Bank Bond Holdings and Bail-in Regulatory Changes: Evidence from Euro Area Security Registers

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Motivation

- **Renewed debate on bank crisis management** framework after the **turmoil in the banking sector in early 2023**

- **Bail-in as key feature of resolution framework** set after the GFC.

- EU banks subject to **requirements for bank bail-inable liabilities:**
  - ✓ **MREL**: Minimum Requirements on Eligible Liabilities, for all EU banks
  - ✓ **TLAC**: Total Loss Absorbency Capacity, for global systemically important banks

- This paper: study the **impact of the introduction of these requirements on the holdings of bank bonds by banks**

- Regulation may foster **intended and less intended incentives**

- **Banks' holdings may have financial stability implications**
  - ✓ In euro area, banks are the largest investors in bank bonds, with strong home bias
  - ✓ Linkages across banks due to cross-holdings may hamper resolvability via bail-in

Research Questions and Preview of Results

- **Setting.** The **introduction of MREL and TLAC** provides a **regulatory change**, affecting issuance and holding incentives of banks

- **Analysis.** Focus on first announcements and diff-in-diff to study effects on holdings by banks, controlling for developments of issuers.

1. Do requirements for bail-inable liabilities affect **banks' incentives to hold bail-inable bank bonds**?

   ✓ On extensive margin, banks **increase probability to hold eligible bonds** relat. to non-eligible ones by 0.9 p.p. (MREL) and 1.5 p.p. (TLAC)

   ✓ **MREL** introduction fosters **relative increase** in banks' **holding amounts and shares of eligible bonds** vs. non-eligible ones.

   ✓ **TLAC** induces **stronger increase in holding amounts** of eligible bonds

2. What are the main **drivers of cross-holdings** across distinct banks?

   ✓ **Evidence of home bias**, part. for banks in formerly stressed countries

Related Literature and Contribution

- **Economic effects of regulation:** intended and less intended
  - **Evidence from regulation of the financial sector** [Efing (RoF 2020); Keppo et al. (JEDC 2010); Boot et al.(JFSR 1999); Acharya et al.(JFE 2013); Gorton & Metrick(Brookings 2010)]

➡ ***Regulatory incentives from bail-in framework to banks' investments/portfolio***

- **Banks' correlated behaviour and systemic risk**
  - **Collective moral hazard:** strategic complementarities [Farhi & Tirole (AER 2012); Acharya and Yorulmazer (JFI 2007)]; network incentives [Acemoglu et al. (AER 2015)]
  - **Empirics:** monetary policy [Jasova et al. (RFS 2023)]; guarantees on liabilities [Gropp et al. (RoF 2014)]; government bailouts [Berger & Roman (JFQA 2015); Berger et al. (JFI 2020)]

➡ ***Correlated behaviour from bond cross-holdings (too-interconnected-to-fail)***

- **Effects of the introduction of bail-in**
  - Hüser et al. (JFS 2018); Crespi et al. (EFM 2019); Cutura (JFS 2021); Fiordelisi & Scardozzi (JCF 2022)

➡ ***Holding decisions of specific banks for individual bail-inable securities***

Data: Security Register Data for Individual Banks

➢ **Combine security-level confidential data sources**

1. Centralised Securities Database: CSDB

- Monthly data for debt and equity instruments from April 2009: issuer, security type, issuance and maturity date, rating, nominal amount
- Complement with DCM Analytics for info on subordination of securities

2. Securities Holdings Statistics for Banking Groups: SHSG

- Quarterly data from 2013 Q4 for 26 largest euro area banking groups: at the ISIN-level, nominal amount, market value, holder identity

3. Securities Holdings at the Sector Level: SHSS

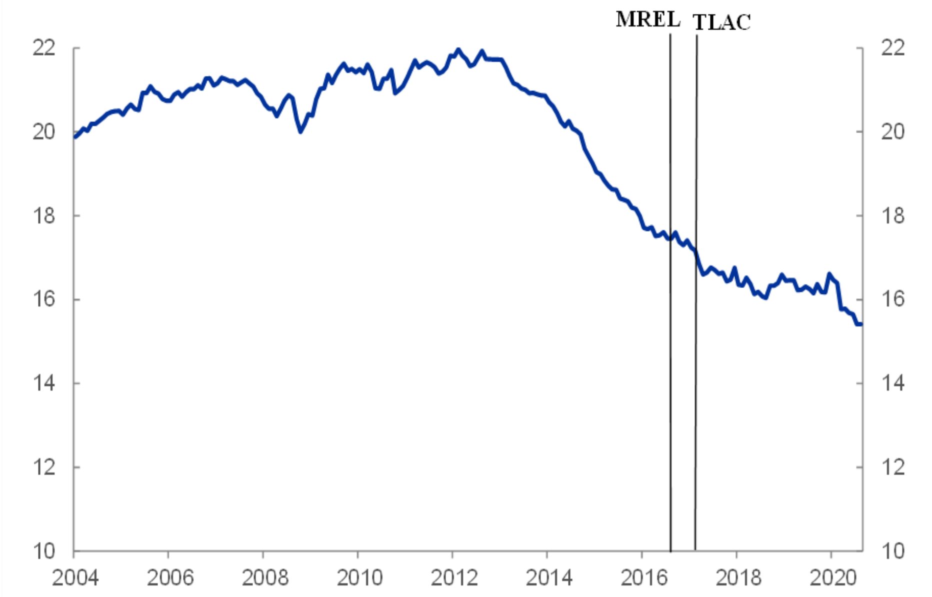
- Quarterly data from 2013 Q4 for the key institutional sectors

➢ Study the **exposures of individual banks to bonds,** knowing whether and to what extent in quarter *t* bank *h* holds bond *b* issued by bank *i*.

