Bank Credit and Firm Export: Is There Really a Link?

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Research question and motivation

Is banking credit a key determinant of export performance?

After the (many) contributions that looked at the financial crisis (followed by the collapse in world trade), we take a step back:

- What about "normal times"? Could instead be the case that exporting firms are more resilient to certain shocks?

In this paper

- We consider a long time span (1997-2009) to analyze the relationship between credit and export in "normal times".
- We use Italian matched bank-firm relationship data to *measure* credit access.
- We exploit banks' M&A episodes as a source of bank credit supply shocks.

- **Main Finding**: Credit is important for overall firm's activity, not for export in particular.

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- **Main Finding**: Credit is important for overall firm's activity, not for export in particular.

Related literature

- Export and Credit Constraints
  - "Old Literature" (pre-crisis):
    - Country level: financial development and sectoral financial vulnerability - Manova (2009).
    - Firm level: various measures of financial health/credit worthiness - Minetti & Zhou (2012), Secchi et al. (2012).

    They find evidence of credit dependence of exports.
  - "New literature" (post-crisis):
    - Cross Country - Manova (2012).
    - Matched bank/firm data applied to the financial crisis as a source of credit supply shocks - Paravisini & al. (2012), Del Prete & Federico (2013)

    More ambiguous results.

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    More ambiguous results.

Empirical strategy

We consider the the log linear model:

$$ln(Exp_{it}) = \alpha_i + \beta ln(Cr_{it}) + \varphi X_{it} + \epsilon_{it}$$

We take differences $(t-3, t)$:

$$\Delta_3 ln(Exp_{it}) = \beta \Delta_3 ln(Cr)_{it} + \gamma \hat{\delta}_{it} + u_{it}. \quad (1)$$

where

- $\Delta_3 ln(Y_{it}) = ln(Y_{it}) - ln(Y_{it-3})$.
- Cr_{it} is endogenous.
- $\hat{\delta}_{it}$ is a proxy for those firms characteristics that affect the growth rate of credit demand (and possibly exports).

Empirical strategy

Main Idea

We use **banks' M&A episodes** as a shock to the supply of credit granted.

- **Relevance:** A vast finance literature shows that (and we support these findings) when banks are involved either as bidders or targets in M&A operations they reduce the supply of credit to continuing borrowers (Beretta e del Prete (2012), Bonaccorsi di Patti and Gobbi (2007), Degryse et al. (2010), Sapienza (2002)).
  - Big banks$\neq$ small banks: loss of soft information (especially true for SMEs) - Angelini et al (1998) and De Mitri et al. (2010).
  - diversification of risk - Beretta e del Prete (2012);
  - changes in organization and business strategy - Rhoades (1998), Calomiris and Karceski (2000);

  Firms cannot fully adjust in the short run and the negative effect on total credit last for few years (around 3) - (Bonaccorsi di Patti and Gobbi (2007)).

Empirical strategy

Main Idea

- **Exogeneity:**
  - M&As are exogenous to firms' activity (and export).
  - Is credit reduced randomly following M&As?
  - Are firms equally able to substitute credit sources?

We proceed in three steps:

1. We identify the shock induced by M&As at the bank-firm relationship level as to estimate the demand drivers of credit granted $\hat{\delta}_{it}$.
2. We aggregate the shock at the firm level (Bofondi et al. (2013)).
3. We use the aggregate shock as an instrument for $\Delta_3 ln(Cr)_{it}$ in eq. (1), controlling for $\hat{\delta}_{it}$.

Empirical strategy

(1) Bank-firm relationship level

$$\Delta_3 lnCr_{ibt} = \alpha + \eta M\&A_{ibt} + \delta_{it} + \upsilon_{ibt}$$

where:

- i firm; b bank, t time;
- $M\&A_{ibt}$ =1 if bank b is involved in a M&A in [t-2,t] (0 otherwise);
- δ_{it} firm-time fixed effects that capture the firm demand of credit and unobserved heterogeneity that affects the dynamic of credit granted;

Empirical strategy

(2) Firm level aggregation

$$\Delta_3 lnCr_{it} = \bar{\alpha} + \bar{\eta} M\&A_{it} + \lambda \hat{\delta}_{it} + \bar{\upsilon}_{it}$$

where

- Cr_{it} is the growth rate of total credit obtained by firm i
- $M\&A_{it} = \sum_{j \in B_{it}} w_{ijt-3} M\&A_{ijt}$, with
  - B_{it} the set of banks that lend money to firm i in period t.
  - $w_{ijt-3} = \frac{Cr_{ibt-3}}{Cr_{it-3}}$ is the share of the bank b involved in M&A in the total credit of firm i.
- **Notice**: since $\hat{\delta}_{it}$ is an estimated regressor we compute bootstrapped s.e.

