Lending to Hedge Funds:

Does Competition Undermine Risk Management?

Christian Bittner

Deutsche Bundesbank and Goethe University Frankfurt

Stephan Jank

Deutsche Bundesbank

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Motivation: Are hedge funds systemically important?

Long-Term Capital Management (LTCM), 1998

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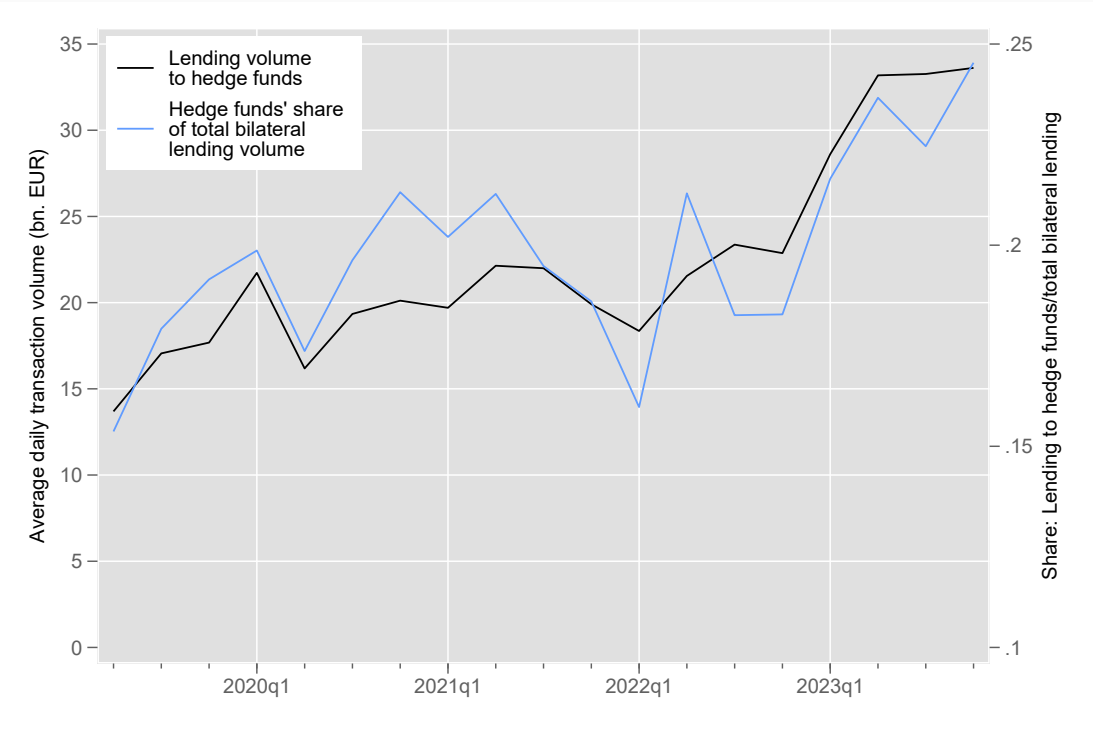
Archegos Capital Management, 2021

- Archegos default resulted in $5.5 bn. losses for Credit Suisse and over $10 bn. for banks worldwide