Issuance of Unsecured Bonds by Euro Area Banks

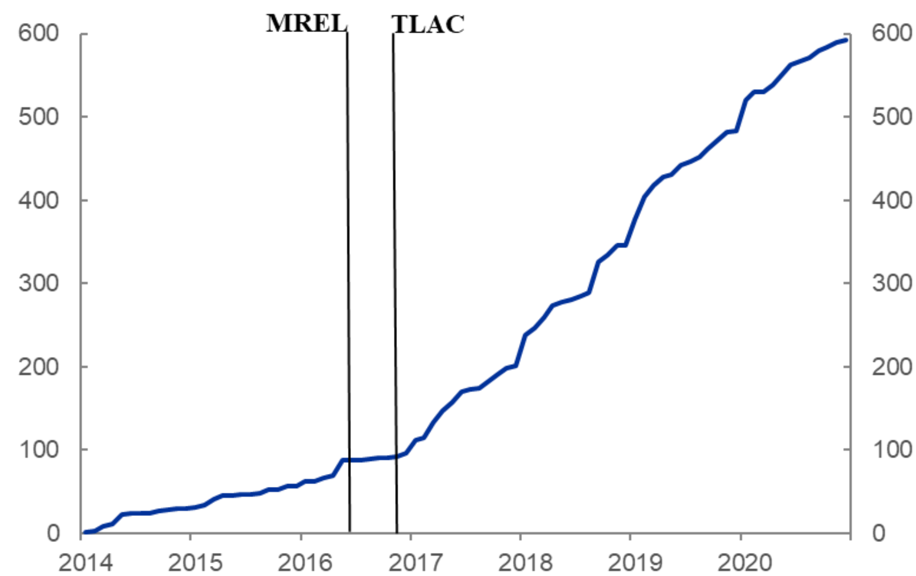
- Before the regulatory change, the **share of debt securities in bank liabilities** was observing a **declining trend**.
- Market developments related to monetary policy **reduced incentives to issue bank bonds**.
- The **requirements for bank bail-inable liabilities** set new **incentives to issue unsecured bank bonds.**
- The new issuances were largely tilted towards **subordinated instruments.**

Figure 1. Debt securities as share of total liabilities of euro area banks (percent)



Source: ECB Statistical Data Warehouse

Figure 2. Volumes of eligible subordinated bonds issued by euro area banks (in EUR bn)



Source: Dealogic, DCM Analytics

The Requirements for Bank Bail-inable Liabilities

- The **MREL** is a **Pillar 2 requirement** for EU banks, introduced by the BRRD and set for individual banks by Resolution Authorities.
  - **Eligible liabilities**: Tier 1 and Tier 2 instruments; unsecured bonds, both senior and subordinated, with remaining maturity of at least one year.
  - **Announcement**: EU Commission Delegated Regulation 2016/1450 (May 2016)
  - **HYPOTHESIS 1**. The introduction of the MREL requirements raises the incentives for banks to increase their exposures to MREL-eligible bonds.

- The **TLAC** is a **Pillar 1 requirement**, set by the Financial Stability Board (FSB) to increase loss-absorbency capacity of G-SIIs
  - **Eligible liabilities must be subordinated instruments**
  - **Announcement:** Basel standard for regulatory treatment of TLAC holdings (Oct 2016); EU Commission's proposal for review of Capital Requirements Regulation (Nov 2016)
  - **HYPOTHESIS 2.** The introduction of the TLAC requirements raises the incentives for other banks – different than issuer – to increase exposures to TLAC-eligible instruments.

Empirical Strategy

Regulatory Change: requirements for bail-inable liabilities (MREL & TLAC)

Banks have to **issue** bail-inable debt, to have **eligible liabilities**.

Change in **holding incentives**, across sectors and within the banking sector

Increased scope for holdings of bank bonds by the banking sector

➢ Identification using data at the security-holder level

- **Disentangle investment decisions** and **issuance behaviour**.
  - ✓ Benchmark analysis: **issuer-quarter FEs** to control for funding strategy of issuer banks
  - ✓ More saturated: **holder-quarter FEs** to control for investment strategy of holder banks
- Estimate a **linear probability model** for the holding decision (extensive margin)
- Estimate a **Tobit model** for nominal holdings and holding shares (intensive margin)

Empirical Specification

- **Diff-in-Diff Analysis:** setting of requirements for bank bail-inable debt
  - **Timing:** compare the two quarters before change with the two quarters after

- **Baseline Specification:** extensive and intensive margin

$$Holdings_{b,i,h,t} = \alpha_{i,t} + \alpha_{h,t} + \beta_1 Eligible_{b,i} + \beta_2 Eligible_{b,i} * Post_t + \varepsilon_{b,i,h,t}$$

  - Extensive: $Hold_{b,i,h,t}$ =1 if bank *h* holds security *b* issued by bank *i* in quarter *t*
  - Intensive: $Expos_{b,i,h,t}$ amount of bond *b* - issued by bank *i* – held by bank *h* in quarter *t*
  - $Eligible_{b,i}$=1 if the instrument *b* issued by bank *i* is eligible for MREL or TLAC
  - β_2 measures the impact of change on prob. or amount of **holdings of eligible bonds**

- **To explore the effects on cross-holdings and self-holdings**

$$\begin{aligned} &Holdings_{b,i,h,t} \\ &= \alpha_{i,t} + \alpha_{h,t} + \beta_1 Eligible_{b,i} + \beta_2 SelfHold_{b,i,h} + \beta_3 Eligible_{b,i} * Post_t * SelfHold_{b,i,h} \\ &+ \beta_4 Eligible_{b,i} * Post_t + \beta_5 Eligible_{b,i} * SelfHold_{b,i,h} + \beta_6 Post_t * SelfHold_{b,i,h} + \varepsilon_{b,i,h,t} \end{aligned}$$

