

Figure A1: Geographic Distribution of Insurers' CRE Mortgage Holdings



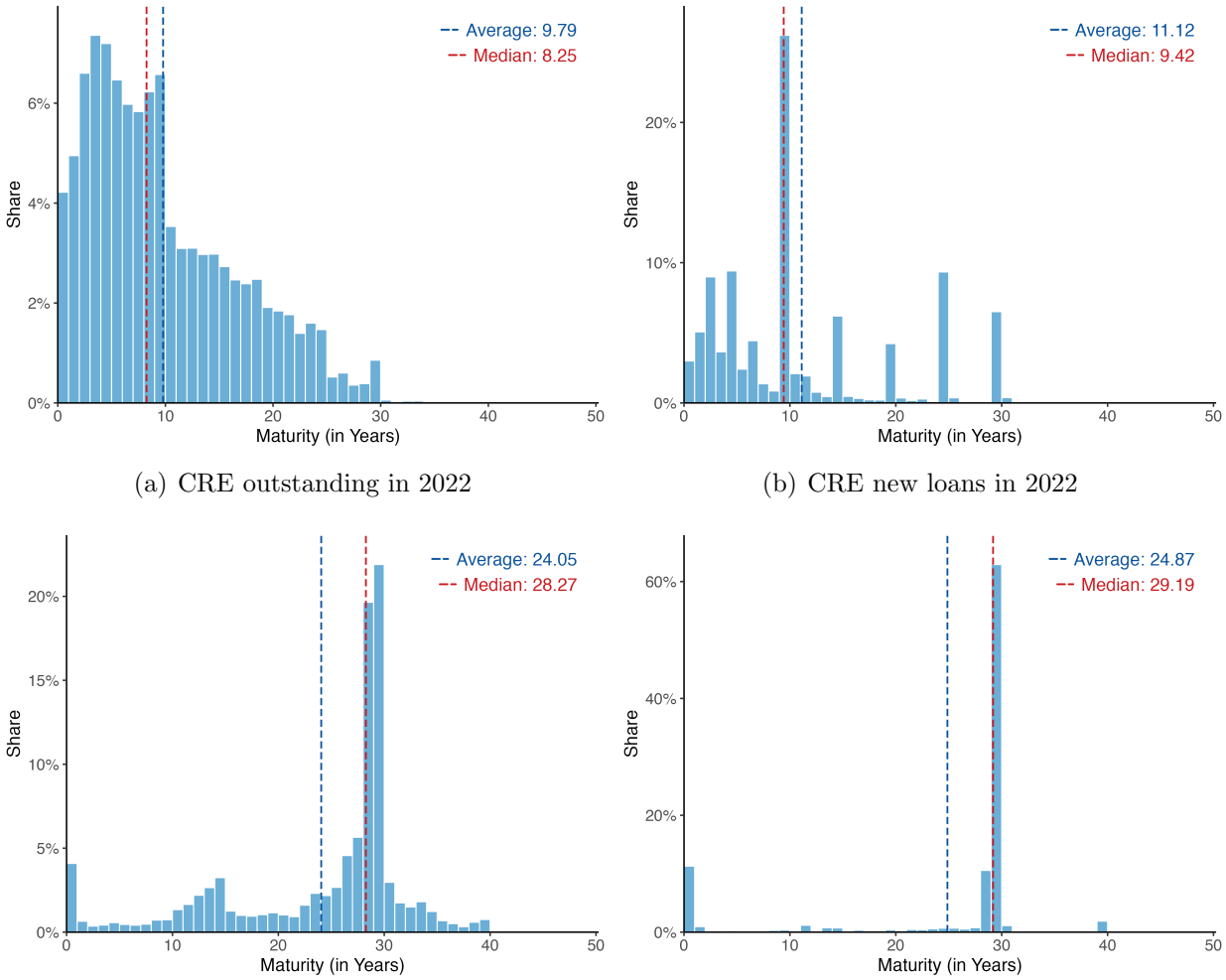
Notes: This figure maps U.S. life insurers' CRE mortgage loan holdings across states as of year-end 2022. For each state, the shaded value is the total book value of mortgage loans secured by property in that state, aggregated across all insurers in our sample. Values are in billions of U.S. dollars and the color scale is logarithmic. States with no reported holdings are shaded white.

Figure A2: Annual CRE Mortgage Investments by Insurers



Notes: This figure plots U.S. life insurers' new commercial real estate mortgage originations by year over 2014–2024. The dashed black line is the total amount originated, in billions of U.S. dollars, measured against the left axis. The solid red line is the number of loans originated, measured against the right axis. Originations are dated by the loan's original investment date and aggregated across all insurers in our sample.

Figure A3: Distribution of Loan Maturities



(a) CRE outstanding in 2022

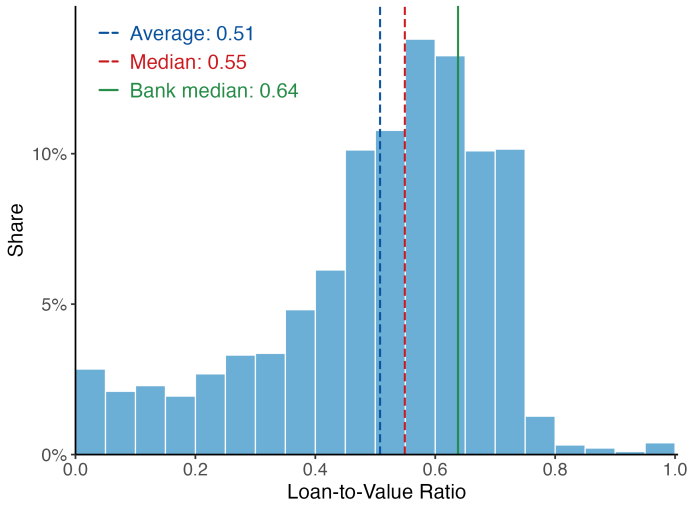
(b) CRE new loans in 2022

(c) RRE outstanding in 2022

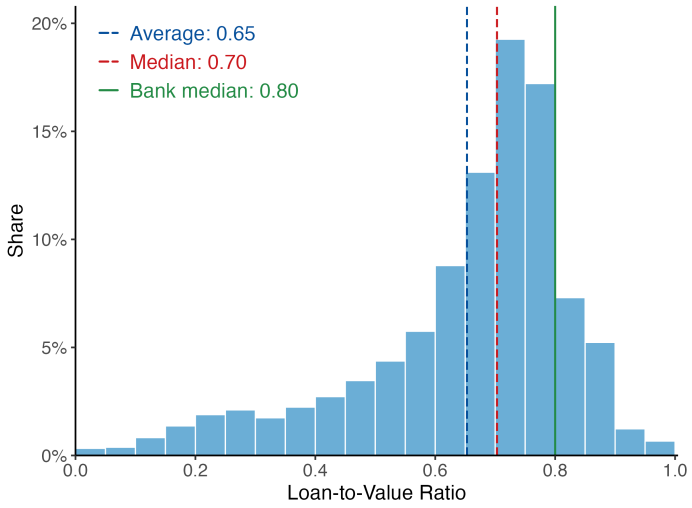
(d) RRE new loans in 2022

Notes: This figure plots the maturity distribution of insurers' mortgage loans as of year-end 2022. Panels (a) and (c) cover all outstanding commercial real estate (CRE) and residential real estate (RRE) loans, respectively. Panels (b) and (d) restrict the sample to loans newly acquired by insurers in 2022. Maturity is the original contractual term of the loan, measured as the difference between the maturity date and the origination date, in years. Dashed vertical lines mark the median (red) and mean (blue), with values reported in each panel.

