The 2014 Russia shock and its effects on Italian firms and banks

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Motivation

Background

- Dual shock suffered by Russia in 2014 after Crimea crisis:
  1. Sanctions levied by EU, US and other countries (March and July 2014). Counter-embargo levied by Russia on imports of various agricultural products (August 2014)
  2. Weaker oil demand and stronger oil supply (e.g. US shale) led to a fall in oil prices: almost -50% in second half of 2014
- Significant contraction in Russia's imports from the rest of the world: -35% over two years for Italy.
- This exogenous demand shock reduced export market opportunities for Italian firms: Russia was the third largest extra-EU market.

Russia shocks

Comparison between 2014 and 2022

- **Similarities:** Both episodes represent an unexpected shock to selected firms' revenues (with consequences for liquidity, credit quality, etc.)
- **Differences:** magnitude, context and policies
  - Trade and financial sanctions much more pervasive in 2022
  - Great surge in energy costs in 2022 (versus fall in 2014)
  - Cost-push shock in 2022 led to global inflation shock triggering monetary and fiscal policy responses
- The 2014 shock hit a limited number of firms:
  $\rightarrow$ no policy response $\rightarrow$ *cleaner setting for identification*

This paper

Research questions

Key questions: *What is the role of the banking system in response to a negative trade shock? Does it help cushion the shock or does it propagate it? Which borrowers end up being more affected?*

- Identify Italian firms relatively more exposed ("*hit borrowers*"): around 3,100 firms with at least 9% of sales from Russia in at least one pre-shock year. Around 0.45% of total NFCs.
- Construct bank level measure of lending exposure towards Italian firms exporting to Russia ("*bank exposure*")
- Diff-in-diff strategy (before and after the shock) to estimate the effect of the Russia shock on the lending strategies of more exposed banks with respect to different borrowers

Overview of the results

- **Effects on hit-borrowers:**
  1. Decline in turnover (-17%; especially export markets); higher leverage; lower liquidity; *higher default rate*
  2. No significant change in granted credit, but significant increase in drawn credit (+7%), especially for credit lines.
- **Effects on banks more exposed to Russia shock**
  1. Stronger reduction in overall credit supply (0.8 p.p. for 1 sd), especially towards risky borrowers
  2. More credit support than other banks to moderately hit-borrowers (exports to Russia <30% of sales)
- Credit supply tightening and reallocation consistent with a *bank capital channel*
- Even w/o global banks credit spillover effects via real trade links and bank asset quality

Literature review

- **Trade shocks and banks**: Federico et al. (2020), Correa et al. (2022), Cao et al. (2022)

  Complementary evidence (export vs import competition shock, sudden vs. gradual shock)

- **Bank shocks and credit spillovers to hit/non-hit borrowers:** Favara and Giannetti (2017), Giannetti and Saidi (2018) and Galaasen et al. (2020)

  Broadly consistent with the highlighted mechanisms

- **How banks and firms react to firms' liquidity shortfalls (e.g. after Covid-19 shock)**: Chodorow-Reich et al. (2021), Li et al. (2020), Kapan and Minoiu (2020)

  Much smaller shock, but without the "interference" of public support measures (moratoria, public guarantees)

Data

- Match four main datasets:
  1. Credit registry: matched bank-firm data with detail on credit granted/drawn by instrument, collateral and export purpose.
  2. Customs data on exports at firm-product-country-year level
  3. Banks' balance sheets: size, capital, loan-to-deposits, asset quality, sovereign debt ratio, share of loans to HHs and NFCs
  4. Firms' balance sheets: turnover, assets, liquidity, leverage, risk
- Sample period: data from 2012 to 2016.

