

Insurance corporations' balance sheets, financial stability and monetary policy

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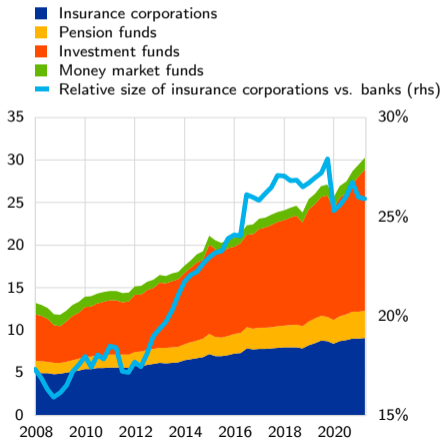
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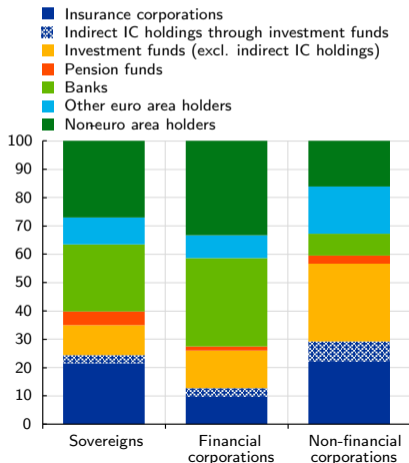
Size of the insurance sector has grown significantly

- ▶ Insurance corporations (ICs) play an important role by managing risks for households and firms and by providing financing for sovereigns and the real economy
- ▶ Sector almost doubled from 5 to 9 EUR trillion between 2008-2021, equivalent to 25% of euro area banking system

(A) Size of financial sectors by type

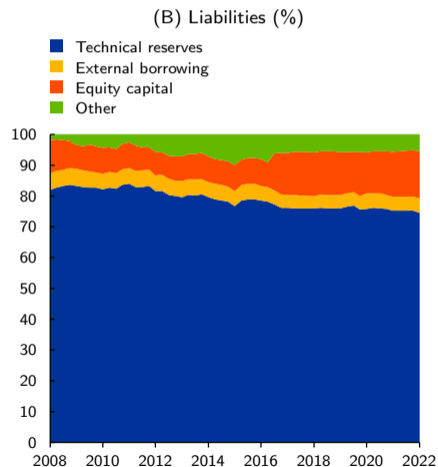
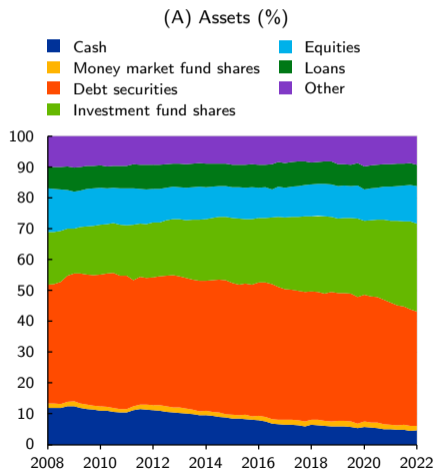


(B) Investor base of long-term debt securities by euro area issuer sector

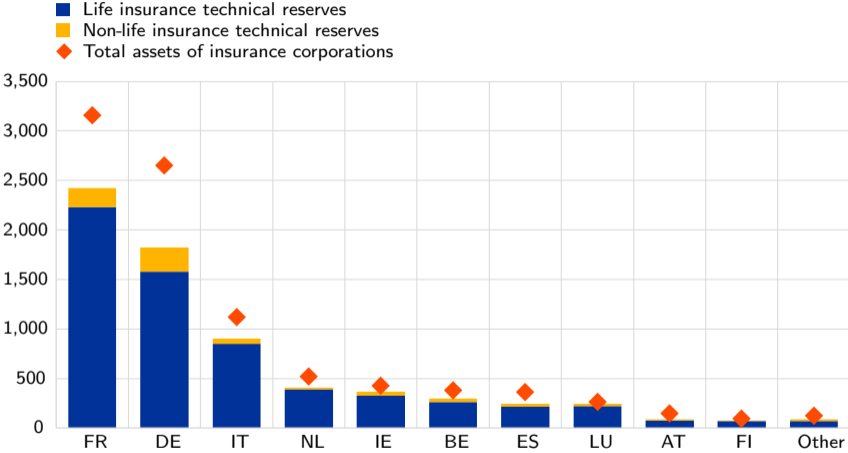


Composition of euro area insurers' balance sheets

- Premiums collected from policy holders are invested in capital markets: mainly long-term bonds, investment fund shares and equity



Size of insurance corporations by country and type of insurance activities



Data is shown in EUR billion in 2021 Q4.

This paper

- ▶ Given their business model, monetary policy (MP) is a key element for insurers, but systematic empirical evidence is scarce
- ▶ **Research questions**
 - ▶ **How does monetary policy affect the size and composition of ICs balance sheets (Transmission)?**
 - ▶ **What are the financial stability implications of those changes (Risks)?**
- ▶ We study dynamic responses of asset & liability side balance sheet items and risk-taking metrics (credit, liquidity, duration) to monetary policy
 - ▶ Country-sector data for all 19 euro area countries between 2008 and 2021
 - ▶ High-frequency monetary policy shocks (Jarocinski & Karadi, 2020; Altavilla et al., 2020)
 - ▶ Local projections to compute impulse response functions (Jorda, 2005)

Insurance corporations and monetary policy: possible channels

What are the mechanisms explaining changes in ICs' size and behaviour after a monetary policy loosening?

▶ Real channels:

- ▶ **Insurance demand channel:** GDP \uparrow , household disposable income & demand for IC products \uparrow
 \Rightarrow Total reserves \uparrow , IC total assets \uparrow , ICs' bond & equity investments \uparrow , firm financing conditions improve
- ▶ ... but "**Euler equation**": consumption \uparrow , savings $\downarrow \Rightarrow$ less IC product demand
 \Rightarrow Total reserves \downarrow , Total assets \downarrow

▶ Financial Channels:

- ▶ **Negative duration gap channel:** Under full mark-to-market accounting, positive valuation effects
 \Rightarrow Total assets $\uparrow <$ Total reserves $\uparrow \Rightarrow$ Capital \downarrow and Leverage \uparrow , portfolio duration \uparrow
 \Rightarrow long-term yields \downarrow , financing conditions improve
- ▶ **Risk-taking/search for yield channel:** Cash/Cash buffers \downarrow , portfolio duration \uparrow , risky asset holdings/share \uparrow , capital (requirements) \uparrow

After a monetary policy loosening:

- ▶ Total assets & technical reserves increase: Significant increase of ICs' **financial intermediation capacity** → **active transmission of monetary policy**
- ▶ ICs decrease their external borrowing, capital positions improve, leverage falls (\neq negative duration gap channel)
- ▶ **Portfolio re-balancing** consistent with **risk-taking channel** of monetary policy:
 - ▶ **Credit risk:** Less debt and more riskier stocks and fund shares
 - ▶ Within bond portfolio: shares of lower-rated debt holdings increase, driven in particular by NFC and RoW assets
 - ▶ ...but counter-cyclical shedding of lower-rated sovereign debt
 - ▶ **Liquidity risk:** Lower cash holdings and buffers
 - ▶ **Duration risk:** Share of long term bond holdings increases

Non-banks and monetary policy:

- ▶ Hau & Lai (2016); Choi & Kronlund (2017); Elliot et al. (2022); Nelson et al. (2018); Kaufmann (2022); Giuzio et al. (2021); Xiao (2019); Daniel et al. (2021)

Investment behaviour of insurers and its effect on the economy:

- ▶ Becker & Ivashina (2015); Domanski, Shin, and Sushko (2017); Carboni and Ellison (2021); Kubitzka (2022); Kubitzka et al. (2022); Ozdagli & Wang (2019); Chodorow-Reich et al. (2020); Fringuellotti & Santos (2021)

Pro-/counter-cyclical behaviour of insurers:

- ▶ Timmer (2018); Kojien et al. (2017, 2021); Fache Rousová & Giuzio (2019)

