

Unconventional Monetary Policy and Bank Lending Relationships

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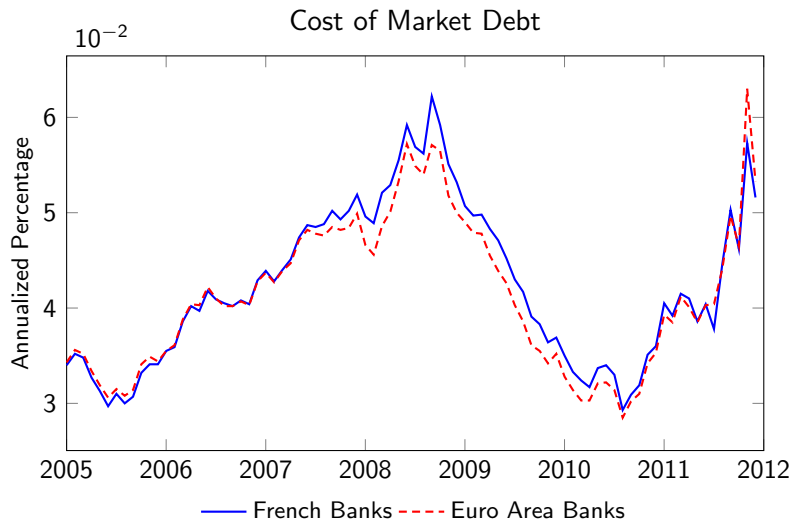
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Motivation



Source: Gilchrist and Mojon (2017)

Motivation

- | Many policies attempt to reduce bank funding costs and increase incentives to lend (ECB LTROs & TLTROs ; UK FLS)
- | No policy effects on lending to (non-large) firms
 - | Iyer et al. 2014; Andrade et al. 2015; Acharya et al. 2015; Darmouni & Rodnyansky 2016.
- | Potential reasons:
 - | Hoarding liquidity (Allen et al. 2009; Caballero & Krishnamurthy 2008)
 - | Crowding out (Diamond & Rajan, 2011; Abbassi et al. 2016; Chakraborty et al. 2016)
- | Small and young firms critical to economy, particularly sensitive to downturns / bank shocks
 - | 2/3 of workforce in FR; 58% of total value added
 - | Highly bank dependent, 80% are single-bank

Research questions

- | How to support private lending to SMEs during aggregate contractions?
- | How do banks adjust their lending portfolio in response to a positive supply shock ?
 - | How do bank lending relationships affect shock transmission ?
 - | Relaxing firm financial constraints or pushing bad loans ?
- | Are single-bank firms especially credit constrained in crisis periods ?

Overview : this paper

"[The ECB] will allow banks to use loans as collateral with the Eurosystem, thereby unfreezing a large portion of bank assets.(...) The goal of these measures is to ensure that firms - and especially small and medium-sized enterprises - will receive credit as effectively as possible under the current circumstances." Mario Draghi, 12/15/2011

- | Regulatory shock changed cost faced by banks of funding loans on some firms but not to others that are closely comparable
- | Clean Difference-in-Differences approach to estimate the causal effects of the policy shock:
 - | On credit supply to existing borrowers
 - | On payment defaults to suppliers and rating downgrade
 - | For single-bank as well as multibank firms

Regulatory shock: Collateral Framework Extension

Loans to firms rated 4 become eligible as collateral

Additional Credit Claims (ACC)

- | Banks can now use lower quality loans as collateral at a time of massive borrowing from Eurosystem (LTROs)
- | Allows banks to borrow more (and cheaply) from Central Bank; Estimated bank marginal cost of funding: 400 bp! 100 bp
- | Shock operates at firm credit-rating level, unlike extensive literature on shocks at the bank level

Main Result

We find a causal effect of reduced cost of funding loans on :

- | **Extra lending:** effect is driven by 1-bank firms (+8.7%)
- | **Lower payment default rate** to suppliers, potentially reducing contagion effects ; Lower probability of rating downgrades.