Firms' exposure to Russia

- Russia was the third extra-EU market for Italy before the shock
- Around 22,000 firms in our sample exported to Russia
- For 3,100 firms the share of Russian exports was above 9% of total sales (incl. domestic sales) in at least one of the three pre-shock years: "hit borrowers"
- Hit-borrowers' performance. Cross-section of firms, pre and post-shock:

$$\Delta Y_i = \beta HitBorrower_i + \gamma X_i + \alpha_j + \alpha_p + \epsilon_i$$

where X_i firm-level variables, α_j, α_p sector and province FEs.

Hit-borrowers' performance

Table: **Firms' post-shock outcomes**

	(1) Δ Sales	(2) Δ Leverage	(3) Δ Liquid ratio	(4) Bad debt	(5) Other NPL
HITBORROWER	-0.1667***	3.5221***	-0.0119***	0.0190***	0.0176***
	(0.0445)	(1.1099)	(0.0035)	(0.0047)	(0.0066)
Firm controls	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes
N	305312	316971	299810	346335	346335
adj. R^2	0.063	0.087	0.019	0.046	0.069

Table: **Firms' post-shock domestic sales and exports**

	(1) Δ Total sales	(2) Δ Domestic sales	(3) Δ Exports	(4) Δ Exports to Russia	(5) Δ Exports to ROW
HITBORROWER	-0.1726***	-0.0834*	-0.4071***	-0.7483***	-0.1110***
	(0.0360)	(0.0445)	(0.0562)	(0.0704)	(0.0316)
Firm controls	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes
N	62524	62009	62519	9867	62117
adj. R^2	0.021	0.009	0.124	0.099	0.124

