The fire-sale channels of universal banks in the European sovereign debt crisis

Giulio Bagattini[1] Falko Fecht[1] Patrick Weber[2]

[1] Frankfurt School of Finance and Management
[2] Deutsche Bundesbank

Introduction

Motivation: Fire sales and contagion

- European banks major investors in Euro area sovereign bonds
- Elevated concerns about some sovereigns' solvency induced Euro area banks to massively reduced crisis countries' sovereign holdings
- German banks reduced their holdings of ES and PT sovereign bonds by 50% from 2009Q1 to 2011Q1
- Fire sale have severe price effects; generally seen as an important channel of financial contagion (Greenwood et al. (JFE 2015))
- Fire sales of sovereign bonds also aggravate the doom loop: Financing of sovereign impaired which increases sovereign default risk

Motivation: Universal banks' fire sale channels

- Euro area banks mostly universal banks
- They engage in proprietary trading, market making, asset management, private wealth management, advisory services etc.
- Fecht et al. (JF 2018): Banks steer their clients' portfolios towards securities that the bank sells off from its proprietary trading portfolio

Three key questions

1. Did banks sell off risky sovereign bonds to both their customer portfolios and their affiliated mutual funds?
2. Did bank affiliated mutual funds increase their holdings of risky sovereign bonds more than their unaffiliated peers?
3. Could banks with affiliated mutual funds sell off larger positions of risky sovereign bonds in the European sovereign debt crisis?

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Main findings

1. Whenever a bank sells off a risky sovereign bond position we find a significant negative correlation with the same bond position in the bank's affiliated mutual funds' holdings and the bank's customers' holdings
2. Bank affiliated mutual funds increase their risky sovereign bond holdings more than their unaffiliated peers
3. Banks with affiliated mutual funds were able to reduce their holdings of risky sovereign bonds more than other comparable banks

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Main implications

Efficiency perspective

- There seems to be a conflict of interest that might impair efficiency of retail customers' investment decision

Financial stability perspective

- Universal banks can bypass market pushing bonds to funds and customers
- Mitigates fire sale pricing and externalities to other financial institutions
- Allocation of risky assets to unleveraged investors
- Changes in banking industry, e.g. due to Liikanen-Report, might affect these fire sale channels and aggravate vulnerability

Related Literature: Conflict of interest vs efficient integration

Efficiency of universal banks

- Kroszner and Rajan (AER 1994, JME 1997)
- Puri (1996): Underpricing lower for IPOs underwritten by banks

Conflict of interest

- Acharya and Johnson (JFE 2007) and Massa and Rehman (JFE 2008): Information from lending business reused in banks' proprietary trading and asset management
- Ber et al. (JME 2001): Bank managed funds pay too much for equity underwritten by the bank
- Golez and Marin (JFE 2014) / Massa and Zaldokas (JFI 2017): bank-affiliated mutual funds purchase stocks / trade on the private information obtained from the controlling bank
- Fecht et al. (JF 2017): Banks sell to customers to avoid market impact

Related Literature: Liquidity insurance and fire sales

Mutual liquidity insurance

- Fecht and Wedow (JFI 2014): banks also provide liquidity support for troubled funds that experience excessive outflows
- Bhattacharya et al. (2013): liquidity support within fund families

Fire sales and sovereign debt crisis

- Ellul et al. (JFE 2011): Sizable price effect of corporate bond fire sales by insurance companies
- Greenwood et al. (JFE 2015): Fire sales main driver of systemic risk in the financial system and a key vulnerability of the banking sector in the Euro area
- Cooper and Nikolov (2013): Fire sales of sovereign bonds by distressed banks key element in the vicious circle linking banking and sovereign crises

Data

Three different data sets from Q3 2009 to Q1 2016

Securities holdings statistics (SHS)

- Proprietary security holdings of each German bank at security level
- For each bank the security holdings of its aggregate retail customers at security level

Investment fund statistics (IFS)

- Security holdings for all German investment funds at security level

External data sets

- Credit default swap data from Markit (country level)
  assigned to sovereign bonds to proxy for credit risk
- Bid-Ask Spread from Bloomberg as liquidity measure (ISIN level)

Two different samples

1. Sample matching bank-fund holdings
    - 19 banks with asset management companies; 31 asset management companies with 3059 different funds
    - A bond position of a bank is matched on average with 7.77 affiliated funds' holdings of the same bond
    - On average a bank holds 329 different sovereign bonds that one of its funds also holds at some point; but largest 3 banks hold 1148 bonds
2. Sample matching bank-customer holdings
    - 538 banks have a sovereign bond that also their customers hold
    - On average a bank holds 13 bonds in common with their retail customers, while largest bank holds 990

