

# Why so negative? The effect of monetary policy on bank credit supply across the euro area

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And what about the euro area as a whole?

## What we do

Examine mid-2014 rate cut by ECB in core *and* periphery

Use *two* credit registers, Portugal and Germany

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Examine mid-2014 rate cut by ECB in core *and* periphery

Use *two* credit registers, Portugal and Germany

Comprehensive test of bank lending in reaction to policy rate change

Consider role of equity and deposits

Examine lending to safe and risky borrowers

## What we find

Periphery (away from zero lower bound on deposit rates)

Effect as in standard bank-capital channel



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⇒ "Augmented" bank-capital channel

# Literature

## Bank lending channel

Kashyap & Stein (1995), Kashyap & Stein (2000), Jimenez, Ongena, Peydro & Saurina (2012)

## Bank capital channel

Van den Heuvel (2002), Bolton & Freixas (2006), Gambacorta & Shin (2018), Ampudia & Van den Heuvel (2018)

## Bank deposit channel

Drechsler, Savov & Schnabl (2017), Wang, Whited, Wu & Xiao (2020)

## Bank risk-taking channel

Adrian & Shin (2010), Maddaloni & Peydro (2011), Jimenez, Ongena, Peydro & Saurina (2014), Dell'Ariccia, Laeven & Suarez (2017)

## Negative policy rates

Heider, Saidi & Schepens (2019), Ulate (2020), Eggertsson, Juelsrud, Summers & Wold (2020), Bubeck, Maddaloni & Peydro (2020), Bottero Minoiu, Peydro, Polo, Presbitero & Sette (2019)

# **Hypothesis development**

## Bank capital channel

External financing constraint  $\rightarrow$  bank capital matters for lending

Lower policy rate increases bank profitability & capital via net-interest margin

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Lower policy rate increases bank profitability & capital via net-interest margin

Stronger pass-through of policy rate  $r_p$  to rate on short-term liabilities  $r_D$  than to loan rate  $R$

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More constrained banks are more sensitive to policy-rate changes

## Augmented at the zero lower bound

Hard zero lower bound on deposit rates but not on market-based debt

$$\frac{\partial r_{D=Deposits}}{\partial r_p} < \frac{\partial r_{D=Debt}}{\partial r_p}$$



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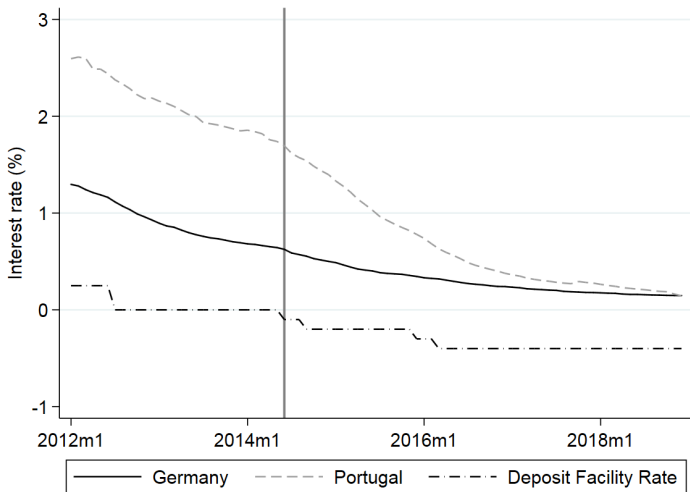
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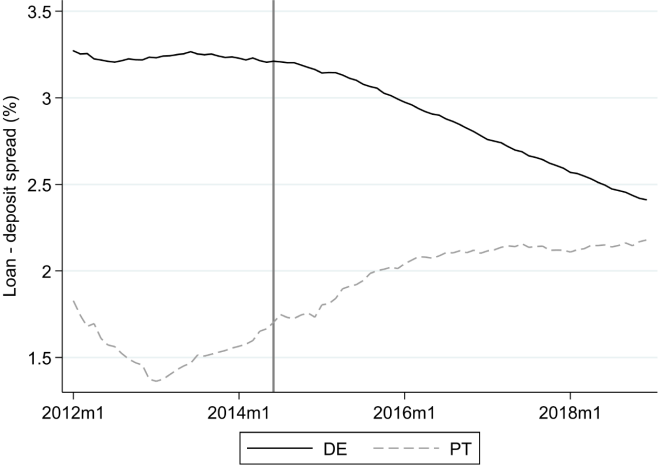
$$\frac{\partial R}{\partial r_p} > \frac{\partial r_{D=Deposits}}{\partial r_p}$$

Squeezed banks perform less costly screening of borrowers

Different distance to ZLB for deposit rates in euro area → different pass-through of 2014 rate cut



