Negative Monetary Policy Rates and Systemic Banks' Risk-Taking: Evidence from the Euro Area Securities Register

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Non-standard monetary policy measures and negative rates

- **Negative policy rates** are a **significant innovation** in monetary policy, and have recently been introduced in several advanced economies (Denmark, euro area, Sweden, Switzerland and Japan)
- The ECB charges negative rates on **excess reserves held by euro area banks** (deposit/IOER facility) since June 2014
- Negative policy rates may become even **more important in the future** (low level of policy rates worldwide, low r^*,…)
- Still relatively **few empirical studies on negative rates** – especially compared to other non-standard monetary policy measures (e.g. long-term liquidity provision, asset purchases, changes in the collateral framework)

Research question

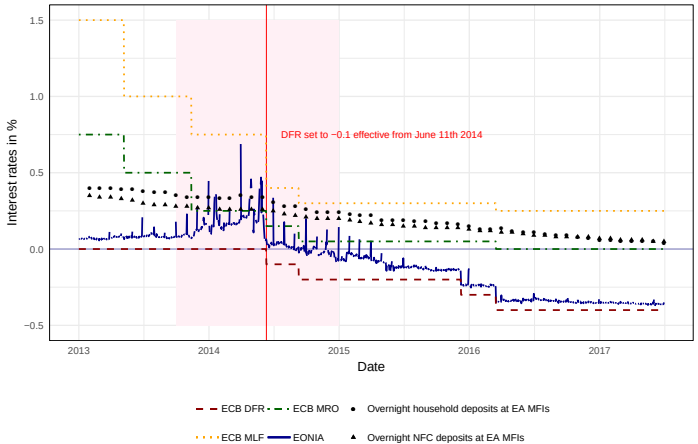
Did euro area banks increase risk-taking in response to negative rates?

- There is evidence that negative rates are **not passed through** to retail customer deposits – this may put significant **pressures on bank profitability**
- For identfication we exploit banks' ex-ante **reliance on customer deposits** in a differences-in-differences approach (Heider, Saidi and Schepens, 2019)
- Banks can **more quickly and easily adjust their securities holdings** compared to the loan portfolio ("transformation risk", cf. Myers and Rajan, 1998)
- We look at risk-taking in the securities portfolio of the **largest 26 banking groups in the euro area** (covering holdings of around 3 trillion euros)

No pass-through of negative rates to depositors

more evidence

Figure 1: Policy rates and market interest rates in the euro area (Source: ECB)



Overview of main findings

The effects of negative policy rates on bank risk-taking

- High deposit-ratio banks – more affected banks – **take more risk in their securities portfolios** *after* the introduction of negative policy rates *compared to* low deposit ratio banks
- Affected banks **retained assets yielding higher returns** compared to other banks
- Risk-taking is driven by **securities issued by the private sector** (financial and non-financial), issued by companies in the euro area and in other developed economies
- Banks more reliant on deposits also grant more **syndicated loans to riskier borrowers**

Theory about low (and negative) interest rates and risk-taking

- Negative rates may expand aggregate demand by **removing the zero lower bound** (Bernanke, 2017; Rogoff, 2016, 2017). However, effects may also become contractionary – **reversal interest rate** (Brunnermeier and Koby, 2017; Eggertsson et al., 2019)
- Low interest rates may drive **reach-for-yield behavior** by financial intermediaries (Rajan, 2005; Taylor, 2009; Allen and Rogoff, 2011; Stein, 2013; Martinez-Miera and Repullo, 2017), consistent with a **risk-taking channel of monetary policy** (Adrian and Shin, 2011; Maddaloni and Peydró, 2011; Borio and Zhu, 2012).

Related literature and contribution

- Several recent studies of the impact of **negative interest rates** on the **lending portfolio**…
  - Loan-level data: Heider, Saidi and Schepens (2018) – EA + Switzerland, Arce et al. (2018) – Spain, Bottero et al. (2019) – Italy
  - Balance-sheet data: Demiralp et al. (2017) – EA, Basten and Mariathasan (2018) – Switzerland, Eggertson et al. (2019) – Sweden
- Other studies looked have looked at the effects of **post-crisis monetary policy** on the **securities portfolio**…
  - Early post-crisis monetary policy: Peydro et al. (2018) – Italy
  - Asset purchases: Koijen et al. (2017) – EA sectors

Our paper

We use a **novel dataset** covering the securities portfolio of the 26 largest euro area banks and look at **risk-taking in the securities portfolio** in response to **negative rates**.