We provide empirical evidence consistent with:

- | No evergreening: additional credit flows to 1-bank firms with strong balance sheets and lending relationships
- | 1-bank firms (vs. multibank) being more credit constrained ex-ante

Note: 1-bank firms are naturally "relationship borrowers" anyway

Related Literature

- | Leverage Cycles and Collateral Capacity
ACC is a positive shock to loan Collateral Value $p_{sj} = PV_{sj}^i + CV_{sj}^i$
(Fostel & Geanakoplos 2008)
- | Liquidity shocks are passed on to banks ...
(Peek & Rosengren 2000; Gan 2007; Paravisini 2008; Khwaja & Mian 2008
Schnabl 2012; Iyer et al. 2014; Jimenez et al. 2012)
... and to more vulnerable firms
(Khwaja & Mian 2008; Iyer et al. 2014)
 - | We have shock varying at the firm level
 - | We can look at 1-bank firms using within bank-month estimator
- | Mixed evidence on value of relationship lending
Increased credit availability, reduced cost, lending continuation over the cycle (Petersen & Rajan 1994; Sette & Gobbi 2015; Bolton et al. 2016)
BUT hold up and rent extraction
(Rajan 1992; Santos & Winton 2008)

Data sources

- | Monthly credit data at firm*bank level, aggregated at firm level
 - | Outstanding amounts of credit, from National Credit Register
 - | Provided bank has a risk exposure to firm \leq 25,000 euros
- | Firm-level accounting data from annual tax returns,
 - | Collected for all firms with sales \geq 0.75 million euros
- | Firm-level rating information provided by BdF,
- | Individual payment default data on trade bills
 - | All non-payment on commercial paper that is mediated by French banks

Sample composition

Assignment to treat / control based on credit rating in Dec 2011

French Independent SMEs:

With 10-250 workers

Observed throughout 2011-12

Unique rms: 8;200

2011	Single-bank	Multibank
Assets	1,879	2,465
Age	17.6	21.4
Debt Ke	450	480
N.Banks	1.0	2.6
N.Obs	36,050	62,245
Unique rms	3,049	5,192

Attenuation bias

Choice of control group

Sample

Statistics All

Statistics Single

Graph Size LR

Empirical Design: Difference in Differences

$$g_{it} = [\text{ACC post}]_{it} + \text{Controls}_{i,y-1} \\ + \text{rm FE} + \text{bank x month FE} + \text{industry x quarter FE} + \epsilon_{it}$$

- | $g_{it} = (D_{it} - D_i) = D_i$; Controls: size, profitability, tangibility
- | Main omitted variable concerns :
 - | Firm loan demand: use rm FE to control for unobserved fixed heterogeneity in fundamentals (proxy for credit demand)
 - | Bank time-varying capital & liquidity shocks : use bank x month FE
 - | Industry-level shocks: use industry x quarter FE
- | Unlike yearly data, monthly credit registry data allows
 - | Powerful test of parallel trends
 - | Examination of exact timing of effects

ACC mainly affects single-bank firms

Figure 1: Single-bank firms

Figure 2: Multibank firms

Effect of the ACC policy on credit growth

Treated 1-bank firms: 8.7 percentage point higher debt

	Single-bank				All firms	
	(1)	(2)	(3)	(4)	(5)	(6)
ACC post	0.102 (0.017)	0.094 (0.017)	0.089 (0.018)	0.087 (0.019)	0.035 (0.015)	0.120 (0.037)
ACC post SingleBank					0.053 (0.024)	
post SingleBank					-0.095 (0.018)	
ACC post N Bank						-0.062 (0.033)
post N Bank						0.097 (0.024)
Firm FE	yes	yes	yes	yes	yes	yes
Bank-Time FE		yes	yes	yes	yes	yes
Industry-Qtr FE			yes	yes	yes	yes
Covariates				yes	yes	yes
N of clusters (firms)	2,973	2,968	2,968	2,671	7,445	7,445
Observations	63,131	63,041	63,041	55,997	157,695	157,695
R ²	0.41	0.42	0.42	0.43	0.41	0.41