Figure A4: Distribution of Loan-to-value (LTV) Ratios



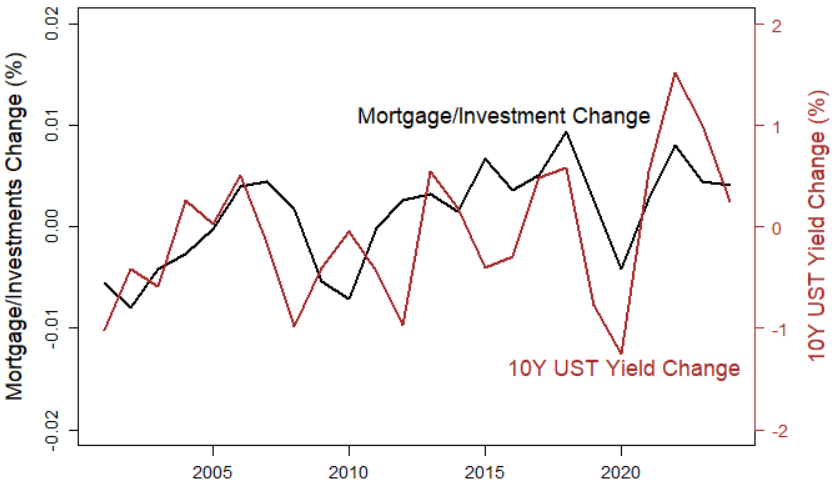
(a) Commercial real estate new loans in 2022



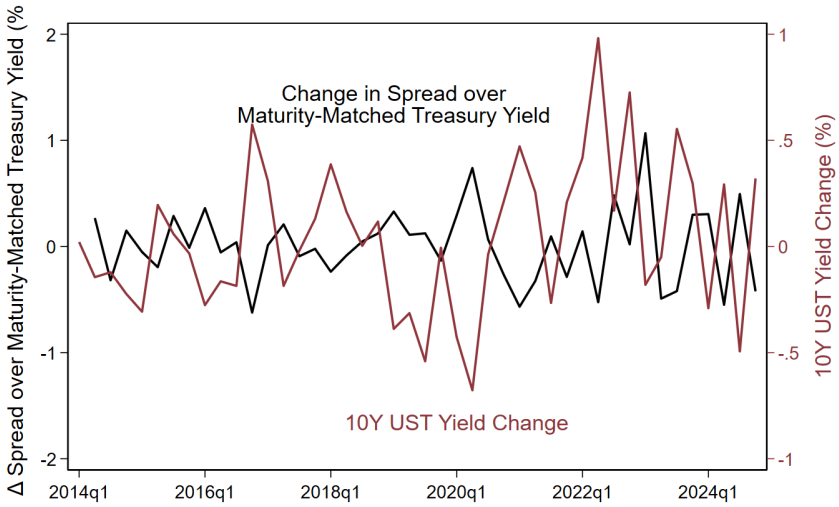
(b) Residential real estate new loans in 2022

Notes: This figure plots the distribution of loan-to-value (LTV) ratios on mortgage loans newly acquired by life insurers in 2022. Panel (a) covers commercial real estate (CRE) loans and Panel (b) residential real estate (RRE) loans. LTV is the loan amount at origination divided by the reported value of the land and building securing the loan. Loans with LTV ratios greater than one are excluded. Dashed vertical lines mark the mean (blue) and median (red) of each distribution. The corresponding median values for bank loans are shown by solid green vertical lines. We obtain bank originations in 2022 from Home Mortgage Disclosure Act (HMDA) data, using multifamily loans as the comparison group for Panel (a) and one-to-four-family loans for Panel (b).

Figure A5: Mortgage Investments and Spreads vs. Changes in Interest Rates



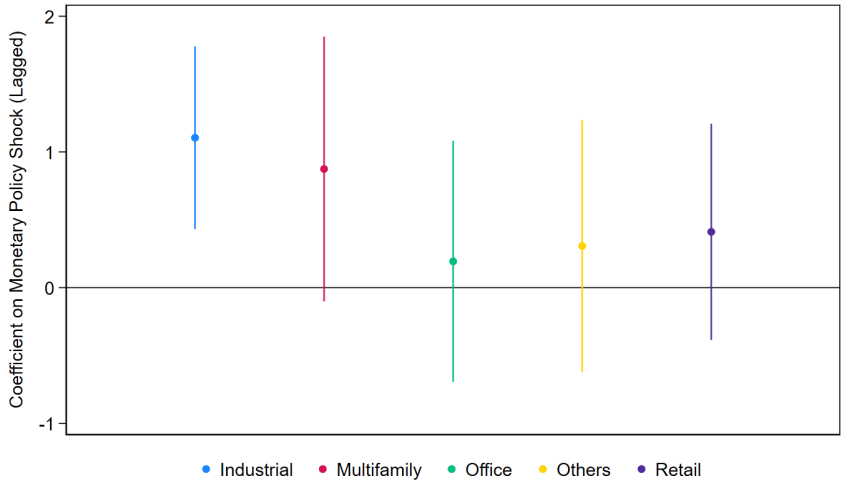
(a) Change in mortgage holdings relative to total investments



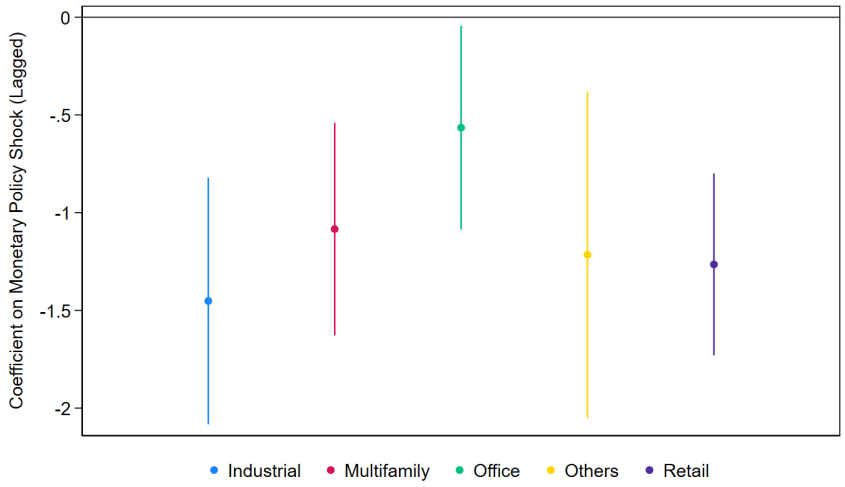
(b) Change in loan spreads over maturity-matched Treasury yields