  - $SelfHold_{b,i,h}$ is a dummy equal to 1 if the bond is held by the banking group of the issuer
  - β_3: further effect on prob. or amount of **holdings** of eligible bonds by **same** banking **group**

MREL and Bank Bond Holdings. Extensive Margin

- MREL introduction fosters **a relative increase in probability to hold eligible** vs. non-eligible **bonds** (**shift in the portfolio composition** towards bail-inable bonds)
- Results confirmed for bank bonds issued only by non G-SII banks (Table A.1)

VARIABLES	(1) Hold	(2) Hold	(3) Hold	(4) Hold	(5) Hold	(6) Hold
ELIGIBLE	-0.0424***	-0.0412***	-0.0412***	-0.0468***	-0.0454***	-0.0453***
	(0.0136)	(0.0136)	(0.0112)	(0.0109)	(0.0108)	(0.00742)
POST	-0.0135***			-0.0119***		
	(0.00242)			(0.00229)		
ELIGIBLE*POST	0.0111***	0.00877***	0.00877***	0.0105***	0.00762***	0.00757***
	(0.00255)	(0.00261)	(0.00239)	(0.00236)	(0.00224)	(0.00203)
Self_Hold				0.632***	0.633***	0.622***
				(0.0319)	(0.0319)	(0.0332)
ELIGIBLE*Self_Hold				0.0932**	0.0929**	0.0923**
				(0.0383)	(0.0383)	(0.0398)
POST*Self_Hold				-0.0988**	-0.100**	-0.102***
				(0.0390)	(0.0387)	(0.0380)
ELIGIBLE*POST*Self_Hold				0.0608	0.0616	0.0636
				(0.0425)	(0.0420)	(0.0413)
Observations	1,530,256	1,530,256	1,530,256	1,530,256	1,530,256	1,530,256
R-squared	0.014	0.015	0.041	0.325	0.326	0.335
Issuer FE	YES	NO	NO	YES	NO	NO
Issuer*Quarter FE	NO	YES	YES	NO	YES	YES
Holder*Quarter FE	NO	NO	YES	NO	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Robustness on MREL timing

MREL and Bank Bond Holdings. Intensive Margin

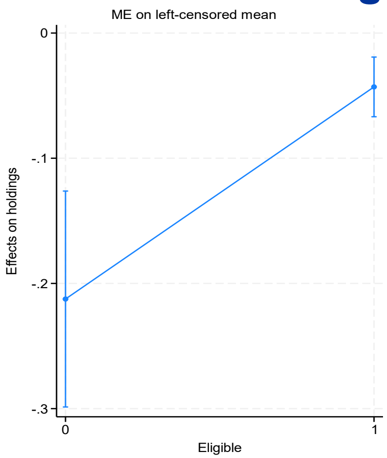
- MREL introduction fosters a **relative increse in holding amounts & shares of eligible** vs. non-eligible **bonds** (amid a declining trend in outstanding amounts).

HOLDING AMOUNTS	(1) Expos	(2) Expos	(3) Expos
ELIGIBLE	-11.13***	-10.87***	-11.04***
	(3.749)	(3.742)	(3.339)
POST	-2.731***	-4.133	-21.07
	(0.474)	(15.50)	(22.65)
ELIGIBLE*POST	1.868***	1.346**	1.410**
	(0.526)	(0.621)	(0.567)
Observations	1,526,602	1,526,602	1,526,602
Issuer FE	YES	NO	NO
Issuer*Quarter FE	NO	YES	YES
Holder*Quarter FE	NO	NO	YES

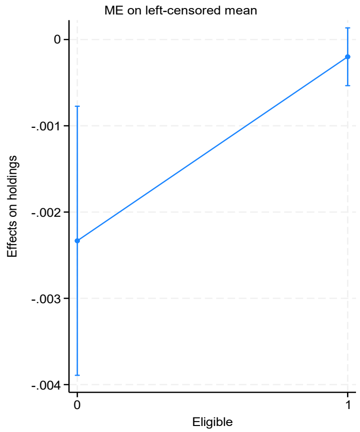
Robust standard errors (clustered at the level of holder bank, security type and holding type). *** p<0.01, ** p<0.05, * p<0.1

HOLDING SHARES	(1) Share	(2) Share	(3) Share
ELIGIBLE	-0.172**	-0.171**	-0.174***
	(0.0690)	(0.0688)	(0.0658)
POST	-0.0267***	0.0628	-0.283
	(0.00904)	(0.278)	(0.437)
ELIGIBLE*POST	0.0226**	0.0191*	0.0201*
	(0.00971)	(0.0116)	(0.0104)
Observations	1,128,011	1,128,011	1,128,011
Issuer FE	YES	NO	NO
Issuer*Quarter FE	NO	YES	YES
Holder*Quarter FE	NO	NO	YES

Marginal Effects on Holding Amounts



Marginal Effects on Holding Shares



Robustness on MREL timing

TLAC and Bank Bond Holdings. Extensive Margin

- Focus on **bonds issued by G-SIIs**. TLAC-eligible securities must be subordinated
- TLAC introduction **increases probability of cross-holdings**, but **decreases probability of self-holdings**, thanks to deduction rule disincentiving G-SII banks