Monthly dynamics of the ACC effect

Figure 3: Single-bank firms

Multibank

Leverage

Which single-bank firms receive extra credit

Firms with best observables

- | Low leverage, more tangible assets, net providers of trade credit 1
- | High-growth firms 2

Effect transmitted through lending relationships

- | Longer lending relationship → wider scope → larger effect 3
- | Longer lending relationship → longer maturity debt 4
- | BUT Soft info does not substitute for hard info 5

! Not consistent with evergreening or zombie lending

Is this Good Lending?

Reduced contagion: default on debt to suppliers falls 1.5% of payables

	2011m3{2013m2		2011m3{2013m12	
	(1)	(2)	(3)	(4)
ACC post	-0.013 (0.006)		-0.015 (0.006)	
ACC pre		0.001 (0.005)		0.001 (0.005)
ACC $1_{t > 2012m2} & t = 2012m8$		-0.004 (0.007)		-0.004 (0.007)
ACC $1_{t > 2012m8} & t = 2013m2$		-0.021 (0.011)		-0.021 (0.011)
ACC $1_{t > 2013m2}$				-0.018 (0.008)
Covariates	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Industry-time FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
Num. clustering rms	2,743	2,743	2,743	2,743
Observations	65,127	65,127	83,838	83,838
R ²	0.11	0.11	0.12	0.12

Is this Good Lending?

Amount under default falls

Figure 4: Amount under default as % of payables

Is this Good Lending?

P(rating downgrade 2 notches) falls in 2012

D=1 if(Downgrade \geq 2 notches below Dec11 rating)

	(1)	(2)	(3)
ACC postJune	-0.0026 (0.0012)		
ACC 2012q2		0.0017 (0.0016)	
ACC 2012q3		0.0003 (0.0019)	-0.0006 (0.0018)
ACC 2012q4		-0.0029 (0.0020)	-0.0037 (0.0019)
ACC 2013q1		-0.0033 (0.0021)	-0.0041 (0.0020)
Covariates	yes	yes	yes
Bank-Time FE	yes	yes	yes
Industry-Qtr FE	yes	yes	yes
Firm FE	yes	yes	yes
N of clusters (rms)	2743	2743	2743
Observations	38,353	38,353	38,353
R ²	0.09	0.09	0.09

Is this Good Lending?

P(rating downgrade 2 notches) falls for single-bank

Figure 5: Single-bank rms

Figure 6: Multibank rms

Crowding out of 5+ ?

Small effect, not statistically significant

- | Sample made of non eligible firms
 - | 5+ rating and 5 rating (1 notch below)
 - | 5+ are considered as treated

	(1)	(2)	(3)	(4)
	Firm,Time	BankxTime	IndxQuarter	Covariates
5+ post	-0.0228 (0.0225)	-0.0160 (0.0229)	-0.0128 (0.0230)	-0.0183 (0.0270)
Covariates				yes
Bank-Time FE		yes	yes	yes
Industry-Qtr FE			yes	yes
Firm FE	yes	yes	yes	yes
Time FE	yes			
N of clusters (firms)	1562	1561	1561	1302
Observations	33,594	33,572	33,571	27,418
R ²	0.41	0.42	0.42	0.43

Robustness & extensions

- | Placebo: no effect on non-pledgeable types of debt
- | Robust to scaling of debt: btw. 8.1 to 10.1 pp higher debt using different measures
- | Robust to clustering at bank-quarter level, including a time trend

Single-bank seem more financially constrained ex-ante

Consistent with benefits of multiple lending relationships to insure against bank liquidity shocks (Detragiache et al.2000)