Main regression specification

$$ln(holdings)_{ijt} = \beta_0 \times Post_t \times Deposit\_Ratio_{jt} \times ACY_{it} + \beta_1 X_{ijt} + \mu_j + \eta_\diamond + \varepsilon_{ijt}$$

- **Outcome variable:** Holdings of a security i by bank j in quarter t
- **Post-Dummy:** Rate on ECB deposit facility lowered to -0.1% p.a. on June 11th 2014 ($Post_t$ = 1 $\Leftrightarrow$ t $\geq$ Q2 2014)
- **Treatment (intensity):** Impact of negative policy rates varies with the deposit ratio ($Deposit\_Ratio_{jt}$ = customer deposits/total assets in %)
- **Proxy for risk:** adjusted current yield (ACY_{ijt} in %)

$$\text{ACY}_{it} = 100 \cdot \frac{\text{coupon}_i[\%\text{ ann.}]}{\text{price}_{it}} + \frac{100 - \text{price}_{it}}{\text{residual\_maturity}_{it}/365}$$

ACY = current yield + adjustment for discount or premium vs. par value (100)

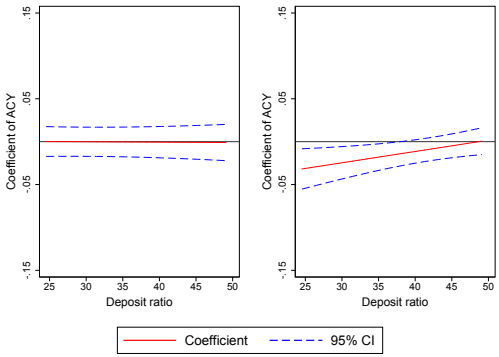
The effects of negative policy rates: identification via deposit ratio

VARIABLES	(1) Ln(holdings)	(2) Ln(holdings)	(3) Ln(holdings)	(4) Ln(holdings)
Post	-0.291**		-1.204**	
	(0.136)		(0.494)	
ACY		0.0186	0.00133	0.0640***
		(0.0197)	(0.0133)	(0.0180)
Post*ACY		-0.115***	-0.0655***	-0.112***
		(0.0434)	(0.0206)	(0.0364)
Deposit ratio*Post		0.0317**	0.0251**	0.0379**
		(0.0130)	(0.0104)	(0.0149)
Deposit ratio*ACY		-0.000790*	-4.75e-05	-0.000976**
		(0.000411)	(0.000335)	(0.000402)
Deposit ratio*Post*ACY		0.00223**	0.00136**	0.00265***
		(0.000997)	(0.000533)	(0.000955)
Observations	386,551	402,649	386,551	276,939
R-squared	0.580	0.223	0.582	0.331
Bank Controls	Yes	Yes	Yes	Yes
Security FE	Yes	No	Yes	No
Time FE	No	Yes	No	–
Bank FE	Yes	Yes	Yes	Yes
Maturity*Rating*Time FE	No	No	No	Yes

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

How do banks react to changes in ACY?

Figure 2: Marginal effect of ACY before and after negative policy rates



An increase in the deposit ratio by 10pp (one std. dev.) implies a ∼**1.4% increase in the sensitivity of holdings** in response to a 1pp change in ACY (w/ security FE, alternative specifications: 2%-2.5%).

Robustness: Parallel trends assumption

- **Parallel trends assumption** given Post-Dummy for 2014Q2 $H_0 : \beta_{01} = 0$

$$ln(holdings)_{ijt} = \beta_{01} \times d_{2013Q4} \times Deposit\_Ratio_{jt} \times ACY_{it} + ...$$

- No rejection of H_0 (even with "narrow" 10% confidence bands)

Figure 3: Security FE

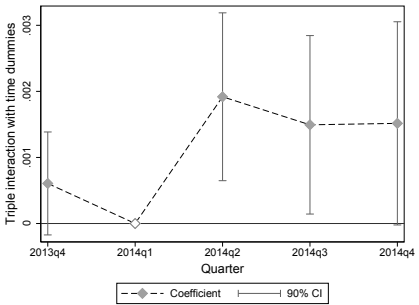
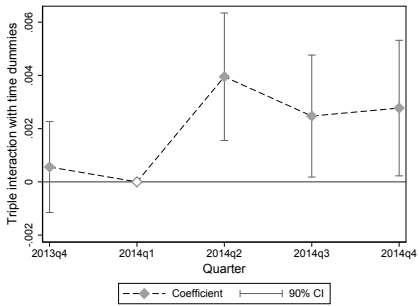
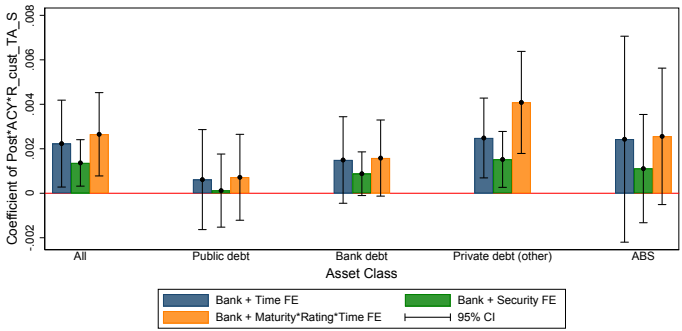