Outline

Data

Monetary Policy Shock Identification

Local Projection Specification

Results

- Main balance sheet aggregates response to MP shocks

- Bond portfolio: Sectoral allocation, risk-taking and duration risk

Data Sources

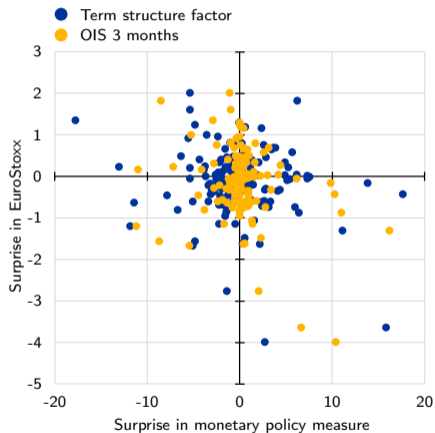
- ▶ Quarterly panel dataset: 19 euro area countries, 2008 Q1 – 2021 Q4
 - ▶ Aggregated at the sector-country level
- ▶ Sources: ICs balance sheet data (ICPF/ICB) and Securities Holding Statistics by Sector (SHSS)
 - ▶ ICPF/ICB: aggregate view at asset/liability balance sheet items
 - ▶ Structural break in 2016 Q3 when merging ICB and ICPF datasets. Cleaning breaks
 - ▶ SHSS: risk-taking behaviour from securities holdings characteristics
- ▶ Data available in market and nominal values
- ▶ Further variables (GDP, inflation, etc.) from standard ECB sources (SDW)

Monetary Policy Surprises

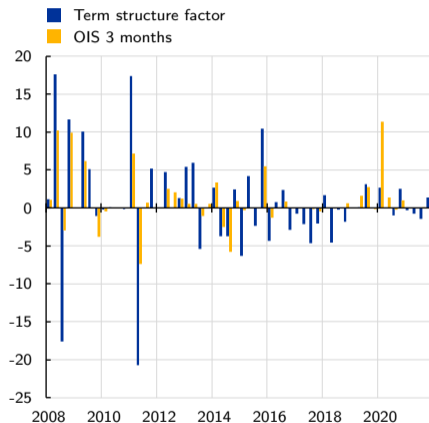
- ▶ Monetary policy surprises obtained from Altavilla et al. (2019)
 - ▶ High-frequency data for different financial assets/indicators around policy announcements by the ECB
- ▶ Jaroncinski and Karadi (2020): need to separate genuine monetary policy shocks from information shocks
 - ▶ Monetary policy shocks identified as negative co-movement in yield and stock market index changes around GovC announcements
- ▶ To capture surprise changes over whole yield curve, we calculate a “term structure factor” using method by Gürkaynak et al. (2005)
 - ▶ Principal component analysis based on OIS with maturities of 1 week, 1, 3, 6, months, and 1 year, plus changes of German Bund with maturities of 2, 5, and 10 years
 - ▶ Include longer end of yield curve to capture effects of unconventional policies during sample period, but results fully robust to short-term and other long-term measures

High-frequency monetary policy surprise measures

(A) Interest rate and EuroStoxx surprises impact



(B) Monetary policy surprises over time



Panel (A): High-frequency interest rate changes (in basis points) and corresponding EuroStoxx changes (in percentage points) on all ECB Governing Council meeting days between 2008 and 2021. Panel (B): Cumulative quarterly monetary policy surprises between 2008 and 2021 in basis points.

Local Projection Specification

- ▶ We estimate:

$$y_{i,t+h} = \alpha_i^h + \theta^h Shock_t + \sum_{l=1}^2 \beta_l^h y_{i,t-l} + \sum_{l=1}^2 \gamma_l^h Controls_{i,t-l} + \epsilon_{i,t+h} \quad (1)$$

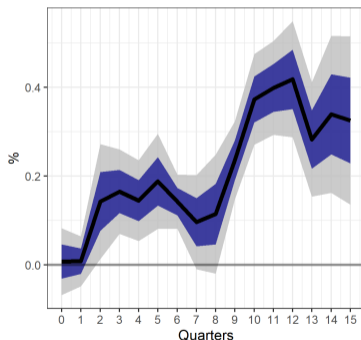
- ▶ ...controlling for macroeconomic and financial conditions: GDP growth, inflation, observed Bund yield at maturity 3 years, VSTOXX, 3-year euro area BBB-rated corporate spread, log total assets (unless dependent variable)
- ▶ ...controlling for lagged values of the shocks
- ▶ Results robust to different lag lengths: we pick 2 lags
- ▶ Standard errors clustered at country level
- ▶ Dynamics of classic real and financial macroeconomic variables consistent with conventional wisdom on monetary policy Classic variables IRFs

Main balance sheet aggregates response to MP shocks

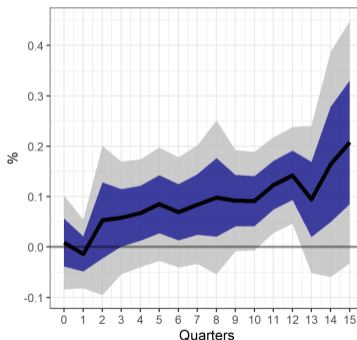
Total Assets (log levels)

Significant increase of IC sector and, thus, financial intermediation capacity after monetary loosening.
10bps shock \Rightarrow EUR 200 bn. *nominal* growth \Leftrightarrow 1.6% of EA GDP after one year

Total Assets Market Value



Total Assets Nominal Value
(w/o valuation effects)

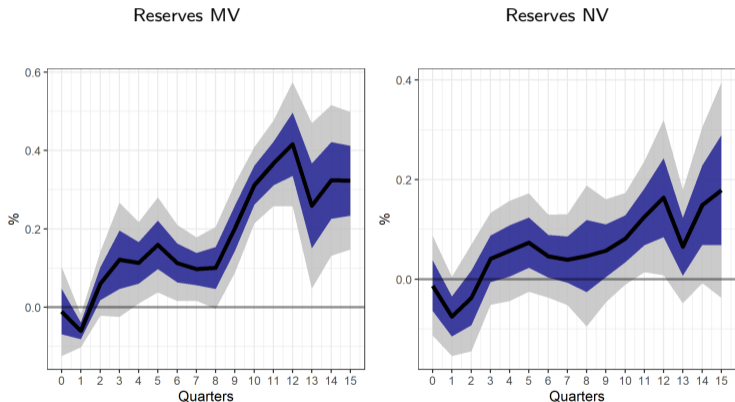


Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

Main balance sheet aggregates response to MP shocks

Liabilities (log levels)

Technical reserves rise \Rightarrow more business after MP loosening \Rightarrow consistent with *insurance demand channel*



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External Debt

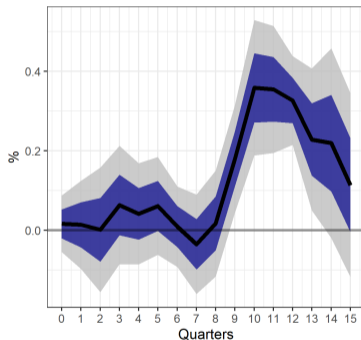
Descriptive Stat.

Reg. Tables

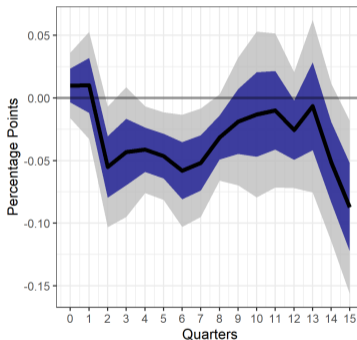
Main balance sheet aggregates response to MP shocks

Asset Composition: Debt securities.

Debt Securities MV (log levels)



Debt Securities MV (Share of total assets)



Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

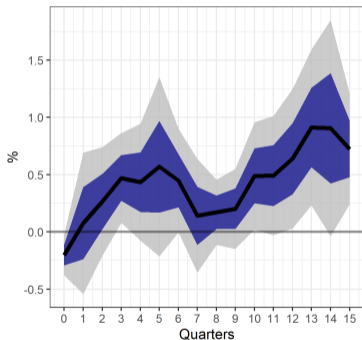
Nominal Value

Descriptive Stat.

