Reciprocity in Shadow Bank Lending: Evidence from the Cross-Holding Relation in Money Market Funds

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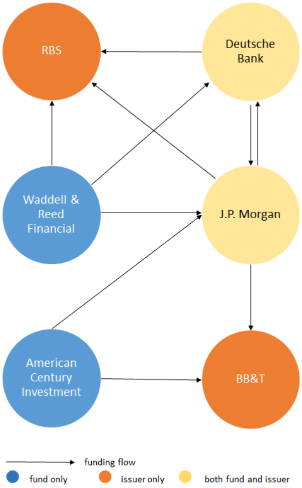
Motivation

- Nonbank financial intermediaries (“shadow banks”: hedge funds, money market funds,...)
  - Provide banking function
  - Not subject to banking regulatory oversight
  - Variation in their lending may create panics spreading around the broader economy(e.g. runs in money market funds in 2008)
- U.S. Money market funds (MMFs)
  - A key source of wholesale funding in short-term credit markets
  - Money market instruments: short-term, high liquidity
  - Nearly $3 trillion AUM by 2015

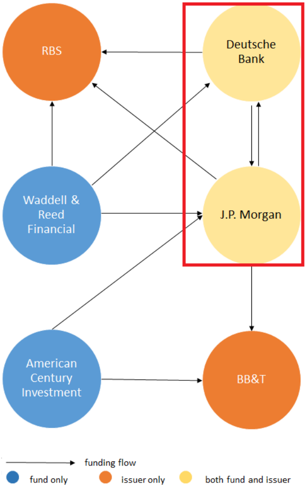
Financial Firms in the MMFs Market

- Different roles
  - Stand-alone funds
  - Banks: issuers of money market instrument
  - Banks: funds + issuers
- Banks with dual roles:
  - 2010–2015, 24 of 163 banks borrowing from U.S. MMFs have affiliated MMFs.
  - Issuer side: more than 30% of holdings in MMFs' overall portfolios
  - Fund side: more than 46% of the total AUMs of all MMFs
- A financial firm unites affiliated MMFs and issuers as a unity. (*Kacperczyk and Schnabl, 2013*)



The Cross-Holding Relation (CHR)

- A bilateral bonding between two financial firms:
  - JPM's MMFs hold DB's money market instruments
  - DB's MMFs hold JPM's money market instruments
- A potential reciprocity naturally arises.



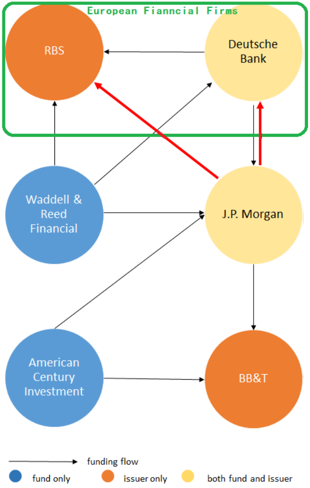
This paper: to which extent the reciprocal CHR affects MMFs' lending

Endogeneity Concern and the 2011 European Bank Crisis

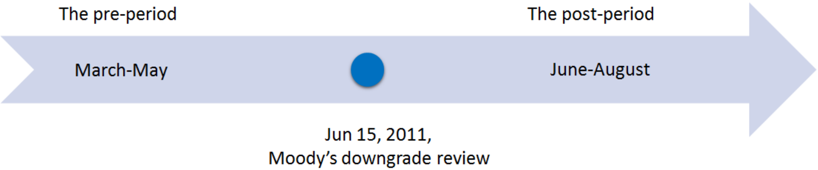
- MMFs are biased towards credit-worthy issuers
  - → A laboratory environment: the difference in MMFs' stakes on different financial firms should be independent of these firms' creditworthiness.
- The European bank crisis in 2011
  - On June 15, 2011, Moody's placed several large European banks on review for possible downgrade.
  - Investors worry about European borrowers' creditworthiness: large outflows in MMFs with high exposure to European issuers (*Chernenko and Sunderam, 2014; Gallagher et al., 2015*).