Econometric strategy

(3) Structural equation and IV

Our main equation is

$$\Delta_3 ln(Exp_{it}) = \beta \Delta_3 ln(Cr)_{it} + \gamma \hat{\delta}_{it} + \varphi X_{it-3} + \mu demand_{it} + u_{it} \qquad (2)$$

where:

- $ln(Cr)_{it}$ is instrumented by $M\&A_{it}$
- X_{it-3} are predetermined firm level controls (productivity, size, fixed assets, Z score);
- $demand_{it}$ are controls for the shocks to firm's products demand (world demand and fixed effects) - see Paravisini et al. (2011).

Data

Sources and description 1

1. **CEBIL/CERVED**: Balance sheet data (assets, value added, etc..), Z Score and Export, Revenues and Employment to complement INVIND data.
2. **INVIND**: Unbalanced panel of firm level data. More big firms, more manufacturing firms. Data from 1997 to 2009 (2011). Main source for Export, Revenues and Employment. ▸ TABLE

3. **Albo Operazioni Bancarie**: Lists all banks M&A operations, the bidder banks and the target banks. ▸ TABLE.

Data

Sources and description 2

1. **Italian credit register**: Data on individual bank-firm relationships for all outstanding loan amounts above 75.000 Euros (30.000 since 2009):
   - monthly frequency and very high quality. We aggregate to annual freq. to get Cr_{it};
   - includes both granted and drawn amounts. We focus on credit granted, as it better captures credit supply;
   - loans are distinguished into three classes: revolving credit lines (i.e. checking account), loans backed by account receivables (i.e. trade credit) and term loans (i.e. mortgages);
   - loans are distinguished by usage: export, import and other ▸ TABLE.

Results (1/4)

Table: Total Credit and Export

	(1) (OLS)	(2) (IV)	(3) (FS)	(4) (OLS)	(5) (IV)	(6) (FS)
$\Delta_3 ln(Cr)_{it}$	0.120***	0.272**		0.143***	0.249*	
	(0.021)	(0.132)		(0.022)	(0.138)	
$\widehat{\delta_{it}}$	0.084***	-0.050	0.899***	0.060**	-0.031	0.874***
	(0.026)	(0.117)	(0.014)	(0.029)	(0.119)	(0.013)
$M\&A_{it}$			-0.265***			-0.256***
			(0.018)			(0.021)
$Empl_{it-3}$				-0.010	-0.009	-0.015***
				(0.008)	(0.008)	(0.004)
$Prod_{it-3}$				0.052**	0.055**	0.023***
				(0.022)	(0.022)	(0.008)
$fixassets_{it-3}$				0.228***	0.233***	-0.054**
				(0.061)	(0.063)	(0.022)
$RATING_{it-3}$				0.010**	0.010**	-0.002
				(0.005)	(0.005)	(0.002)
Observations	17161	17161	17161	15282	15282	15282
Dummies	Y	Y	Y	Y	Y	Y
F-stat FS			add			add

t<2010. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Results (2/4)

Table: Total Credit and Export-Continue

	Dependent variable: $\Delta_3 ln(Exp)_{it}$				
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)	(5) (RF)
$\Delta_3 ln(Cr)_{it}$	0.146***	0.316**	0.302*	0.128	
	(0.024)	(0.153)	(0.166)	(0.150)	
$\hat{\delta}_{it}$	0.060**	-0.085	-0.077	0.069	0.179***
	(0.029)	(0.130)	(0.140)	(0.130)	(0.020)
$M\&A_{it}$					-0.037
					(0.038)
$Empl_{it-3}$	-0.013	-0.010	-0.008	-0.016*	-0.018**
	(0.009)	(0.010)	(0.011)	(0.010)	(0.008)
$Prod_{it-3}$	0.054**	0.059***	0.074***	0.027	0.022
	(0.024)	(0.023)	(0.026)	(0.019)	(0.022)
$fixassets_{it-3}$	0.174***	0.186***	0.136**	0.134**	0.128**
	(0.063)	(0.063)	(0.068)	(0.068)	(0.064)
$RATING_{it-3}$	0.011**	0.011**	0.012**	0.008	0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005
$DlnWtrade_{it}$			0.272***		
			(0.075)		
Observations	15223	15223	13511	15253	15316
Dummies	PT	PT	PT	ST	ST
MeAdummy_it		-0.283***	-0.277***	-0.249***	

