BANK FOR INTERNATIONAL SETTLEMENTS

The real effects of relationship lending

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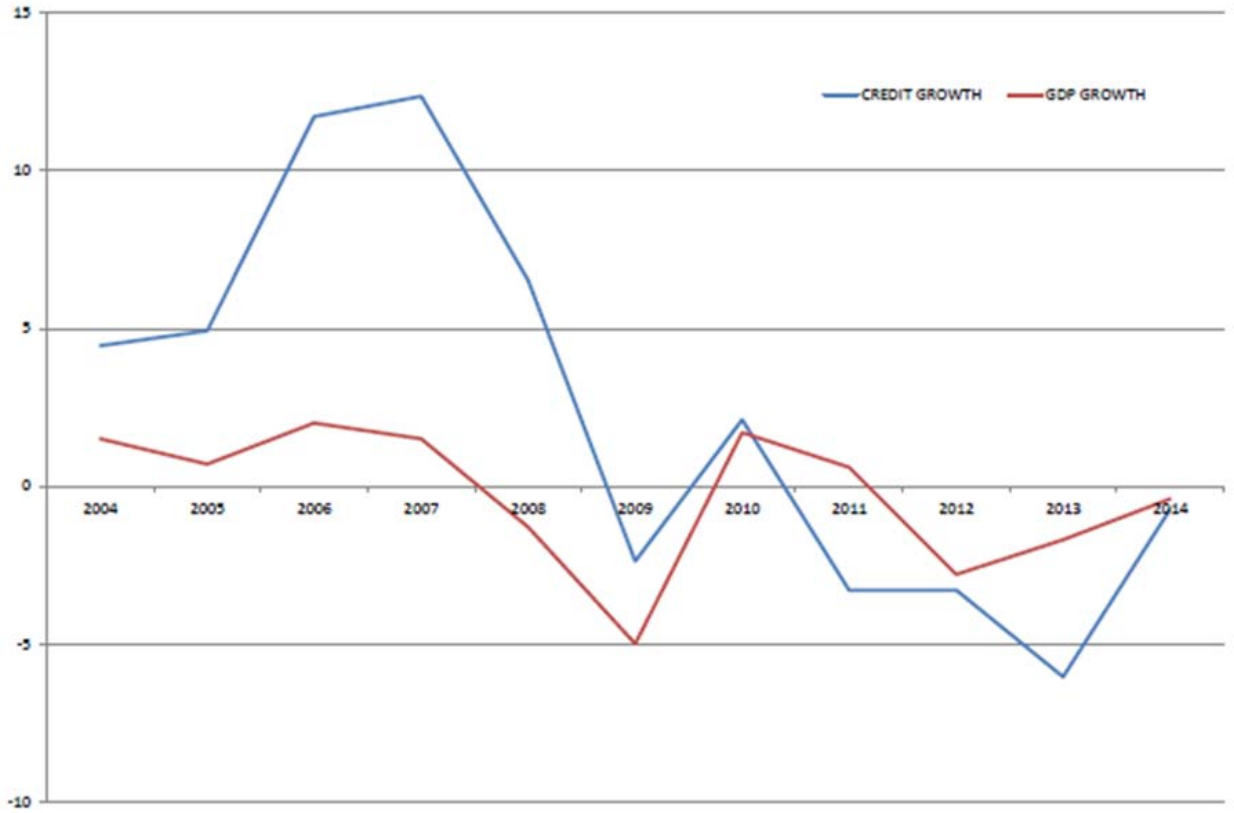
Motivation (1)

- 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 contributed to soften the transmission from banks to firms (Bolton et al. 2016; Sette and Gobbi, 2015, Beck et al. 2015)
- In good times, RL helps access to finance for small / opaque firms (Degryse et al. 2009 for a review).

Motivation (2)

- Is RL a good banking technology when also banks are under stress? What are the real effects in systems that rely on RL?