A Natural Experiment: MMFs' Stakes on European Issuers surrounding Moody's Review

- JPM's MMFs holdings: in DB vs. in RBS
  - $\rightarrow$ CHR does not matter: both decrease
  - $\rightarrow$ CHR matters: different changes
- Independent of creditworthiness
- Control for time-varying variables and fixed effects



Two Periods


The pre-period
The post-period
March-May
June-August
Jun 15, 2011,
Moody's downgrade review

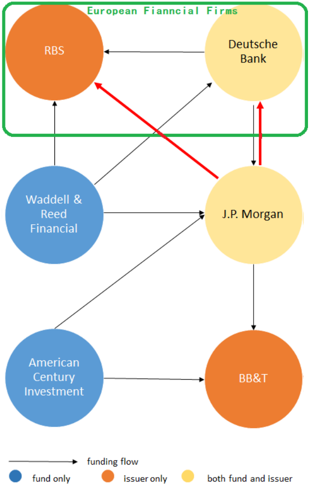
Hypothesis Development

DB: JPM's connected European bank
RBS: JPM's unconnected European bank

- Does CHR affect lending?

Hypothesis 1.

In the post-period, MMFs increase their portfolio weights of the European banks which are in pre-existing CHR with the funds' sponsors.

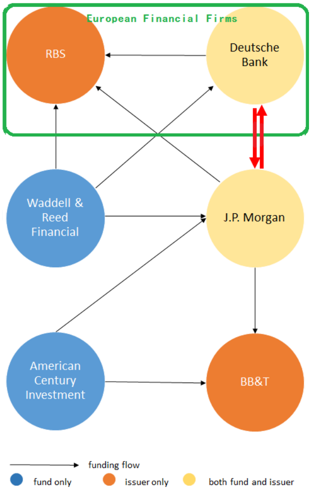


Hypothesis Development

- **Reciprocity**
  "you scratch my back and I scratch yours."
- Reverse holdings:
  DB's MMFs holdings in JPM

Hypothesis 2.

In the post-period, securities held in reverse fund-issuer pairs are different from securities in other fund-issuer pairs.



Data and Sample

- SEC monthly form N-MFP
  - Prime MMFs: mainly invest in non-government securities, \$1.7 trillion AUM by August 2011.
  - Fund-level: gross yields, TNAs, maturities, advisors...
  - Class-level: Nasdaq tickers, net yields, shareholder flow activities...
  - Holdings-level data: issuer, yield, maturity date, value, type...
- CRSP Mutual Fund Database
  - Class-level: expense ratios, shareholder type (institutional or retail), ages...
- Factset and Bloomberg (manual check)
  - Each holding company's formal name, industry category, headquarter location...
- Markit CDS

Measures and Variables

Fund(f)-Issuer(i) Pairs:

- $BConnected_{f,i}$: pairs that are crossly held in the pre-period
- $RPairs_{f,i}$: $BConnected_{f,i}$ & f is owned by an European firm
- $Exposure_{f,i,t}$: in month t,the fund f's portfolio weight of money market instruments issued by issuer i
- Risk measures (*Kacperczyk and Schnabl, 2013*):
  - *Spread*
  - *Maturity*
  - *Holdings Risk*: the weight of i's insecure securities net of its secure securities in f's portfolio
- Other issuer- and fund-level control variables: fund size, yield, age, expense ratio, institutional share, flow, issuer's CDS rate
- Fixed effects: month, issuer, fund, financial firm, issuer type

Changes in MMFs' Exposure to European Financial Firms: Univariate Analysis

Hypothesis 1. In the post-period, MMFs increase their portfolio weights of the European banks which are in pre-existing CHR with the funds' sponsors.

- Between the two periods, a fund's exposure to European financial firms (measured in portfolio weights):
  - connected: increases by 0.35%($29.58 million)
  - unconnected: drops by 0.23%($19.66 million)

	Pair Number	Post Mean(%)	Post SD(%)	Pre Mean(%)	Pre SD(%)	Diff(%)	SD(%)
Panel A: European Issuers							
Connected	148	4.013***	3.906	3.660***	3.465	0.352**	1.564
Unconnected	3714	2.174***	1.802	2.408***	1.717	-0.234***	1.408
Panel B: Non-European Issuers							
Connected	278	2.112***	1.928	2.021***	2.032	0.091	1.350
Unconnected	3583	1.990***	1.600	1.811***	1.547	0.179***	1.214

Changes in MMFs' Exposure to European Financial Firms : Multivariate Analysis

$$Exposure_{f,i,t} = \alpha + \beta_1 BConnected_{f,i} \times Post + \beta_2 BConnected_{f,i} + \beta_3 Post + \lambda Control + \epsilon_{f,i,t}$$