VARIABLES	(1) Hold	(2) Hold	(3) Hold	(4) Hold	(5) Hold	(6) Hold
ELIGIBLE	0.0235	0.0223	0.0223	0.0333**	0.0320**	0.0319***
	(0.0180)	(0.0180)	(0.0156)	(0.0130)	(0.0131)	(0.0112)
POST	-0.00145**			-0.00144***		
	(0.000655)			(0.000459)		
ELIGIBLE*POST	0.0128***	0.0153***	0.0153***	0.0151***	0.0178***	0.0177***
	(0.00410)	(0.00421)	(0.00401)	(0.00383)	(0.00395)	(0.00392)
Self_Hold				0.920***	0.920***	0.907***
				(0.00960)	(0.00944)	(0.00973)
ELIGIBLE*Self_Hold				-0.185***	-0.185***	-0.184**
				(0.0690)	(0.0687)	(0.0708)
POST*Self_Hold				0.0526***	0.0525***	0.0513***
				(0.0117)	(0.0113)	(0.00976)
ELIGIBLE*POST*Self_Hold				-0.0984*	-0.0994*	-0.0988*
				(0.0541)	(0.0530)	(0.0526)
Observations	338,104	338,104	338,104	338,104	338,104	338,104
R-squared	0.005	0.005	0.125	0.627	0.627	0.631
Issuer FE	YES	NO	NO	YES	NO	NO
Issuer*Quarter FE	NO	YES	YES	NO	YES	YES
Holder*Quarter FE	NO	NO	YES	NO	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Chart on investor base heterogeneity by type of issuer

TLAC and Bank Bond Holdings. Intensive Margin

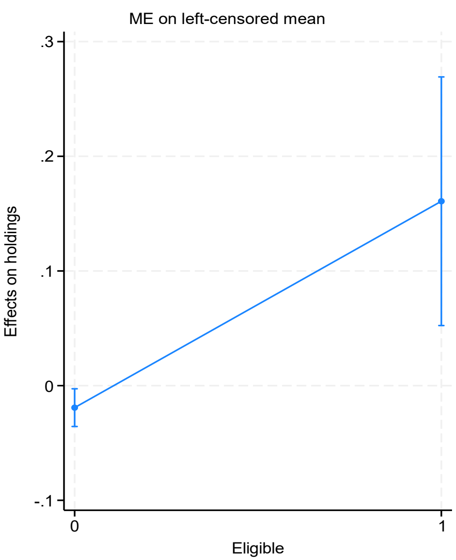
- After TLAC standard, **banks increase the volumes of their exposures to TLAC-eligible** vs. non-eligible **instruments issued by G-SIIs**

Tobit Estimates

VARIABLES	(1) Expos	(2) Expos	(3) Expos	(4) Expos	(5) Expos	(6) Expos
ELIGIBLE	6.177	5.879	6.154	7.695***	7.486***	7.427***
	(5.467)	(5.424)	(4.805)	(2.795)	(2.767)	(2.243)
POST	-0.578**	9.428	6.571	-0.857***	10.87***	4.756**
	(0.288)	(8.859)	(9.988)	(0.326)	(2.903)	(1.994)
ELIGIBLE*POST	3.350***	3.958***	4.689***	2.968***	3.385***	3.651***
	(1.058)	(1.138)	(1.185)	(0.901)	(1.020)	(1.037)
Self_Hold				45.18***	45.27***	39.56***
				(9.159)	(9.124)	(7.780)
ELIGIBLE*Self_Hold				-10.67***	-10.64***	-10.32***
				(3.388)	(3.407)	(3.007)
POST*Self_Hold				1.780***	1.554***	1.498***
				(0.540)	(0.514)	(0.564)
ELIGIBLE*POST*Self_Hold				-1.604	-1.707	-2.107
				(1.552)	(1.721)	(1.780)
Observations	337,378	337,378	337,378	337,378	337,378	337,378
Issuer FE	YES	NO	NO	YES	NO	NO
Issuer*Quarter FE	NO	YES	YES	NO	YES	YES
Holder*Quarter FE	NO	NO	YES	NO	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Marginal Effects on Holding Amounts



Cross-holdings and Home Bias. Extensive Margin

- Explore whether the **holder bank is from the same country of the issuer bank**
- MREL introduction fosters an **increase in the existing home bias of banks' exposures to bank bonds** (only in stressed countries: too-interconnected-to fail?)

	Stressed Countries			Non-stressed Countries		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Hold	Hold	Hold	Hold	Hold	Hold
ELIGIBLE	-0.0500***	-0.0493***	-0.0489***	-0.0355***	-0.0330***	-0.0330***
	(0.0106)	(0.0107)	(0.00789)	(0.00990)	(0.00970)	(0.00722)
POST	-0.0174***			-0.00774***		
	(0.00380)			(0.00283)		
ELIGIBLE*POST	0.0147***	0.0134***	0.0136***	0.00735**	0.00240	0.00243
	(0.00391)	(0.00413)	(0.00342)	(0.00287)	(0.00262)	(0.00242)
HOME	0.102***	0.102***	0.100***	0.0779***	0.0788***	0.0738***
	(0.0335)	(0.0337)	(0.0285)	(0.0250)	(0.0249)	(0.0180)
ELIGIBLE*HOME	-0.0345	-0.0344	-0.0384	-0.0448	-0.0454*	-0.0455**
	(0.0356)	(0.0357)	(0.0295)	(0.0271)	(0.0270)	(0.0184)
POST*HOME	-0.0374***	-0.0373***	-0.0362***	-0.00969*	-0.0115**	-0.0109**
	(0.0114)	(0.0114)	(0.0105)	(0.00572)	(0.00498)	(0.00469)
ELIGIBLE*POST*HOME	0.0317***	0.0315***	0.0304**	0.00628	0.00739	0.00721
	(0.0117)	(0.0116)	(0.0120)	(0.00593)	(0.00514)	(0.00472)
Observations	233,855	233,855	233,855	1,255,451	1,255,451	1,255,451
R-squared	0.051	0.054	0.065	0.052	0.054	0.070
Issuer FE	YES	NO	NO	YES	NO	NO
Issuer*Quarter FE	NO	YES	YES	NO	YES	YES
Holder*Quarter FE	NO	NO	YES	NO	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Stressed countries include CY, GR, IT, IE, PT, ES, SI. Non-stressed countries include AT, BE, DE, FI, FR, LU, MT, NL, SK.

Risk–taking?