Notes: This figure plots changes in insurers' mortgage holdings and changes in mortgage loan spreads alongside changes in 10-year U.S. Treasury yield. Panel (a) plots the annual change in mortgage holdings scaled by total investments (black, left axis) and annual change in 10-year Treasury yield (red, right axis). Panel (b) plots the quarterly loan-amount-weighted change in average spread on newly acquired mortgage loans over maturity-matched Treasury yields (black, left axis) and quarterly change in 10-year Treasury yield (red, right axis). The mortgage spread is calculated as the loan yield less the Treasury yield of comparable maturity. Yields and spreads are expressed in percentage points.

Figure A6: Originations and Spread Responses by Property Type



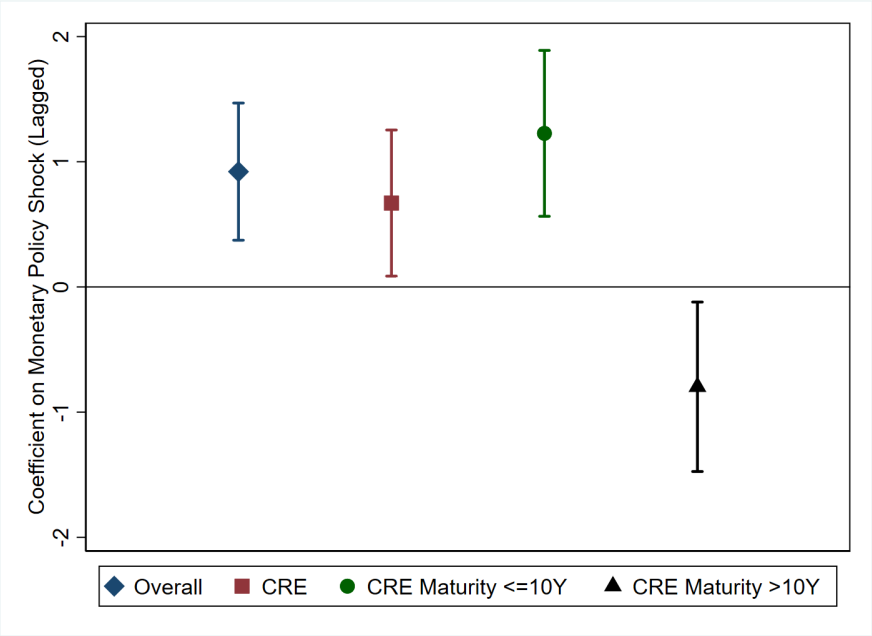
(a) Mortgage originations



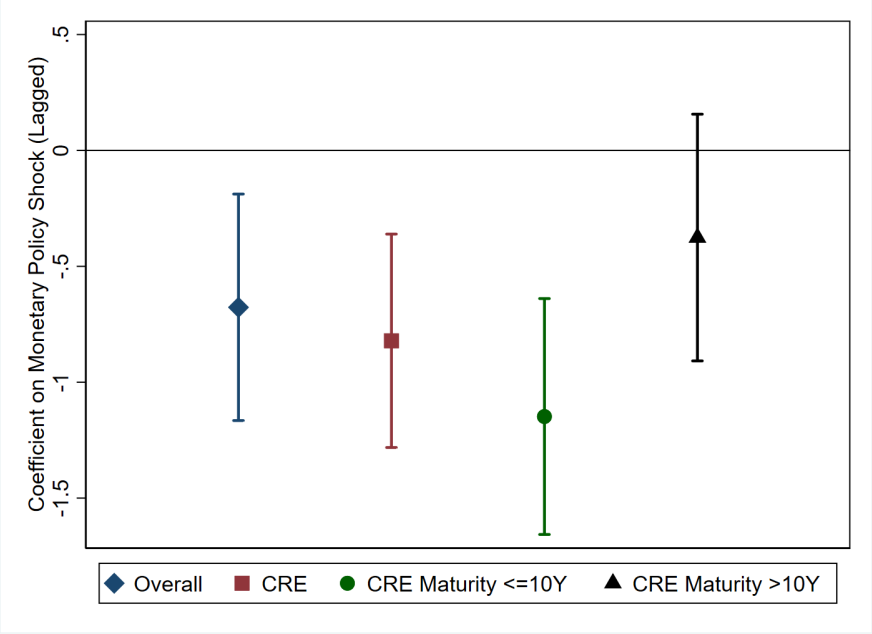
(b) Mortgage loan spreads

Notes: This figure reports coefficients on the one-quarter-lagged monetary policy shock from regressions of insurers' mortgage originations and mortgage loan spreads, estimated separately by property type. Panel (a) reports estimates for the log dollar amount of newly acquired mortgage loans. Panel (b) reports the corresponding estimates for mortgage loan spreads over maturity-matched Treasury yields. Markers denote point estimates, and vertical bars denote 95% confidence intervals.