Figure 7: Outstanding Amounts in M

Conclusion

Cleanly identified micro-evidence on causal link between :

- | Reduced cost of bank funding SME lending increase
 - | Central OECD policy objective
 - | No evidence of zombie lending
 - | Reducing default contagion
 - | Especially important for high growth firms

Focus attention on single-bank firms in crises - they appear especially credit constrained

- | Relationship banking provides insurance only for strong firms
- | Policies changing cost of liabilities may be more effective if change is tied to the assets financed

APPENDIX

Sample characteristics

- | French SMEs: firms with 10 - 250 workers
 - | Also includes firms with < 10 workers if sales are \geq 2M euros and total assets $>$ 2M euros
 - | Independent firms (one legal unit), SA and SARL
 - | Drop financials, utilities, health, teaching and farming (standard)
- | Firms observed throughout 2011 and 2012
- | Credit ratings of: 4 (treated, better) and 5+ (control, worse)
- | Number of unique firms: 8,200

Empirical Design

Choice of Control Group

5+ is the right control group

- | ACC is concurrent with LTRO 2
- | 4+ are also treated and with higher treatment intensity

Eurosystem General Collateral Framework

- | Eurosystem provides central bank liquidity only against adequate collateral
- | Eligibility criteria defined in Single List
 - | Marketable: sovereign bonds, covered bonds, ABS, etc.
 - | Non-marketable assets: loans or CCs
- | CCs eligibility based on minimum Credit Rating requirements
- | BDF has its own rating system, acknowledged by the Eurosystem (50% of FR banks' collateral is made of CCs)

Descriptive Statistics I

	Single-bank			Multibank			p-val.
	Mean	Med.	N	Mean	Med.	N	
Total Assets	1,879	1,141	36,550	2,465	1,416	62,245	0.000
Age	17.6	14.0	36,550	21.4	19.0	62,245	0.000
Bank Debt Ke	450	160	36,550	480	235	62,245	0.093
Leverage	0.24	0.17	36,550	0.21	0.18	62,245	0.000
N.Banks	1.0	1.0	36,550	2.6	2.0	62,245	0.000
Payment Default	0.045	0.00	36,550	0.054	0.00	62,245	0.001

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Descriptive Statistics II

Single-bank rms

	ACC rms			5+ rms			p-val.
	Mean	Med.	N	Mean	Med.	N	
Total Assets	1,822	1,034	22,909	1,975	1,417	13,641	0.472
Age	19.7	17.0	22,909	14.1	9.0	13,641	0.000
Bank Debt Ke	288	118	22,909	722	295	13,641	0.000
Leverage	0.18	0.13	22,909	0.34	0.29	13,641	0.000
Payment Default	0.045	0.00	22,909	0.046	0.00	13,641	0.820

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Age and Size by number of Lending Relationships

Median rm age and Median rm size by N Lending relationships

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g(Debt) by rating category: 5+, ACC, 4+ and 3

Figure 8: Single-bank rms

Figure 9: Multibank rms

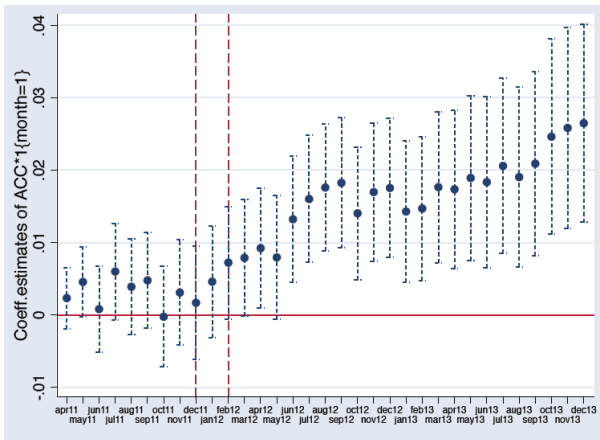
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Monthly dynamic of the ACC effect