	(1)	(2)	(3)	(4)	(5)
BConnected × Post	0.379***	0.446***	0.403***	0.403***	0.361**
	(0.134)	(0.134)	(0.132)	(0.133)	(0.140)
BConnected	1.121*	0.063	0.215	0.215	0.923**
	(0.585)	(0.283)	(0.279)	(0.280)	(0.387)
Post	-0.320**	-0.056	-0.034	-0.112*	-0.296*
	(0.157)	(0.083)	(0.077)	(0.061)	(0.166)
Conglomerate × Post					0.591**
					(0.288)
Conglomerate					0.075
					(0.096)
Month-Fixed Effects	Y	Y	Y	Y	Y
Fund-Fixed Effects	Y	N	Y	Y	Y
Issuer-Fixed Effect	N	Y	Y	Y	N
Sponsor-Fixed Effects	N	N	N	Y	Y
Issuer-Type-Fixed Effects	N	N	N	Y	N
Observations	10835	10835	10835	10835	10835
R^2	0.268	0.276	0.421	0.421	0.289

With controls, std errors are two-way clustered at the fund-level and the issuer-level

Changes in *Reverse Pairs*

Hypothesis 2. In the post-period, securities held in reverse fund-issuer pairs are different from securities in other fund-issuer pairs.

$$HoldingRisk_{f,i,t} = \alpha + \beta_1 RPair_{f,i} \times Post + \beta_2 RPair_{f,i} + \beta_3 Post + \lambda Control + \epsilon_{f,i,t};$$

	(1)	(2)	(3)	(4)	(5)
Reverse Pair × Post	14.258***	11.320***	10.852***	11.796***	11.316***
	(4.418)	(3.842)	(3.685)	(3.984)	(3.846)
Reverse Pair	-11.452	-0.672	-5.295	-4.247	-5.576
	(11.082)	(3.734)	(5.200)	(7.775)	(5.079)
Post	-4.139**	-2.379**	-1.384	-0.346	-2.367**
	(1.799)	(1.103)	(1.181)	(1.030)	(1.101)
BConnected	-27.462**	-4.443	-4.483	-25.909**	-5.305
	(13.085)	(5.421)	(5.465)	(12.900)	(5.028)
European Issuer				5.375	
				(7.058)	
European Fund Sponsor					5.369
					(4.525)
Month-Fixed Effects	Y	Y	Y	Y	Y
Fund-Fixed Effects	Y	N	Y	Y	N
Issuer-Fixed Effect	N	Y	Y	N	Y
Sponsor-Fixed Effects	N	N	N	Y	N
Issuer-Type-Fixed Effects	N	N	N	Y	Y
Observations	25345	25325	25325	25345	25325
R^2	0.099	0.449	0.502	0.174	0.450

With controls, std errors are two-way clustered at the fund-level and the issuer-level

- In return, European financial firms, through their affiliated MMFs, accepted more insecure securities than secure ones from their connected partners.

→ A form of benefit given insecure securities are unwelcome in post period.

Spillover Effects

How deeply and widely the cross-holding relation affects the overall MMFs market?

- *SEurop Fund Share*: equal to one if i's security is hold by MMFs who are involved in cross-holding relation with European issuers
- *Issuer Euro Share*:an issuer's indirect exposure to European issuers through MMFs (*Chernenko and Sunderam, 2014)*

$$\Delta Outstanding_i = \alpha + \beta Issuer\ \ Euro\ \ Share_i + \epsilon_i$$

	SEuro Fund Share=0			*SEuro Fund Share*=1		
	(1)	(2)	(3)	(4)	(5)	(6)
Issuer Euro Share	-0.102	-0.118	-0.117	$\boxed{-1.129^{***}}$	$\boxed{-0.821^{**}}$	$\boxed{-0.804^{**}}$
	(-0.367)	(-0.411)	(-0.404)	(-4.986)	(-3.254)	(-3.169)
European Issuer		0.035	0.036		-0.186*	-0.187*
		(0.246)	(0.250)		(-2.597)	(-2.605)
Yield			1.230			0.654
			(0.657)			(0.639)
Observations	130	130	130	165	165	165
R^2	0.001	0.002	0.006	0.134	0.170	0.172

- Those financial firms borrowing money from MMFs who are bilaterally connected with European issuers are prone to have trouble in raising money.

Other Tests

- Control conglomerate: not because of “too big to fail”
- Test if the negative flow-EuroShare relationship still holds in MMFs with the CHR bias
- Not find any evidence showing that securities issued by MMFs’ bilaterally-connected European issuers are less risky than other holdings in MMFs’ portfolio after mid-2011

Concluding Remarks

The cross-holding relation:

- Represents a reciprocity that is rooted in financial conglomerates' nature of serving dual roles of borrowers and lender in a particular market
- Explains some risky holdings in MMFs' portfolios
- Provides an implicit guarantee between financial institutions