RISK SHIFTING *VERSUS* RISK MITIGATING: EVIDENCE FROM BANKS SECURITY TRADING IN CRISES

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The views expressed in this paper do not necessarily coincide with those of the Bank of Italy or of the Eurosystem

Research Question

Do risk shifting incentives dominate risk mitigating incentives when banks approach financial distress?

We analyze this question looking at banks' security trading during financial crises

Risk shifting

- Particularly relevant for banks
  - The most leveraged corporations with very low skin in the game (Admati and Hellwig, 2013)
  - A very opaque industry (Morgan, 2002)
  - Some of their liabilities are government (explicitly and implicitly) guaranteed (Freixas and Rochet, 2008)
- However other forces, such as regulation and supervision (Dewatripont and Tirole, 1994) or the preservation of franchise value (Keeley, 1990; Hellmann, Murdock and Stiglitz, 2000), may push shareholders of distressed banks to reduce risk
- Theoretical literature offers ambiguous predictions

Why Looking at Banks' Security Trading in Crises?

☐ Particularly easy to quickly change risk by buying and selling securities (Brunnermeier, Dong and Palia, 2012; Boot and and Ratnovsky, 2016)

  ☐ <u>Paradox of liquidity</u>: more liquid assets reduce management's ability to commit credibly to an investment strategy that protects investors (Myers and Rajan, 1998)

☐ Amount of securities held by banks as a percentage of total assets is large, more than 20 percent both in Europe and the U.S. (Mayer et al., 2018)

☐ Detailed data on the riskiness of individual assets: supervisory data at *ISIN-bank-month* level

☐ Financial crisis shocks are the moments in which incentives to risk shift are higher

Previous Empirical Evidence

- On corporations: Largely in favour of the risk-shifting hypothesis
  - Saunders, Strock, and Travlos (1990), Laeven and Levine (2009), Gan (2004), Esty (1997), Landier, Sraer, and Thesmar (2015)

- Similar conclusions by the literature on banks' increase in holdings of sovereign debt during the Euro area sovereign crisis
  - Acharya and Steffen (2015), Drechsler et al., (2016), Altavilla, Pagano and Simonelli, (2017) using Euro area data, show that in distressed countries banks with less capital purchased larger quantity of sovereign debt
  - Conclusion ➡ *Risk-shifting in securities by more fragile banks in the crisis*

Data Limitations of Previous Literature

□ Previous literature:

    ❏ does not consider all securities, at least within a given class (e.g. bonds):

        ■ only just government bonds, or only just securities that banks pledge as collateral to borrow ECB liquidity

    ❏ unit of observation is not the security: does not distinguish between securities with high and low yields

        ■ i.e. more aggregate data may show that two banks have the same amount of government bonds but e.g. we do not know whether they are holdings 10-y or 1-m government bonds, or bonds with different yields from the same issuer

This paper

- We use a proprietary dataset from the Bank of Italy where we have *security (ISIN) level data* of **all** securities investments of **all** Italian banks at a **monthly** frequency and the **portfolios** in which they are held in (HTM, AFS, TB) from 2005
  - HTM, AFS, TB are held to maturity; available for sale; and trading book
- We exploit the Global Financial Crisis and the Euro Area Sovereign Debt Crisis, and also analyze the COVID-19 Crisis

- We consider only bonds (81% of holdings), and for each security we obtain yields, prices, issuer, ratings (from Datastream and FactSet)

- In additional tests we use all the securities

Main Empirical Strategy

Net Buys$_{sbt}$=β_1Capital$_{bt-1}$*Yield$_{st-1}$*Financial Distress$_{t-1}$+ Controls$_{sbt}$+α_{st}+α_b+ε_{sbt}

- ☐ Dependent variable: Net buys (Davis-Haltiwanger)

$$Net\ Buys_{s,b,t} = \frac{Holdings_{s,b,t} - Holdings_{s,b,t-1}}{\frac{1}{2}*(Holdings_{s,b,t} + Holdings_{s,b,t-1})}$$

- ☐ We analyze securities holdings on lagged:

  - ◻ Security heterogeneity: current yields

  - ◻ Bank heterogeneity: excess capital (capital in excess of the regulatory minimum), interbank exposure