Motivation: Growth of NBFI sector

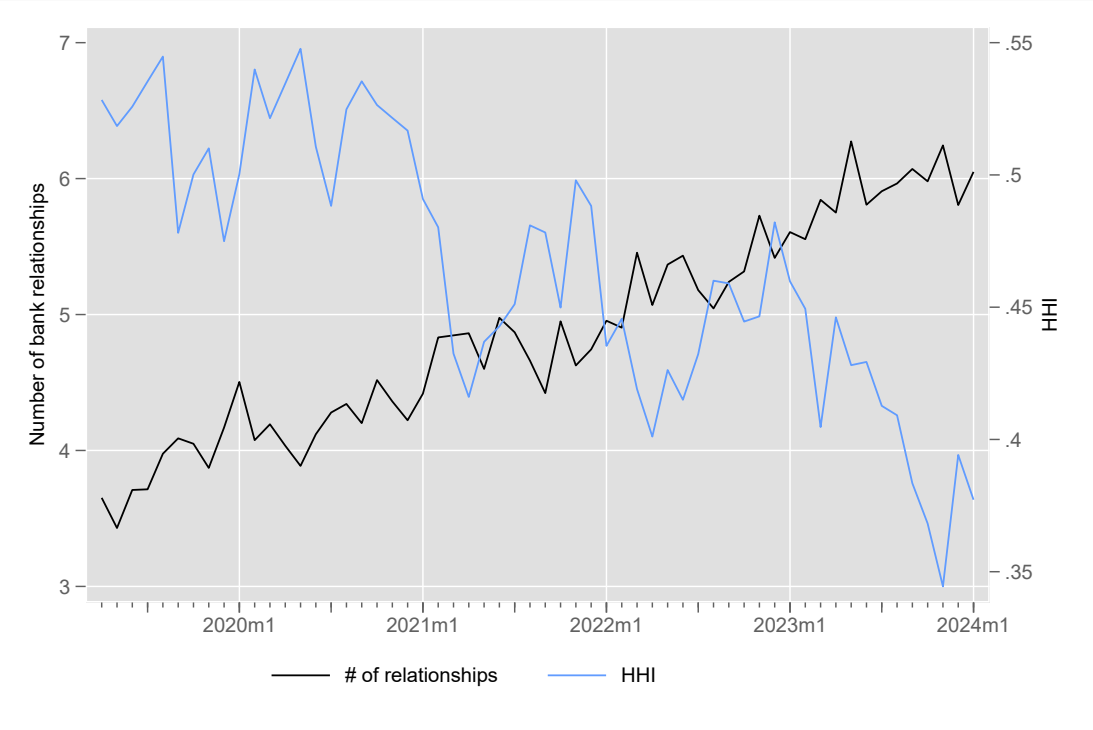
- Hedge fund industry more than tripled within a decade to $4.8 tn. AUM in 2022
- Growing interconnectedness between banks and NBFIs (Acharya et al., 2024)



Motivation: Increasing broker diversification

- Trend started after Lehman insolvency in 2008 (Dahlquist et al. 2024)

  $\rightarrow$ Enhanced bargaining power for hedge funds in negotiations with banks



Motivation: Research question

- **Limited understanding of interconnectedness between banks and hedge funds**
  - Banks' risk management to highly leveraged and opaque market participants
  - Competition may compromise banks' risk management (Bernanke, 2006)
- This paper: How does the enhanced bargaining power of hedge funds impact risk management practices of banks?

Data & descriptive statistics

Data description

- **Banks' lending to hedge funds**
  1. Credit registry of Euro area banks (AnaCredit)
     $\Rightarrow$ probability of default
  2. Money market transactions of Euro area banks (MMSR)
     $\Rightarrow$ lender (bank), borrower (hedge fund), collateral, haircut
- **Hedge funds**
  - SEC-filings (ADV and IAPD) $\Rightarrow$ AUM, broker information
- **Banks**
  - Bank balance sheet data (EBA transparency exercise)
- **Collateral**
  - Rating information (CSDB)
  - Return data (Refinitiv)

Sample

- **Repo transactions:**
  banks lending cash against collateral to hedge funds

  Variation of haircuts

- **14 Euro Area banks** lending to hedge funds
  - On average: 45% relative to lending to real economy
- **179 hedge funds**
  - Almost exclusively domiciled in Cayman, while management is predominantly in the US or UK
  - On average: $20 bn. assets; 4 broker; PD of 1.5% (B+)
- **Collateral:** mainly government bonds; 40% high-grade

  Dataset

Saturated regression

Empirical specification

Analysis at the transaction level:

$$Haircut_{l(bfct)} = \beta HHI_{ft} + \gamma PD_{bft} + \alpha_{bct} + \varepsilon_{l(bfct)}$$

- $Haircut_{l(bfct)}$, haircut (%) applied by bank b for collateral c in a repo transaction with hedge fund f at date t
- HHI_{ft}, Herfindahl-Hirschman Index, quantifies the concentration of bank funding relationships of hedge fund f at date t based on the previous month
- within bank-collateral-date analysis (α_{bct}), and controlling for the default probability of hedge fund f reported by bank b at date t

Effect of funding concentration on haircuts

$Haircut_{l(bfct)}$	(1)	(2)	(3)	(4)
HHI_{ft}	1.31***	1.21***	1.23***	1.30***
	(5.77)	(3.27)	(3.03)	(2.60)
PD_{bft}	18.84***	21.96**	23.74**	24.85*
	(7.36)	(2.40)	(2.13)	(1.81)
N	450,787	449,578	446,519	229,561
R^2 (%)	92.8	98.0	98.2	96.7
Security FE	✓	-	-	-
Date FE	✓	✓	✓	-
Bank-Security-Month FE	-	✓	-	-
Bank-Security-Week FE	-	-	✓	-
Bank-Security-Date FE	-	-	-	✓

standard errors are clustered at the bank-fund-security level

One interquartile range ⇓ in hedge funds' funding concentration is associated with a 0.51 p.p. ⇓ in haircuts.