Figure A7: Originations and Spread Responses to Interest Rates



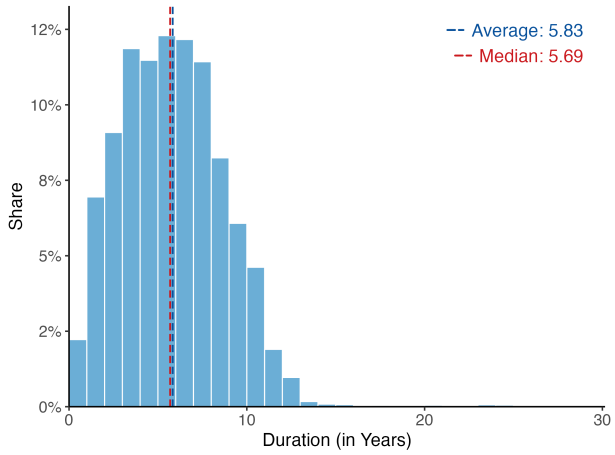
(a) Mortgage originations



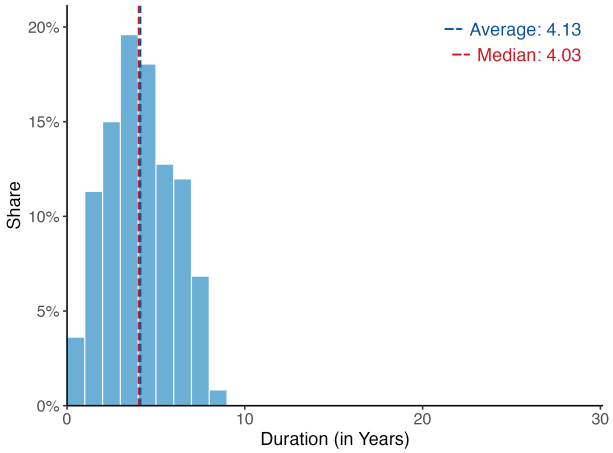
(b) Mortgage loan spreads

Notes: This figure reports coefficients on the one-quarter-lagged monetary policy shock from regressions of insurers' mortgage originations and mortgage loan spreads. Panel (a) reports estimates for the log dollar amount of newly acquired mortgage loans for all mortgage loans, all commercial real estate (CRE) loans, and CRE loans with maturities of 10 years or less and greater than 10 years. Panel (b) reports the corresponding estimates for mortgage loan spreads over maturity-matched Treasury yields. Markers denote point estimates, and vertical bars denote 95% confidence intervals.

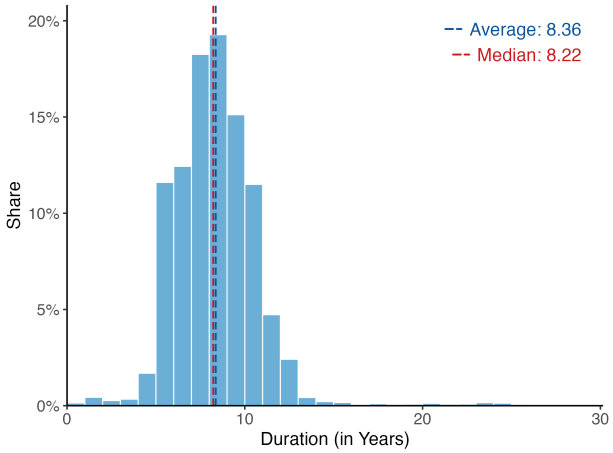
Figure A8: Distribution of CRE Loan Duration



(a) All CRE loans



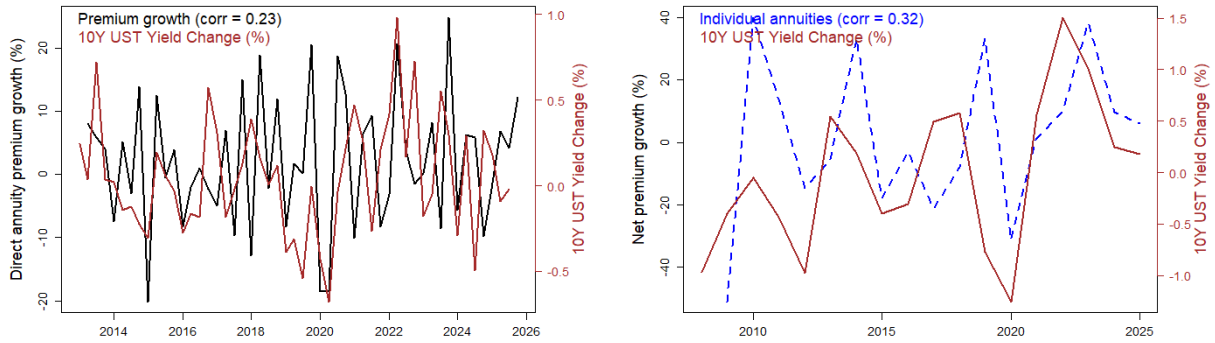
(b) Original maturity $\leq$ 10Y



(c) Original maturity $>$ 10Y

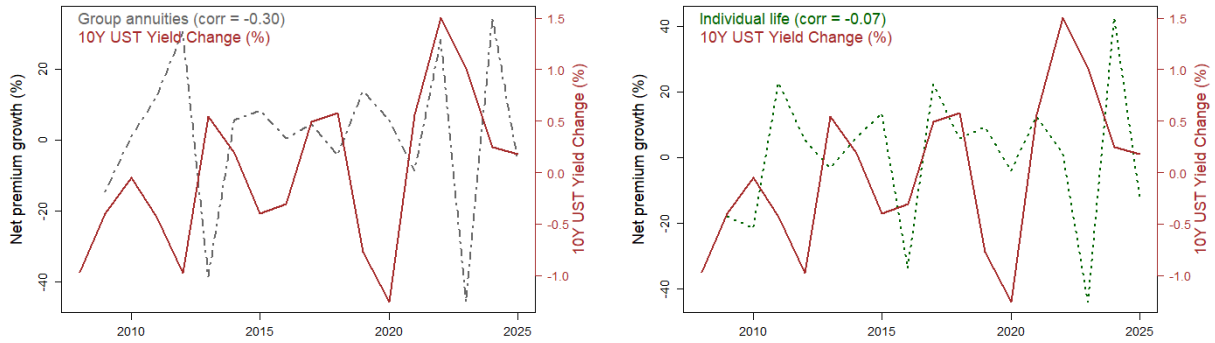
Notes: This figure plots the distribution of duration for insurers' commercial real estate (CRE) mortgage loans outstanding at year-end 2022. Duration is measured over each loan's remaining term as of year-end 2022 in all three panels. Panel (a) covers all outstanding CRE loans; Panels (b) and (c) partition the same loans by original maturity—10 years or less and more than 10 years—measured from the origination date. Duration is calculated by treating each loan as a fixed-coupon instrument, using its contractual interest rate and maturity and accounting for scheduled principal repayment. We infer each loan's amortization rate from the observed path of its book value across annual filings. Dashed vertical lines mark the median (red) and mean (blue), with values reported in each panel.

Figure A9: Interest Rates and Annuity Flows - Changes



(a) Direct annuity considerations (quarterly)

(b) Individual annuities (annual)

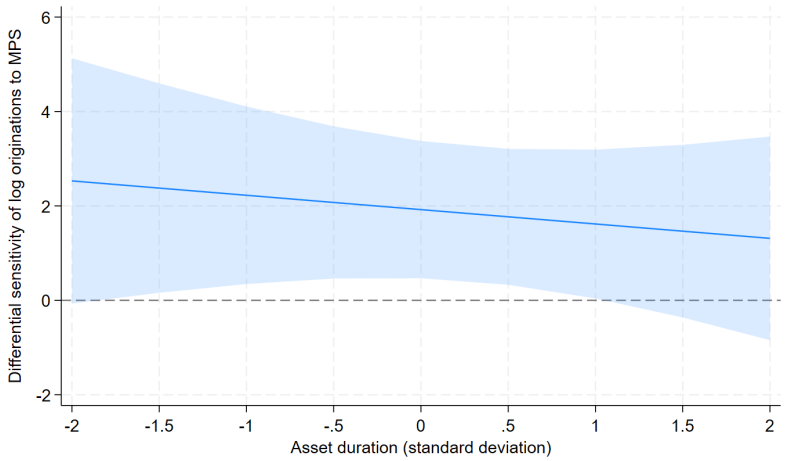


(c) Group annuities (annual)

(d) Individual life (annual)

Notes: This figure plots changes in aggregate premium inflows to U.S. life insurers, by product line, alongside changes in 10-year U.S. Treasury yield. Panel (a) shows quarter-over-quarter growth in direct annuity considerations. Panels (b)–(d) report the same for individual annuities, group annuities, and individual life. Premium growth is in percent (left axis); the yield change is in percentage points (right axis). Each legend reports the contemporaneous correlation between the two series.

