

# Targeted monetary policy, dual rates and bank risk taking

F. Barbiero <sup>1</sup>, L. Burlon <sup>1</sup>, M. Dimou <sup>1</sup>, J. Toczyński <sup>2</sup>

<sup>1</sup>European Central Bank

<sup>2</sup>University of Zurich

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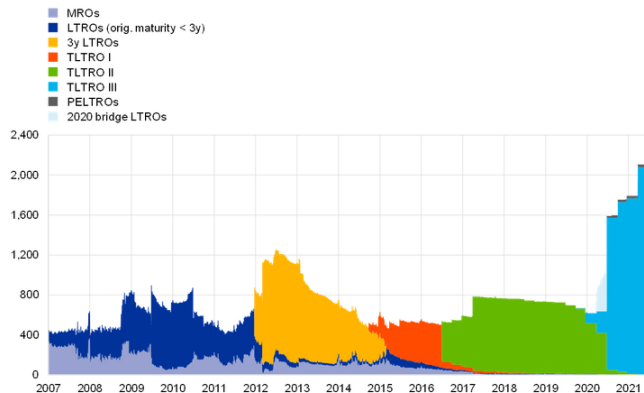
\*The views expressed in this paper are those of the authors and do not necessarily reflect those of the European Central Bank or the Eurosystem.

- **Targeted Longer-Term Refinancing Operations (TLTROs)** provide central bank funding to banks at attractive rates as long as banks use the funds to meet lending targets
- The TLTRO III series was **recalibrated** in early 2020 to support lending during the COVID-19 pandemic
- Banks could borrow funds from the central bank at a rate **below the rate at which reserves are remunerated**
- This resulted in widespread participation and **unprecedented take-up** of funds (over 1.3 trillion in June 2020 alone).

# Borrowing from the Eurosystem

## Borrowing from the Eurosystem

(EUR billions)



- TLTRO III terms were re-calibrated on 30 April 2020 (and previously on 12 March 2020).
- The recalibration allowed for the interest rate charged on borrowed funds to reach a minimum of 50 basis points **below the deposit facility rate (DFR)**
- Conditional on meeting their lending target, banks could borrow from the ECB at a minimum of -1%, while interbank market rates were around -0.5%.
- Banks could borrow up to 50% of their loan book to the eligible sectors (non-financial corporations and households with the exclusion of mortgages).

We exploit the unexpected recalibration of TLTRO III terms on April 30 2020 to answer 2 main research questions:

- Did the TLTRO recalibration of 30 April 2020 generate an increase in loan origination? ([Benetton & Fantino 2021](#), [Altavilla et al. 2020](#) and many others)
- Did TLTRO affect the qualitative composition of credit? ([Andreeva & García-Posada 2021](#))

We combine the following data sources:

- **AnaCredit** - loan level data from pan-European credit registry including detailed information on loan volume, conditions and borrower characteristics.
- **iBSI** (individual Balance Sheet Items statistics) - bank level balance sheet items.
- **Markit iBoxx** - daily data on bank bonds yields.

The final sample covers 98 major European banks from 13 countries and totals nearly 2.5 million bank-firm relationships from January to October 2020.

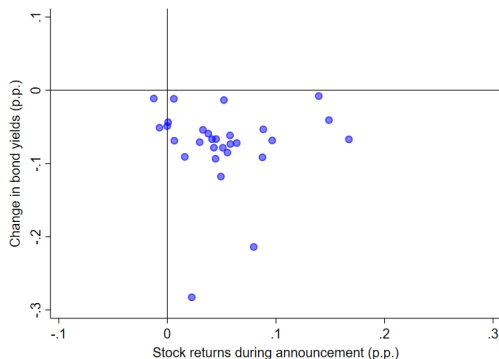
- Identifying the effect of TLTRO is challenging:
  - endogeneity of decision to participate
  - indirect cost relief that TLTRO has on non-participating banks.
- We exploit the **unexpected recalibration of TLTRO III** of 30 April 2020:
  - high frequency response of bank bonds yields around announcement.
- Empirical specification:

$$\text{Loan growth}_{b,f} = \alpha_{i,l,s} + \beta \text{TLTRO shock}_b + X_b + X_f + \epsilon_{b,f}, \quad (1)$$

- Bank-firm level information from AnaCredit to control for **loan demand**:
  - Industry-Location-Size FE (ILS) ([Degryse et al. 2019](#)).
  - Alternatively, Firm FE ([Khwaja & Mian 2008](#)).

