

Homeowners Insurance and the Transmission of Monetary Policy

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Introduction

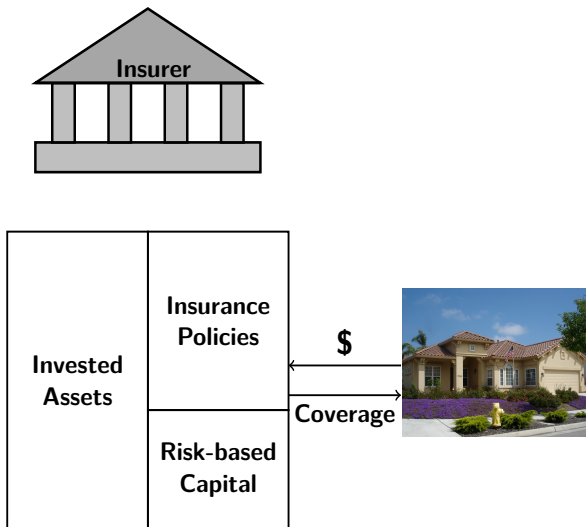
- Financial intermediaries are important for the transmission of monetary policy
- Pass through via insurance markets?
 - Insurers are one-third the size of banks
 - Central for household welfare, especially **homeowners insurance**:
 - Protection against climate risk, mandatory for mortgages
 - 21% of home costs* on average

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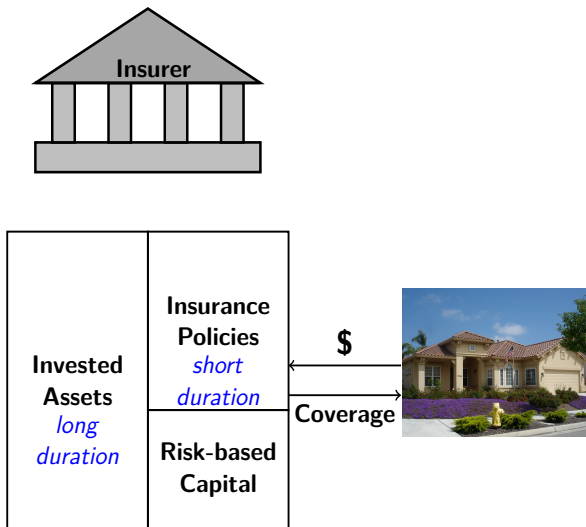
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 - Protection against climate risk, mandatory for mortgages
 - 21% of home costs* on average
- **This paper:** Monetary policy and homeowners insurance
 - **Frictionless benchmark:** Interest rates $\uparrow$ → PV(Future claims) $\downarrow$ → Insurance prices $\downarrow$
 - **Instead:** Interest rates $\uparrow$ → Asset values $\downarrow$ → Regulatory constraints $\uparrow$
 - Insurance prices $\uparrow$
 - House prices $\downarrow$

* Home costs = Principal, interest, taxes, insurance

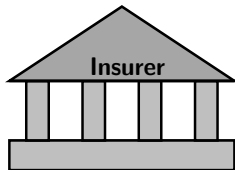
Mechanism



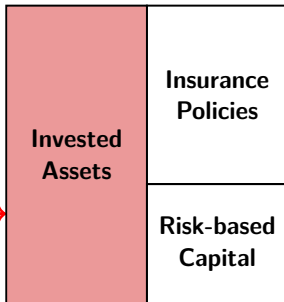
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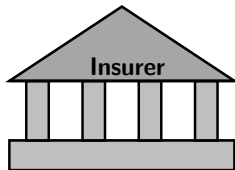
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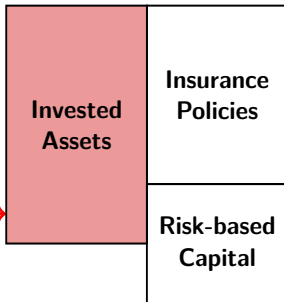
$R_F \uparrow$