Figure A10: Differential Sensitivity of Originations to Rates by Asset Duration



Notes: This figure plots the estimated differential response of long-duration-liability insurers' log CRE mortgage originations to the lagged 10-year monetary policy shock (MPS), relative to other insurers lending in the same ZIP code and year, across asset duration standardized to mean zero and unit variance. Estimates are based on the specification in column (2) of Table A11. The shaded region denotes the 95% confidence interval, based on standard errors two-way clustered by insurer and ZIP code. The dashed line marks zero.

Table A1: Maturity Distribution by CRE Property Type

	Mean	SD	p25	p50	p75	N
Industrial	12.4	7.5	7	10	16	16,159
Multifamily	11.1	7.9	5	10	15	17,439
Office	12.6	8.0	6	10	20	12,074
Retail	15.9	8.0	10	15	25	18,657
Others	11.0	8.3	4	10	15	11,135
–Lodging	8.4	7.0	3	5	10	1,880
–Healthcare	10.1	6.2	5	10	11	809
–Mixed use	12.4	8.5	5	10	15	1,645

Notes: This table reports summary statistics for loan maturity (in years) by property type for commercial real estate loans. Others comprises Lodging, Healthcare, Mixed use, and remaining property types.

Table A2: Whole Loans vs. CMBS – Credit Risk and Illiquidity Premia

	Interest rate (%)			
	Pairwise samples		Pooled sample	
	Loans and agency CMBS	Loans and non-agency CMBS	Loans and all CMBS	
	(1)	(2)	(3)	(4)
Commercial mortgage loan	1.077***	0.493***	1.000***	0.997***
	(0.089)	(0.062)	(0.075)	(0.076)
Non-agency CMBS			0.488***	0.490***
			(0.072)	(0.073)
Remaining maturity (years)				-0.030***
				(0.004)
Omitted category			Agency CMBS	Agency CMBS
Insurer×Year×Maturity bucket FE	Y	Y	Y	Y
Observations	79,348	120,806	126,725	126,725
Adj. R^2	0.78	0.72	0.72	0.72

Notes: This table reports the yield premium that commercial mortgage whole loans earn over comparable-maturity commercial mortgage-backed securities (CMBS) acquired by the same insurer in the same year. The sample is insurers' new commercial mortgage originations and newly acquired CMBS positions over 2014–2024. Each position is assigned to a cell c defined by insurer × acquisition year × remaining-maturity bucket (0–5, 5–10, 10–15, 15–20, 20–25, 25–30, and 30–50 years). The estimating equation is:

$$y_{p,c} = \beta' G_p + \gamma\, M_p + \alpha_c + \varepsilon_{p,c},$$

where $y_{p,c}$ is the yield on position p in percent, G_p is a set of asset-class indicators, M_p is remaining maturity in years, and α_c is a cell fixed effect. Columns (1) and (2) restrict the sample to mortgage loans and agency CMBS, and to mortgage loans and non-agency CMBS, respectively. The coefficient in columns (1) and (2) is the within-cell loan–CMBS yield differential. Columns (3) and (4) pool all three asset classes, with Agency CMBS as the omitted category. Agency status is assigned from CUSIP issuer prefixes for Ginnie Mae, Fannie Mae, and Freddie Mac. Yields are effective interest rates for loans, as reported in Schedule B, and interest rates for CMBS, as reported in Schedule D Part 1. Positions with yields outside 0–15% or remaining maturity outside 0–50 years are excluded. Standard errors clustered by insurer are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3: Appraisal Timing and Mortgage Spread Responses

	Spreads (%)	
	(1)	(2)
Long pipeline = 1	-0.016	-0.028
	(0.074)	(0.074)
Long pipeline = 1 × MPS (lagged)	-0.146	-0.399
	(0.882)	(0.824)
N	7,534	7,527
Loan controls	N	Y
Insurer FE	Y	Y
Time FE	Y	Y
Adj. R^2	0.65	0.66

Notes: This table reports insurer-quarter regressions of mortgage spreads over maturity-matched Treasury yields on an indicator for long appraisal pipelines and its interaction with the lagged 10-year monetary policy shock. The long-pipeline indicator equals one when appraisal time exceeds 90 days. Column (2) additionally controls for property value, loan-to-value ratio, and maturity. Both specifications include insurer and time fixed effects. Standard errors clustered by insurer are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A4: Monetary Policy Responses by Insurer Characteristics

	Originations (log $)			
	(1)	(2)	(3)	(4)
MPS (lagged)	0.861***	0.967***	1.894***	1.078***
	(0.248)	(0.234)	(0.451)	(0.378)
MPS (lagged) × Swap usage	0.387			
	(0.643)			
MPS (lagged) × Total assets		0.038		
		(2.906)		
MPS (lagged) × RBC ratio			-0.960**	
			(0.409)	
MPS (lagged) × Surplus ratio				-0.453
				(2.634)
N	5,024	5,197	4,951	5,197
Insurer FE	Y	Y	Y	Y
Adj. R^2	0.83	0.82	0.82	0.82
	Spreads (%)			
	(1)	(2)	(3)	(4)
MPS (lagged)	-1.118***	-1.069***	-1.240***	-0.772**
	(0.244)	(0.225)	(0.457)	(0.332)
MPS (lagged) × Swap usage	0.386			
	(0.452)			
MPS (lagged) × Total assets		0.268		
		(3.122)		
MPS (lagged) × RBC ratio			0.329	
			(0.394)	
MPS (lagged) × Surplus ratio				-2.714
				(2.626)
N	5,006	5,179	4,933	5,179
Insurer FE	Y	Y	Y	Y
Adj. R^2	0.78	0.78	0.78	0.78

Notes: This table reports insurer-quarter regressions of log mortgage originations and spreads over maturity-matched Treasury yields on the lagged 10-year monetary policy shock and its interaction with insurer characteristics. The characteristics are swap usage, total assets, the risk-based capital ratio, and the surplus ratio. Each column considers one characteristic separately. Lower-order terms are included but not reported for brevity. Standard errors clustered by insurer are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A5: Monetary Policy and Mortgage Originations – Robustness I