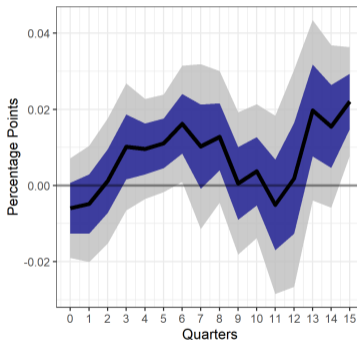
Main balance sheet aggregates response to MP shocks

Asset Composition: Equity

Equity MV (log levels)



Equity MV (Share of total assets)



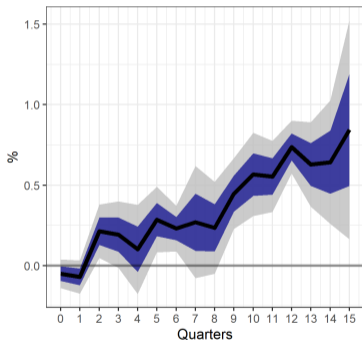
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Nominal Value

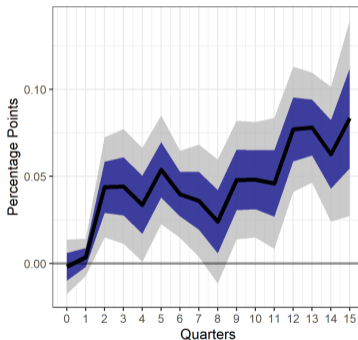
Main balance sheet aggregates response to MP shocks

Asset Composition: Investment fund shares (no MMF)

Investment fund shares MV (log levels)



Investment fund shares MV (Share of total assets)



Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

Nominal Value

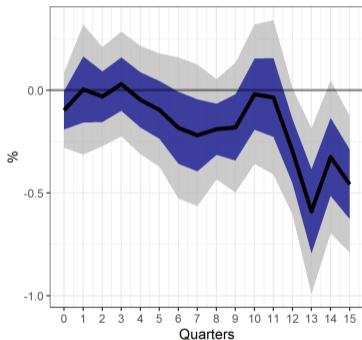
All IFs

MMFs

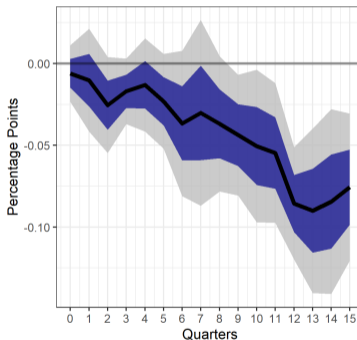
Main balance sheet aggregates response to MP shocks

Asset Composition: Cash holdings

Cash Holdings MV (log levels)



Cash Buffers

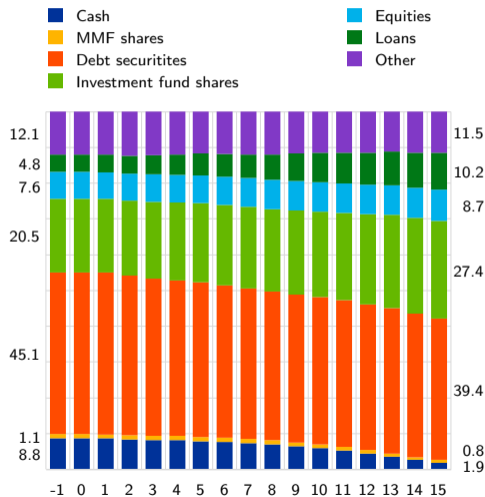


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Cash + MMF shares

Main balance sheet aggregates response to MP shocks

Asset Composition in Market Value (after 10bps loosening)



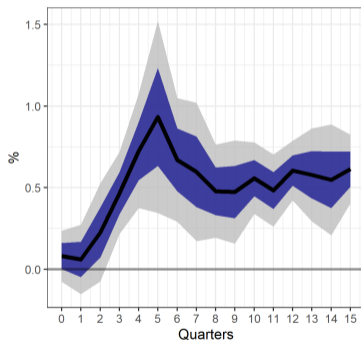
- ▶ Holdings in most asset categories increase. More financial intermediation through ICs → active monetary policy transmission
- ▶ Re-balancing to higher proportion of riskier stocks and fund shares, and out debt securities
- ▶ More liquidity risk-taking: Lower cash holdings and buffers
- ▶ Consistent with risk-taking channel of monetary policy

Main balance sheet aggregates response to MP shocks

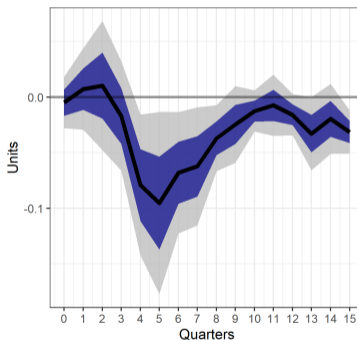
Capital and Leverage

Capital positions improve, leverage falls

Capital MV (log levels)



Leverage MV

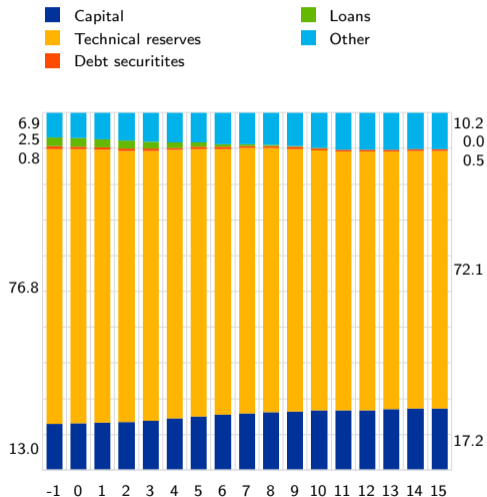


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Nominal Value

Main balance sheet aggregates response to MP shocks

Liabilities Composition in Market Value (after 10bps loosening)



Capital increases, different from negative duration gap channel. Why?

- ▶ In (historical) accounting practise, mark-to-market often on asset side only in many jurisdictions (local GAAPs, IFRS4 & 9)
- ▶ Higher-risk taking can imply higher capital requirements

Bond portfolio: sectoral allocation, risk-taking and duration risk

We study the bond portfolio of ICs along three principal breakdowns:

- ▶ **Issuer sector:** euro area non-financial corporations, financial corporations and government + Rest of the World (All sectors)
- ▶ **Credit Risk:** low rated (BBB + High yield) + Investment Grade
- ▶ **Duration Risk:** holdings with residual maturity over 5 and 10 years for AAA bonds.

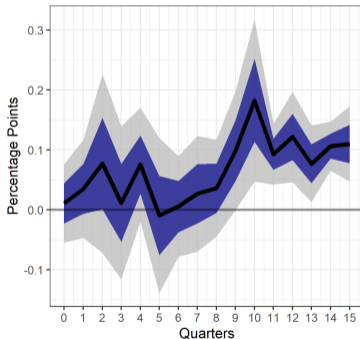
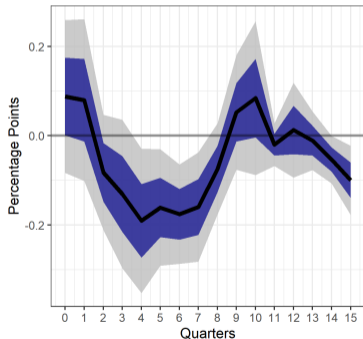
Bond portfolio: Sectoral allocation and risk-taking

Overall bond portfolio

- ▶ Bond holdings (% Total Assets NV) using SHSS decrease after MP loosening
- ▶ Portfolio share of lower-rated debt securities increases

Debt securities holdings NV (Share of total Assets)

Low-rated debt sec. as share of total bonds NV



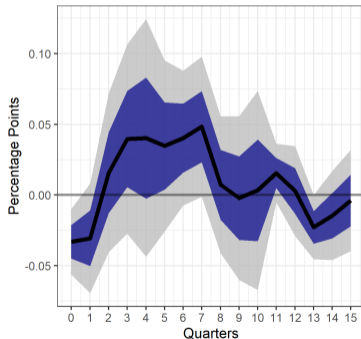
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Bond portfolio: Sectoral allocation and risk-taking