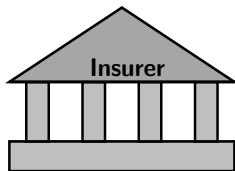
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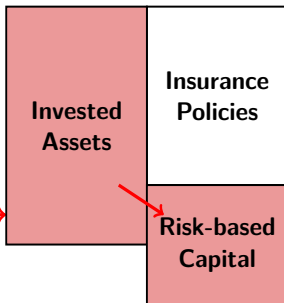
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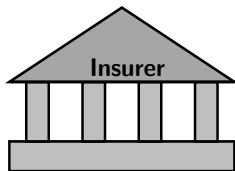
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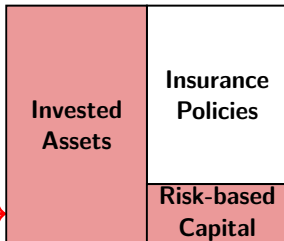
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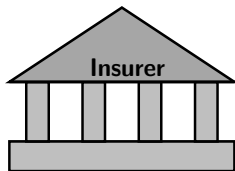
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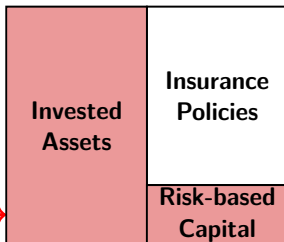
$R_F \uparrow$



Mechanism



$R_F \uparrow$



$\$ \uparrow$
Coverage



This paper

(I) Stylized model of non-life insurance and monetary policy

- Without financial frictions: rate hikes decrease insurance prices
- With financial frictions: rate hikes increase insurance prices

This paper

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- Without financial frictions: rate hikes decrease insurance prices
- With financial frictions: rate hikes increase insurance prices

(II) Empirical evidence on homeowners insurance

- Rate hikes increase insurance prices
- Driven by constrained insurers with interest-rate sensitive investment portfolios

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- Driven by constrained insurers with interest-rate sensitive investment portfolios

(III) Effects on housing markets

- Local insurers constrained → Stronger effects of hikes on house prices

Contribution

- **Interest rate pass-through** to financial markets (Neumark and Sharpe 1992 QJE; Kayshap and Stein 2000 AER; Drechsler et al. 2017 QJE; Xiao 2020 RFS) and insurers' investments (Kaufmann et al. 2023; Li 2025; Kirti and Singh 2025)
New: Insurance pricing & amplification through regulatory frictions
- **Insurance supply** and financial frictions (Kojien and Yogo 2015 AER, 2016 ECMA, 2017 JF; Ge 2022 JF; Sen 2023 RFS; Barbu and Sen 2025; Kalda et al. 2025; Knox and Sorensen 2025)
New: Monetary policy transmission
- **Insurance & housing markets:** Growing evidence on interlinkages (Blickle and Santos 2022; Sastry 2025 RFS; Ge et al. 2023, 2024; Sastry et al. 2025)
New: Homeowners insurance amplifies macroeconomic shocks

Impact of interest rate hikes on insurance prices

$$\frac{\partial \log P}{\partial r_f} = -1$$

- Frictionless benchmark: prices decrease

Impact of interest rate hikes on insurance prices

$$\frac{\partial \log P}{\partial r_f} = -1 + \underbrace{\delta \times (\text{Duration}(A) - \text{Duration}(L) + c)}_{\text{Shadow cost of capital}}$$

where δ = regulatory friction

- Frictionless benchmark: prices decrease
- If frictions ($\delta > 0$) and duration gap sufficiently large: prices increase
 - Interest rate $\uparrow \Rightarrow$ Asset values $\downarrow \Rightarrow$ Shadow cost of capital $\uparrow \Rightarrow$ Price $\uparrow$

Data

- (1) All **price filings in US homeowners insurance** from 2010 to 2019 (S&P)
⇒ Information on insurer, state, product, Δ Price, filing date
- (2) Insurer **balance sheets** (NAIC)
⇒ Security-level asset holdings and transactions, regulatory capital requirements

Data

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	N	Mean	SD	p1	p25	p50	p75	p99
<i>Filing level</i>								
Δ Price (%)	27,357	6.01	6.30	-8.20	0.70	5.00	9.60	27.00
Filing time	27,357	420.12	427.35	5.00	195.00	358.00	452.00	2,238.00

Empirical specification

$$\Delta\text{Price}_f = \beta \Delta\text{MP}_{(t-1:t-6)} + \text{Controls} + \text{FEs} + \varepsilon_f$$