# Monetary policy shock

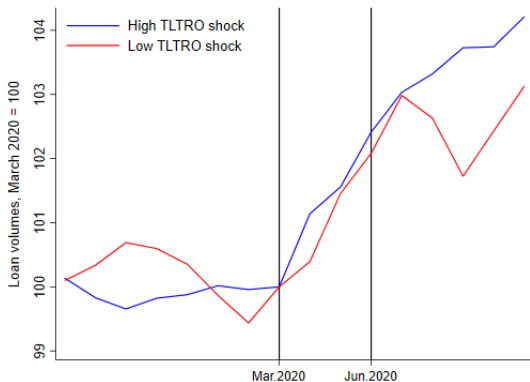
Figure: Intra-daily stock returns during announcement and daily change in bond yields on 30 April 2020





# Monetary policy shock

Figure: Lending before and after announcement by policy exposure



- We find a **sizeable positive effect of TLTRO** on both the intensive and the extensive margin of credit.
- Credit expansion was **not accompanied by an increase in risk taking or in the mispricing of risk** as measured by *ex ante* and *ex post* riskiness of borrowers.
- Banks with **lower intermediation margins** benefitted the most from the leeway afforded by the TLTRO relief.

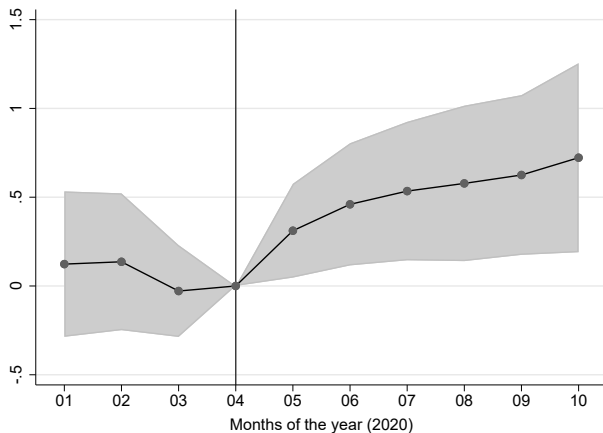
# Effect on loan growth - intensive margin

Table: Impact of TLTRO shocks on bank credit provision

	Dependent Variable: Loan growth					
	(1) <i>Full sample</i>			(2) <i>Multiple-relationship firms</i>		
	(-3M)	(3M)	(6M)	(-3M)	(3M)	(6M)
TLTRO Shock	-0.110 (0.221)	0.554** (0.212)	0.737** (0.287)	-0.0426 (0.309)	0.469** (0.218)	0.559* (0.310)
Firm FE	No	No	No	Yes	Yes	Yes
ILS FE	Yes	Yes	Yes	No	No	No
Bank characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	No	No	No
<i>N</i>	1,207,460	1,207,460	1,207,460	454,313	454,313	454,313
<i>R</i> <sup>2</sup>	0.111	0.118	0.118	0.406	0.397	0.402

- The effect of TLTRO shock on credit supply is positive and significant, also after controlling for bank and firm characteristics.
- The results are qualitatively the same and of similar magnitude when restricting the analysis to multiple bank relationships firms ([Khwaja & Mian 2008](#)).

Figure: Credit growth after TLTRO shock



# Effect on loan growth - extensive margin

Table: Extensive margin of credit

	Dependent Variable: Probability of new loan		
	(1)	(2)	(3)
TLTRO Shock	0.399*** (0.143)	0.365** (0.141)	0.370** (0.145)
ILS FE	Yes	Yes	Yes
Bank characteristics	No	Yes	Yes
Firm characteristics	No	No	Yes
<i>N</i>	2,488,661	2,416,194	2,410,721
<i>R</i> <sup>2</sup>	0.210	0.211	0.214

- Dependent variable is a dummy variable that takes the value of 1 if a new loan is granted to a firm which had zero credit outstanding vis-à-vis a given bank as of April 2020.
- We find a strong positive effect of TLTRO shock on new loans creation.

# Qualitative composition of credit

Table: Qualitative composition of credit

	Loan growth		Prob. of a new loan		Lending rate	
	(1)	(2)	(3)	(4)	(5)	(6)
TLTRO Shock	0.917** (0.397)	0.809** (0.307)	0.276* (0.152)	0.354** (0.147)	-0.306 (0.341)	-0.258 (0.307)
Ex-ante PD	-0.124** (0.052)		-0.094*** (0.020)		0.179** (0.083)	
TLTRO Shock $\times$ Ex-ante PD	-0.497 (0.581)		-0.367* (0.212)		0.698 (0.656)	
Ex-post risk		-0.112** (0.043)		-0.151*** (0.025)		0.196*** (0.056)
TLTRO Shock $\times$ Ex-post risk		-0.738** (0.344)		-0.095 (0.298)		0.887** (0.395)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
ILS FE	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	1,094,520	1,207,460	2,047,553	2,416,546	1,020,849	1,126,124
<i>R</i> <sup>2</sup>	0.123	0.121	0.221	0.222	0.178	0.174

- Ex-ante borrower risk is the probability of default as of April 2020, ex-post risk is the share of a given firm's arrears over total credit as of October 2020.
- We find **no evidence of excessive risk taking**.