  - ◻ Proxy for financial market distress: changes in the Euribor-OIS spread

  - ◻ Large set of other controls and fixed effects: rating*maturity*time FE, security*time FE, bank FE

Proxy for Financial Market Distress

3 months Euribor- OIS spread
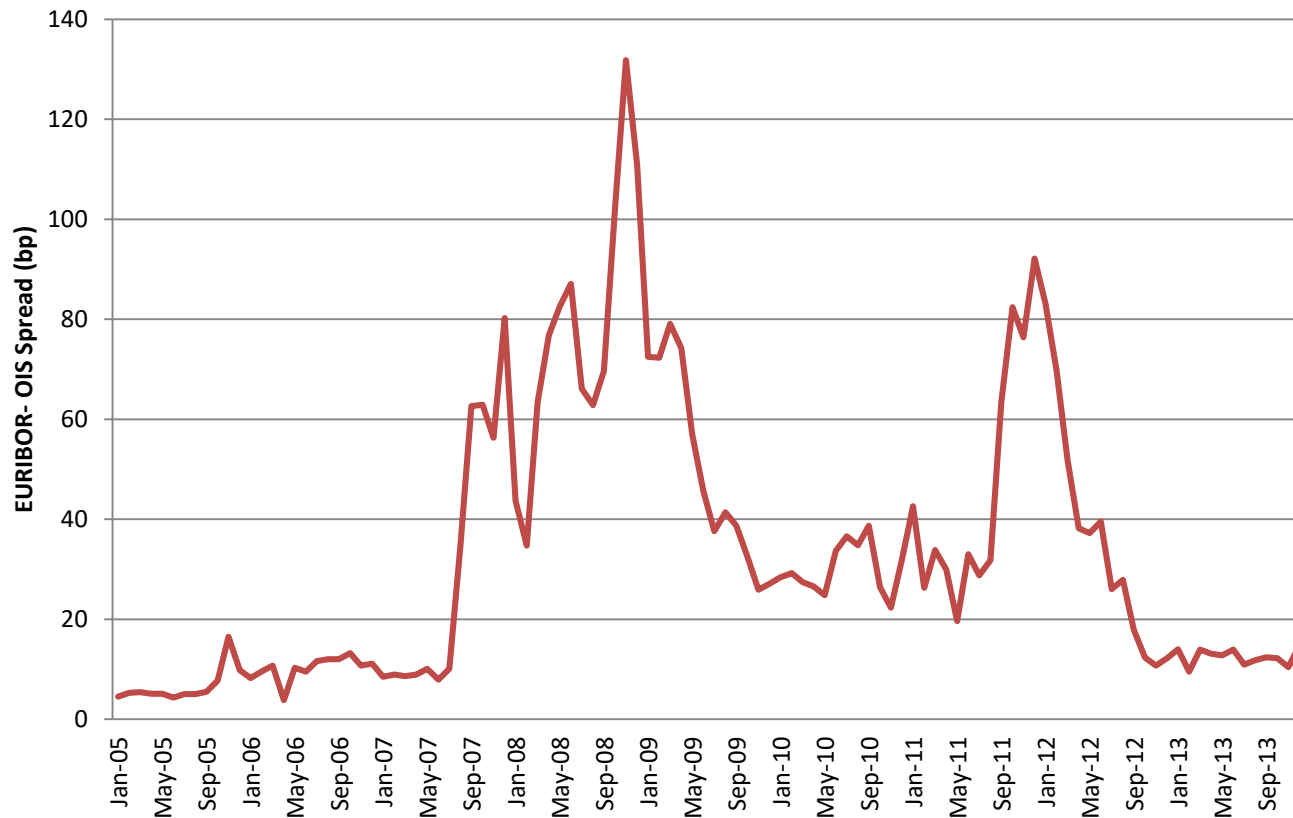
Used by Gorton and Metrick (2012) for the US
and by Aggarwal, Bai and Laeven (2020) for the Euro Area