- ΔPrice_f : Price change of filing f of insurer i in state s in month t
- $\Delta\text{MP}_{(t-1:t-6)}$: High-frequency changes in 10y Treasury yield around FOMC meetings

Empirical specification

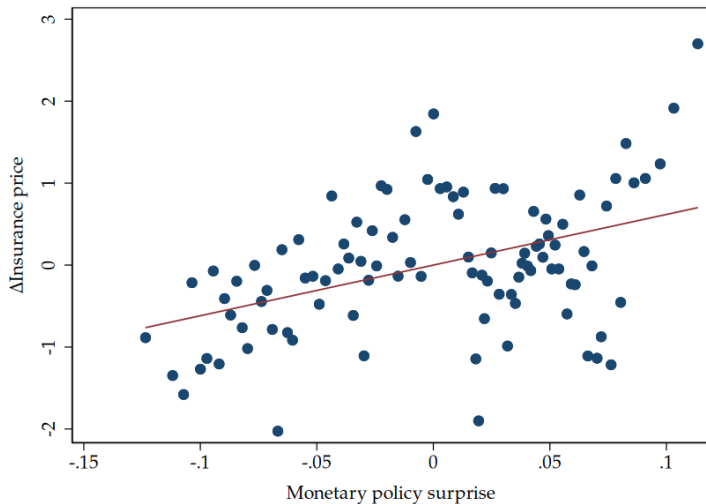
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- ΔPrice_f : Price change of filing f of insurer i in state s in month t
- $\Delta\text{MP}_{(t-1:t-6)}$: High-frequency changes in 10y Treasury yield around FOMC meetings
- **Controls:**
 - Insurer characteristics (including size, lagged profitability)
 - State characteristics (including lagged disaster damages, ΔGDP , inflation)
 - Macro characteristics (VIX, ΔGDP , inflation)

►► Monetary policy shocks

►► List of controls

Monetary policy hikes increase insurance prices (no controls)



Monetary policy hikes increase insurance prices

	Dependent variable: $\Delta Price_f$		
	(1)	(2)	(3)
$\Delta MP_{(t-1:t-6)}$	9.713*** [3.84]	8.118*** [3.87]	7.350*** [3.63]
Insurer controls		Yes	Yes
State & macro controls			Yes
Insurer-State FE	Yes	Yes	Yes
Product-State FE	Yes	Yes	Yes
No. of obs.	27,357	27,357	27,357
R^2	0.315	0.331	0.346

Elasticity: +7 ppt (≈ 1 sd) vs. -1 ppt (frictionless benchmark)

» Robustness

» Other variables & extensive margin

Mechanism

- MoPo $\uparrow \rightarrow$ Asset values $\downarrow \rightarrow$ Regulatory capital ratio $\downarrow \rightarrow$ Insurance Prices $\uparrow$
 - (1) Constraints
 - (2) Assets held at market value: high-yield bonds & stocks
 - (3) Assets with long duration

Mechanism

- MoPo $\uparrow \rightarrow$ Asset values $\downarrow \rightarrow$ Regulatory capital ratio $\downarrow \rightarrow$ Insurance Prices $\uparrow$
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Examine **balance sheet determinants**:

$$\Delta \text{Price}_f = \beta \text{Constrained}_{i,y-1} \times \Delta \text{MP}_{(t-1:t-6)} + \text{Controls} + \text{FEs} + \varepsilon_f$$

- $\text{Constrained}_{i,y-1}$: Lowest tercile of $(\text{RBC Ratio}_{i,y-1} - \overline{\text{RBC Ratio}_{i,y-(2:6)}})$
- Portfolio sensitivity:
 - portfolio duration (p10-p90: 4.2-9.8)
 - share of assets held at market value (p10-p90: 0%-37%)

Mechanism

Regulatory constraints & investment sensitivity drive monetary policy impact:

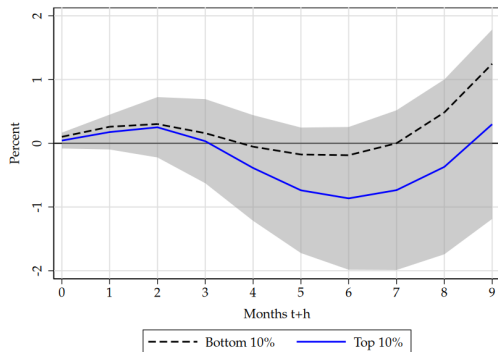
Constraints:	Dependent variable: $\Delta Price_f$		
	Regulatory capital	+High MTM	+Long duration
	(1)	(2)	(3)
Constrained $_{i,y-1} \times \Delta MP_{(t-1:t-6)}$	6.281*** [3.21]		
Other interaction terms	Yes		
Insurer controls	Yes		
Insurer-State FE	Yes		
Product-State-Year-Month FE	Yes		
High sensitivity-Year-Month FE			
No. of obs.	23,527		
R^2	0.671		
Within R^2	0.014		

Mechanism

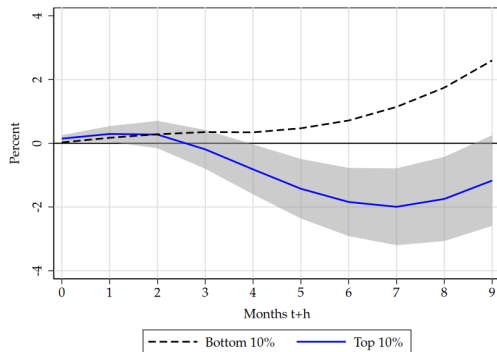
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	Regulatory capital	+High MTM	+Long duration
	(1)	(2)	(3)
Constrained $_{i,y-1} \times \Delta MP_{(t-1:t-6)}$	6.281*** [3.21]	3.846* [1.87]	1.521 [0.74]
High sensitivity $_{i,y-1} \times$ Constrained $_{i,y-1} \times \Delta MP_{(t-1:t-6)}$		12.040** [2.14]	15.320*** [3.15]
Other interaction terms	Yes	Yes	Yes
Insurer controls	Yes	Yes	Yes
Insurer-State FE	Yes	Yes	Yes
Product-State-Year-Month FE	Yes	Yes	Yes
High sensitivity-Year-Month FE		Yes	Yes
No. of obs.	23,527	23,527	23,418
R^2	0.671	0.676	0.682
Within R^2	0.014	0.014	0.017

Home prices decline more when insurers are more sensitive



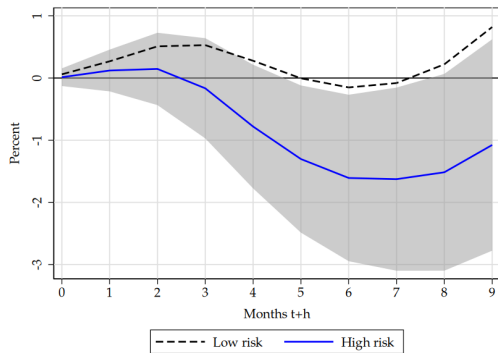
(a) Duration ϕ



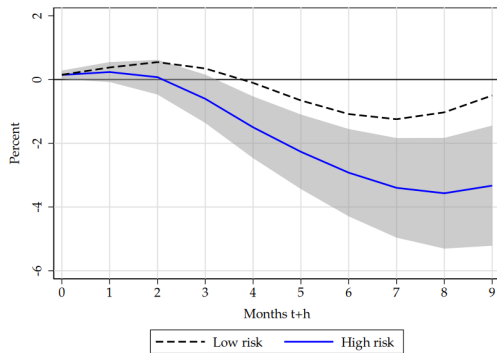
(b) MTM share ϕ

Top 10%: Insurers most sensitive to monetary policy

... especially in disaster-exposed areas



(a) Duration ϕ



(b) MTM share ϕ

Plots the differential impact of hikes for top- vs. bottom-sensitive insurers in high-risk and low-risk counties.

Additional results & construction zone

Additional results:

- Impact on mortgage applications
- New measure for asset sensitivity accounting for equity duration
- Results robust to alternative inflation controls and different time windows
- No significant impact of monetary policy on filing probability or type of filing

Ongoing work:

- Data up to 2025
- County-level variation in insurer exposure

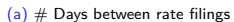
Conclusion

- Stylized model: Monetary policy transmission driven by financial frictions in insurance market
- Empirical evidence that rate hikes
 - increase insurance prices
 - driven by sensitivity of insurers' investments and regulatory constraints
 - amplify transmission to housing markets

Policy implications:

- Countercyclicality: Insurance sector amplifies monetary policy in bad times
- Insurance especially relevant for households with exposure to natural disasters
⇒ Monetary policy meets climate risk

Monetary policy surprises



- Homeowners insurance has one year maturity at median

Conclusion

- **Insurer-level controls:** Log(Assets), leverage, ann. ROE, RBC ratio, ann. underwriting gain scaled by lagged assets, ann. investment income scaled by lagged assets
 - All measured 5 quarters, i.e., one year before the filing
- **State-level controls:** Log(Mean 5-yr disaster damages), Log(Standard deviation of 5-yr disaster damages), Log(Per capita GDP), ann. change in HPI
 - All measured at the end of the preceding year; HPI change measured at the end of the preceding quarter
- **Macro controls:** CBOE Volatility Index, GDP growth over previous 6 months, CPI inflation over previous 6 months
 - All measured at the end of the preceding quarter

Robustness: Monetary policy and insurance prices

Specification:	Dependent variable: $\Delta Price_f$				
	Sample windows		Inflation controls		MP horizon
	Post 2010	Post 2011	PCE	U.S. states	
	(1)	(2)	(3)	(4)	
$\Delta MP_{(t-1:t-6)}$	8.786*** [3.82]	6.430*** [2.91]	8.104*** [3.74]	9.313*** [4.50]	
$\Delta MP_{(t-1:f-1)}$					6.723*** [7.37]
Insurer controls	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes
Macro controls	Yes	Yes	Yes	Yes	Yes
Insurer-State FE	Yes	Yes	Yes	Yes	Yes
Product-State FE	Yes	Yes	Yes	Yes	Yes
No. of obs.	34,558	31,525	37,607	17,065	37,607
R^2	0.325	0.345	0.306	0.364	0.313
Within R^2	0.076	0.087	0.065	0.069	0.075

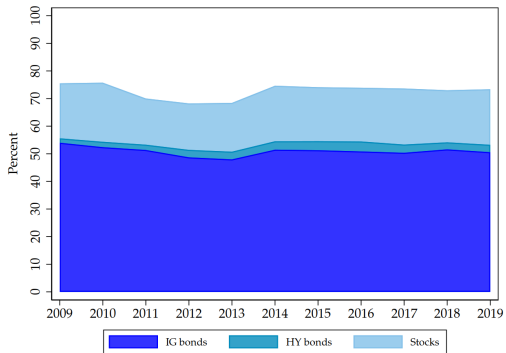
Robustness: Monetary policy and insurance prices

Dep. variable:	Other filing variables		Extensive margin		
	$P'holders_f$	$Premiums_f$	$1(Rate\ filing_{ist})$	$1(Filing_{ist})$	$\Delta Price_{ist}$
	(1)	(2)	(3)	(4)	(5)
$\Delta MP_{(t-1:t-6)}$	0.564*** [2.83]	0.005 [0.01]			0.955*** [4.31]
$ \Delta MP_{(t-1:t-6)} $			-0.089*** [-3.69]	-0.079*** [-2.98]	
Insurer controls	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes
Macro controls	Yes	Yes	Yes	Yes	Yes
Insurer-State FE	Yes	Yes	Yes	Yes	Yes
Product-State FE	Yes	Yes			
State-Season FE			Yes	Yes	Yes
No. of obs.	36,129	36,458	493,662	493,662	493,662
R^2	0.795	0.793	0.038	0.038	0.029
Within R^2	0.033	0.067	0.016	0.016	0.013

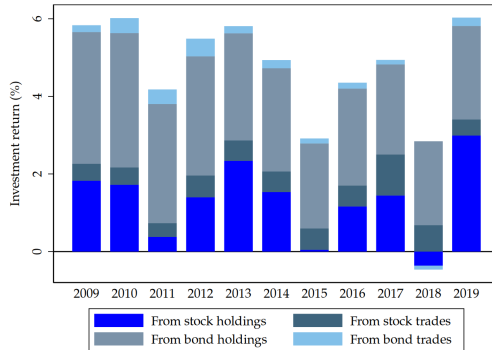
Investment income changes and regulatory capital