# Increasing interest margin in PT, decreasing in DE



Source: iMIR data

# **Theoretical framework**

## Use friction from Holmstrom & Tirole (1997)

Unobservable ex-post loan monitoring & limited liability

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Innovations

Outside cost of funding depends on policy rate,  $r_O(r_p)$

Loan rate depends on policy rate,  $R(r_p)$

Ex-ante screening: endogenous success probability  $p$



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$$p[R(r_p)L - r_D(L - A)] \geq \delta p[R(r_p)L - r_D(L - A)] + bL,$$

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Outsiders' participation constraint

$$pr_D(L - A) \geq r_O(r_p)(L - A)$$

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## Financing constraint

Defining pledgeable return

$$\mathcal{P}(r_p, p, b) \equiv R(r_p) - \frac{b}{p(1 - \delta)}$$

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$$\underbrace{\left( \frac{r_D(r_p)}{r_D(r_p) - \mathcal{P}(r_p, p, b)} \right)}_{\text{multiplier } k(r_p, p, b)} A \geq L.$$

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Can derive  $\frac{dL^*}{dr_p}$ ,  $\frac{d^2L^*}{dr_p db}$ ,  $\frac{dp^*}{dr_p}$ , etc...

## **Data and empirical specification**



## Data - *two credit registers*

Bank-firm level credit exposure from credit registers

Germany: Quarterly, >1m €

Portugal Monthly, >50 €

Bank balance-sheet information (Monetary and Financial Statistics)

Germany: Bank-holding company

Portugal: Main entity of group

Firm balance-sheet information

Germany: BvD Amadeus

Portugal: Informação Empresarial Simplificada (limit to  $\geq 10$  employees)

## Standard diff-in-diff (**b**ank, **f**irm, **t**ime)

$$\text{New relationship}_{bft} = \beta \text{Exposure}_b \times \text{After}(06/2014)_t + \mu_b + \theta_{ft} + \varepsilon_{bft}$$

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Dependent variable is extensive margin

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$\text{Exposure}_b$  is  $\frac{\text{Equity}}{\text{Assets}}$  or  $\frac{\text{Deposits}}{\text{Assets}}$  in 2013

## Banks' exposure to rate cut comparable

	Portugal			Germany		
	Mean	Std. dev.	N	Mean	Std. dev.	N
Equity ratio	0.097	0.034	1,529,890	0.060	0.037	345,180
Deposit ratio	0.318	0.103	1,529,890	0.367	0.224	345,180
Any new credit	0.222	0.416	1,529,890	0.225	0.418	345,180
New relationship	0.016	0.125	1,529,890	0.053	0.224	345,180
Credit ( $\neq 0$ ) in thd€	727	5,420	1,486,216	6,276	26,447	228,655

**Credit supply**

# Our comprehensive test

Country Firms Variable	New relationship $\in \{0, 1\}$					
	All (1)	Portugal Risky (2)	Safe (3)	All (4)	Germany Risky (5)	Safe (6)
Equity ratio $\times$ After(06/2014)						
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$						
$N$						
Variable	(7)	(8)	(9)	(10)	(11)	(12)
Deposit ratio $\times$ After(06/2014)						
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$						
$N$						



# Away from ZLB → standard bank-capital channel

Country Firms Variable	New relationship $\in \{0, 1\}$					
	All (1)	Portugal Risky (2)	Safe (3)	All (4)	Germany Risky (5)	Safe (6)
Equity ratio $\times$ After(06/2014)	-0.031** (0.012)	-0.024** (0.011)	-0.038** (0.016)			
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$	0.052	0.062	0.047			
N	1,491,926	472,125	490,469			
Variable	(7)	(8)	(9)	(10)	(11)	(12)
Deposit ratio $\times$ After(06/2014)						
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$						
N						

# At ZLB → standard bank-capital channel inactive

Country Firms Variable	New relationship $\in \{0, 1\}$					
	All (1)	Portugal Risky (2)	Safe (3)	All (4)	Germany Risky (5)	Safe (6)
Equity ratio $\times$ After(06/2014)	-0.031** (0.012)	-0.024** (0.011)	-0.038** (0.016)	-0.094 (0.243)	0.237 (0.159)	-0.315 (0.277)
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$	0.052	0.062	0.047	0.096	0.122	0.107
N	1,491,926	472,125	490,469	303,036	86,904	99,348
Variable	(7)	(8)	(9)	(10)	(11)	(12)
Deposit ratio $\times$ After(06/2014)						
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$						
N						