Table A.4

Cross-holdings and Home Bias. Intensive Margin

- After MREL introduction, **banks increase their exposures to eligible bonds**, particularly if **issued by banks from the same country**.
- This effect is confirmed **only in stressed countries**: too-interconnected-to fail?

	Stressed Countries			Non-stressed Countries		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Hold	Hold	Hold	Hold	Hold	Hold
ELIGIBLE	-18.93***	-18.93***	-19.60***	-21.16***	-20.38***	-20.62***
	(3.726)	(3.653)	(2.232)	(3.921)	(3.941)	(1.981)
POST	-3.979***	23.02**	28.43**	-2.284***	-11.43	-13.37
	(0.631)	(9.780)	(11.20)	(0.745)	(16.18)	(17.35)
ELIGIBLE*POST	1.240	1.398	1.701*	1.888**	0.329	0.548
	(0.975)	(1.221)	(0.976)	(0.869)	(1.136)	(0.974)
HOME	14.63***	14.59***	14.18***	19.11***	19.28***	14.01***
	(4.250)	(4.234)	(3.019)	(4.491)	(4.526)	(2.398)
ELIGIBLE*HOME	11.35**	11.43**	9.575***	-0.805	-0.787	0.276
	(5.361)	(5.350)	(3.572)	(5.893)	(5.955)	(2.630)
POST*HOME	-2.573*	-2.579*	-1.346	-0.322	-0.751	-0.371
	(1.561)	(1.522)	(1.641)	(1.169)	(1.162)	(0.988)
ELIGIBLE*POST*HOME	3.529**	3.343*	2.088	-0.510	-0.577	-0.865
	(1.775)	(1.731)	(1.738)	(1.382)	(1.272)	(1.024)
Observations	233,136	233,136	233,136	1,252,770	1,252,770	1,252,770
Issuer FE	YES	NO	NO	YES	NO	NO
Issuer*Quarter FE	NO	YES	YES	NO	YES	YES
Holder*Quarter FE	NO	NO	YES	NO	NO	YES

Stressed countries include CY, GR, IT, IE, PT, ES, SI. Non-stressed countries include AT, BE, DE, FI, FR, LU, MT, NL, SK.

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets. *** p<0.01, ** p<0.05, * p<0.1

Conclusions

- This paper: analyze the effects of the **requirements for bank bail-inable debt** on **holdings of euro area bank bonds**, particularly by banks

- The **introduction of MREL requirements**:
  - fosters a relative increase in **cross-holdings** of bail-inable bank bonds
  - strengthens the **home bias** in the exposures to eligible bank bonds
  - effects persistent over time and robust to test for potential anticipation effects

- The **introduction of TLAC requirements** increases the incentives to hold eligible subordinated bonds, for other banks different than the issuer

- **Policy implications** for financial stability and regulatory design
  - Large holdings of bail-inable bonds may increase **banking sector interlinkages for riskier instruments**
  - But regulatory design may avoid unintended incentives for banks' behavior.

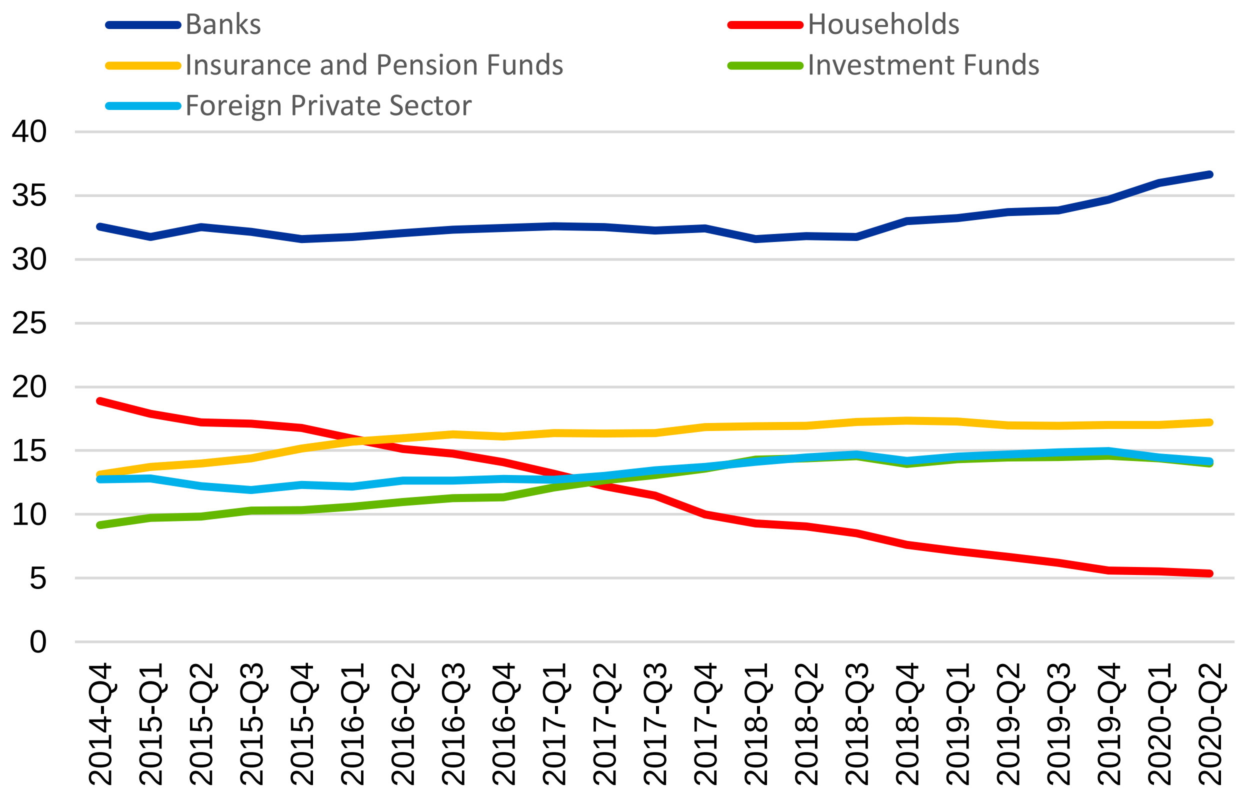
Thank you!