t<2010. Bootstrapped s.e. in parentheses. * p<0.10, ** p<0.05,*** p<0.01.

Results (3/4)

Table: Total Credit and Revenues - exporters only

	Dependent variable: $\Delta_3 ln(Revenues)_{it}$			
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)
$\Delta_3 ln(Cr)_{it}$	0.109***	0.187***	0.200***	0.158***
	(0.010)	(0.051)	(0.056)	(0.052)
$\hat{\delta}_{it}$	0.054***	-0.013	-0.024	0.013
	(0.010)	(0.044)	(0.049)	(0.044)
L3_lnEmpl_it	-0.003	-0.002	-0.002	-0.006
	(0.003)	(0.003)	(0.004)	(0.004)
L3_lnProd_it	0.041***	0.043***	0.048***	0.025***
	(0.008)	(0.009)	(0.009)	(0.009)
L3_fixassets_it	0.109***	0.114***	0.096***	0.088***
	(0.022)	(0.019)	(0.020)	(0.020)
L3_RATING	0.007***	0.007***	0.007***	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
D_lnWtrade_it			0.173***	
			(0.043)	
Observations	15155	15155	13459	15186
Dummies	PT	PT	PT	ST
MeAdummy_it		-0.283***	-0.249***	-0.277***

t<2010. Bootstrapped s.e in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Results (4/4)

Table: Total Credit and Revenues - extended sample

	Dependent variable: $\Delta_3 ln(Revenues)_{it}$				
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)	(5) (RF)
$\Delta_3 ln(Cr)_{it}$	0.147***	0.245***	0.309***	0.243***	
	(0.007)	(0.031)	(0.035)	(0.032)	
$\hat{\delta}_{it}$	0.040***	-0.047*	-0.084***	-0.050*	0.168***
	(0.008)	(0.027)	(0.032)	(0.027)	(0.007)
$M\&A_{it}$					-0.076***
					(0.009)
L3_lnEmpl_it	0.000	0.001	0.001	-0.000	-0.005**
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
L3_lnProd_it	0.018***	0.020***	0.032***	0.016**	0.011**
	(0.006)	(0.005)	(0.008)	(0.007)	(0.006)
L3_fixassets_it	0.084***	0.087***	0.097***	0.092***	0.079***
	(0.012)	(0.012)	(0.017)	(0.015)	(0.014)
L3_RATING	0.006***	0.006**	0.007****	0.005***	0.004***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
D_lnWtrade_it			0.011		
			(0.007)		
Observations	39715	39715	28419	39809	40037
Dummies	PT	PT	PT	ST	ST
MeAdummy_it		-0.343***	-0.301***	-0.321***	

t<2010. Bootstrapped s.e. in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Robustness checks

- Total Credit and Export - Manufacturing
- Short Term Credit and Export
- Trade Credit and Export
- Total Credit and Export - small firms
- Total Credit and Export - with crisis

Results

Summary and Conclusions

- Credit supply is important for the **overall firm activity**.
- The intensive margin of trade is not found to be credit intensive; on the contrary, it is **not affected** by shocks to the supply of credit.
  - Export hysteresis;
  - Other financing sources;
- Exporting firms are less sensitive to credit than domestic firms (Formai (2013)).
- Export credit is less sensitive to certain shocks on the supply side (Del Prete & Federico (2013)).