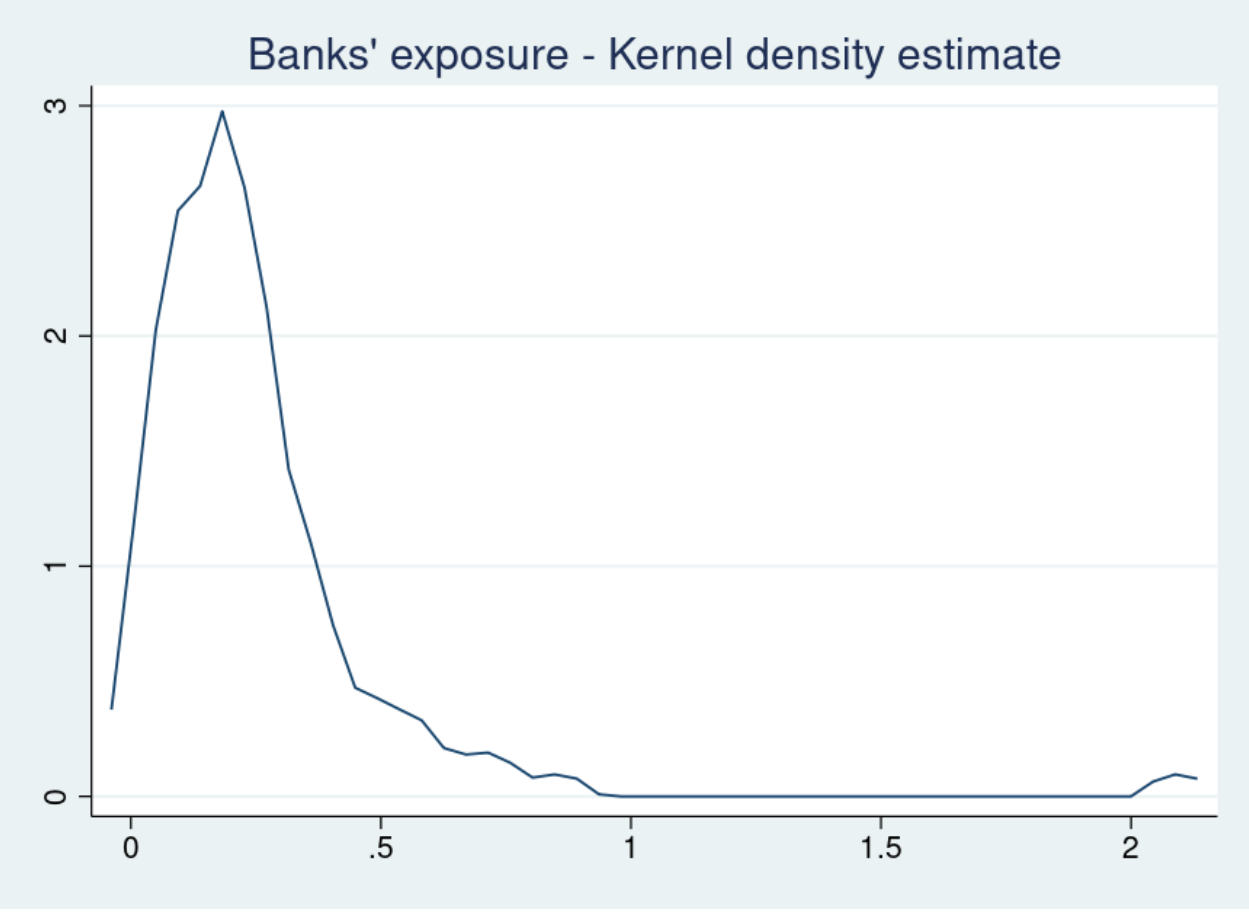
Hit-borrowers' credit dynamics

Table: **Firms' Borrowing**

	(1) Total loans	(2) Credit Lines	(3) Term Loans	(4) Trade finance
(a) Credit granted				
POST x HITBORROWER	0.0160	0.0082	0.0252	0.0027
	(0.0104)	(0.0119)	(0.0153)	(0.0295)
Firm time-varying controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Sector x Time FE	Yes	Yes	Yes	Yes
Province x Time FE	Yes	Yes	Yes	Yes
N	2746613	2391331	1987308	208464
adj. R^2	0.963	0.958	0.930	0.880
(b) Credit outstanding				
POST x HITBORROWER	0.0744**	0.1255**	0.0547**	0.0133
	(0.0284)	(0.0487)	(0.0183)	(0.0293)
Firm time-varying controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Sector x Time FE	Yes	Yes	Yes	Yes
Province x Time FE	Yes	Yes	Yes	Yes
N	2601962	1995077	1887544	149586
adj. R^2	0.902	0.835	0.923	0.885

Banks' exposure to Russia shock

$$BankExposure_b = \frac{\sum_i C_{ib} \frac{ExpRussia_i}{Sales_i}}{\sum_i C_{ib}}$$



Econometric framework

- Sample period: four quarters from 2013Q3 to 2014Q2 (Pre period) and six quarters after from 2014Q3 to 2015Q4 (Post period)
- Estimate credit supply

$$lnC_{ibt} = \beta BankExposure_b \times Post_t + \gamma \mathbf{Z}_{ibt} + \alpha_{it} + \alpha_{ib} + \epsilon_{ibt}$$

where:

1. *Post* dummy from 2014Q3 to 2015Q4
2. Bank-firm FE: α_{ib}
3. Firm-time FE: α_{it}
4. Controls: $\mathbf{Z}_{ibt}$
   - Pre-shock bank var.#*Post*: assets, loan-to-deposits ratio, capital ratio, share of gov. securities holdings, share of loans to households and NFCs
   - Loan-level controls: share of collateralized loans, trade finance, bad debt, other NPLs in total borrowing

Banks' credit supply

Baseline by loan instrument

- More exposed banks decrease credit supply to their borrowers after the shock relative to less exposed banks
- A one standard deviation increase in bank exposure is associated to a 0.8 p.p. decrease in credit supply
- Effect is largely driven by credit lines