APPENDIX

Sectoral holdings of unsecured bonds issued by euro area banks

- **Banks are the largest investors** in bonds issued by euro area banks.
- The **reduction in holdings by households** after the BRRD (from 19% in 2014 Q4 to 6% in 2020 Q1) triggered a reallocation of the investor base

Figure A.1. Holdings of unsecured bonds issued by euro area banks, by holding sector (percent)



Source: SHSS and authors' calculations

Motivation

Composition of the issuances of bank bonds

- From 2017, **large part of new issuances** focused on **subordinated instruments**
- Subordinated instruments include: Additional Tier 1 and Tier 2 instruments, senior non-preferred notes, other senior bonds classified as equivalent for bail-in.

Figure A.2. Share of quarterly issuances in volumes of bonds by euro area banks, by debt type

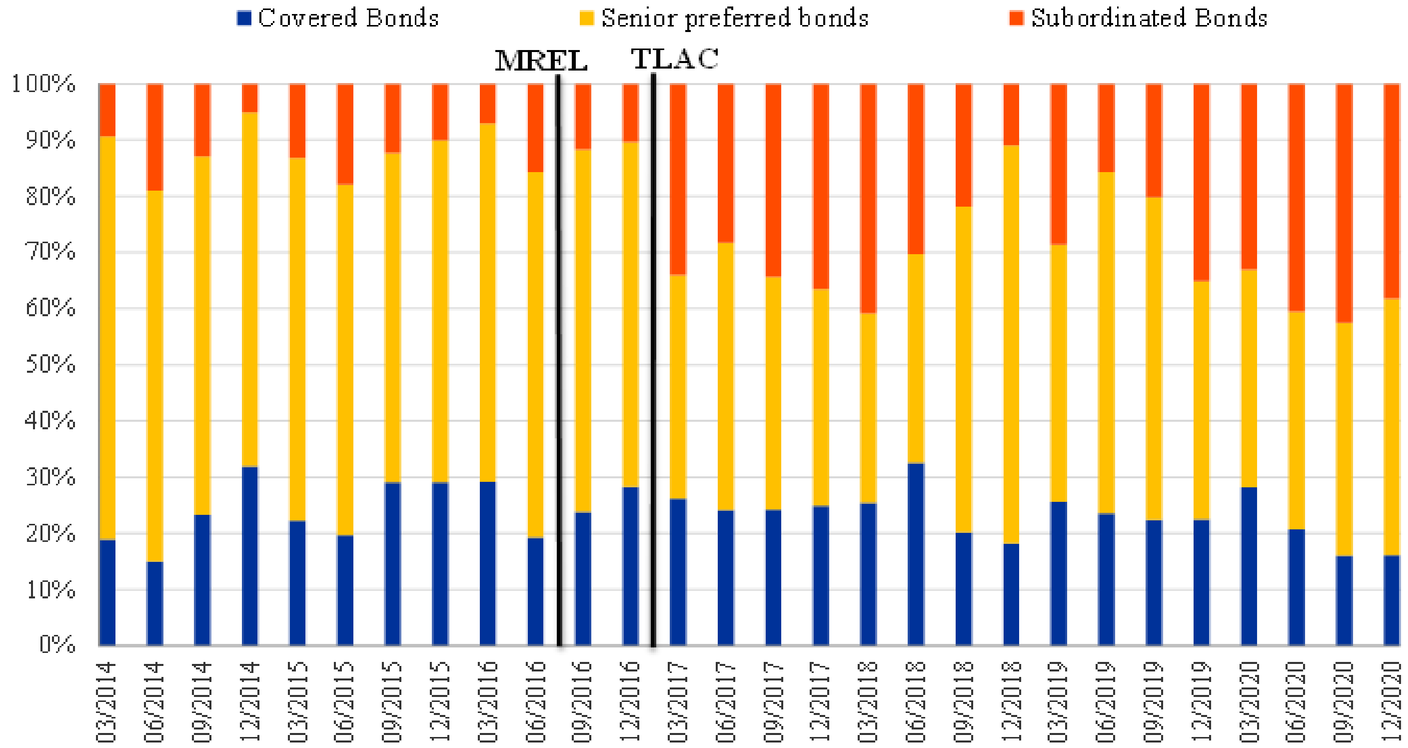


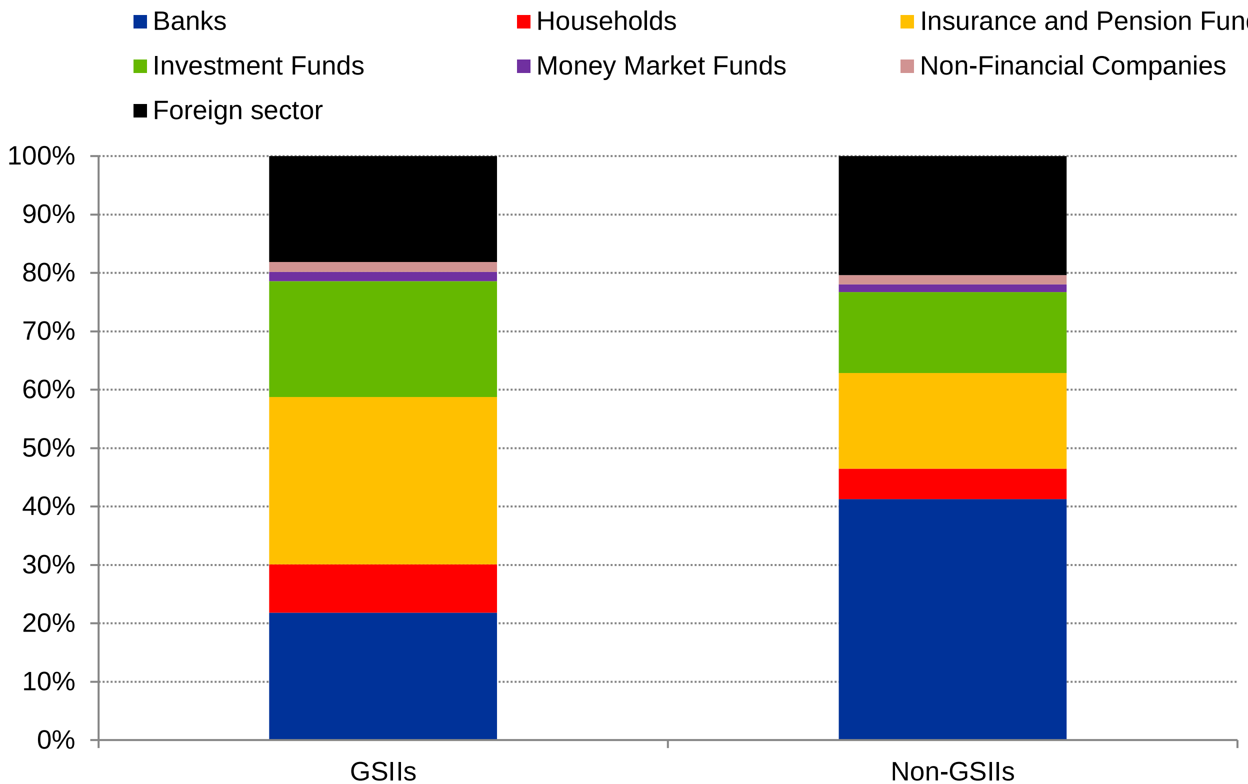
Figure 2

Source: DCM Analytics, Dealogic

Holdings of unsecured bonds issued by EA GSIIs and non-GSIIs

- The **investor base of bonds issued by GSII** (Global Systemically Important Institutions) is **more diversified** (banks account for slightly more than 20%)
- **Banks** play a stronger role as **investors in the bonds issued by non-GSII** banks (more than 40% of the investor base)

Figure A.3 Shares of unsecured bonds by euro area GSII and non-GSII banks, held by sectors (percent)



Source: SHSS and authors' calculations

Table 2

MREL and holdings of bonds issued by non-GSII banks

- Consider **only bank bonds issued by non-GSII banks**, to avoid potential confounding effect from TLAC introduction for GSII banks. (Table 1)

VARIABLES	(1) Hold	(2) Hold	(3) Hold	(4) Hold
ELIGIBLE	-0.0391***	-0.0391***	-0.0443***	-0.0443***
	(0.0137)	(0.0111)	(0.0107)	(0.00701)