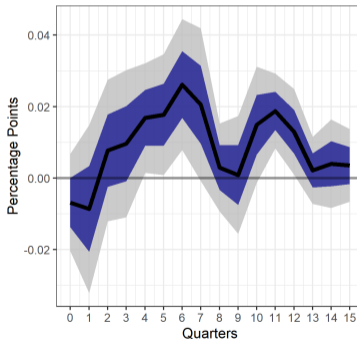
Euro area non-financial corporate bonds

- ▶ Increase in (lower-rated) NFC bond holdings after a loosening
- ▶ Consistent with risk-taking behaviour: evidence of insurance-based MP transmission channel

NFC bonds as a share of TBs NV



Low-rated NFC bonds as a share of TBs NV

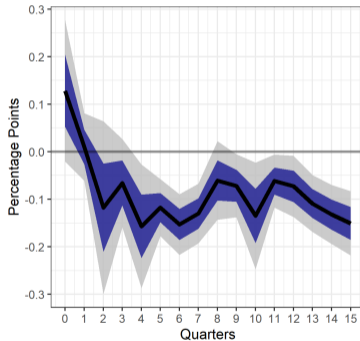


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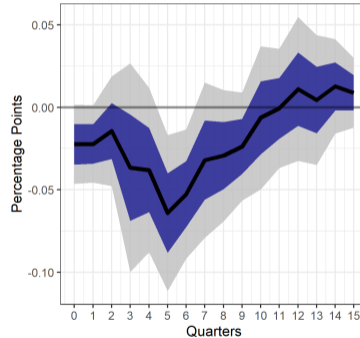
Bond portfolio: Sectoral allocation and risk-taking

Euro area financial corporate bonds

FC bonds as a share of TBs NV



Low-rated FC bonds as a share of TBs NV



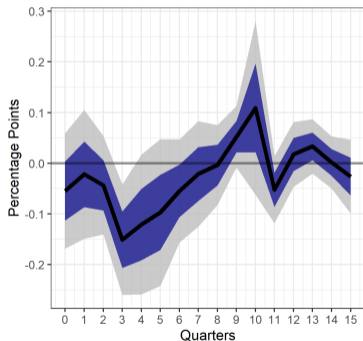
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Bond portfolio: Sectoral allocation and risk-taking

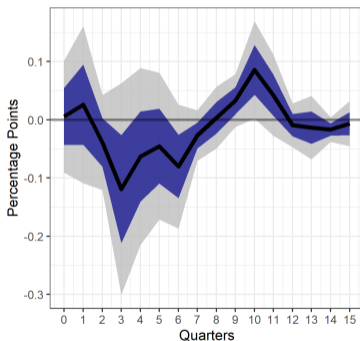
Euro area sovereign bonds

- ▶ Sovereign bond holdings fall counter-cyclically after loosening, pointing towards an insurance-sovereign nexus

Gov. bonds as a share of TBs NV



Low-rated Gov. bonds as a share of TBs NV

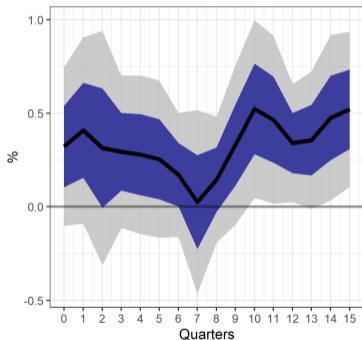


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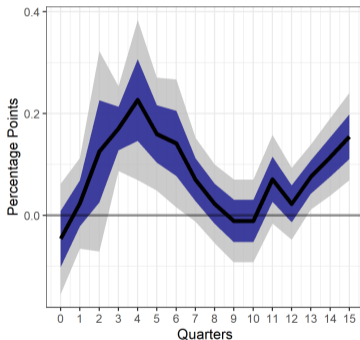
Bond portfolio: Sectoral allocation and risk-taking

Rest of the World bonds

Rest of the world bonds NV (log levels)



Rest of the world bonds as a share of TBs NV

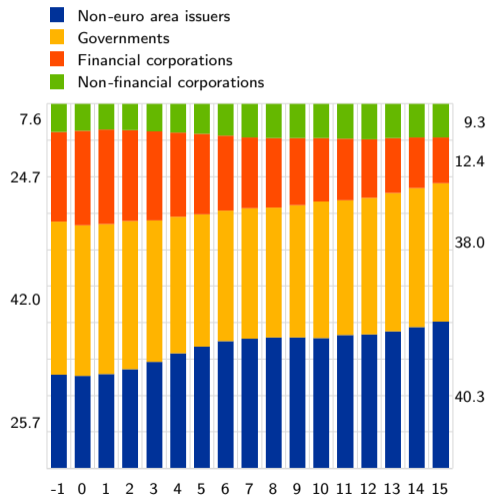


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RoW sectors

Bond portfolio: Sectoral allocation

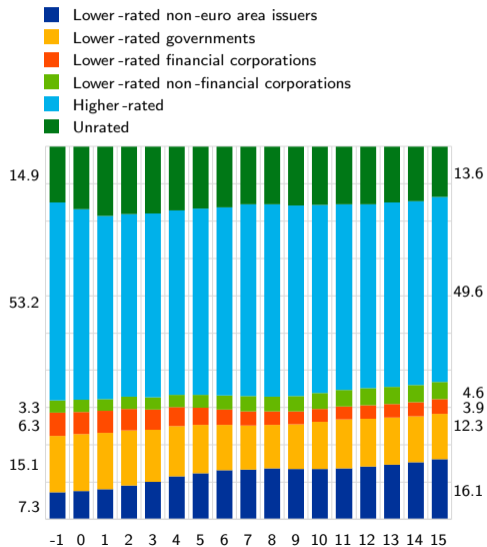
after 10bps loosening



- ▶ Heterogeneous response of bond holdings depending on the issuer sector
- ▶ Sizeable increase in NFC & RoW bond holdings \Rightarrow evidence of international risk-taking channel / searching-for-yield abroad
- ▶ Counter-cyclical selling of sovereign and financial corporate bond holdings

Bond portfolio: Sectoral allocation and credit risk-taking

after 10bps loosening



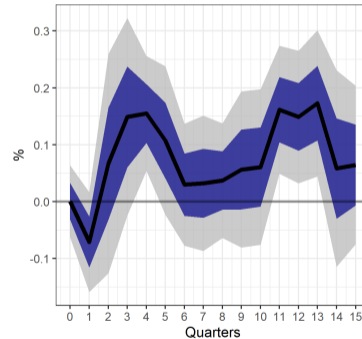
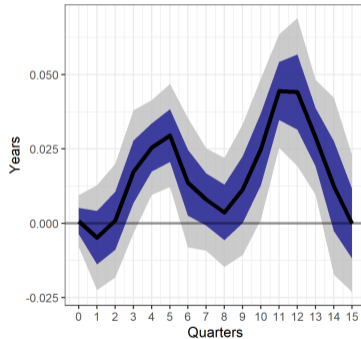
- ▶ Rise in the share of lower-rated bonds of around 5 percentage points after 16 quarters
- ▶ Driven especially by lower-rated RoW and NFC bonds
- ▶ Instead, selling of lower-rated sovereign and financial corporate bonds

Bond portfolio: Duration risk

► Duration risk-taking increases after MP loosening

Weighted average residual maturity: AAA Gov. bonds

Share of long term AAA Gov. bond holdings over AAA Gov holdings



Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

Robustness checks and further results

- ▶ Sample: results are consistent for longer/shorter sample 2010 Q1 to 2019 Q4 with/without GFC and COVID
- ▶ Shocks: Results are robust when using other long and short maturity shocks
- ▶ Adding demographic controls in the specification Demographic controls
- ▶ Adding Euro Area GDP growth (\sim capturing time FEs) EA gdp FE
- ▶ Central bank information shock: interest rates $\downarrow \Rightarrow$ Total assets \downarrow Info shock