Table: Summary Statistics - Firms' Data

Variable	Mean		Std. Dev.		Min.		Max.		N	
	No Exp.	Exp.	No Exp.	Exp.	No Exp.	Exp.	No Exp.	Exp.	No Exp.	Exp.
Exp.	0	41	0	218	0	0.01	0	9663	10.5	39.3
Rev.	56	106	291	610	0.01	0.02	13281	33691	10.6	38.9
Exp. Sh.	0	0.40	0	0.37	0	0.00	0	1	10.6	38.9
Credit	16216	27547	77990	164670	75	75	2098474	14093759	9.2	30.6
Empl.	267	341	1835	1581	11	1	153149	83666	10.6	38.7
Prod.	50	60	59	136	-638	-4522	2084	12194	9.4	34.3
Fix Asset	0.36	0.23	7.05	0.15	0.00	0.00	0.87	0.89	9.5	36.5
Z Score	4.63	4.30	1.8	1.79	1	1	9	9	9.4	34.6

The data refer to the period 1997-2009. Exports, Revenues and Credit are expressed in thousands of euros. Fixed Assets defined as the ratio between fixed assets and revenues.Productivity as the ratio between value added and employees. Sources: INVIND, CEBIL/CERVED and Credit Register.
Number of observations is expressed in thousands.

Table: Export Status

Export Status	N. of Firms	Share of Firms
Always Exporting	5444	0.56
Never Exporting	2457	0.25
Changing Status	1802	0.19
Total	9703	1.00

Sources: INVIND, CEBIL/CERVED

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Fix Asset	0.36	0.23	7.05	0.15	0.00	0.00	0.87	0.89	9.5	36.5
Z Score	4.63	4.30	1.8	1.79	1	1	9	9	9.4	34.6

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Table: Mergers and Acquisitions

	N. Mergers	N. Acquisitions	N. Bidders	N. Targets
1997	5	17	22	24
1998	3	27	30	34
1999	6	42	48	59
2000	9	32	41	56
2001	6	23	29	36
2002	3	29	32	40
2003	6	24	30	35
2004	-	16	16	17
2005	-	6	6	7
2006	1	11	12	13
2007	1	8	9	10
2008	4	12	16	19
2009	1	13	14	15

Source: Albo Operazioni Bancarie

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Table: Shares of credits by types and destinations

	Export	Import	Other	Total
Loans backed by account-receivables	3.9	0.0	18.6	22.7
Term loans	0.01	2.7	58.1	60.8
Revolving credits lines	0.00	0.03	16.4	16.4
Total	3.9	2.6	93.4	100

Notes: The data represent the shares of each type on the total amount of credit granted in 2003. *Source:* Credit Register

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Robustness Results (1/5)

Table: Total Credit and Export- Manufacturing

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)
$\Delta_3 ln(Cr)_{it}$	0.141***	0.282*	0.266*	0.095
	(0.022)	(0.155)	(0.155)	(0.141)
$\hat{\delta}_{it}$	0.039	-0.082	-0.077	0.081
	(0.026)	(0.134)	(0.133)	(0.125)
L3_lnEmpl_it	-0.006	-0.004	-0.007	-0.015
	(0.009)	(0.010)	(0.011)	(0.010)
L3_lnProd_it	0.069***	0.073***	0.068***	0.034*
	(0.022)	(0.024)	(0.024)	(0.021)
L3_fixassets_it	0.110*	0.122*	0.114*	0.128*
	(0.066)	(0.066)	(0.067)	(0.069)
L3_RATING	0.011**	0.012**	0.010*	0.009*
	(0.005)	(0.005)	(0.005)	(0.005)
D_lnWtrade_it			0.467***	
			(0.064)	
Observations	14329	14329	13343	14387
Dummies	PT	PT	PT	ST
MeAdummy_it		-0.275***	-0.244***	-0.276***

t<2010. Bootstrapped s.e. in parentheses. * p<0.10, ** p<0.05, *** p<0.01

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Robustness Results (2/5)