ELIGIBLE*POST	0.00895***	0.00895***	0.00832***	0.00830***
	(0.00265)	(0.00242)	(0.00226)	(0.00204)
Self_Hold			0.633***	0.621***
			(0.0335)	(0.0352)
ELIGIBLE*Self_Hold			0.132***	0.134***
			(0.0384)	(0.0407)
POST*Self_Hold			-0.0998**	-0.102**
			(0.0408)	(0.0400)
ELIGIBLE*POST*Self_Hold			0.0404	0.0413
			(0.0451)	(0.0440)
Observations	1,239,576	1,239,576	1,239,576	1,239,576
R-squared	0.016	0.043	0.310	0.320
Issuer*Quarter FE	YES	YES	YES	YES
Holder*Quarter FE	NO	YES	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Drivers of bank bond cross-holdings: home bias

- Explore whether the **holder bank is from the same country of the issuer bank**
- MREL introduction fosters an **increase in the existing home bias of banks' exposures to bank bonds** (stronger effect in stressed countries)

VARIABLES	(1) Hold	(2) Hold	(3) Hold	(4) Hold
ELIGIBLE	-0.0450***	-0.0450***	-0.0361***	-0.0358***
	(0.00973)	(0.00717)	(0.00913)	(0.00683)
ELIGIBLE*POST	**0.00634*** **	**0.00633*** **	**0.00448***	**0.00446***
	(0.00217)	(0.00195)	(0.00250)	(0.00226)
SameCountry			0.0805***	0.0789***
			(0.0229)	(0.0173)
ELIGIBLE*SameCountry			-0.0436*	-0.0453**
			(0.0249)	(0.0182)
POST*SameCountry			-0.0135***	-0.0134***
			(0.00495)	(0.00472)
ELIGIBLE*POST*SameCountry			**0.00911***	**0.00914***
			(0.00509)	(0.00474)
Observations	1,489,306	1,489,306	1,489,306	1,489,306
R-squared	0.043	0.059	0.053	0.066
Issuer*Quarter FE	YES	YES	YES	YES
Holder*Quarter FE	NO	YES	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** p<0.01, ** p<0.05, * p<0.1

MREL Requirements and Risk-Taking

- Explore whether banks have incentive to **invest in bonds issued by banks with lower ratings** (RelRating is dummy equal to 1 if issuer has worse rating than holder).
- No evidence of risk-taking towards bonds issued by lower-rated banks