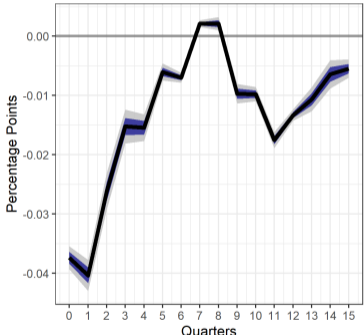
Conclusion

- ▶ Monetary policy has macroeconomically-relevant effects on insurers' balance sheets
- ▶ After MP loosening:
 - ▶ A pro-cyclical rise in the IC sector's **financial intermediation capacity**
 - ▶ **Portfolio re-balancing** consistent with **risk-taking channel** of monetary policy
 - ▶ More risky assets (equity vs. debt), more lower-rated and long-duration bonds, lower cash buffers
 - ▶ But counter-cyclical selling of sovereign and financial corporation bonds
- ▶ Low yield environment contributed to build-up of financial stability risks (Grimm et al., 2023; Jiménez et al., 2022):
 - ▶ Increased vulnerability of ICs to economic downturn (credit risks) and liquidity shocks (policy lapses, margin calls)
 - ▶ Rapidly rising rates as potential trigger, but also possible reversion of some risk-taking

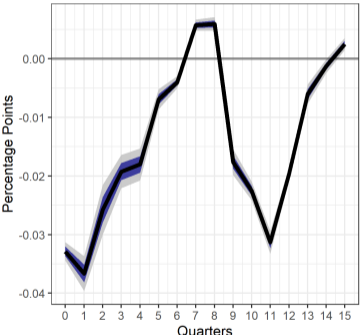
Appendix

Effects of Monetary Policy Shocks

Bund yield 3 years



Bund yield 5 years

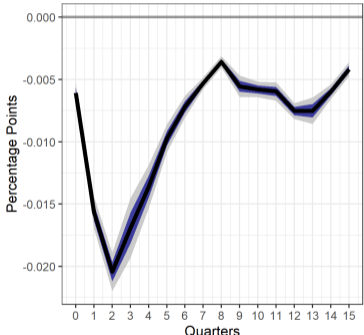


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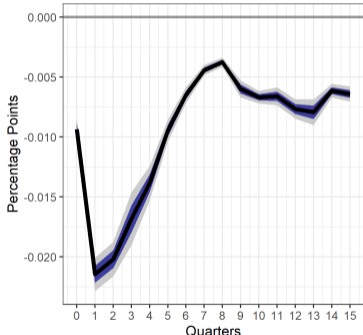
Appendix

Effects of Monetary Policy Shocks

OIS 1 month



OIS 3 months

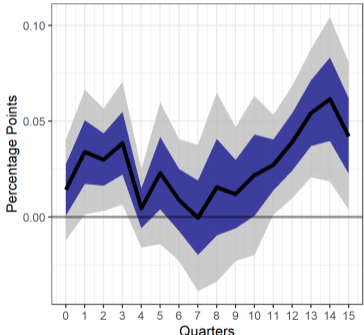


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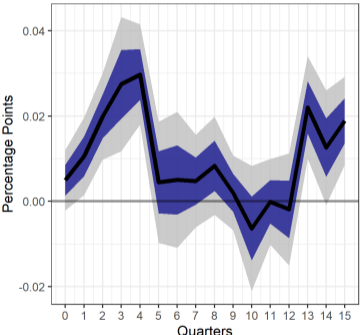
Appendix

Effects of Monetary Policy Shocks

GDP growth YoY



Inflation

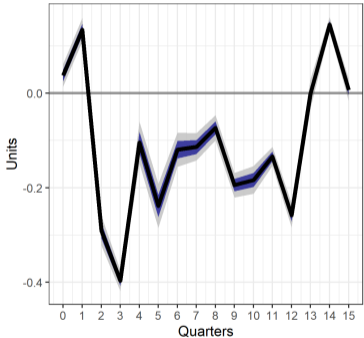


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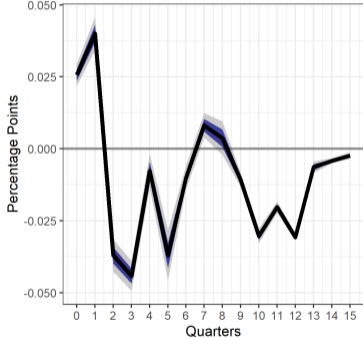
Appendix

Effects of Monetary Policy Shocks

VSTOXX



BBB spread



Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

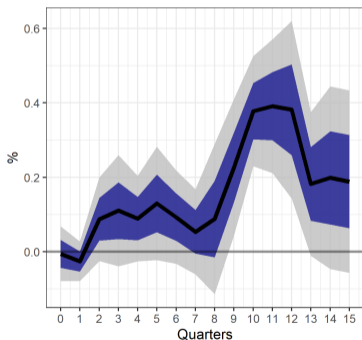
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Appendix

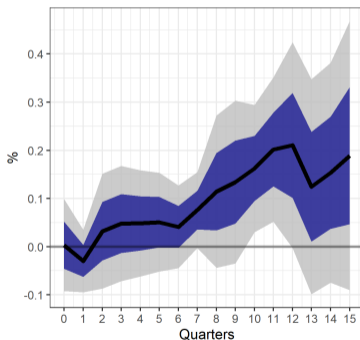
Adding demographic variables to the controls

We add the following demographics controls to the LPs: Life expectancy, old-age dependency ratio and log population

Total assets MV (log levels)



Total assets NV (log levels)



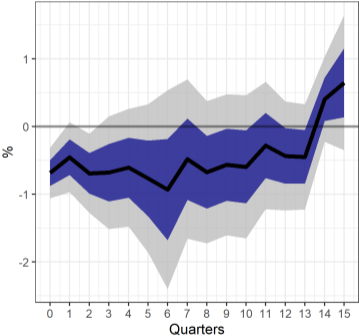
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

[return](#)

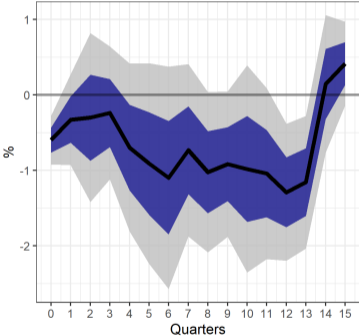
Appendix

Liabilities (log levels)

Debt Securities and Loans MV



Debt Securities and Loans NV



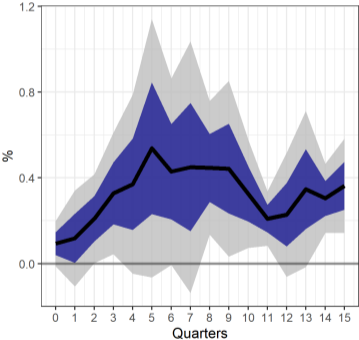
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

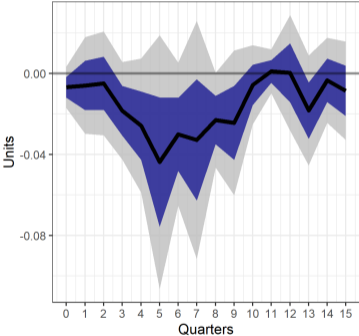
Appendix

Capital and Leverage

Capital NV (log levels)



Leverage NV



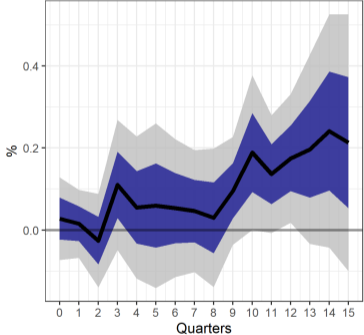
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

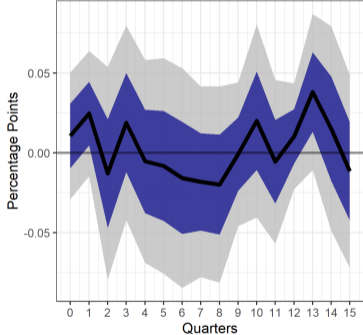
Appendix

Asset Composition: Debt securities.