Panel A: Alternative rate measures	Originations (log $)					
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (contemporaneous)	1.508***	1.507***	1.502***			
	(0.235)	(0.240)	(0.249)			
Δ 10Y Treasury				0.118***	0.120***	0.196***
				(0.032)	(0.032)	(0.031)
N	5,756	5,559	5,198	5,756	5,559	5,198
Loan controls	N	Y	Y	N	Y	Y
Insurer controls	N	N	Y	N	N	Y
Insurer FE	N	N	Y	N	N	Y
Adj. R^2	0.80	0.80	0.83	0.80	0.80	0.83

Panel B: MPS (monetary event) / Poisson	Originations (log $)			Originations ($)		
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (monetary event, lagged)	0.590***	0.590***	0.490***			
	(0.154)	(0.156)	(0.140)			
MPS (lagged)				0.703***	0.775***	0.786***
				(0.270)	(0.265)	(0.207)
N	5,756	5,559	5,198	9,725	7,010	6,563
Loan controls	N	Y	Y	N	Y	Y
Insurer controls	N	N	Y	N	N	Y
Insurer FE	N	N	Y	N	N	Y
Adj. R^2	0.80	0.80	0.83			

Notes: This table reports insurer-quarter regressions of mortgage originations using alternative monetary policy measures and specifications. Panel A uses the contemporaneous 10-year monetary policy shock in columns (1)–(3) and the change in the 10-year Treasury yield in columns (4)–(6). Panel B, columns (1)–(3), uses the lagged "monetary event" shock of Acosta et al. (2025), which measures the change in the 10-year Treasury yield over a window spanning both the FOMC statement release and the subsequent press conference. Columns (4)–(6) of panel B estimate PPML regressions of dollar origination amounts on the lagged 10-year MPS. All specifications include two lags of the dependent variable and the cumulative change in the 10-year Treasury yield over the preceding eight quarters. Loan controls include loan-to-value ratio, maturity, and appraisal time. Insurer controls include insurer assets, surplus ratio, and risk-based capital ratio. Standard errors clustered by insurer are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A6: Monetary Policy and Mortgage Originations – Robustness II

Panel A: Changes and counts	Δ Originations (log $)			Originations (log count)		
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (lagged)	0.674**	0.722***	0.625**	0.486*	0.526**	0.441*
	(0.276)	(0.271)	(0.273)	(0.254)	(0.242)	(0.236)
N	5,165	4,999	4,689	5,756	5,559	5,198
Loan controls	N	Y	Y	N	Y	Y
Insurer controls	N	N	Y	N	N	Y
Insurer FE	N	N	Y	N	N	Y
Adj. R^2	0.23	0.24	0.23	0.70	0.72	0.75
Panel B: MPS (30Y) / Std. errors	Originations (log $)			Originations (log $)		
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (30Y, lagged)	1.309***	1.320***	1.007***			
	(0.394)	(0.395)	(0.367)			
MPS (contemporaneous)				1.692***		
				(0.510)		
Δ 10Y Treasury					0.202***	
					(0.067)	
MPS (lagged)						1.067*
						(0.642)
N	5,756	5,559	5,198	5,534	5,534	5,534
Loan controls	N	Y	Y	Y	Y	Y
Insurer controls	N	N	Y	N	N	N
Insurer FE	N	N	Y	Y	Y	Y
Adj. R^2	0.80	0.80	0.83	0.83	0.83	0.83
Panel C: Scaled originations / LTV	Δ Originations / Assets			Loan-to-value		
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (lagged)	0.003***	0.002**	0.002*	-0.011	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.034)	(0.034)	(0.035)
N	9,244	6,720	6,336	5,737	5,555	5,194
Loan controls	N	Y	Y	N	Y	Y
Insurer controls	N	N	Y	N	N	Y
Insurer FE	N	N	Y	N	N	Y
Adj. R^2	0.20	0.20	0.24	0.38	0.41	0.47

Notes: This table reports insurer-quarter regressions of alternative mortgage lending outcomes on MPS or rate changes. Panel A uses the change in log dollar originations in columns (1)–(3) and the log number of originations in columns (4)–(6). Panel B uses the lagged 30-year MPS in columns (1)–(3), and the indicated rate measures with Driscoll–Kraay standard errors (4 lags) in columns (4)–(6). Panel C uses change in originations scaled by total assets in columns (1)–(3) and the loan-to-value ratio in columns (4)–(6), where controls exclude LTV. Other specification details follow Table 3. Standard errors clustered by insurer are reported in parentheses unless noted. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A7: Monetary Policy and Mortgage Spreads – Robustness

Panel A: Alternative rate measures	Spreads (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (contemporaneous)	-1.925***	-1.958***	-1.580***			
	(0.220)	(0.219)	(0.242)			
MPS (30Y, lagged)				-0.661*	-0.684**	-0.615*
				(0.346)	(0.337)	(0.329)
N	5,737	5,542	5,181	5,737	5,542	5,181
Adj. R^2	0.73	0.74	0.77	0.75	0.77	0.79
Panel B: Monetary event / Weights	Spreads (%)			Spreads (weighted, %)		
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (monetary event, lagged)	-0.655***	-0.664***	-0.543***			
	(0.102)	(0.098)	(0.093)			
MPS (lagged)				-0.864***	-0.883***	-0.881***
				(0.268)	(0.266)	(0.260)
N	5,737	5,542	5,181	5,737	5,542	5,181
Adj. R^2	0.75	0.77	0.79	0.74	0.76	0.78
Panel C: Changes / Restricted sample	Δ Spreads (%)			Spreads (%)		
	(1)	(2)	(3)	(4)	(5)	(6)
MPS (lagged)	-0.766***	-0.870***	-0.901***	-0.702***	-0.712***	-0.691***
	(0.252)	(0.254)	(0.271)	(0.246)	(0.246)	(0.231)
N	5,148	4,984	4,672	4,874	4,872	4,579
Adj. R^2	0.26	0.27	0.26	0.78	0.79	0.81
Loan controls	N	Y	Y	N	Y	Y
Insurer controls	N	N	Y	N	N	Y
Insurer FE	N	N	Y	N	N	Y

Notes: This table reports insurer-quarter regressions of mortgage spreads using alternative monetary policy measures, spread measures, and samples. Panel A uses the contemporaneous 10-year MPS in columns (1)–(3) and the lagged 30-year MPS in columns (4)–(6). Panel B uses the lagged "monetary event" shock of Acosta et al. (2025) in columns (1)–(3) and the loan-amount-weighted spread over the maturity-matched Treasury yield in columns (4)–(6). Panel C uses the change in spreads in columns (1)–(3) and restricts the sample to loans with appraisal times below 90 days in columns (4)–(6), to mitigate the impact of stale appraisals. Controls and fixed effects, indicated at the bottom for all panels, follow Table 3. Standard errors clustered by insurer are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A8: Validation of Liability Duration Classification