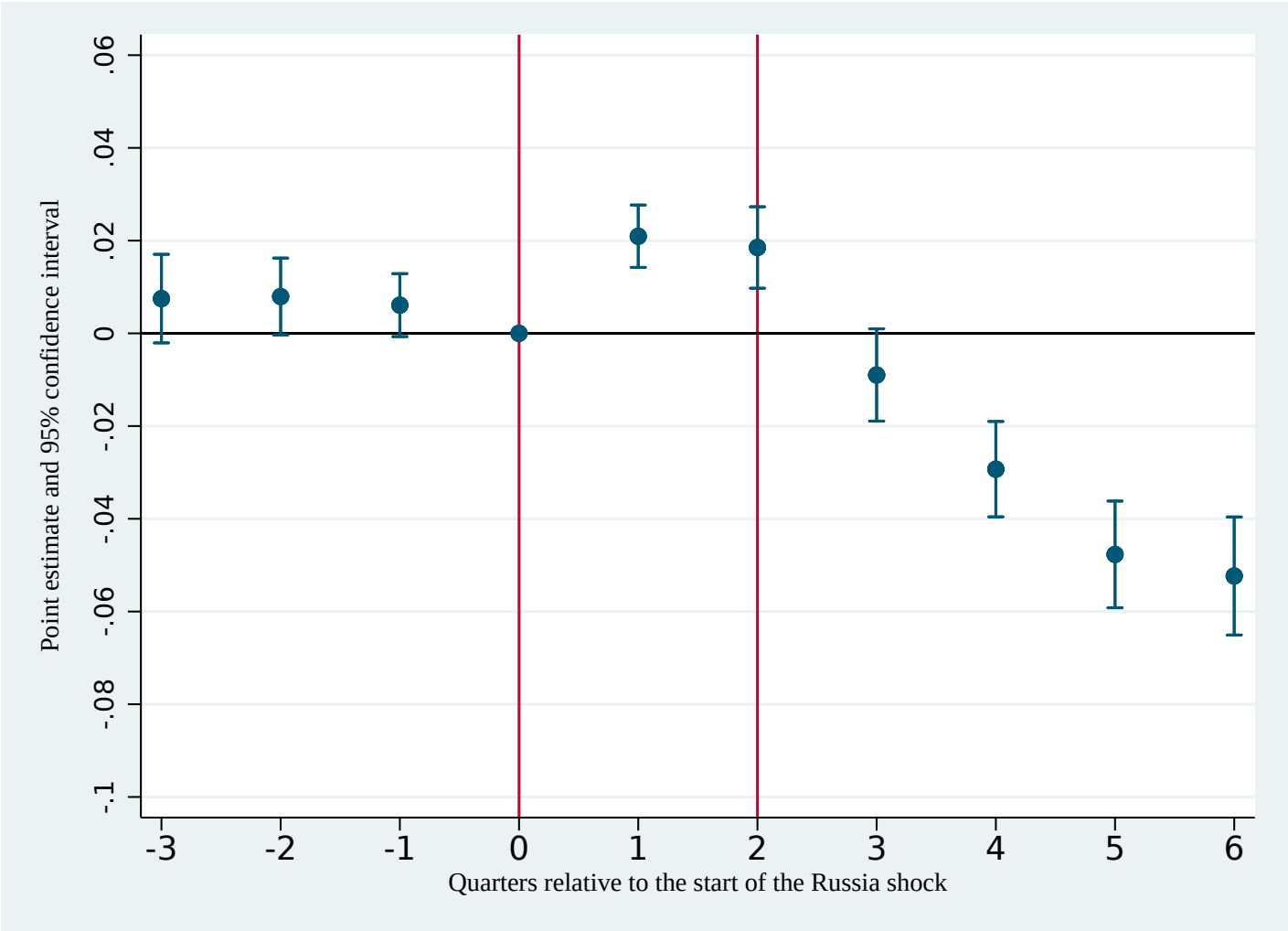
Table: **Credit supply - Baseline**

	(1)) Total loans	(2) Total loans	(3) Total loans	(4) Credit Lines	(5) Term Loans	(6) Trade finance
BANKEXPOSURE x POST	-0.0438***	-0.0431***	-0.0184***	-0.0311***	-0.0120	-0.0735***
	(0.0043)	(0.0042)	(0.0042)	(0.0048)	(0.0107)	(0.0284)
Bank x firm	Yes	Yes	Yes	Yes	Yes	Yes
Firm x time	Yes	Yes	Yes	Yes	Yes	Yes
Loan-level controls		Yes	Yes	Yes	Yes	Yes
Bank-level controls			Yes	Yes	Yes	Yes
N	5424360	5424360	5424360	4511316	2873813	360555
adj. R^2	0.9482	0.9486	0.9486	0.9280	0.8918	0.8260

Banks' credit supply

Time evolution

Figure: **Effects of the shock on credit supply over time**



Banks' credit supply

Heterogeneous response across hit and non-hit borrowers

	(1) Hit borrowers	(2) Medium and high-hit borrowers	(3) Non-hit borrowers
BANKEXPOSURE x POST	-0.0209***	-0.0208***	
	(0.0043)	(0.0043)	
BANKEXPOSURE x POST x HITBORROWER	0.0678***		0.0469**
	(0.0204)		(0.0200)
BANKEXPOSURE x POST x MEDIUMHITBORROWER		0.1071***	
		(0.0314)	
BANKEXPOSURE x POST x HIGHHITBORROWER		-0.0247	
		(0.0341)	
BANKEXPOSURE x POST x MANUFNONHIT			-0.0629***
			(0.0210)
BANKEXPOSURE x POST x CONSTRUCTIONNONHIT			-0.1187***
			(0.0235)
BANKEXPOSURE x POST x SERVICESNONHIT			-0.0615***
			(0.0210)
BANKEXPOSURE x POST x OTHERNONHIT			-0.0233
			(0.0286)
Bank x firm	Yes	Yes	Yes
Firm x time	Yes	Yes	Yes