# Intermediation margins

**Table: Impact on bank lending conditions by level of intermediation margins**

	Impact on bank lending conditions			Impact on composition of bank lending		
	Loan growth (1)	Prob. of new loan (2)	Lending rate (3)	Loan growth (4)	Prob. of new loan (5)	Lending rate (6)
<i>Banks with high intermediation margins</i>						
TLTRO shock	0.379 (0.428)	0.362*** (0.110)	-0.0677 (0.242)	0.452 (0.588)	0.224* (0.119)	-0.042 (0.348)
Ex ante PD				-0.217*** (0.066)	-0.122*** (0.013)	0.285*** (0.096)
TLTRO shock × Ex ante PD				0.258 (0.775)	-0.234 (0.173)	0.076 (0.962)
<i>Banks with low intermediation margins</i>						
TLTRO shock	2.408** (1.019)	3.007*** (1.069)	-1.075** (0.454)	3.148*** (1.145)	3.383*** (1.190)	-1.013* (0.577)
Ex ante PD				0.277*** (0.086)	0.097 (0.067)	0.049 (0.045)
TLTRO shock × Ex ante PD				-5.342*** (1.389)	-2.758** (1.277)	-0.195 (0.757)
<i>F-test</i>						
TLTRO shock: High = Low	3.38*	6.07**	0.385*			
TLTRO shock × PD: High = Low				12.47***	3.86*	0.05*

- TLTRO provides funding cost relief for affected banks and helps to preserve unit margins of intermediation.
- Banks with more compressed net margins *ex-ante* benefit the most from the relief.

# Identification challenges and robustness

We carry out a series of robustness checks:

- Placebo shock exercise
- Alternative definition of the TLTRO shock (obtained with Fama French factor model)
- Controlling for government guarantees
- Controlling for banks' characteristics and net capital buffers
- Substitution of lending to the same firm from one bank to another
- Controlling for March-April lending performance.



# Conclusion

- The TLTRO recalibration had a strong positive effect on credit supply, both in the intensive and extensive margin
- The credit expansion spurred by exposure to TLTROs was not accompanied by an increase in risk-taking or a mispricing of risk
- Bank with lower ex ante intermediation margins benefitted the most from the TLTRO relief
- Central bank funding at rates below the level at which reserves are remunerated (so-called 'dual rates') can help to enhance transmission of bank-based monetary policy and avoid risks associated with a standard rate cut in a negative interest rate environment

## Robustness checks

# Robustness on the timing

	% change in loan volume	
	(1)	(2)
TLTRO Shock	0.040*** (0.012)	0.036*** (0.013)
1 day before	-0.014 (0.018)	-0.005 (0.014)
1 day after	0.010 (0.013)	0.002 (0.014)
2 days before	-0.021 (0.015)	-0.026 (0.016)
2 days after	0.008 (0.021)	0.004 (0.016)
5 days before	0.016 (0.030)	0.001 (0.027)
5 days after	-0.005 (0.012)	-0.010 (0.018)
1 week before	0.006 (0.017)	0.001 (0.014)
1 week after	0.016 (0.020)	0.020 (0.014)
10 days before	0.005 (0.023)	0.012 (0.018)
10 days after	-0.025 (0.023)	-0.021 (0.021)
15 days before	0.036 (0.031)	0.017 (0.026)
15 days after	0.011 (0.015)	0.016 (0.016)
Bank controls	No	Yes
Firm controls	No	Yes
ILS FE	Yes	Yes

# Alternative TLTRO shock

Table: Alternative TLTRO shock

	Dep. Var.: Loan growth				
	(1)	(2)	(3)	(4)	(5)
FF TLTRO Shock	0.712*** (0.189)	0.579** (0.276)	0.579** (0.277)	0.883*** (0.264)	0.571** (0.228)
ILS FE	Yes	Yes	Yes	No	No
Firm FE	No	No	No	Yes	Yes
Bank characteristics	No	Yes	Yes	No	Yes
Firm characteristics	No	No	Yes	No	No
<i>N</i>	1,100,710	1,100,710	1,100,710	383,261	383,261
<i>R</i> <sup>2</sup>	0.124	0.126	0.126	0.410	0.415

The table presents the results for an alternative measure of TLTRO shock (FF TLTRO Shock) which is calculated as the abnormal one-day change in bank bond returns on 30 April 2020, extracted using a standard Fama-French (FF) factor model. Each observation is a bank-firm pair. Standard errors clustered at the bank level are reported in parentheses.