# Away from ZBL → bank funding structure does not matter

Country Firms Variable	New relationship $\in \{0, 1\}$					
	All (1)	Portugal Risky (2)	Safe (3)	All (4)	Germany Risky (5)	Safe (6)
Equity ratio $\times$ After(06/2014)	-0.031** (0.012)	-0.024** (0.011)	-0.038** (0.016)	-0.094 (0.243)	0.237 (0.159)	-0.315 (0.277)
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
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Variable	(7)	(8)	(9)	(10)	(11)	(12)
Deposit ratio $\times$ After(06/2014)	-0.011 (0.008)	-0.009 (0.008)	-0.018 (0.012)			
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$	0.052	0.062	0.047			
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# At ZLB → funding structure matters, risk taking

Country Firms Variable	New relationship $\in \{0, 1\}$					
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Equity ratio $\times$ After(06/2014)	-0.031** (0.012)	-0.024** (0.011)	-0.038** (0.016)	-0.094 (0.243)	0.237 (0.159)	-0.315 (0.277)
Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
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Bank FE	Y	Y	Y	Y	Y	Y
Firm-time FE	Y	Y	Y	Y	Y	Y
Adj. $R^2$	0.052	0.062	0.047	0.096	0.122	0.106
N	1,491,926	472,125	490,469	303,036	86,904	99,348

# Augmented bank-capital channel

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# Real effects

▶ [Jump over](#)

# How we test for real effects

Country	$\Delta \ln(\text{Tangible fixed assets})$			
	Portugal		Germany	
New relationship				
New relationship $\times$ Equity exposure				
New relationship $\times$ Deposit exposure				
New credit				
Industry-Location FE	Y	Y	Y	Y
Industry-size FE	Y	Y	Y	Y
<i>N</i>				

# Do firms with new relationships invest more?

Country	$\Delta \ln(\text{Tangible fixed assets})$			
	Portugal		Germany	
New relationship	?	?	?	?
New relationship $\times$ Equity exposure				
New relationship $\times$ Deposit exposure				
New credit				
Industry-Location FE	Y	Y	Y	Y
Industry-size FE	Y	Y	Y	Y
<i>N</i>				



# Holding constant more credit from existing relationships

Country	$\Delta \ln(\text{Tangible fixed assets})$			
	Portugal		Germany	
New relationship	?	?	?	?
New relationship $\times$ Equity exposure				
New relationship $\times$ Deposit exposure				
New credit	✓	✓	✓	✓
Industry-Location FE	Y	Y	Y	Y
Industry-size FE	Y	Y	Y	Y
<i>N</i>				

## Risky firms are financially constrained

Country	$\Delta \ln(\text{Tangible fixed assets})$			
	Portugal		Germany	
New relationship	?	?	?	?
New relationship $\times$ Equity exposure	0			
New relationship $\times$ Deposit exposure		0		
New credit	✓	✓	✓	✓
Industry-Location FE	Y	Y	Y	Y
Industry-size FE	Y	Y	Y	Y
<i>N</i>				

## Risky firms are financially constrained

Country	$\Delta \ln(\text{Tangible fixed assets})$			
	Portugal		Germany	
New relationship	?	?	?	?
New relationship $\times$ Equity exposure	0		0	
New relationship $\times$ Deposit exposure		0		+
New credit	✓	✓	✓	✓
Industry-Location FE	Y	Y	Y	Y
Industry-size FE	Y	Y	Y	Y
<i>N</i>				

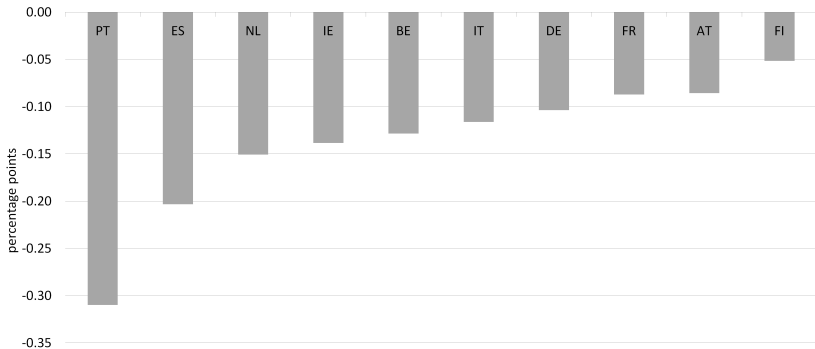
# Investment effects of new credit relationships

Country	$\Delta \ln(\text{Tangible fixed assets})$			
	Portugal		Germany	
New relationship	0.086*	0.108***	0.060**	0.009
	(0.037)	(0.036)	(0.026)	(0.025)
New relationship $\times$ Equity exposure	0.097		-0.057	
	(0.483)		(0.342)	
New relationship $\times$ Deposit exposure		-0.075		0.154***
		(0.127)		(0.058)
New credit	0.052***	0.052***	0.037**	0.038**
	(0.012)	(0.012)	(0.018)	(0.018)
Industry-Location FE	Y	Y	Y	Y
Industry-size FE	Y	Y	Y	Y
<i>N</i>	15,618	15,618	3,594	3,594