Debt Securities NV (log levels)



Debt Securities NV (Share of total assets)



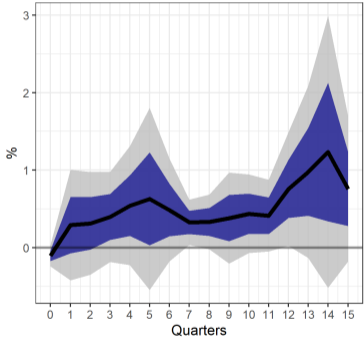
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

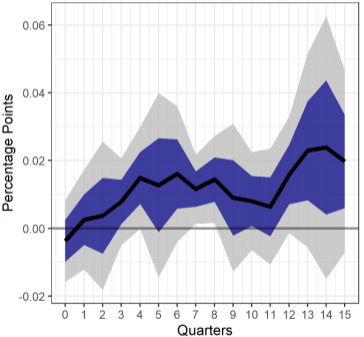
Appendix

Asset Composition: Equity

Equity NV (log levels)



Equity NV (Share of total assets)



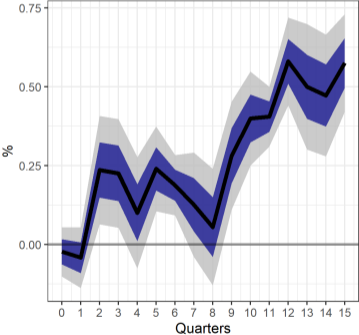
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

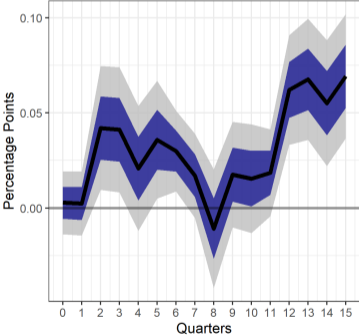
Appendix

Asset Composition: Investment fund shares ALL

Investment fund shares MV (log levels)



Investment fund shares MV (Share of total assets)

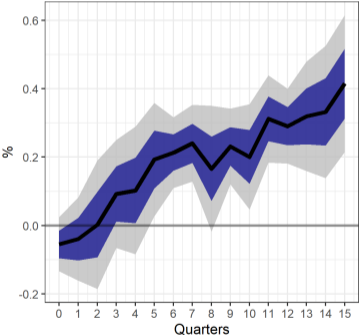


Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

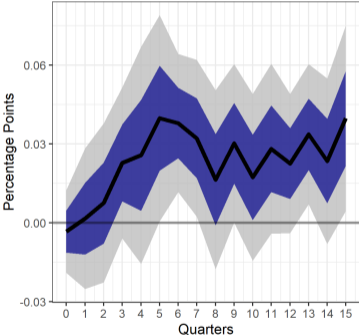
Appendix

Asset Composition: Investment fund shares ALL

Investment fund shares NV (log levels)



Investment fund shares NV (Share of total assets)



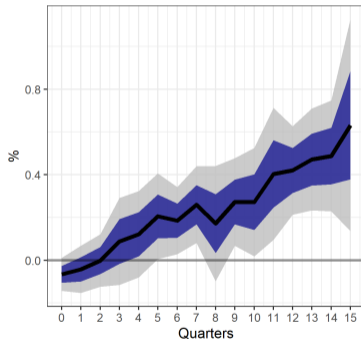
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return

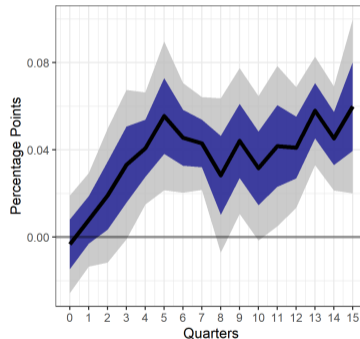
Appendix

Asset Composition: Investment fund shares (no MMF)

Investment fund shares NV (log levels)



Investment fund shares NV (Share of total assets)



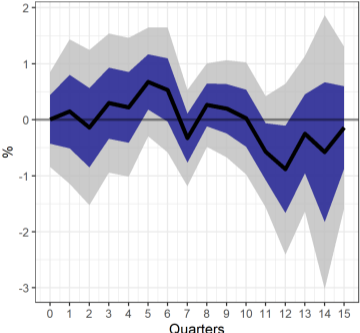
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

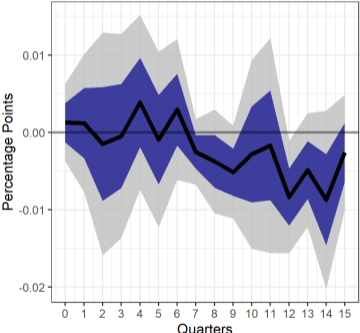
Appendix

Asset Composition: Money Market Fund share

MMF shares MV (log levels)



MMF shares MV (Share of total assets)

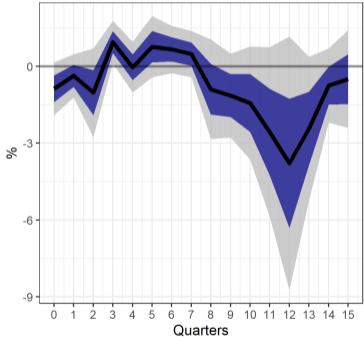


Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

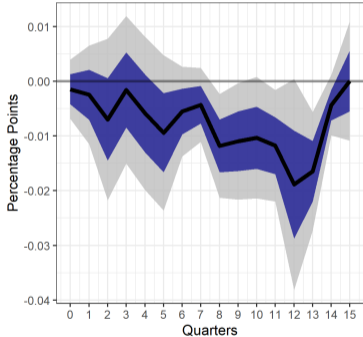
Appendix

Asset Composition: Money Market Fund share

MMF shares NV (log levels)



MMF shares NV (Share of total assets)



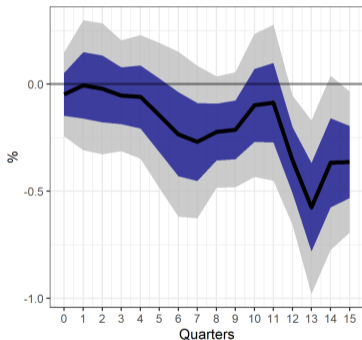
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

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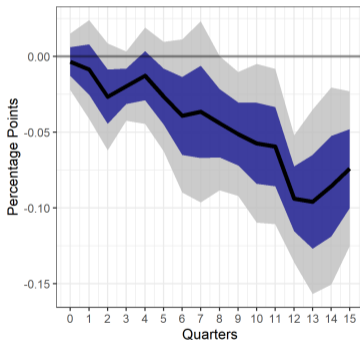
Appendix

Cash holdings + MMF shares

Cash Holdings + MMF shares MV (log levels)



Cash Buffers incl. MMF shares MV



Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

[return](#)

Appendix

Descriptive Statistics

Table: As share of total assets %

	mean	median	SD	Max	Min
CashHoldings	8.77	7.40	6.56	30.15	0.79
Loans	4.80	1.58	7.78	45.27	0.05
DebtSec	45.14	44.25	15.88	73.84	10.52
Equity	7.55	6.83	4.63	22.47	0.17
Investmentfunds	20.55	18.02	11.38	51.28	3.26
MMFshares	1.14	0.51	1.29	5.37	0.00

return

Appendix

Descriptive Statistics

Table: As share of total liabilities %

	mean	median	SD	Max	Min
DebtSec	0.75	0.38	0.85	4.93	0.00
Loans	2.50	1.70	2.51	23.45	0.00
Reserves	76.84	77.22	6.69	95.14	55.40
Capital	13.01	11.11	6.85	42.51	2.38

return

Appendix

Descriptive Statistics

Table: As share of total bond portfolio %

	mean	median	SD	Max	Min
LowRatingALL	29.61	22.93	19.57	84.01	1.09
LowRatingNFC	3.26	2.84	1.79	10.58	0.22
LowRatingFC	6.27	5.22	4.33	25.94	0.08
LowRatingGov	15.34	7.46	17.67	65.75	0.03
LowRatingRoW	7.05	5.46	4.91	28.28	0.83

return

Table: Total Assets MV

h	0	1	2	3	4	5	6	7	8	9	10
TA MV	0.00707	0.00726	0.14091**	0.16294***	0.1421***	0.18447***	0.13894***	0.09243*	0.11058	0.23257***	0.37042***
SD	0.03819969	0.02848034	0.06577634	0.04855976	0.04626120	0.05485507	0.03114967	0.05376127	0.06821751	0.04444107	0.05144403
N	722	703	684	665	646	627	608	589	570	551	532