Table: Short Term Credit and Export

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)
$\Delta_3 ln(Cr)_{it}$	0.075***	0.314*	0.292*	0.104
	(0.019)	(0.173)	(0.173)	(0.168)
$\hat{\delta}_{it}$	0.146***	-0.027	-0.018	0.119
	(0.027)	(0.128)	(0.128)	(0.123)
L3_lnEmpl_it	-0.015	-0.013	-0.012	-0.016*
	(0.009)	(0.010)	(0.011)	(0.009)
L3_lnProd_it	0.051**	0.054**	0.070***	0.027
	(0.022)	(0.021)	(0.026)	(0.020)
L3_fixassets_it	0.155**	0.170**	0.105	0.121*
	(0.063)	(0.071)	(0.071)	(0.065)
L3_RATING	0.011*	0.011**	0.012**	0.007
	(0.006)	(0.005)	(0.006)	(0.005)
D_lnWtrade_it			0.291***	
			(0.072)	
Observations	15112	15112	13413	15132
Dummies	PT	PT	PT	ST
MeAdummy_it		-0.267***	-0.234***	-0.286***

t<2010. Bootstrapped s.e. in parentheses. * p<0.10, ** p<0.05, *** p<0.01

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Robustness Results (3/5)

Table: Trade Credit and Export

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)
$\Delta_3 ln(Cr)_{it}$	0.043***	-0.014	-0.313	-0.082
	(0.008)	(3.795)	(5.231)	(42.187)
$\hat{\delta}_{it}$	0.229***	0.275	0.493	0.323
	(0.027)	(2.964)	(4.038)	(31.946)
L3_lnEmpl_it	0.006	0.005	0.001	0.004
	(0.010)	(0.126)	(0.120)	(1.922)
L3_lnProd_it	0.007	0.001	-0.014	-0.020
	(0.023)	(0.397)	(0.449)	(7.429)
L3_fixassets_it	0.087	0.102	0.191	0.084
	(0.081)	(1.182)	(1.874)	(24.466)
L3_RATING	0.013**	0.014	0.021	0.012
	(0.006)	(0.136)	(0.175)	(0.531)
D_lnWtrade_it			0.457	
			(0.461)	
Observations	9332	9332	8318	9329
Dummies	PT	PT	PT	ST
MeAdummy_it		-0.134	-0.132**	-0.139

t<2010. Bootstrapped s.e. in parentheses. * p<0.10, ** p<0.05, *** p<0.01

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Robustness Results (4/5)

Table: Total Credit and Export-small firms

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)
$\Delta_3 ln(Cr)_{it}$	0.116	-0.073	-0.171	-0.100
	(0.090)	(0.405)	(0.405)	(0.378)
$\hat{\delta}_{it}$	0.024	0.174	0.231	0.216
	(0.102)	(0.338)	(0.342)	(0.305)
L3_lnEmpl_it	-0.434***	-0.454***	-0.435***	-0.529***
	(0.160)	(0.146)	(0.157)	(0.140)
L3_lnProd_it	0.039	0.039	0.053	0.052
	(0.052)	(0.045)	(0.059)	(0.043)
L3_fixassets_it	0.008	0.001	-0.115	0.028
	(0.192)	(0.162)	(0.210)	(0.155)
L3_RATING	-0.006	-0.005	0.000	0.008
	(0.015)	(0.014)	(0.017)	(0.014)
D_lnWtrade_it			0.750***	
			(0.211)	
Observations	2677	2677	2689	2400
Dummies	PT	PT	PT	ST
MeAdummy_it		-0.328***	-0.259***	-0.338***

t<2010. Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

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Robustness Results (4/5)

Table: Total Credit and Export-with crisis

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1) (OLS)	(2) (IV)	(3) (IV)	(4) (IV)
D_lnTotCr_it	0.160***	0.297*	0.302*	0.118
	(0.021)	(0.153)	(0.165)	(0.144)
$\hat{\delta}_{it}$	0.040	-0.076	-0.077	0.068
	(0.026)	(0.130)	(0.139)	(0.122)
L3_lnEmpl_it	-0.008	-0.006	-0.008	-0.010
	(0.008)	(0.009)	(0.011)	(0.009)
L3_lnProd_it	0.076***	0.078***	0.074***	0.046***
	(0.020)	(0.022)	(0.026)	(0.017)
L3_fixassets_it	0.205***	0.215***	0.136**	0.158**
	(0.061)	(0.056)	(0.069)	(0.063)
L3_RATING	0.013***	0.013***	0.012**	0.010**
	(0.004)	(0.005)	(0.005)	(0.004)
D_lnWtrade_it			0.272***	
			(0.076)	
Observations	18553	18553	13511	18593
Dummies	PT	PT	PT	ST
MeAdummy_it		-0.259***	-0.277***	-0.228***

t<2012. Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

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