Loan-level controls	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes
N	5424360	5402199	5424360
adj. R^2	0.9486	0.9486	0.9486

Banks' credit supply

Heterogeneous response across ex ante risky borrowers

	(1) Baseline	(2) Bank quartile	(3) By NPL ratio	(4) By hit-borrowers
BANKEXPOSURE x POST	-0.0071		0.0008	-0.0078
	(0.0053)		(0.0057)	(0.0054)
BANKEXPOSURE x POST x RISKIER FIRM	-0.0180**		-0.0271***	-0.0327***
	(0.0089)		(0.0443)	(0.0092)
BANKEXPOSURE Q2 x POST		-0.0279***		
		(0.0089)		
BANKEXPOSURE Q3 x POST		-0.0571***		
		(0.0086)		
BANKEXPOSURE Q4 x POST		-0.0108		
		(0.0086)		
BANKEXPOSURE Q2 x POST x RISKIER FIRM		-0.0040		
		(0.0130)		
BANKEXPOSURE Q3 x POST x RISKIER FIRM		-0.0295***		
		(0.0123)		
BANKEXPOSURE Q4 x POST x RISKIER FIRM		-0.0683***		
		(0.0121)		
BANKEXPOSURE x POST x NPL RATIO			-0.0420***	
			(0.0144	
BANKEXPOSURE x POST x NPL RATIO X RISKIER FIRM			0.0406*	
			(0.0219)	
BANKEXPOSURE x POST X HITBORROWER				0.0212
				(0.0283)
BANKEXPOSURE x POST x RISKIER FIRM X HITBORROWER				0.0988**
				(0.0453)
Bank x firm	Yes	Yes	Yes	Yes
Firm x time	Yes	Yes	Yes	Yes
Loan-level controls	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes
N	5147793	5147793	5147793	5147793
adj. R^2	0.9486	0.9486	0.9486	0.9486

Banks' credit supply

Interpretation

Heightened credit risk of exporters to Russia implied higher future losses for more exposed banks.