Table: Total Assets NV

	0	1	2	3	4	5	6	7	8	9	10
TA NV	0.00888	-0.01356	0.05299	0.05801	0.06736	0.08525	0.06925	0.08416	0.09851	0.09214*	0.09128*
SD	0.04750370	0.03473846	0.07563658	0.05711918	0.05460235	0.05750034	0.05572274	0.06011352	0.07776828	0.05122272	0.04967459
N	640	621	602	583	564	545	526	507	488	469	450

return

Table: Total Reserves MV

	0	1	2	3	4	5	6	7	8	9	10
TR MV	-0.0118	-0.06125***	0.05818	0.11905	0.11118**	0.15703**	0.11046**	0.0954**	0.0985*	0.20006***	0.31023***
SD	0.05758035	0.02122898	0.04135229	0.07409728	0.05270529	0.06142978	0.04956137	0.04092933	0.05308954	0.05776904	0.04937340
N	699	679	659	639	620	601	582	563	544	525	506

Table: Total Reserves NV

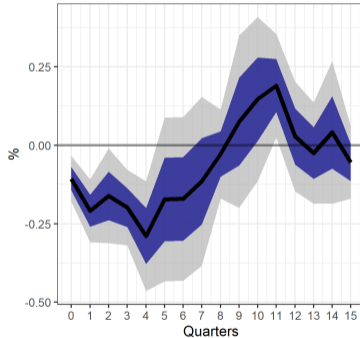
	0	1	2	3	4	5	6	7	8	9	10
TR NV	-0.01311	-0.07314*	-0.03578	0.04336	0.06027	0.07626	0.04872	0.04422	0.04933	0.06343	0.08657*
SD	0.05103652	0.04009946	0.05413147	0.04606254	0.04980247	0.04930044	0.04157568	0.04496288	0.07160289	0.05034645	0.04491034
N	640	621	602	583	564	545	526	507	488	469	450

[return](#)

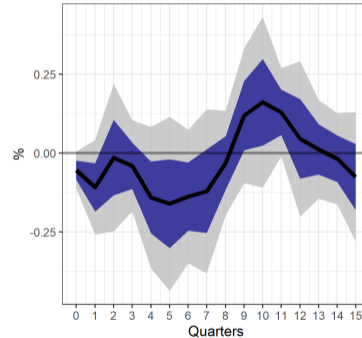
Appendix

Total Assets (log levels) and News shock

Total Assets Market Value



Total Assets Nominal Value



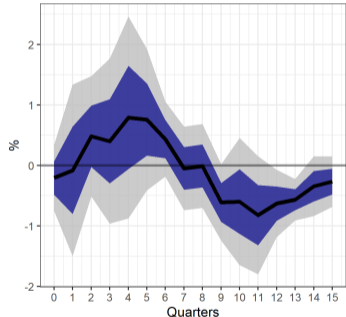
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

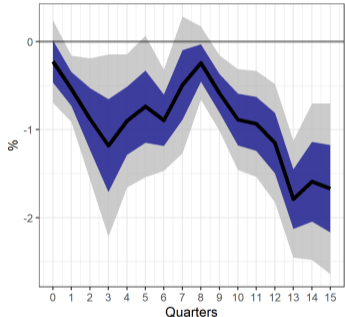
Appendix

Rest of the World bonds by issuer sector (Levels)

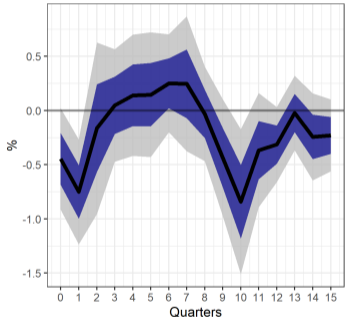
RoW Government bonds (log levels)



RoW NFC bonds (log levels)



RoW FC bonds (log levels)



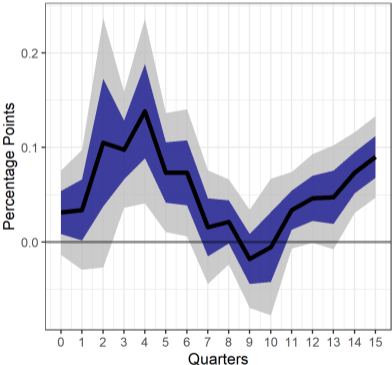
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

Appendix

Low-rated Rest of the World

Low-rated RoW bonds as a share of TBs

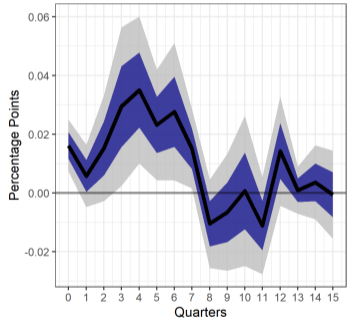


Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

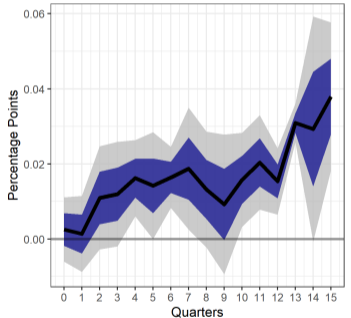
Appendix

Low-rated Rest of the World bonds by issuer sector

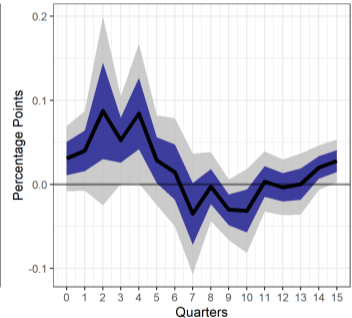
Low-rated RoW Government bonds as a share of TBs



Low-rated RoW NFC bonds as a share of TBs



Low-rated RoW FC bonds as a share of TBs



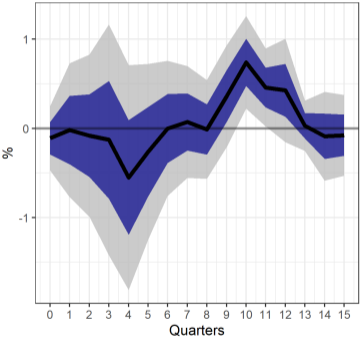
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return

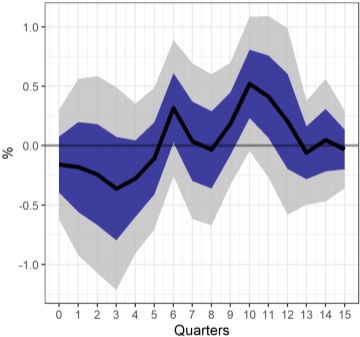
Appendix

NFC bonds (Levels)

NFC bonds (log levels)



Low-rated NFC bonds (log levels)



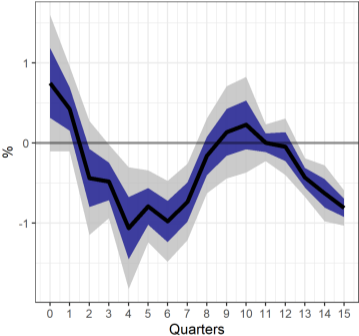
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

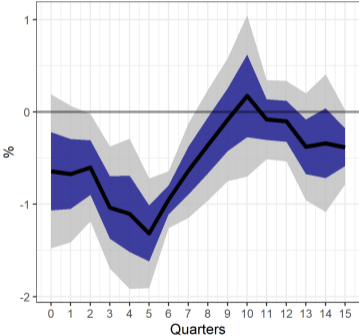
Appendix

Financial corporation bonds (Levels)

FC bonds (log levels)



Low-rated FC bonds (log levels)



