



BANK FOR INTERNATIONAL SETTLEMENTS

# The real effects of relationship lending

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*Monetary policy pass-through and credit markets*

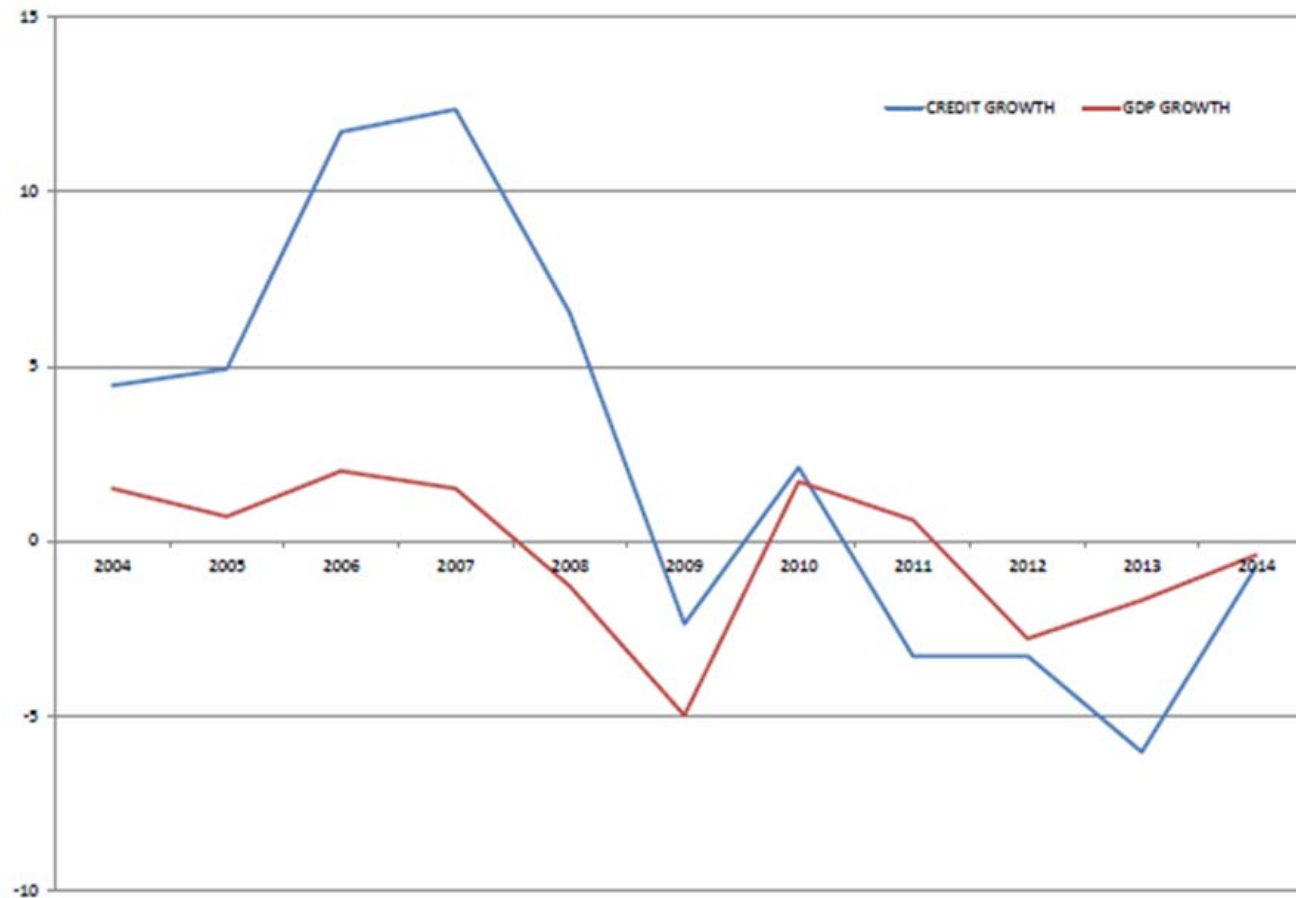
ECB, Frankfurt am Main, 28 October 2016

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## Motivation (1)