	Dependent variable: $\Delta \text{Regulatory capital}_{i,y}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Investment income (in USD) $_{i,y}$	0.966*** [11.94]	0.966*** [11.94]				
<i>From stocks</i>			1.013*** [13.15]	1.013*** [13.15]		
<i>From bonds</i>			0.757*** [5.15]	0.757*** [5.15]		
<i>From holding stocks</i>					0.998*** [10.36]	0.998*** [10.36]
<i>From holding bonds</i>					0.850*** [9.34]	0.850*** [9.34]
Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes		Yes		Yes
No. of obs.	7,063	7,063	7,063	7,063	7,063	7,063
R^2	0.561	0.561	0.562	0.562	0.608	0.608
Within R^2	0.308	0.308	0.310	0.310	0.382	0.382

Asset composition

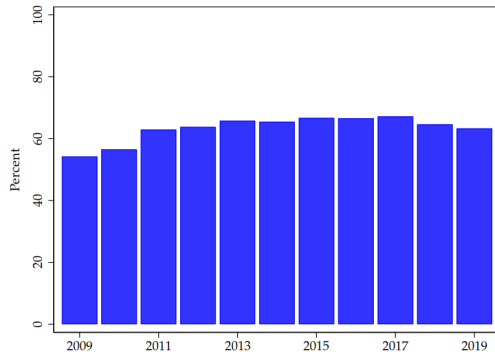


(a) Asset side composition

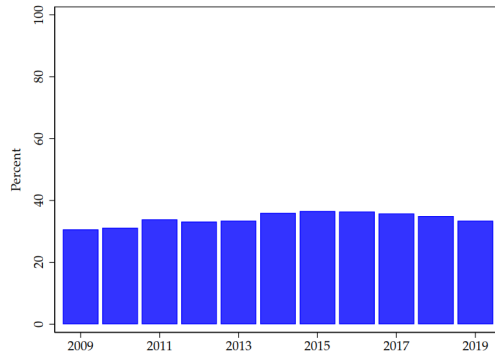


(b) Investment income composition

Measuring duration

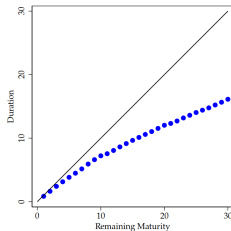


(a) Fixed income portfolio

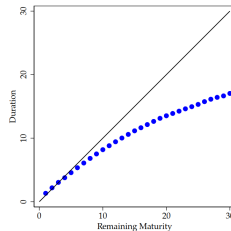


(b) Total assets

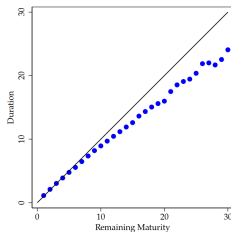
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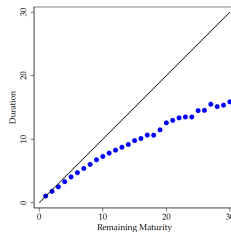
(a) Corporate bonds



(b) Municipal bonds



(c) Treasuries



(d) Foreign bonds

◀ Back

Measuring duration: Interest rate sensitivity

Price variable:	Dependent variable: R_{bm}					
	Median price			Average price		
	Sample period:			Sample period:		
	2009:M1-2019:M12			2006:M1-2019:M12		
	(1)	(2)	(3)	(4)	(5)	(6)
ΔMP_{m-1}	-9.516*** [-15.64]	-8.996*** [-15.39]	-1.929** [-2.00]	-1.620 [-1.55]	-1.460** [-2.32]	-0.833 [-1.39]
$\text{Duration}_{b,y(m)-1}$	0.146*** [29.23]	0.116*** [19.21]	0.117*** [19.47]	-0.046*** [-8.17]	0.115*** [20.45]	-0.042*** [-7.77]
$\text{Duration}_{b,y(m)-1} \times \Delta MP_{m-1}$	-0.433*** [-6.14]	-0.550*** [-7.89]	-0.313*** [-4.43]	-0.160** [-2.38]	-0.258*** [-4.63]	-0.146*** [-2.65]
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls		Yes	Yes	Yes	Yes	Yes
$\Delta MP_{m-1} \times \text{Controls}$			Yes	Yes	Yes	Yes
No. of obs.	1,000,808	789,995	789,995	899,405	789,995	899,405
R^2	0.086	0.125	0.128	0.055	0.105	0.057
Within R^2	0.009	0.015	0.018	0.019	0.018	0.019