	Shorter-duration liab.		Long-duration liab.		Difference in	
	Mean	SD	Mean	SD	Means	Distributions
Stock beta (Δ10Y Yield)	5.6	7.7	8.7	6.0	3.1**	0.29*
Interest rate swap usage	0.08	0.22	0.29	0.36	0.21***	0.26***
Assets ($ billion)	8.6	23.7	31.9	66.8	23.3***	0.26***
Asset duration (excl. mortgages)	9.1	2.9	9.4	2.4	0.3	0.13
Asset duration (incl. mortgages)	8.8	2.8	9.1	2.3	0.3	0.13
Individual annuities offered (0/1)	0.80	0.40	0.94	0.24	0.14***	

Notes: This table compares insurer characteristics across shorter- and long-duration liability insurers. Long-duration liability insurers are defined as insurers with guaranteed variable annuities (VAs) or those without guaranteed VAs but above-median liability duration. The statistics are calculated at the insurer level after averaging each characteristic over time. The first four columns report means and standard deviations. The "Means" column reports the difference in means between long- and shorter-duration liability insurers, with significance based on two-sided unequal-variance t-tests. The "Distributions" column reports the two-sample Kolmogorov–Smirnov statistic (the maximum distance between the two empirical CDFs), with significance based on the two-sided exact p-value. The Kolmogorov–Smirnov test is omitted for the binary annuity indicator, for which it reduces to the difference in means. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A9: Insurer-level Sensitivity to Rates and Annuity Flows

	Direct annuity considerations			
	(change in $ thousand)		Scaled by lagged assets	
	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	182,863.4**	184,326.1**	1.13*	1.17*
	(76,114.9)	(76,559.0)	(0.568)	(0.648)
N	15,632	15,521	15,848	15,848
Insurer controls	N	Y	N	Y
Insurer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Adj. R^2	0.01	0.01	0.49	0.50

Notes: This table reports insurer-quarter regressions of annuity inflows on lagged monetary policy shocks interacted with an indicator for long-duration liability insurers. The dependent variable is direct annuity considerations, expressed as changes in $ thousand in columns (1)–(2) and scaled by lagged total assets in columns (3)–(4). MPS is the quarterly monetary policy surprise measured on 10Y yields, lagged one period. Long-duration liab. equals one for insurers with guaranteed variable annuities or, among insurers without guaranteed VAs, those with above-median liability duration. Standard errors clustered by insurer and year are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A10: Summary Statistics – Variables Used in Yearly Analysis

	Mean	SD	p25	p50	p75	N
Asset duration (excl. mortgages)	9.51	2.51	7.81	9.59	11.27	2,439
Deposit beta exposure (county-level)	0.35	0.06	0.33	0.37	0.39	1,524
Monetary Policy Shock (10Y)	-0.02	0.10	-0.12	0.01	0.06	11
Monetary Policy Shock (30Y)	-0.01	0.07	-0.06	0.01	0.02	11
US Treasury Yield (10Y)	2.49	0.99	1.84	2.33	2.95	11
Δ US Treasury Yield (10Y)	0.17	0.80	-0.40	0.25	0.58	11
US Treasury Yield (30Y)	2.96	0.82	2.58	2.89	3.34	11
Δ US Treasury Yield (30Y)	0.09	0.64	-0.50	0.22	0.50	11
Slope (10Y-2Y)	0.63	0.79	-0.04	0.50	1.18	11
Δ Slope (10Y-2Y)	-0.20	0.56	-0.59	-0.21	0.33	11

Notes: This table reports summary statistics for variables used in the annual regressions. Asset duration is at the insurer-year level, in years. Deposit beta exposure is at the county level, for counties in which sample insurers lend. Monetary policy shocks and yield changes are annual and expressed in percentage points.

Table A11: Mechanism – Balance Sheet – Standardized Asset Duration

	Originations (log $)			
	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	1.185*	1.922**	2.005***	1.536**
	(0.601)	(0.741)	(0.717)	(0.703)
MPS (lagged) × Long-duration liab. × Asset duration	-1.186*	-1.648**	-1.429*	-1.364*
	(0.611)	(0.772)	(0.764)	(0.723)
Δ Slope × Long-duration liab.		0.298***	0.308***	0.295***
		(0.097)	(0.099)	(0.098)
Δ Slope × Long-duration liab. × Asset duration		-0.259**	-0.251**	-0.334***
		(0.119)	(0.119)	(0.113)
N	9,291	9,291	8,109	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.77

Notes: This table repeats the analysis of Table 6, Panel A, standardizing asset duration to have zero mean and unit variance, so that coefficients on interactions with asset duration are per standard deviation. Controls and fixed effects follow Table 6. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A12: Mechanism – Balance Sheet Duration Gap – Robustness I

	Originations (log $)			
Panel A: 10Y Monetary Policy Shock (2-year cumulative)	(1)	(2)	(3)	(4)
MPS (cumulative) × Long-duration liab.	5.472**	6.042***	5.549**	4.251**
	(2.243)	(2.256)	(2.189)	(1.801)
MPS (cumulative) × Long-duration liab. × Asset duration	-0.525**	-0.574**	-0.529**	-0.408*
	(0.228)	(0.232)	(0.228)	(0.210)
Δ Slope × Long-duration liab.		0.731**	0.762**	0.896***
		(0.301)	(0.312)	(0.298)
Δ Slope × Long-duration liab. × Asset duration		-0.065**	-0.069**	-0.082***
		(0.030)	(0.031)	(0.030)
N	9,291	9,291	8,109	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.77
Panel B: 30Y Monetary Policy Shock (2-year cumulative)	(1)	(2)	(3)	(4)
MPS (cumulative) × Long-duration liab.	7.464***	7.591***	6.880***	6.159***
	(2.222)	(2.223)	(2.037)	(1.799)
MPS (cumulative) × Long-duration liab. × Asset duration	-0.729***	-0.735***	-0.644***	-0.597***
	(0.237)	(0.240)	(0.221)	(0.225)
Δ Slope × Long-duration liab.		0.380	0.375	0.537
		(0.327)	(0.368)	(0.341)
Δ Slope × Long-duration liab. × Asset duration		-0.032	-0.031	-0.047
		(0.033)	(0.037)	(0.034)
N	9,291	9,291	8,109	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.77

Notes: This table repeats the analysis of Table 6 using cumulative monetary policy shocks (MPS), measured as the cumulative shock over the preceding two years, at the 10-year (Panel A) and 30-year (Panel B) maturities. Controls and fixed effects follow Table 6, with insurer controls interacted with the corresponding cumulative shock. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A13: Mechanism – Balance Sheet Duration Gap – Robustness II