- Understand factors favoring the resilience of economies during and after a crisis



## Motivation (2)

- Extent to which banks rely on Relationship Lending (RL) is particularly interesting
- RL=lending technology based on acquisition of soft information about the borrower, through repeated / close interaction
- RL helps access to finance for small / opaque firms (Degryse et al. 2009 for a review).
- RL contributed to soften the transmission of shocks (Bolton et al. 2016; Sette and Gobbi, 2015, Beck et al. 2015; Gambacorta and Mistrulli, 2015)

## Motivation (2)

- Most of the studies on downturn not associated with a financial crisis.
- Is RL a good banking technology when also banks are under stress? What are the real effects in systems that rely on RL?
- Debate on change in bank business models and diversification of financing mix

## Motivation (3)

- In this paper: do firms that rely more on relationship lending experience higher investment and employment growth during the crisis?
  - Effect of RL seems to depend on banks' balance sheet strength (Bolton et al. 2014; Sette and Gobbi, 2015)
  - Not clear that RL really helps if the crisis is protracted / systemic

## Related Literature

- **Relationship lending in good and bad times**

(Sette and Gobbi JEEA 2015, Gobbi and Sette RF 2015, Bolton et al. RFS 2016, Beck et al. 2016)

- **Real effects of credit shocks**

(On the crisis: Chodorow-Reich QJE 2014, Cingano, Manaresi, Sette, RFS 2016, Bentolila et al. 2015, Acharya et al. 2015)

- **Contributions:**

- focus on different crisis periods
- transmission mechanism: different types of credit (working capital loans versus term loans)
- Impact on investment and employment

## Empirical Strategy (1)

1. Show that RL leads to better access to credit, distinguish between the 2 phases of the crisis
  - 2008-2010: global financial crisis but Italian banks heterogeneously affected (Panetta et al, 2010)
  - 2011-2013: sovereign debt crisis
2. Test whether firms' RL intensity has an effect on investment and employment

## Empirical Strategy (2)

Use Khwaja-Mian-type identification (2008, AER)

$$\Delta Y_{i,j,t} = RL_{i,j,t} + RL_{i,j,t} * D(\text{Crisis 1}) + RL_{i,j,t} * D(\text{Crisis 2}) + \beta X + \gamma_{i,t} + \varepsilon_{i,j,t}$$

where  $Y$  is  $\Delta$  (log credit) or  $\Delta$  (interest rate),  $X$  vector of controls,  $\gamma$  fixed effects

- RL measure of relationship lending is (log) length of the relationship (standard in the literature)
- Potentially endogenous, so important to control for firm time\*varying unobservables



## Data

- Merge Credit Register, Firm Register (CERVED) and Supervisory reports
- Data span 2004-2013
- Non-financial firms
- Multiple bank relationships

## Effects of relationship banking on lending

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta\text{Log}$ (Total credit)	$\Delta\text{Log}$ (Total credit)	$\Delta\text{Log}$ (Revolving credit lines)	$\Delta\text{Log}$ (Revolving credit lines)	$\Delta\text{Log}$ (Term loans)	$\Delta\text{Log}$ (Term loans)
Relationship duration <sub>t-1</sub>	0.493** (0.200)	-0.245 (0.292)	1.189*** (0.195)	0.702** (0.306)	0.151 (0.336)	-0.549 (0.823)
Relationship duration <sub>t-1</sub> *D(Post 2008)		1.111*** (0.348)		0.906** (0.429)		1.038 (1.087)
Relationship duration <sub>t-1</sub> *D(Post 2011)		-0.208 (0.341)		-0.489 (0.337)		-0.215 (0.944)
Log credit granted <sub>t-1</sub>	-14.33*** (0.427)	-14.33*** (0.427)	-13.03*** (0.605)	-13.03*** (0.606)	-9.018*** (0.799)	-9.018*** (0.800)
Drawn/granted <sub>t-1</sub>	0.0452*** (0.00500)	0.0453*** (0.00500)	0.0991*** (0.00850)	0.0992*** (0.00850)	0.00247 (0.0315)	0.00262 (0.0315)
Share revolving credit lines <sub>t-1</sub>	0.0534*** (0.00485)	0.0534*** (0.00487)	-0.610*** (0.0274)	-0.610*** (0.0274)	0.416*** (0.0230)	0.416*** (0.0231)
Bank*Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm*Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	314649	314649	268953	268953	138698	138698
R-squared	0.401	0.401	0.382	0.382	0.397	0.397