- Important also for policy debate on diversification of financing mix and on universal vs commercial bank

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 2015, Gobbi and Sette 2015, Bolton et al. 2016, Beck et al. 2016)

- Real effects of credit shocks

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

- Contributions:
  - **analysis of the real effects of relationship lending**
  - **transmission mechanism: different types of credit (working capital loans versus term loans)**

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)
   - 2010-2013: 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)

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

where Y is Δ (log credit) or Δ (interest rate), X vector of controls, γ 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 and Supervisory reports
- Data span 2004-2014
- Non-financial firms

Table 1 Effects of relationship banking on lending

	(1) ΔLog (Total credit)	(2) ΔLog (Total credit)	(3) ΔLog (Revolving credit lines)	(4) ΔLog (Revolving credit lines)	(5) ΔLog (Term loans)	(6) ΔLog (Term loans)
Relationship duration$_{t-1}$	0.493**	-0.245	1.189***	0.702**	0.151	-0.549
	(0.200)	(0.292)	(0.195)	(0.306)	(0.336)	(0.823)
Relationship duration $_{t-1}$*D(Post 2008)		1.111***		0.906**		1.038
		(0.348)		(0.429)		(1.087)
Relationship duration $_{t-1}$*D(Post 2011)		-0.208		-0.489		-0.215
		(0.341)		(0.337)		(0.944)
Log credit granted $_{t-1}$	-14.33***	-14.33***	-13.03***	-13.03***	-9.018***	-9.018***
	(0.427)	(0.427)	(0.605)	(0.606)	(0.799)	(0.800)
Drawn/granted$_{t-1}$	0.0452***	0.0453***	0.0991***	0.0992***	0.00247	0.00262
	(0.00500)	(0.00500)	(0.00850)	(0.00850)	(0.0315)	(0.0315)
Share revolving credit lines $_{t-1}$	0.0534***	0.0534***	-0.610***	-0.610***	0.416***	0.416***
	(0.00485)	(0.00487)	(0.0274)	(0.0274)	(0.0230)	(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

Table 2 Effects of relationship banking on interest rates

	(1) Δ(Interest rate on revolving credit lines)	(2) Δ(Interest rate on revolving credit lines)	(3) Δ(Interest rate on term loans)	(4) Δ(Interest rate on term loans)
Relationship duration$_{t-1}$	0.209***	0.256***	-0.00254	0.0214**
	(0.0265)	(0.0494)	(0.00735)	(0.00907)
Relationship duration $_{t-1}$*D(Post 2008)		-0.0572		-0.0438***
		(0.0550)		(0.0130)
Relationship duration $_{t-1}$*D(Post 2011)		-0.0144		0.0251*
		(0.0679)		(0.0150)
Log credit granted $_{t-1}$	-0.238***	-0.238***	-0.0686***	-0.0687***
	(0.0306)	(0.0306)	(0.00657)	(0.00655)
Drawn/granted$_{t-1}$	0.000395	0.000387	-0.000820***	-0.000824***
	(0.000515)	(0.000515)	(0.000204)	(0.000203)
Share revolving credit lines $_{t-1}$	-0.0104***	-0.0104***	0.00127***	0.00126***
	(0.000984)	(0.000985)	(0.000253)	(0.000253)
Level of interest rate on revolving credit lines $_{t-1}$	-0.473***	-0.473***		
	(0.0114)	(0.0114)		
Level of interest rate on term loans $_{t-1}$			-0.310***	-0.310***
			(0.00806)	(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

Real effects

- Get to the firm level
- Construct credit-weighted average length of relationships
- Problem: potentially endogenous
  - Test for correlation between RL intensity and firm observables
  - Fix it 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 Kacperckyk, 2009)
  - Intuition: "Change in average length of relationship, conditional on firm FE and firm time varying controls uncorrelated with firm unobservables"

Firms' characteristics – Balancing of covariates

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	Standard deviation
Leverage					
(Total debt/Total assets)	85.14	83.15	81.66	80.34	15.74
	(0.30)	(0.18)	(0.08)	(0.00)	
Return on assets	40.57	36.88	35.98	34.26	48.92
	(0.15)	(0.08)	(0.07)	(0.03)	
EBITDA/Value added	31.99	19.19	14.41	14.6	75.83
	(0.15)	(0.00)	(0.07)	(0.07)	