Multibank firms

Monthly dynamic of the ACC effect on Leverage

Single-bank firms



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ACC effect conditional on Hard Information

"Good" lending : credit does not flow to firms with weak balance-sheets

	High Leverage	Low Tangibles	Trade Credit User	Young	Small
	(1)	(2)	(3)	(4)	(5)
ACC post D	-0.084 (0.041)	-0.090 (0.031)	-0.071 (0.041)	-0.093 (0.039)	-0.038 (0.036)
ACC post	0.097 (0.039)	0.095 (0.024)	0.122 (0.034)	0.091 (0.022)	0.096 (0.024)
post D	-0.145 (0.034)	-0.026 (0.025)	-0.021 (0.032)	-0.036 (0.023)	-0.007 (0.023)
Covariates	yes	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes	yes
N of clusters (firms)	2671	2671	2610	2671	2671
Observations	55,997	55,997	54,818	55,997	55,997
R ²	0.44	0.43	0.43	0.43	0.43

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ACC effect on "Gazelles" and Young firms

"Good" lending : positive credit shock for high-growth firms

	Single-bank rms		Multibank rms	
	(1) G=1 if Gazelles	(2) G=1 if High Sales	(3) G=1 if Gazelles	(4) G=1 if High Sales
ACC post <i>G</i>	0.1182 (0.2358)	0.1159 (0.0692)	0.1614 (0.0753)	0.1195 (0.0549)
ACC post	0.0805 (0.0196)	0.0811 (0.0221)	0.0188 (0.0149)	0.0135 (0.0152)
post <i>G</i>	0.0681 (0.2184)	-0.0792 (0.0477)	-0.0181 (0.0492)	-0.0891 (0.0430)
Covariates	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
N of clusters (firms)	2295	2294	4327	4327
Observations	52,889	48,477	101,139	101,139
R ²	0.43	0.42	0.40	0.40

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ACC supply shock & Relationship Lending

Stronger increase in debt for longer and information-intensive relationships

	(1) LR \geq p50(6y)	(2) Large Scope=1	(3) LR \geq p50(6y) \ Large Scope=1
ACC post <i>D</i>	0.0704 (0.0347)	0.0556 (0.0517)	0.1554 (0.0596)
ACC post	0.0363 (0.0240)	0.0689 (0.0190)	0.0598 (0.0187)
post <i>D</i>	-0.0002 (0.0243)	0.0048 (0.0348)	-0.0437 (0.0335)
Covariates	yes	yes	yes
Bank-Time FE	yes	yes	yes
Industry-Qtr FE	yes	yes	yes
Firm FE	yes	yes	yes
N of clusters (firms)	2672	2672	2672
Observations	61,153	61,153	61,153
R ²	0.43	0.43	0.43

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ACC supply shock & Relationship Lending

Increase in long-term (short-term) debt for longer (shorter) lending relationships

	All Single-bank		LR <p50		LR >= p50	
	(1) g(ST)	(2) g(MLT)	(3) g(ST)	(4) g(MLT)	(5) g(ST)	(6) g(MLT)
ACC post	0.1614 (0.1047)	0.0684 (0.0220)	0.4126 (0.1547)	0.0418 (0.0262)	-0.0484 (0.1476)	0.0959 (0.0354)
Covariates	yes	yes	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes	yes	yes
N of clusters (firms)	1524	2414	666	1200	853	1209
Observations	23,307	50,676	9,951	25,138	13,269	25,426
R ²	0.49	0.59	0.53	0.61	0.47	0.58

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ACC effect conditional on Hard Information

[LR $p50$]: Soft information does not offset the dominant role of hard information

	Conditions under which $D = 1$			
	High Leverage (1)	Low Tangibles (2)	Trade Credit User (3)	Small (4)
ACC post D	-0.144 (0.052)	-0.116 (0.047)	-0.099 (0.054)	-0.127 (0.055)
ACC post	0.150 (0.046)	0.125 (0.030)	0.169 (0.043)	0.143 (0.031)
post D	-0.120 (0.040)	-0.045 (0.0409)	-0.012 (0.043)	0.025 (0.042)
Covariates	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
N of clusters (firms)	1515	1577	1519	1577
Observations	31,711	33,174	32,009	33,174
R ²	0.43	0.42	0.43	0.42

Good Lending?