Figure 4: Maturity*Rating*Time FE



Evidence by asset class

Figure 5: Coefficient of the triple interaction (95% confidence interval)



Evidence of the identified effect is **strongest** for private debt securities (and ABS).

Further robustness checks

- The triple interaction effect remains significant for the **Khwaja-Mian estimator** (security-quarter fixed effects, p-value: 0.01), security-bank fixed effects (p-value: 0.05) and other specifications
- We extend our analysis by **up to 3 additional quarters** and the effects are still present
- The analysis of the parallel trends assumption provides additional evidence on the **timing and persistence** of the effects
- Sign of the triple interaction is robust across subsamples restricted to the **bottom, central and top quartiles of the ACY variable**
- The triple interaction of Post*Deposit Ratio*ACY remains positive and significant in a specification that **adds an interaction with bank leverage**.

Other results

Banks can increase risk through longer maturities of their holdings

We find no evidence that more affected banks banks increase **duration risk** after negative rates.

Risk-taking can additionally be explained by banks' risk-bearing capacity

We corroborate findings of Peydró, Polo and Sette (2018): **better capitalised banks** increased holdings of securities with higher ACY. go to table

Loan provision by large euro area banks

Banks more reliant on deposits grant more syndicated loans to **riskier borrowers** (cf. Heider, Saidi and Schepens, 2019) go to table

Fee income

There is some evidence that high deposit banks also charge **higher fees** (i.e. higher fee income in percent of net income). go to graph

Conclusions

Do negative rates affect the securities portfolios of big banks?

- Banks with a high deposit ratio (banks that are more affected by negative interest rates) **reshuffle their portfolios towards riskier securities** after the introduction of negative rates
- Affected banks **retain assets yielding higher returns** compared to other banks
- The results hold when **controlling for maturity and ratings**, the main determinants of capital regulation
- Strongest effect within a sample restricted to **private debt securities** (issued by non-bank financial companies and non-financial companies)

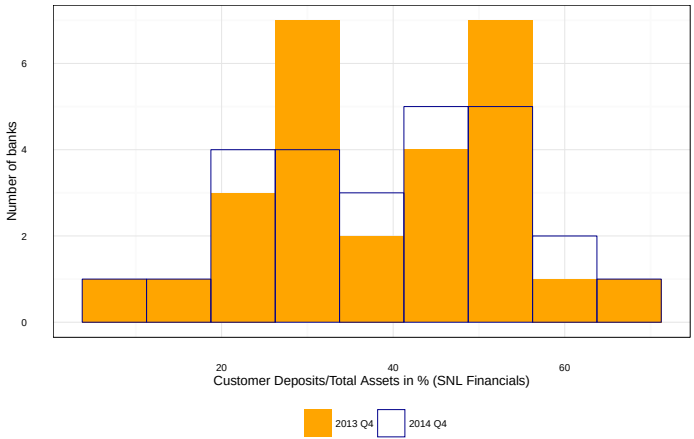
Thank you for your attention!

No pass-through of negative rates to depositors

back to main slide

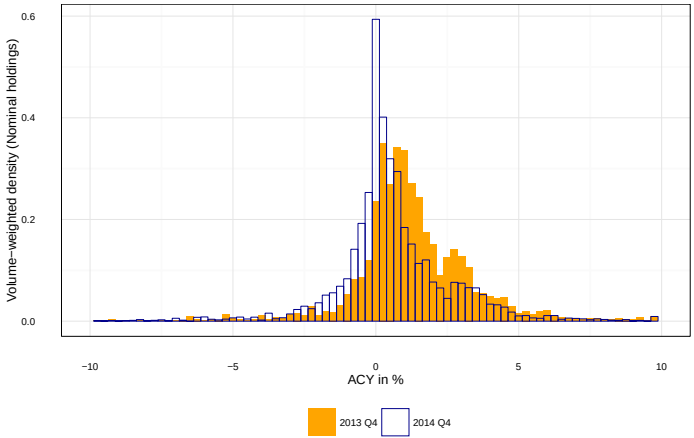
Figure 6: Market interest rates in the euro area (Source: ECB)