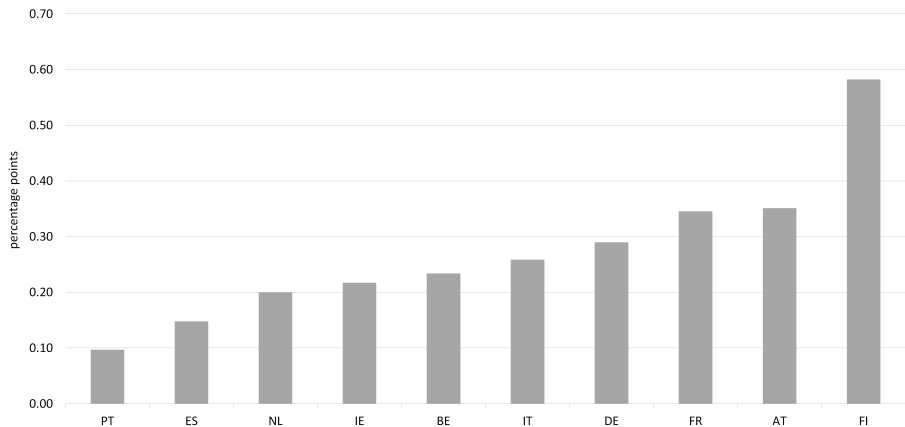
## Implications for the euro area

▶ [Jump over](#)

## Standard bank-capital channel across the euro area



# Risk taking because of deposit funding across the euro area



# Conclusion

Comprehensive view of post-crisis monetary policy rate transmission via banks

Augmented bank-capital channel

External financing constraint & net-interest margin

Funding structure matters at zero lower bound

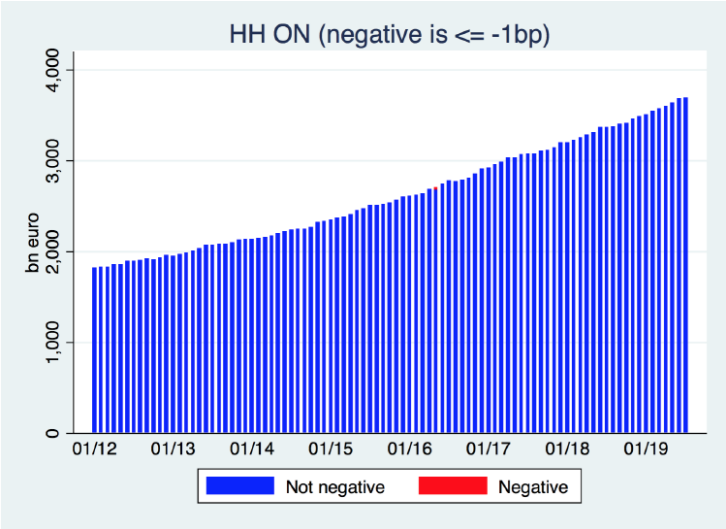
Differences in transmission across euro area

Stimulus in the periphery, risk-taking in the core

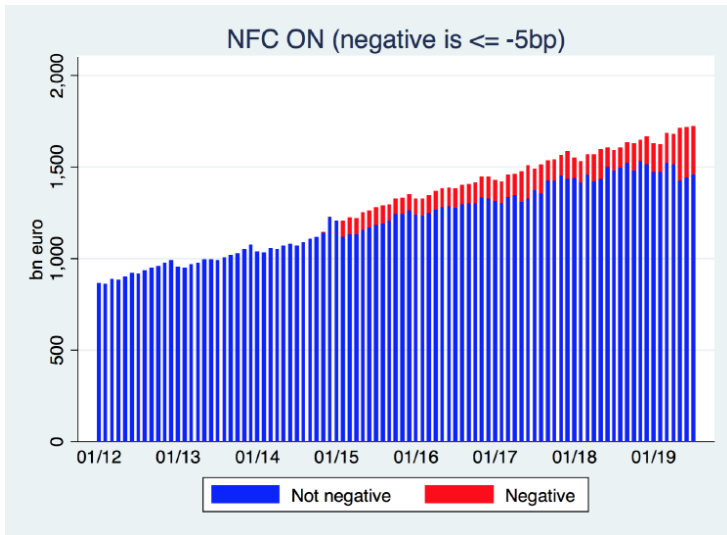


**Additional slides**

# No negative rates on ON household deposits



## Some negative rates on ON corporate deposits



# Share of overnight deposits small