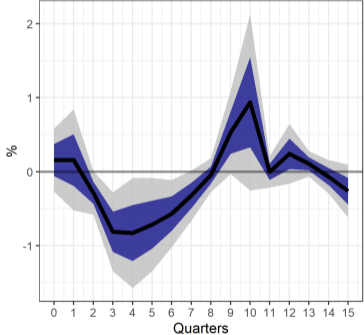
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

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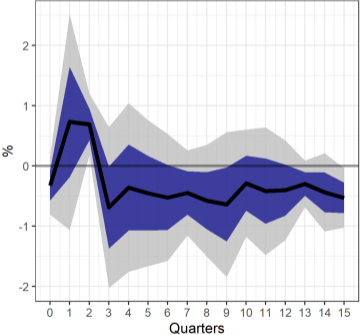
Appendix

Government bonds (Levels)

Government bonds (log levels)



Low-rated Government bonds (log levels)



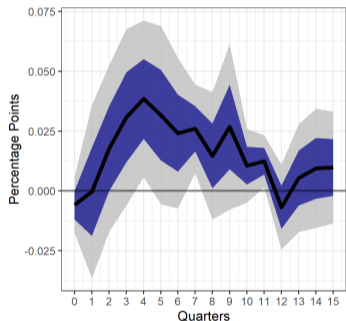
Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

return

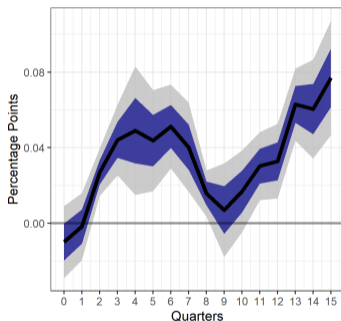
Bond portfolio: Sectoral allocation and risk-taking

Rest of the World bonds by issuer sector

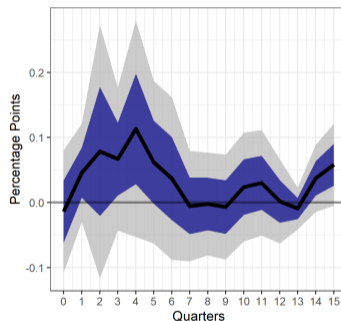
RoW Government bonds as a share of TBs NV



RoW NFC bonds as a share of TBs NV



RoW FC as a share of TBs NV



Shaded areas denote 95% (gray) and 68% (blue) confidence intervals. Reactions are shown to high-frequency shock of 1 basis point.

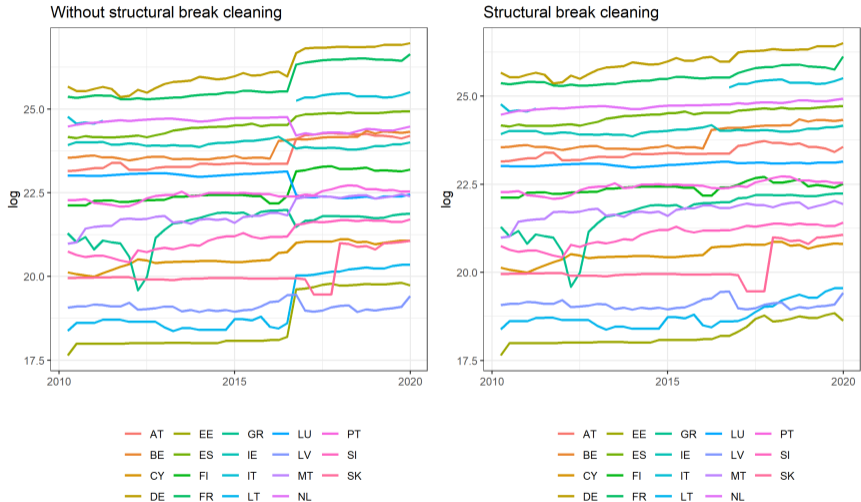
Levels

RoW and credit risk

return

Appendix

Structural break in capital

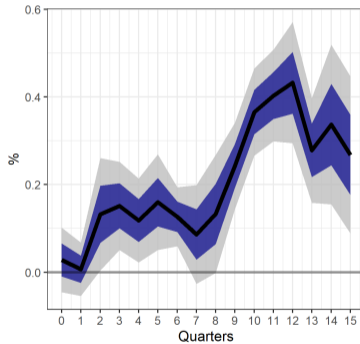


[return](#)

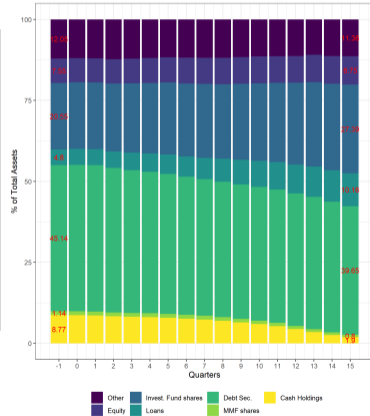
Appendix

Term structure shock

Total Assets Market Value



Asset Composition in Market Value (after 10bps loosening)



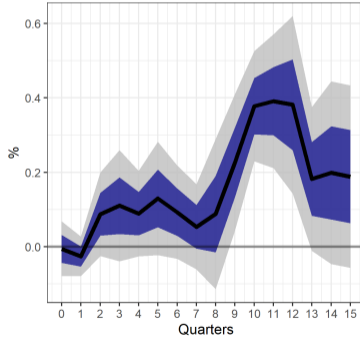
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Appendix

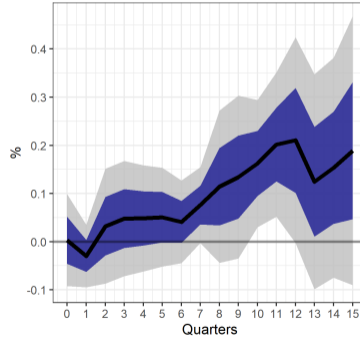
Adding demographic variables to the controls

We add the following demographics controls to the LPs: Life expectancy, old-age dependency ratio and log population

Total assets MV (log levels)



Total assets NV (log levels)

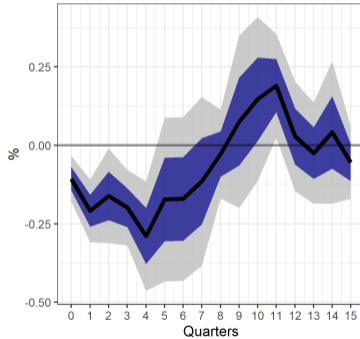


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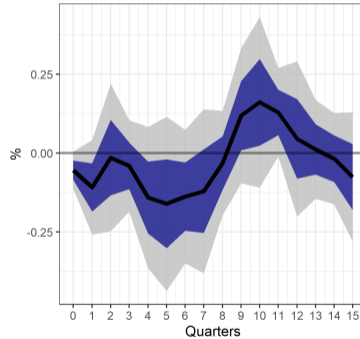
Appendix

Total Assets (log levels) and News shock

Total Assets Market Value



Total Assets Nominal Value

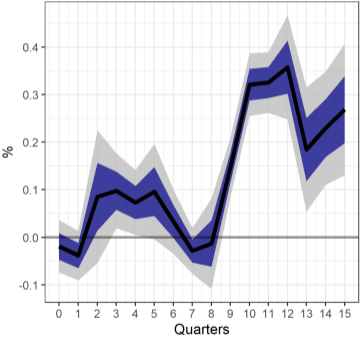


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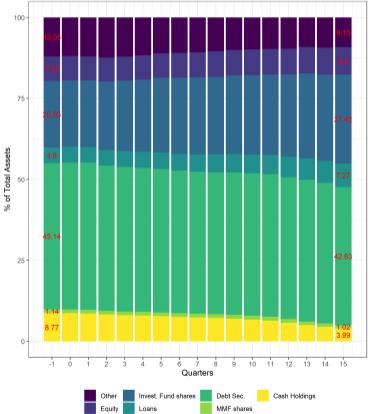
Appendix

Add EA gdp growth (~ capturing time FEs)

Total Assets Market Value



Asset Composition in Market Value (after 10bps loosening)



return