# Controlling for government guarantees

Table: Controlling for government guarantees

	Dependent Variable: Loan growth		
	Bank-firm level	Firm-level	
	(1)	(2)	(3)
TLTRO Shock	0.455* (0.231)		
Firm-level TLTRO Shock		0.175*** (0.020)	0.201*** (0.026)
Gov. Guarantee	0.554*** (0.041)	0.496*** (0.002)	0.495*** (0.002)
Firm-level TLTRO shock $\times$ Gov. guarantee			0.153** (0.075)
ILS FE	Yes	Yes	Yes
Bank characteristics	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes
<i>N</i>	1,207,460	1,003,684	1,003,684
<i>R</i> <sup>2</sup>	0.219	0.241	0.241

The table presents a robustness test of our main results on loan growth controlling for government guarantees at the bank-firm level (columns 1) and at the aggregated firm level (columns 2 and 3). Gov. Guarantee is a dummy equal to 1 if the share of guaranteed loans has increased between April 2020 and October 2020, at the bank-firm (column 1) and at the aggregated firm level (columns 2 and 3). In column 3, the firm-level TLTRO shock and Gov. Guarantee variables are centered at the mean. The firm-level treatment is calculated by weighting bank level bond yield shocks by the amount of credit. Bank characteristics are also weighted by the amount of credit. Standard errors are clustered at the bank level.

# Controlling for bank characteristics

**Table: Controlling for concomitant measures and balance sheet characteristics**

	Dependent Variable: Loan growth				
	(1)	(2)	(3)	(4)	(5)
TLTRO Shock	0.821*** (0.259)	0.730** (0.288)	0.737** (0.287)	0.720** (0.285)	0.696** (0.276)
log(Main assets)		0.044*** (0.015)	0.044*** (0.015)	0.044*** (0.015)	0.038** (0.018)
ROA		-2.702 (4.577)	-2.611 (4.601)	-2.234 (4.669)	-3.196 (4.463)
CET 1 Ratio		0.091 (0.270)	0.092 (0.270)		0.181 (0.278)
Securities holdings		0.300 (0.275)	0.305 (0.271)	0.340 (0.261)	0.147 (0.327)
Deposits ratio		-0.053 (0.114)	-0.066 (0.118)	-0.073 (0.114)	-0.022 (0.101)
Firm age			-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)
Capital buffer				-0.003 (0.005)	
Mar-Apr performance					0.338 (0.284)
ILS FE	Yes	Yes	Yes	Yes	Yes
<i>N</i>	1,207,460	1,207,460	1,207,460	1,207,460	1,207,460
<i>R</i> <sup>2</sup>	0.114	0.117	0.118	0.118	0.118

# Substitution between banks

Table: Firm-level aggregation

	Dependent Variable: Loan growth		
	(1)	(2)	(3)
Firm-level TLTRO Shock	0.580*** (0.020)	0.559*** (0.021)	0.566*** (0.021)
ILS FE	Yes	Yes	Yes
Bank characteristics	No	Yes	Yes
Firm characteristics	No	No	Yes
<i>N</i>	1,030,418	1,003,697	1,003,684
<i>R</i> <sup>2</sup>	0.151	0.151	0.151

The table presents the results from a regression in which the dependent variable (loan growth), the TLTRO shock and bank characteristics have been aggregated at the firm level. Firm level treatment is calculated by weighting bank level bond yield shocks by the amount of credit outstanding as of April 2020. Bank characteristics are also weighted by the same amount of credit. Standard errors are clustered at the firm level.

# March-April lending performance

Table: Robustness for lending in March and April

	Dep. Var.: Loan growth		
	(1)	(2)	(3)
<i>Full sample</i>			
Bond Shock	0.778*** (0.230)	0.686*** (0.259)	0.692*** (0.257)
March-April performance		0.245 (0.280)	0.248 (0.281)
ILS FE	Yes	Yes	Yes
Bank characteristics	No	Yes	Yes
Firm characteristics	No	No	Yes
<i>N</i>	1360560	1341807	1341791
<i>R</i> <sup>2</sup>	0.108	0.111	0.111



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