Alternative concentration measure

Zero vs. positive haircut

Natural experiment

Natural experiment: Credit Suisse´s exit from prime brokerage

$$Haircut_{l(bfct)} = \beta POST_t \times CS_{f,2020} + \gamma PD_{bft} + \delta_{bfc} + \eta_{bt} + \mu_{ct} + \varepsilon_{l(bfct)}$$

- $POST_t$, equals one after Credit Suisse announced its exit from the prime brokerage business on November 4, 2021, and zero otherwise
- $CS_{f,2020}$, equals one if Credit Suisse provided brokerage services to hedge fund f as of 2020, and zero otherwise
- Note: Hedge funds with relationships to Credit Suisse experience lower growth in broker relationships Broker

Effect of Credit Suisse exit on haircuts

$Haircut_{l(bfct)}$	(1)	(2)	(3)	(4)
$POST_t \times CS_{f,2020}$	0.49**	0.47**	0.29**	0.34***
	(2.28)	(2.28)	(2.08)	(2.14)
$POST_t$	-0.08			
	(-1.39)			
N	355,840	355,840	204,994	204,994
R^2 (%)	97.3	97.4	98.3	98.3
PD_{bft}	✓	✓	✓	✓
Bank-Counterparty-Security FE	✓	✓	✓	✓
Date FE	-	✓	-	-
Security-Date FE	-	-	✓	✓
Bank-Date FE	-	-	-	✓

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Haircuts 0.49 p.p. ⇑ for hedge funds' with pre-existing relationships with Credit Suisse after its prime brokerage exit.

Relationships | Zero vs. positive haircuts | Robustness

Adequacy of haircuts

Adequacy of haircuts

$$1(Haircut_{l(bfct)} < Haircut^{m}_{ct}) \quad = \quad \beta HHI_{ft} + \gamma PD_{bft} + \alpha_{bct} + \varepsilon_{l(bfct)}$$

Dependent variable: dummy indicating that haircut is insufficient based on a specific model and value-at-risk.

Insufficient haircut; *VaR 5%*	(1)	(2)	(3)	(4)
	Historical		GARCH (1,1)	
HHI_{ft}	-0.24***	-0.24***	-0.26***	-0.27***
	(-3.37)	(-2.90)	(-4.21)	(-3.65)
R^2 (%)	96.4	93.7	94.4	93.4
N	305,400	157,544	325,597	168,936
Date FE	✓	–	✓	–
Bank-Security-Week FE	✓	–	✓	–
Bank-Security-Date FE	–	✓	–	✓

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Conclusion

- Archegos default revealed vulnerabilities in banks' risk management
- Regulatory scrutiny and risk management frameworks are crucial in mitigating systemic risks posed by interconnected (leveraged) entities
- Our study examines these dynamics through the lens of secured lending transactions, providing insights into how bargaining power affects risk management:
    - **Hedge funds with a more diversified funding structure have lower haircuts.**
    - Haircuts fall below the levels of benchmark models.

Variation of haircuts

SD (Haircut)	(1)	(2)	(3)	(4)	(5)
		Haircuts demeaned by…			
Rating		security	security-month	security-week	security-date
High Grade	1.08	0.37	0.27	0.25	0.24
Medium-Low Grade	4.57	1.43	0.9	0.86	0.84
Speculative Grade (or NA)	6.33	2.53	1.53	1.45	1.43
Full Sample	5.74	1.59	0.98	0.93	0.91

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Dataset

Panel A: Bank	Sample *(N=14)*		Reference *(N=66)*	
	Mean	SD	Mean	SD
Assets (in € bn)	928.16	629.57	142.72	211.74
G-SIB Bucket	.79	.97	.06	.30
CET1 Ratio	.15	.03	.19	.08
Traded Assets / Total Assets	.15	.03	.04	.07
Liquid Assets / Total Assets	.12	.05	.15	.10
Panel B: Hedge Fund	Sample *(N=179)*		Reference *(N=6,864)*	
	Mean	SD	Mean	SD
Number of Broker Relationships	4.08	2.64	1.95	1.90
Credit Suisse Exposure (CS)	.58	.50	.13	.33
AUM (in $ bn, Company)	161.55	190.63	23.34	68.62

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Alternative concentration measure