Deposit ratio



Source: SNL Financials

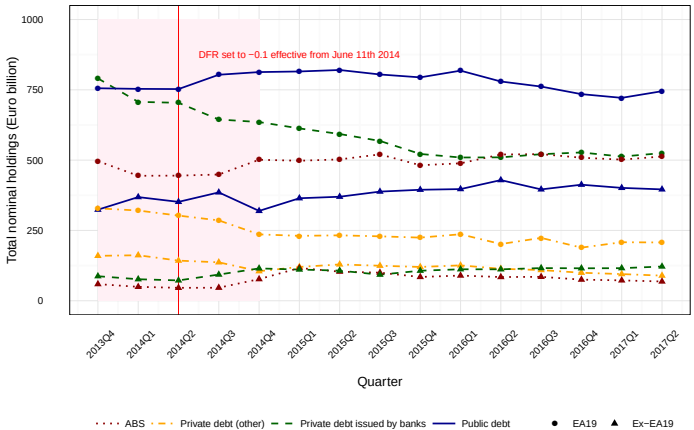
Overall shift in adjusted current yield (ACY)



Source: SHSG

Evolution of the securities portfolio of large euro area banks

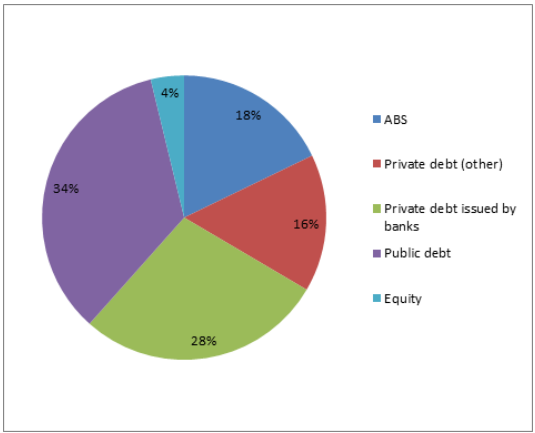
Figure 7: Evolution in nominal holdings across asset class and geography (Source: SHSG)



$\sim$ 20 % of total banking assets

Portfolio by asset class

Figure 8: Portfolio shares (market values) by asset class



Source: SHSG

Summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
ACY	454,534	0.979	4.008	-29.75	14.47
Equity/TA in %	453,144	4.812	1.156	3.109	8.167
Customer deposits / Assets in % (from SNL)	453,144	35.25	13.39	9.943	85.68
Eonia (average over quarter)	454,534	0.0997	0.0840	-0.0151	0.192
Wu-Xia shadow rate (average over quarter)	454,534	-0.967	0.560	-1.895	-0.262
log_assets	453,144	27.48	0.745	25.02	28.36
log_nominal	404,039	14.22	3.619	-4.605	24.57
Post	454,534	0.614	0.487	0	1

Post-NIRP security holdings and ACY

VARIABLES	(1) Ln(holdings)	(2) Ln(holdings)	(3) Ln(holdings)	(4) Ln(holdings)
Post	-0.291**		-0.283**	
	(0.136)		(0.136)	
ACY		-0.00934	-0.00150	0.0278***
		(0.00671)	(0.00890)	(0.00870)
Post*ACY		-0.0393***	-0.0173**	-0.0148
		(0.0141)	(0.00719)	(0.0151)
Observations	386,551	402,649	386,551	276,939
R-squared	0.580	0.220	0.580	0.327
Bank Controls	Yes	Yes	Yes	Yes
Security FE	Yes	No	Yes	No
Time FE	No	Yes	No	–
Bank FE	Yes	Yes	Yes	Yes
Maturity*Rating*Time FE	No	No	No	Yes