Main Results

Dependent Variable:	Net Buys $_{s,b,t}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Capital*Risk*Financial Stress	1.443***	1.378***	1.462***	2.097***	1.480***	1.421***
	(0.430)	(0.388)	(0.399)	(0.564)	(0.551)	(0.514)
Double Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	-	-	-	-
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Security Fixed Effects	No	Yes	No	No	-	-
Time Fixed Effects	No	No	Yes	-	-	-
Rating*Maturity*Time Fixed Effects	No	No	No	Yes	-	-
Security*Time Fixed Effects	No	No	No	No	Yes	Yes
Bank Fixed Effects	No	No	No	No	No	Yes
Observations	304568	304568	304568	232162	304568	304568

In contrast to the risk shifting hypothesis and to prior empirical evidence, we find that, in response to stress, less ex-ante capitalized banks buy securities with lower yield

Robustness

Results are similar if we:

- use alternative definition of the dependent variable
- alternative measures of capital
- fix bank capital to its pre-crisis level or use several alternative definitions of bank capital
- control for alternative measure of fragility: interbank exposure
- alternative definitions of risk (rating instead of yield)
- control for several macroeconomic, bank and security portfolio variables (e.g., ECB monetary policy)
- exclude too-big-to-fail banks
- control for the correlation of securities traded with the existing entire bank portfolio, which suggests changes in bank risk-taking
- alternative indexes for market stress or dummies for Lehman and Sovereign crises
- additional fixed effects (in particular, bank*time)

Why do we find these effects?

- Regulation? Different securities carry different risk weights. Run test on securities with same risk weights (Italian Govt Bonds). <u>Same results as in baseline</u>

- Supervision? Supervisors can enforce prudent behavior. Run tests on quarters in which banks are not supervised. <u>Same results as in baseline</u>

- Economic forces? Banks wish to preserve their franchise value. Run test on subsamples of banks with Lerner Index above and below the median. **Risk mitigation only when banks have enough franchise value,**

Concentration risk

Concern: fragile banks reduce their exposure toward securities with higher yield, but it could still be the case that more fragile banks increase their overall risk exposure by increasing the concentration of their holdings

- Bank level analysis

- Dependent variable: share of securities issued by Italian government, HHI of issuer/security type (Di Maggio and Kacperczyk (2017))

- No evidence of increased concentration by fragile banks after market stress episodes

Evidence from the COVID-19 Shock

The COVID-19 Crisis

Evidence from the COVID-19 Shock

Dependent Variable:	Net Buys $_{s,b,t}$						
	Post COVID-19 Starting in March 2020				Post COVID-19 Starting in February 2020		
	(1)	(2)	(3)		(4)	(5)	(6)
Capital*Risk*Post COVID-19	0.810**	0.775**	0.883**		0.944**	0.985**	0.854**
	(0.395)	(0.388)	(0.378)		(0.377)	(0.378)	(0.418)
Double interactions	Yes	Yes	Yes		Yes	Yes	Yes
Security*Time Fixed Effects	Yes	Yes	Yes		Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes		Yes	Yes	Yes
Observations	24682	24682	23491		24467	24467	23332

Different shock (not originated from banking sector), with a softening of banking regulation and supervision (Altavilla et al., 2020) but … same results!

Theoretical framework to rationalize our findings

- Assume presence of financial frictions that limit banks' ability to pledge their full franchise value to outside investors

- Highly indebted but solvent banks with a sufficiently high franchise value will respond to a negative net worth shock, which all-else-equal increases the banks' likelihood of default, by lowering their investment in risky assets as an attempt to off-set the increase in the risk of default

- We show that the standard risk shifting result obtains
  - (i) in the absence of financial frictions and/or
  - (i) when franchise value is sufficiently low

Conclusion

- We analyze the question whether banks start to gamble when they are closer to distress or become more cautious, i.e.: Risk shifting vs risk mitigation

- Thanks to a comprehensive dataset of security trading we have a stronger identification and a more complete analysis, which leads us to a different conclusion with respect to the previous literature

- Even for institutions characterized by very high leverage and opportunities to quickly change risk exposure we find that risk-mitigating dominate risk-shifting incentives when close to financial distress
  - Results suggest that economic forces, preserving franchise value, are a key driver of the results