	Originations (log $)			
Panel A: Pre-2022 sample	(1)	(2)	(3)	(4)
MPS (lagged) × Long-duration liab.	5.651**	7.523**	7.351**	6.979**
	(2.454)	(2.908)	(3.091)	(2.779)
MPS (lagged) × Long-duration liab. × Asset duration	-0.413	-0.594*	-0.554	-0.578
	(0.284)	(0.323)	(0.350)	(0.351)
Δ Slope × Long-duration liab.		0.944	1.039*	1.264**
		(0.589)	(0.571)	(0.579)
Δ Slope × Long-duration liab. × Asset duration		-0.084	-0.088	-0.116*
		(0.068)	(0.066)	(0.069)
N	6,947	6,947	6,184	6,002
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.77
Panel B: Control for swap usage	(1)	(2)	(3)	(4)
MPS (30Y, lagged) × Long-duration liab.	6.273**	7.769**	7.143**	7.008**
	(2.848)	(3.198)	(3.248)	(3.093)
MPS (30Y, lagged) × Long-duration liab. × Asset duration	-0.607*	-0.750**	-0.663*	-0.659*
	(0.311)	(0.380)	(0.386)	(0.369)
Δ Slope × Long-duration liab.		0.687**	0.693*	0.868**
		(0.347)	(0.387)	(0.354)
Δ Slope × Long-duration liab. × Asset duration		-0.064*	-0.063	-0.081**
		(0.038)	(0.042)	(0.038)
MPS (30Y, lagged) × Swap	-3.180***	-3.040***	-3.402***	-3.639**
	(1.060)	(1.062)	(1.177)	(1.546)
N	9,090	9,090	7,920	7,890
Loan controls	N	N	Y	Y
Insurer controls	N	N	N	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Time FE	Y	Y	Y	Y
Adj. R^2	0.76	0.76	0.77	0.78

Notes: This table reports two robustness checks of the balance sheet duration-gap mechanism. Panel A restricts the sample to the pre-2022 period to ensure that the results are not driven by the single tightening cycle of 2022–2023. Panel B controls for insurers' interest rate swap usage and its interaction with the lagged 30-year MPS, to account for off-balance-sheet hedging. Controls and fixed effects follow Table 6. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A14: Mechanism – Duration Gap at Loan Level – Robustness

Panel A: 10Y US Treasury Yield	Loan size (log $)		Spreads (%)	
	(1)	(2)	(3)	(4)
Δ Treasury (lagged) × Long-duration liab.	1.815***	1.500***	-0.354**	-0.422***
	(0.550)	(0.444)	(0.154)	(0.162)
Δ Treasury (lagged) × Long-duration liab. × Asset duration	-0.169***	-0.139***	0.040**	0.052***
	(0.056)	(0.048)	(0.016)	(0.017)
N	17,284	16,507	16,969	16,218
Loan controls	Y	Y	Y	Y
Insurer controls	N	Y	N	Y
Slope controls	Y	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Property Type×Time FE	Y	Y	Y	Y
Adj. R^2	0.78	0.77	0.41	0.39
Panel B: 10Y Monetary Policy Shock (2-year cumulative)	Loan size (log $)		Spreads (%)	
	(1)	(2)	(3)	(4)
MPS (cumulative) × Long-duration liab.	8.025***	4.815**	-2.364***	-2.600***
	(2.798)	(1.925)	(0.755)	(0.837)
MPS (cumulative) × Long-duration liab. × Asset duration	-0.794***	-0.503**	0.277***	0.332***
	(0.287)	(0.224)	(0.086)	(0.099)
N	17,284	16,507	16,969	16,218
Loan controls	Y	Y	Y	Y
Insurer controls	N	Y	N	Y
Slope controls	Y	Y	Y	Y
Insurer×ZIP Code FE	Y	Y	Y	Y
ZIP Code×Property Type×Time FE	Y	Y	Y	Y
Adj. R^2	0.78	0.77	0.41	0.39

Notes: This table repeats the loan-level analysis of Table 8 using alternative interest rate measures. Panel A uses the lagged change in the 10-year Treasury yield and Panel B the cumulative 10-year monetary policy shock (MPS) over the preceding two years. Within each panel, columns (1)–(2) use log loan size and columns (3)–(4) the spread over the maturity-matched Treasury yield as the dependent variable. Controls and fixed effects follow Table 8, with insurer controls interacted with the respective rate measure. Standard errors two-way clustered by insurer and ZIP code are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A15: Validation of Bank Mortgage Originations and Deposit Beta

	Bank originations (thousands)			
	(1)	(2)	(3)	(4)
MPS (lagged) × Deposit beta exposure	-105.057**	-94.203**	-94.139**	-94.146**
	(47.994)	(43.108)	(43.384)	(43.355)
MPS (lagged)	7.625	6.637		
	(12.526)	(11.552)		
N	49,458	49,458	49,458	49,458
County FE	N	Y	Y	Y
Time FE	N	N	Y	Y
Loan Type FE	N	N	N	Y
Adj. R^2	0.06	0.83	0.85	0.86

Notes: This table validates the bank retrenchment measure by regressing county-level bank mortgage originations from HMDA, measured in thousands of U.S. dollars, on the lagged 10-year MPS, county deposit-beta exposure, and their interaction. The panel is at the county-loan-type-year level, and regressions are weighted by lagged total application amounts. Columns progressively add county, year, and loan-type fixed effects. Standard errors clustered by county are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A16: Mechanism – Bank Retrenchment and Liability Duration

	Originations (log $)			
	(1)	(2)	(3)	(4)
MPS (lagged) × Deposit beta exposure	4.458*	4.501***	4.478***	3.804**
	(2.295)	(1.502)	(1.484)	(1.561)
MPS (lagged) × Long-duration liab.	2.742**	2.743**	2.735**	2.798*
	(1.166)	(1.163)	(1.154)	(1.514)
MPS (lagged) × Total application amount (log)			0.139	0.138
			(0.109)	(0.120)
N	16,731	16,731	16,731	14,754
Slope controls	N	Y	Y	Y
Loan, Insurer controls	N	N	N	Y
Insurer, Time, Insurer×ZIP Code FE	Y	Y	Y	Y
Adj. R^2	0.68	0.68	0.68	0.70

Notes: This table repeats the analysis of Table 10, adding the interaction of the lagged 10-year monetary policy shock (MPS) with the long-duration-liability indicator. Because insurer-by-year fixed effects would absorb this interaction, specifications include insurer, year, and insurer-by-ZIP-code fixed effects. The dependent variable is log CRE mortgage originations. All lower-order terms implied by the interactions are included but not reported. Standard errors two-way clustered by insurer and county are reported in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.