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Interaction with bank capital (trimmed table)

go back

VARIABLES	(1) Ln(Holdings)	(2) Ln(Holdings)	(3) Ln(Holdings)	(4) Ln(Holdings)
...				
Deposit ratio*Post*ACY		0.0147***	0.0110***	0.0169***
		(0.00473)	(0.00348)	(0.00488)
...				
		(0.0268)	(0.0244)	(0.0399)
Leverage ratio*Post*ACY		0.155***	0.108***	0.185***
		(0.0450)	(0.0319)	(0.0510)
Leverage ratio*Deposit ratio*ACY		0.00196***	0.00172***	0.00277***
		(0.000605)	(0.000591)	(0.000835)
Leverage ratio*Deposit ratio*Post*ACY		-0.00300***	-0.00225***	-0.00349***
		(0.000959)	(0.000726)	(0.00106)
Observations	386,551	402,649	386,551	276,939
R-squared	0.573	0.225	0.583	0.333
Bank Controls	Yes	Yes	Yes	Yes
Security FE	Yes	No	Yes	No
Time FE	No	Yes	No	–
Bank FE	Yes	Yes	Yes	Yes
Maturity*Rating*Time FE	No	No	No	Yes

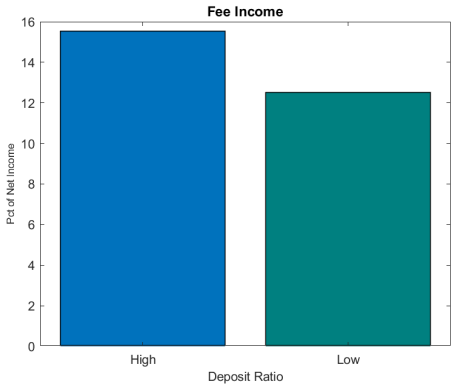
Evidence from syndicated loans

go back

Table 1: Regression based on Dealogic data (1 November 2013 – 31 December 2014, w/o APP period)

VARIABLES	(1) Ln(Amount)	(2) Ln(I-Amount)	(3) Ln(Amount)	(4) Ln(Amount)	(5) Ln(Amount)	(6) Ln(Amount)
Deposit Ratio*Post*Rating					0.00619**	0.00406*
					(0.00304)	(0.00223)
Deposit Ratio*Post	-0.0236	0.00602	-0.0152*	0.00270	-0.0684**	-0.0401*
	(0.0240)	(0.0125)	(0.00797)	(0.00381)	(0.0296)	(0.0213)
Deposit Ratio*Rating					-0.00149	-0.00203
					(0.00219)	(0.00169)
Post*Rating					-0.0366	
					(0.136)	
Rating					-0.192*	
					(0.102)	
Observations	60	183	568	530	125	123
R-squared	0.508	0.606	0.197	0.920	0.744	0.906
Lead Arrangers Only	Yes	Yes	No	No	No	No
Bank-Month Level	Yes	Yes	No	No	No	No
Bank-Borrower Level	No	No	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	No	Yes	No
Borrower-Month FE	No	No	No	Yes	No	Yes

Figure 9: High vs. Low Deposit ratio Banks



Source: ECB

Reporting banking groups

	Country	Code	Short name	Full name
1	AT	AT20100	Erste	Erste Group Bank AG
2	BE	BE0403227515	KBC	KBC Group-KBC Groep NV/ KBC Groupe SA
3	BE	BE0403201185	Belfius	Belfius
4	DE	DE00001	DB	Deutsche Bank AG
5	DE	DE00003	COBA	Commerzbank AG
6	DE	DE00316	LBBW	Landesbank Baden-Wuerttemberg
7	DE	DE00317	BLB	Bayerische Landesbank
8	DE	DE00319	HELABA	Landesbank Hessen-Thüringen Girozentrale
9	DE	DE00320	NORDLB	Norddeutsche Landesbank Girozentrale NORD/LB
10	DE	DE01121	DZ	Deutsche Zentral-Genossenschaftsbank-DZ Bank AG
11	DE	DE03249	PBB	Deutsche Pfandbriefbank AG
12	ES	ES0049	BSCH	Banco Santander SA
13	ES	ES0182	BBVA	Banco Bilbao Vizcaya Argentaria SA
14	ES	ES7865	BFA	BFA Tenedora de Acciones SA
15	ES	ESHO486478	La Caixa	Criteria Caixa Holding SA
16	FR	FR10278	BFCM	Credit Mutuel CM5-CIC
17	FR	FR16188	BPCE	Group BPCE
18	FR	FR30003	SG	Société Générale
19	FR	FR30004	BNP	BNP Paribas
20	FR	FR30006	CA	Crédit Agricole Group-Crédit Agricole
21	IT	IT0000203426147	MPdS	Banca Monte dei Paschi di Siena
22	IT	IT0000102484824	UC	Unicredit SpA
23	IT	IT0000101262255	ISP	Intesa Sanpaolo
24	NL	NL149	ABN	ABN Amro Group NV
25	NL	NL163	ING	ING Groep NV
26	NL	NL600	Rabobank	Rabobank Group-Rabobank Nederland