## Effects of relationship banking on interest rates

	(1)	(2)	(3)	(4)
	$\Delta(\text{Interest rate on revolving credit lines})$	$\Delta(\text{Interest rate on revolving credit lines})$	$\Delta(\text{Interest rate on term loans})$	$\Delta(\text{Interest rate on term loans})$
Relationship duration <sub>t-1</sub>	0.209*** (0.0265)	0.256*** (0.0494)	-0.00254 (0.00735)	0.0214** (0.00907)
Relationship duration <sub>t-1</sub> *D(Post 2008)		-0.0572 (0.0550)		-0.0438*** (0.0130)
Relationship duration <sub>t-1</sub> *D(Post 2011)		-0.0144 (0.0679)		0.0251* (0.0150)
Log credit granted <sub>t-1</sub>	-0.238*** (0.0306)	-0.238*** (0.0306)	-0.0686*** (0.00657)	-0.0687*** (0.00655)
Drawn/granted <sub>t-1</sub>	0.000395 (0.000515)	0.000387 (0.000515)	-0.000820*** (0.000204)	-0.000824*** (0.000203)
Share revolving credit lines <sub>t-1</sub>	-0.0104*** (0.000984)	-0.0104*** (0.000985)	0.00127*** (0.000253)	0.00126*** (0.000253)
Level of interest rate on revolving credit lines <sub>t-1</sub>	-0.473*** (0.0114)	-0.473*** (0.0114)		
Level of interest rate on term loans <sub>t-1</sub>			-0.310*** (0.00806)	-0.310*** (0.00807)
Bank*Time fixed effects	Yes	Yes	Yes	Yes
Firm*Time fixed effects	Yes	Yes	Yes	Yes
Observations	199820	199820	103185	103185
R-squared	0.567	0.567	0.799	0.799

# Bank capital and lending relationship

	$\Delta \text{Log}$ (Total credit)	$\Delta(\text{Interest}$ rate on revolving credit lines)	$\Delta(\text{Interest}$ rate on term loans)
Relationship duration <sub>t-1</sub>	-0.211 (0.339)	0.263*** (0.0468)	0.0283 (0.0183)
Relationship duration <sub>t-1</sub> *D(Post 2008)	0.982*** (0.0834)	-0.0720 (0.0539)	-0.0757*** (0.00718)
Relationship duration <sub>t-1</sub> *D(Post 2011)	-0.160 (0.499)	-0.00640 (0.0603)	0.0637*** (0.0157)
Tier 1 capital ratio	-0.271 (0.188)	-0.0208 (0.0531)	-0.00809 (0.0118)
Tier 1 capital ratio <sub>t-1</sub> *D(Post 2008)	0.452*** (0.167)	-0.0505* (0.0298)	0.0104 (0.0100)
Tier 1 capital ratio <sub>t-1</sub> *D(Post 2011)	0.0796 (0.191)	-0.0317 (0.0492)	-0.0394*** (0.0111)
Level of interest rate on revolving credit lines <sub>t-1</sub>		-0.473*** (0.0117)	
Level of interest rate on term loans <sub>t-1</sub>			-0.317*** (0.00777)
Bank specific characteristics	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Observations	312399	198807	102138
R-squared	0.396	0.555	0.790