ACC effect on defaults to payments to suppliers

- | Payment default
 - | Failure to pay a trade bill to a given supplier, in full and/or on time
 - | For insolvency, liquidity or disputes motives
 - | Average monthly payment default rate 4.5%
- | Descriptive Statistics on Payment Default in 2011 (Single-bank)

<i>Default in % of payables</i>	Mean	Sd	p50	N	pval (clust)
Rating 5+ firms	0.017	0.222	0.00	13,641	
ACC firms	0.010	0.145	0.00	22,909	0.056

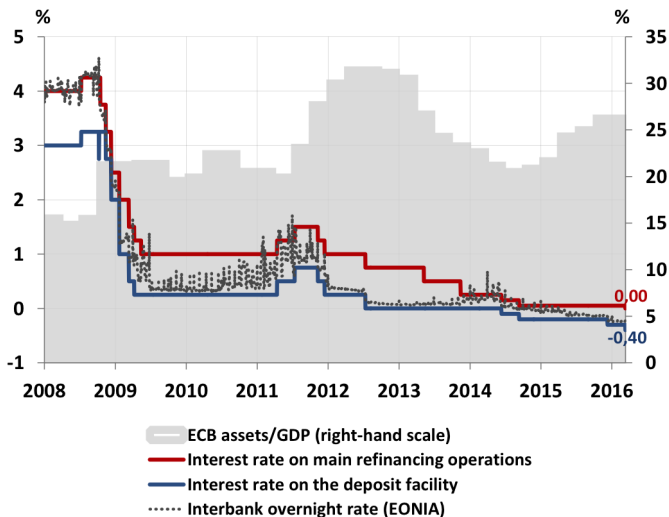
Robustness Tests

Effect of the ACC policy on non-pledgeable types of debt

	(1)	(2)	(3)	(4)
	Undrawn	Undrawn/TA	Leasing	Leasing/TA
ACC post	-0.086 (0.109)	-0.002 (0.003)	-0.015 (0.088)	-0.004 (0.005)
Covariates	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
N of clusters (firms)	1069	1116	607	614
Observations	15,935	24,294	11,301	13,419
R ²	0.54	0.73	0.80	0.88

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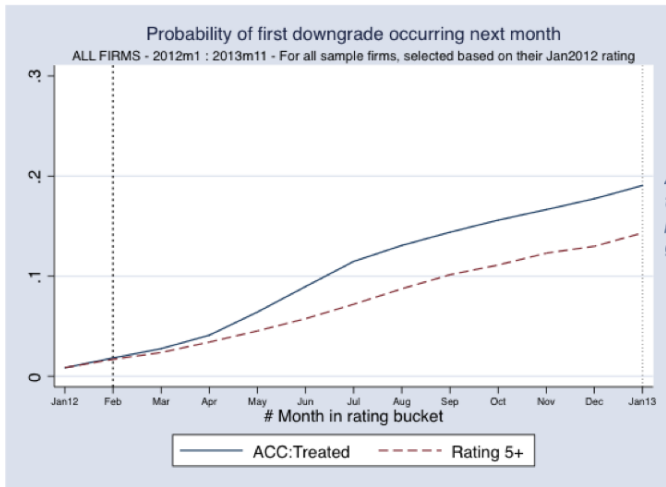
ECB Main Rates



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Rating changes over time : All firms

Probability first downgrade occurs next month



*Attenuation bias:
treatment group
pushed into control
group*

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