1. **Negative spillover for their overall credit supply**
   - *Bank capital channel*: Bernanke and Lown (1991), Peek and Rosengren (1995), Thakor (1996), den Heuvel (2006).
   - *De-risking strategy* with overall credit supply reduction: Favara and Giannetti (2017), Giannetti and Saidi (2018), Galaasen et al. (2020), Federico et al. (2020).
2. **Credit reallocation towards hit-borrowers**
   - Try to limit future losses from firm insolvencies – that would end up worsening their capital position – through the granting of new credit to hit-borrowers, in an attempt to let them cope with the liquidity shortfall.
   - At the same time preserve capital position by reducing exposures to risky non-hit borrowers.

Robustness

Relationship lending and specialization

	(1) Main lender	(2) Trade finance special.	(3) Sector special.
BANKEXPOSURE x POST	-0.0205***	-0.0207***	-0.0229***
	(0.0043)	(0.0043)	(0.0043)
BANKEXPOSURE x POST x HITBORROWER	0.0736***	0.0712***	0.0678***
	(0.0259)	(0.0215)	(0.0202)
MAINLENDER x POST	0.0530***		
	(0.0081)		
MAINLENDER x POST x HITBORROWER	-0.0618		
	(0.0448)		
TRADE FINANCE SPEC. x POST		-0.0012	
		(0.0036)	
TRADE FINANCE SPEC. x POST x HITBORROWER		0.0048	
		(0.0253)	
SECTOR SPEC. x POST			0.0068***
			(0.0013)
SECTOR SPEC. x POST x HITBORROWER			0.0106
			(0.0114)
Bank x firm	Yes	Yes	Yes
Firm x time	Yes	Yes	Yes
Loan-level controls	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes
N	5424360	5424360	5424360
adj. R^2	0.9487	0.9486	0.9486

Robustness

Russian subsidiaries, imports, energy and tourism

	(1) Dropping banks with subsidiaries in Russia	(2) Dropping main sectors importing from Russia	(3) Bank exposure to energy intensive sectors	(4) Bank exposure to Russian tourism
BANKEXPOSURE x POST	-0.0222**	-0.0197***	-0.0258***	-0.0210***
	(0.0047)	(0.0043)	(0.0042)	(0.0043)
BANKEXPOSURE x POST x HITBORROWER	0.0574***	0.0688***	0.0789***	0.0677**
	(0.0185)	(0.0199)	(0.0252)	(0.0198)
Bank x firm	Yes	Yes	Yes	Yes
Firm x time	Yes	Yes	Yes	Yes
Loan-level controls	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes
Energy intensive controls	No	No	Yes	No
Russian tourism controls	No	No	No	Yes
N	3569878	5361957	5417842	5424360
adj. R^2	0.9481	0.9480	0.9486	0.9486

This table reports the estimation results of a linear fixed effects model where the outcome variable is the logarithm of the stock of loans granted by banks to non-financial corporations. Column (1) drops banks with subsidiaries in Russia. Column (2) drops the main sectors importing from Russia. Column (3) adds a control for bank exposure to energy-intensive sectors. Column (4) adds a control for bank exposure to Russian tourism. Standard errors are clustered at the bank-firm and firm-time level. *, ** and *** denote respectively 10 per cent, 5 per cent and 1 per cent significance levels.

Conclusions

Starting question: what is the role of the banking system in response to a negative trade shock?

- We exploit the 2014 Russia shock as an exogenous event that reduces export market opportunities for Italian firms selling to Russia
- The banking sector propagates trade shocks with a mechanism related to the capital channel: negative credit spillovers to non-hit borrowers, especially ex ante risky ones
- At the same time more exposed banks provide liquidity to moderately hit borrowers (with good prospects for recovery)
- Broader implication: Transmission of trade shocks to the financial sector does not necessarily pass through global banks, but also through local or regional banks specialized in lending to companies exporting to specific markets