## Real effects

- Get to the firm level
- Construct credit-weighted average length of relationships
- Problem: potentially endogenous
  - Test for sorting
  - Fix RL at 2006 (before the crisis) and add interactions with crisis dummies + firm fe
  - Use IV: instrument is the difference between average length and the average length of relationships with banks involved in M&As in 2006 (Hong and Kacpercky, 2009)
  - Intuition: "Change in average length of relationship, conditional on firm FE and firm time varying controls uncorrelated with firm unobservables"

## A test for the presence of sorting in bank-firm relationship

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	Standard deviation
Leverage (Total debt/Total assets)	85.14 (0.30)	83.15 (0.18)	81.66 (0.08)	80.34 (0.00)	15.74
Return on assets	0.53 (0.06)	0.60 (0.07)	0.72 (0.10)	0.75 (0.10)	5.19
EBITDA/Value added	40.57 (0.15)	36.88 (0.08)	35.98 (0.07)	34.26 (0.03)	48.92

Note: The number in parentheses is the normalized difference of the average length of bank-firm credit relationships (weighted by the share of credit) measured as of end-2006 between the average for the quartile in column and the average of the other quartiles (Imbens and Wooldridge 2009). If the statistic in parenthesis is less than 0.25, then the difference is not statistically significant.

## Firm equations: Real effects of relationship lending

VARIABLES	Dependent variable: ΔLog (Total credit)		Dependent variable: Investment Rate		Dependent variable: ΔLog (Labour costs)	
	(1)	(2)	(3)	(4)	(5)	(6)
Weighted relationship duration*D(Post 2008)	4.396*** (0.667)	4.341*** (0.665)	8.697*** (1.753)	8.839*** (1.745)	4.302*** (0.515)	4.449*** (0.513)
Weighted relationship duration*D(Post 2011)	1.075 (0.700)	0.913 (0.695)	-3.376* (1.739)	-3.764** (1.721)	0.467 (0.546)	0.421 (0.543)
Return on assets		0.327*** (0.0458)		1.004*** (0.115)		0.410*** (0.0369)
Firm leverage		-0.195*** (0.0202)		0.725*** (0.0550)		-0.0512*** (0.0170)
EBITDA/interest expenses		0.179*** (0.0200)		0.341*** (0.0485)		0.0405*** (0.0109)
Log (firm total assets)		-11.98*** (0.684)		-48.83*** (1.922)		-5.346*** (0.553)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	57544	57544	57338	57338	55769	55769
R-squared	0.203	0.202	0.225	0.225	0.288	0.287

## Instrumental variable estimation

	(1)	(2)	(3)
	$\Delta\text{Log}$ (Total credit)	Investment rate	$\Delta\text{Log}$ (Labour costs)
Weighted relationship duration*D(Post 2008)	9.194*** (1.553)	11.68*** (4.057)	6.449*** (1.185)
Weighted relationship duration*D(Post 2011)	-2.072 (1.537)	-6.584* (3.818)	1.138 (1.151)
Time fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Observations	57544	57338	55769
R-squared	0.201	0.225	0.287
Kleibergen-Paap weak identification F-statistic	753.59	745.15	708.43



## Robustness

- Homogeneous sample credit – interest rates
- Interact all variables with dummies crisis
- Control for the granting of new term loans
- Control for past-due loans
- Firm heterogeneity on credit quantity (limited effects, would be in line with Cingano, Manaresi, Sette RFS 2016)
  
- To do 1: bank heterogeneity on real outcomes
- To do 2: look at effects year by year or look at shorter/different time windows

## Main points to take away

1. Relationship lending ensured firms a steadier flow of credit during the financial crisis
2. Firms more reliant on RL invest and increase employment (relatively) more than other firms
3. Insulation effects of RL somewhat weaker in the 2<sup>nd</sup> phase of the financial crisis (sovereign debt crisis)
4. Bank capital seems to influence the role of relationship lending in affecting credit supply, investment and employment