Table 3

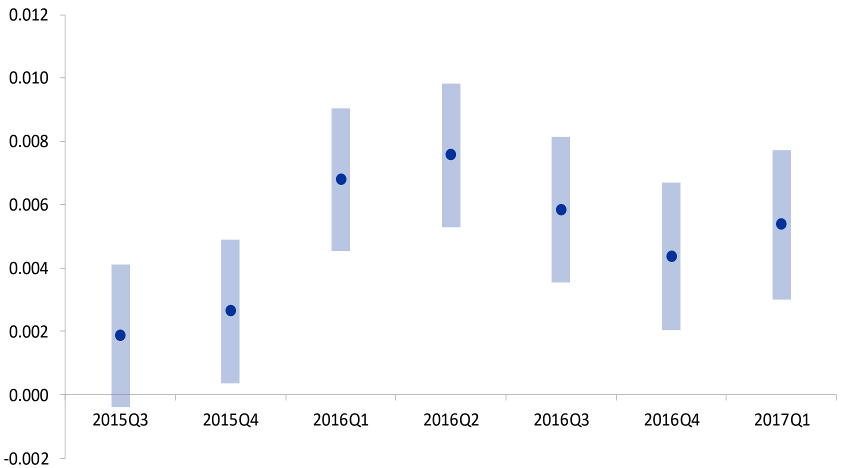
VARIABLES	(1) Hold	(2) Hold	(3) Hold	(4) Hold
ELIGIBLE	-0.0360***	-0.0360***	-0.0274**	-0.0250**
	(0.0133)	(0.00984)	(0.0132)	(0.0103)
ELIGIBLE*POST	0.00797***	0.00797***	0.00810**	0.00771***
	(0.00295)	(0.00267)	(0.00320)	(0.00285)
RelRating			0.0298	-0.0444
			(0.0437)	(0.0310)
ELIGIBLE* RelRating			-0.0460	-0.0591*
			(0.0429)	(0.0322)
POST* RelRating			-0.00405	0.0107*
			(0.00537)	(0.00637)
ELIGIBLE*POST* RelRating			0.00206	0.00451
			(0.00586)	(0.00645)
Observations	1,085,707	1,085,707	1,085,707	1,085,707
R-squared	0.012	0.041	0.013	0.050
Issuer*Quarter FE	YES	YES	YES	YES
Holder*Quarter FE	NO	YES	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Robustness: timing of change. Extensive margin

- **Timing of regulatory change:** check potential anticipation effects
  - Estimate the model for **various subsamples assuming each time different date** for introduction of MREL (in our baseline event in 2016 Q2)
  - Focus on $\mathrm{Eligible}_{b,i} * \mathrm{Post}_t$ [baseline for LPM with issuer-quarter FEs]

2 quarters before vs. 2 quarters after



Results estimated using 95% confidence intervals

1 quarter before vs. 1 quarter after

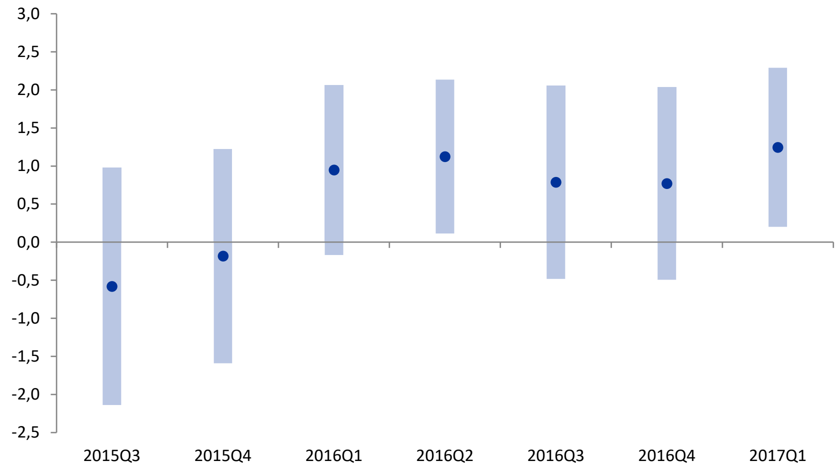
Coefficients of interest are not significant when the actual treatment date (2016 Q2) is not included in the estimation window of hypothetical treatments

Table 1.A

Robustness: timing of change. Intensive margin

- **Timing of regulatory change:** check potential anticipation effects
  - Estimate the model for **various subsamples assuming each time different date** for introduction of MREL (in our baseline event in 2016 Q2)
  - Focus on $\text{Eligible}_{b,i} * \text{Post}_t$ [baseline for LPM with issuer-quarter FEs]

Intensive Margin. 2 quarters before vs. 2 quarters after



Results estimated using 95% confidence intervals

Coefficient of interest is significant only using the actual treatment date (2016 Q2)

Table 1.B

Robustness: estimation window

- Banks might take longer time to **adjust to regulatory changes**
- To ensure that results are not driven by short-term developments, use an estimation window of **4 quarters before vs. 4 quarters after** the setting of MREL

	(1)	(2)	(3)	(4)
VARIABLES	Hold	Hold	Hold	Hold
ELIGIBLE	-0.0361***	-0.0361***	-0.0382***	-0.0382***
	(0.0111)	(0.00881)	(0.00895)	(0.00603)
ELIGIBLE*POST	**0.00892*** **	**0.00892*** **	**0.00761** **	**0.00758*** **
	(0.00326)	(0.00282)	(0.00315)	(0.00270)
Self_Hold			0.531***	0.522***
			(0.0291)	(0.0299)
ELIGIBLE*Self_Hold			0.0448	0.0447
			(0.0440)	(0.0440)
POST*Self_Hold			-0.0948***	-0.0951***
			(0.0303)	(0.0300)
ELIGIBLE*POST*Self_Hold			**0.0669***	**0.0682***
			(0.0374)	(0.0370)
Observations	3,816,176	3,816,176	3,816,176	3,816,176
R-squared	0.016	0.037	0.255	0.262
Issuer*Quarter FE	YES	YES	YES	YES
Holder*Quarter FE	NO	YES	NO	YES

Robust standard errors (clustered at the level of holder bank, security type and holding type) in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Ex-post increase in prob. for banks to hold eligible bonds persistent also in magnitude

Further increase in prob. of self-holdings arises in longer horizon

Robustness Analysis