Key variable of interest

- We derive from the end of quarter holdings the net quarterly transactions (sales/purchases):

$$\Delta\text{Bank Holding}_{ijt} = \text{Bank Holding}_{ijt} - \text{Bank Holding}_{ijt-1},$$
$$\Delta\text{Fund Holding}_{ijt} = \text{Fund Holding}_{ijt} - \text{Fund Holding}_{ijt-1},$$
$$\Delta\text{HH Holding}_{ijt} = \text{HH Holding}_{ijt} - \text{HH Holding}_{ijt-1}.$$

Descriptives: Risk measures

- Different sovereigns entered crisis in different times:
  IR and PT already in 2010Q2; IT and ES only in 2011Q2
- Two measures for the riskiness of bonds:
  1. CDS_{jt}: CDS spread of country j in quarter t floored at 300 bps.
  2. $Risky_{jt}$: Dummy variable for $CDS_{jt} \geq 300$ bps.
- Bonds are matched to CDS_{jt} and $Risky_{jt}$ according to their remaining maturity

Do banks sell off risky sovereign bonds to their funds and customers?

Empirical identification

1. For the bank-fund sample we estimate:

$$\begin{aligned}\Delta\text{Fund Holding}_{ijt} =& \beta_0 \cdot \text{Sell}_{ijt} + \beta_1 \cdot \Delta\text{Bank Holding}_{ijt} \\ &+ \beta_2 \cdot \Delta\text{Bank Holding}_{ijt} \cdot \text{Sell}_{ijt} \\ &+ \beta_3 \cdot \Delta\text{Bank Holding}_{ijt} \cdot \text{CDS}_{jt} \\ &+ \beta_4 \cdot \Delta\text{Bank Holding}_{ijt} \cdot \text{Sell}_{ijt} \cdot \text{CDS}_{jt} \\ &+ \gamma_{jt} + \alpha_{it},\end{aligned} \tag{1}$$

   where the CDS_{jt} is the floored CDS spread at 300 bps. Alternatively, we replace CDS_{jt} with the dummy $Risky_{jt}$.

2. For the bank-customer sample we estimate the same regression replacing $\Delta\text{Fund Holding}_{ijt}$ with $\Delta\text{HH Holding}_{ijt}$

Results: Funds' risk bond purchases

Table 1: Funds' and banks' trades of bonds with high default risk.

	(1) $\Delta FundHolding$	(2) $\Delta FundHolding$	(3) $\Delta FundHolding$	(4) $\Delta FundHolding$	(5) $\Delta FundHolding$
Sell	9606.6	9097.7	8954.7	-1440.8	-1638.2
	(0.25)	(0.24)	(0.23)	(-0.04)	(-0.04)
$\Delta BankHolding$	0.000199	0.0000958	0.0000965	0.0000299	0.0000271
	(0.36)	(0.29)	(0.30)	(0.07)	(0.06)
$\Delta BankHolding \times Sell$	0.00217**	0.000448	0.000447	0.000326	0.000330
	(2.45)	(1.02)	(1.02)	(0.45)	(0.45)
$\Delta BankHolding \times CDS$	-0.000000341				
	(-0.27)				
$\Delta BankHolding \times CDS \times Sell$	-0.00000586**				
	(-2.37)				
$\Delta BankHolding \times Sell \times Risky$		-0.00291***		-0.00235*	
		(-2.69)		(-1.88)	
$\Delta BankHolding \times Sell \times Risky \times (1 - Public)$			-0.00187*		-0.00130
			(-1.65)		(-1.10)
$\Delta BankHolding \times Sell \times Risky \times Public$			-0.00819***		-0.00743***
			(-4.34)		(-3.01)
Fund-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Security-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Security-fund fixed effects	No	No	No	Yes	Yes
Observations	343682	343682	343682	335509	335509
R^2	0.273	0.273	0.273	0.436	0.436

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Results: Funds' risky bond purchases

Economic significance:

- For a bank's sale of a risky bond amounting to 66 mln Euro (90th pct.), an affiliated public fund purchases additional 540,540 Euro of that bond
  (average absolute value of public fund trades 1.24 mln Euro).

Results: HHs' risky bond purchases

Table 2: Households' and banks' trades of bonds with high default risk.

	(1) $\Delta HouseholdsHolding$	(2) $\Delta HouseholdsHolding$	(3) $\Delta HouseholdsHolding$	(4) $\Delta HouseholdsHolding$
Sell	78603.7	78071.3	74273.2	73577.4
	(1.41)	(1.40)	(1.41)	(1.39)
$\Delta BankHolding$	0.000416	0.000698*	0.000118	0.000532
	(0.76)	(1.74)	(0.20)	(1.36)
$\Delta BankHolding \times Sell$	0.000532	-0.000996**	0.00175*	-0.000431
	(1.21)	(-2.11)	(1.69)	(-1.16)
$\Delta BankHolding \times CDS$	0.000000838		0.00000125	
	(1.44)		(1.36)	
$\Delta BankHolding \times CDS \times Sell$	-0.00000486***		-0.00000702**	
	(-5.19)		(-2.55)	
$\Delta BankHolding \times Sell \times Risky$		-0.00135***		-0.00211***
		(-3.87)		(-3.60)
Bank-quarter fixed effects	Yes	Yes	Yes	Yes
Security-quarter fixed effects	Yes	Yes	Yes	Yes
Security-bank fixed effects	No	No	Yes	Yes
Observations	47529	47529	46493	46493
R^2	0.278	0.278	0.384	0.384

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Summary: IFs' and HHs' risky bond purchases

- Whenever a bank sells a risky bond both bank affiliated public funds and retail customers of that bank tend to purchase this bond.
- This is not a mere result of banks serving as market maker for funds and customers.
  This would imply also a negative correlation for bank buy trades.