Table 4 RL and total credit at the firm level

	Dependent variable: ΔLog (Total credit)			
	Using log relationship duration fixed in 2006		Using time varying log relationship duration	
VARIABLES	(1)	(2)	(3)	(4)
Weighted relationship duration			-15.25***	-14.91***
			(0.673)	(0.670)
Weighted relationship duration*D(Post 2008)	4.396***	4.341***	1.187*	1.164*
	(0.667)	(0.665)	(0.670)	(0.666)
Weighted relationship duration*D(Post 2011)	1.075	0.913	-0.295	-0.358
	(0.700)	(0.695)	(0.638)	(0.632)
Return on assets		0.327***		0.325***
		(0.0458)		(0.0417)
Firm leverage		-0.195***		-0.186***
		(0.0202)		(0.0191)
EBITDA/interest expenses		0.179***		0.173***
		(0.0200)		(0.0177)
Log (firm total assets)		-11.98***		-13.68***
		(0.684)		(0.650)
Time fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	57544	57544	68258	68258
R-squared	0.203	0.202	0.236	0.234

Table 5 RL and investment at the firm level

	Dependent variable: Investment Rate			
	Using log relationship duration fixed in 2006		Using time varying log relationship duration	
VARIABLES	(1)	(2)	(3)	(4)
Weighted relationship duration			-7.209***	-7.223***
			(1.578)	(1.575)
Weighted relationship duration*D(Post 2008)	8.697***	8.839***	7.569***	7.771***
	(1.753)	(1.745)	(1.739)	(1.733)
Weighted relationship duration*D(Post 2011)	-3.376*	-3.764**	-2.801*	-3.132**
	(1.739)	(1.721)	(1.478)	(1.471)
Return on assets		1.004***		1.021***
		(0.115)		(0.105)
Firm leverage		0.725***		0.746***
		(0.0550)		(0.0530)
EBITDA/interest expenses		0.341***		0.340***
		(0.0485)		(0.0448)
Log (firm total assets)		-48.83***		-52.79***
		(1.922)		(1.896)
Time fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	57338	57338	67971	67971
R-squared	0.225	0.225	0.253	0.253

Table 6 RL and employment (labour costs) at the firm level

	Dependent variable: ΔLog (Labour costs)			
	Using log relationship duration fixed in 2006		Using time varying log relationship duration	
VARIABLES	(1)	(2)	(3)	(4)
Weighted relationship duration			-5.199***	-5.330***
			(0.485)	(0.484)
Weighted relationship duration*D(Post 2008)	4.302***	4.449***	2.860***	3.000***
	(0.515)	(0.513)	(0.514)	(0.511)
Weighted relationship duration*D(Post 2011)	0.467	0.421	3.185***	3.223***
	(0.546)	(0.543)	(0.479)	(0.477)
Return on assets		0.410***		0.390***
		(0.0369)		(0.0344)
Firm leverage		-0.0512***		-0.0613***
		(0.0170)		(0.0162)
EBITDA/interest expenses		0.0405***		0.0381***
		(0.0109)		(0.0107)
Log (firm total assets)		-5.346***		-6.694***
		(0.553)		(0.542)
Time fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	55769	55769	65812	65812
R-squared	0.288	0.287	0.317	0.317

Instrumental variable estimation

	(1) ΔLog (Total credit)	(2) Investment rate	(3) ΔLog (Labour costs)
Weighted relationship duration*D(Post 2008)	9.194***	11.68***	6.449***
	(1.553)	(4.057)	(1.185)
Weighted relationship duration*D(Post 2011)	-2.072	-6.584*	1.138
	(1.537)	(3.818)	(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 2016)

- To do 1: firm 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 2nd phase of the financial crisis (sovereign debt crisis)
4. Substitution of capital with labor as the cost of longer-term loans became relatively more expensive? Term-structure of interest rates influences firm choices on the composition of capital and labour in production.