$Haircut_{l(bfct)}$	(1)	(2)	(3)	(4)
$CR_{1,ft}$	1.36***	1.29***	1.31***	1.40***
	(5.85)	(3.52)	(3.28)	(2.80)
PD_{bft}	18.77***	21.17**	22.97**	24.08*
	(7.32)	(2.33)	(2.08)	(1.77)
Constant	2.98***	2.98***	2.95***	3.13***
	(19.71)	(10.19)	(8.65)	(7.14)
R^2 (%)	92.8	98.0	98.2	96.7
N	450,787	449,578	446,519	229,561
Security FE	✓	–	–	–
Date FE	✓	✓	✓	–
Bank-Security-Month FE	–	✓	–	–
Bank-Security-Week FE	–	–	✓	–
Bank-Security-Date FE	–	–	–	✓

standard errors are clustered at the bank-fund-security level

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Zero vs. positive haircuts

Sample:	1(**Haircut = 0**) *full*		**Haircut** *Haircut > 0*	
	(1)	(2)	(3)	(4)
HHI_{ft}	-0.26***	-0.27***	1.59***	1.67**
	(-4.75)	(-4.06)	(2.64)	(2.27)
N	446,519	229,561	300,210	153,342
R^2 (%)	95.5	91.9	97.8	95.7
PD_{bft}	✓	✓	✓	✓
Date FE	✓	-	✓	-
Bank-Security-Week FE	✓	-	✓	-
Bank-Security-Date FE	-	✓	-	✓

standard errors are clustered at the bank-fund-security level

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Natural experiment: broker relationship growth

Growth of Broker Relationships	(1)	(2)
$Post_t \times CS_{f,2020}$	-0.06***	
	(-6.98)	
$2018_t \times CS_{f,2020}$		0.00
		(0.18)
$2019_t \times CS_{f,2020}$		-0.01
		(-1.15)
$2021_t \times CS_{f,2020}$		-0.05***
		(-3.22)
$2022_t \times CS_{f,2020}$		-0.04***
		(-2.64)
$2023_t \times CS_{f,2020}$		-0.13***
		(-9.22)
R^2 (%)	22.2	22.4
N	35,372	35,372
Fund FE	✓	✓
Year FE	✓	✓

standard errors are clustered at the fund level

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Natural experiment: number of broker relationships

Relationships:	**up to 5**		**more than 5**	
$Haircut_{l(bfct)}$	(1)	(2)	(3)	(4)
$POST_t \times CS_{f,2020}$	1.91**	3.11***	0.06	0.06
	(2.04)	(6.55)	(1.35)	(1.60)
N	97,435	96,435	92,641	91,767
R^2 (%)	97.2	97.2	98.6	98.6
PD_{bft}	✓	✓	✓	✓
Bank-Counterparty-Security FE	✓	✓	✓	✓
Security-Date FE	✓	✓	✓	✓
Bank-Date FE	-	✓	-	✓

standard errors are clustered at the bank-fund-security level

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Natural experiment: zero vs. positive haircuts

Sample:	1(**Haircut = 0**) *full*		**Haircut** *Haircut > 0*	
	(1)	(2)	(3)	(4)
$POST_t \times CS_{f,2020}$	-0.16**	-0.16**	0.40*	0.44*
	(-2.53)	(-2.29)	(1.68)	(1.77)
N	204,994	204,299	138,166	137,187
R^2 (%)	97.1	97.2	97.7	97.7
PD_{bft}	✓	✓	✓	✓
Bank-Counterparty-Security FE	✓	✓	✓	✓
Security-Date FE	✓	✓	✓	✓
Bank-Date FE	-	✓	-	✓

standard errors are clustered at the bank-fund-security level

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Natural experiment: robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Haircut_{l(bfct)}$	**pre trend**		**confounding events**		**average PD**		**clustering**	
$POST_t \times CS_{f,2020}$	0.32**	0.38**	0.19*	0.24**	0.34**	0.36**	0.29**	0.34**
	(2.15)	(2.20)	(1.79)	(2.05)	(2.37)	(2.31)	(2.68)	(3.02)
$PRE_t \times CS_{f,2020}$	0.07	0.09						
	(0.58)	(0.64)						
R^2 (%)	98.3	98.3	98.1	98.1	98.3	98.3	98.3	98.3
N	204,994	204,299	118,526	118,005	204,994	204,299	204,994	204,299
PD	PD_{bft}	PD_{bft}	PD_{bft}	PD_{bft}	PD_{ft}	PD_{ft}	PD_{bft}	PD_{bft}
Bank-Counterparty-Security FE	✓	✓	✓	✓	✓	✓	✓	✓
Security-Date FE	✓	✓	✓	✓	✓	✓	✓	✓
Bank-Date FE	-	✓	-	✓	-	✓	-	✓

standard errors are clustered at the bank-fund-security level in column (1) to (6) and at the bank, fund, security level in column (7) and (8)

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