$\Rightarrow$ Banks do seem to push some of the risky sovereign bonds that they sell off both to their affiliated public funds and to their retail customer

Summary: Why do banks dumb risky bond?

- Whenever banks have to cover a drop in equity they seem to sell off risky sovereign bonds to their funds and customers maybe to deleverage quicker
- Using the bid-ask-spread as a measure for market liquidity we do not find evidence that banks sell off bonds to mitigate market impact.
  BUT: Bid-ask-spread not a good proxy for market impact

Did bank affiliated mutual funds acquire more risky sovereign bonds during the crisis?

Identification

1. We estimate the following:

$$\Delta\text{Fund Holding}_{ijt} = \beta \cdot \text{Has Bank}_{it} \cdot \text{Risky}_{jt} + \gamma_{jt} + \alpha_{it}, \qquad (2)$$

   where $\text{Has Bank}_{it} = 1$ if fund i has a parent bank, 0 otherwise.

2. We also estimate the portfolio share of different bonds in funds:

$$\Delta\text{Portfolio Share}_{ij} = \text{Has Bank}_{i} \cdot CDS_j + \gamma_j + \alpha_i, \qquad (3)$$

   where CDS_j (or alternatively $Risky_j$) is values for 2012Q2.

   $\Delta\text{Portfolio Share}_{ij}$ is the change in the portfolio share of bond j at fund i from 2010Q2 to 2012Q2.

Results: Trades of affiliated vs non-affiliated funds

	(1) Δ Fund Holding
Has Bank × Risky	151607.7**
	(1.99)
Fund-quarter fixed effects	Yes
Security-quarter fixed effects	Yes
Security-fund fixed effects	No
Observations	1381926
R^2	0.205

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Funds with a parent bank acquire on average 151.608 Euro more of a risky bond (average absolute value of fund trades 1.1 mln Euro).

Results: Portfolio change of affiliated vs non-affiliated funds

	(1) Δ Portfolio Share	(2) Δ Portfolio Share
Has Bank × CDS	0.000163***	
	(4.90)	
Has Bank × Risky		0.0520***
		(12.14)
Fund fixed effects	Yes	Yes
Security fixed effects	Yes	Yes
Observations	64535	64535
R^2	0.398	0.401

t statistics in parentheses
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- After the sovereign debt crisis the portfolio share of risky sovereign bonds was 5 percentage points higher at bank affiliated mutual funds

Were banks with affiliated mutual funds able to sell off larger risky sovereign bond positions?

Identification

- We estimate the following regression:

$$\Delta\text{Bank Holding}_{ijt} = \beta \cdot \text{Has Fund}_i \cdot \text{Risky}_{jt} + \gamma_{jt} + \alpha_{it}. \qquad (4)$$

- "$\text{Has Fund}_i = 1$" for a bank with affiliated investment funds.
- We restrict the sample to net bank sales ($\Delta\text{Bank Holding}_{ijt} < 0$).
- We focus on banks in the upper decile of sovereign bond holdings, to have a more homogeneous sample.

Results: Bank risky bond sales

	(1) Bank buys	(2) Bank sells	(3) Bank buys	(4) Bank sells
Has Fund × Risky	-1865054.2	-6698968.6*		
	(-0.67)	(-1.91)		
Has Fund × CDS			-1806.1	-5812.2**
			(-1.36)	(-2.55)
Bank-quarter fixed effects	Yes	Yes	Yes	Yes
Security-quarter fixed effects	Yes	Yes	Yes	Yes
Observations	42505	33912	42505	33912
R^2	0.444	0.444	0.444	0.444

Dependent variable: ΔBank Holding.
Subsample of the 10% bigger banks by sovereign bond holdings.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. t statistics in parentheses.

- Sale of risky bonds is on average 6.7 million bigger for banks with funds available.
- More significant if we use the floored CDS spread.
- No effect for the sample of bank purchases ("placebo" test).

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Conclusion

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Our main findings:

- Banks seem to shift opportunistically risky sovereign bonds to their affiliated funds and retail customers
- Affiliated funds load up more risky sovereign bonds than their unaffiliated peers
- Banks with affiliated funds were able to sell off larger positions of risky bonds than comparable banks

Implications:

- Universal banks might mitigate fire sale contagion
- A separation between bank proprietary trading and other bank activities might actually aggravate fire-sale contagion in crisis times