
Implicit Guarantees and Risk Taking: Evidence from Money Market Funds

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Motivation

- Implicit guarantees
 - Firm's termination generates bankruptcy costs
 - Generate incentives for owner or third-parties to bail out a firm
 - Can affect firm's risk taking outside bankruptcy
 - Importance of implicit guarantees
 - Difficult to measure (similar to costs of financial distress)
 - Often exist between parent company and subsidiary
 - Important in financial industry (to avoid inefficient runs)
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Research Question

- How do implicit guarantees affect risk taking?
 - Theory (largely in banking) emphasizes two effects:
 - Beneficiary of guarantee increases risk taking (moral hazard)
 - Provider of guarantee reduces risk taking (internalizes the cost)
 - But limited empirical work
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Empirical challenges

1. Implicit guarantees are non-contractual
 2. Risk taking is difficult to measure
 3. Provision of implicit guarantees is endogenous
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Setting: Money Market Funds

- Money market funds are regulated by SEC
 - Must invest in safe money market instruments (high ratings, short maturity, etc.)
 - In exchange, can value investments at cost and sell demand deposits with stable Net Asset Value (\$1 per share)
 - Structured like a “narrow bank”
 - Money market funds are subject to bank runs
 - “Breaking the buck” is one mechanism to stop run (before 2008, only used once by small fund in 1994)
 - Alternatively, fund sponsor provides guarantee to stop run
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Setting: Money Market Mutual Funds

Sponsor

Chooses managers

Provides implicit guarantee

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Money Market Funds

Certificate of Deposits
(Asset-Backed) Commercial Paper
Repurchase Agreements
Obligations
Treasury Bills

Demand Deposits
(sold at a fixed NAV, usually \$1)

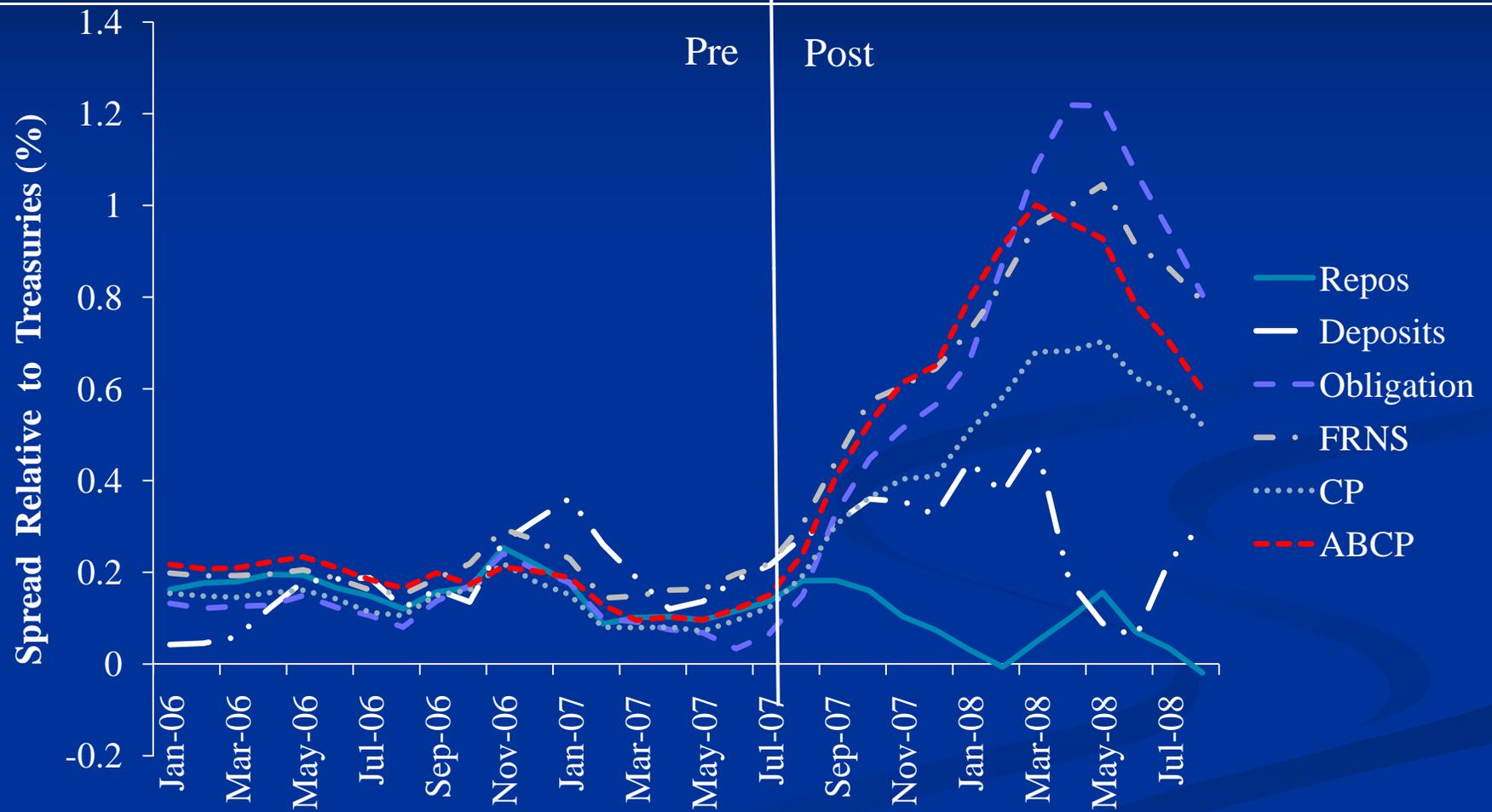
Advantage of our setting

- Implicit guarantees are central to this industry
 - Large and important industry (\$ 3 trillion in 2008)
 - Assets under management about the size of equity mutual funds
 - Demand deposits provided similar to commercial banking sector
 - Can observe and measure risk-taking decisions
 - Weekly data on fund holdings, flows, and returns
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Empirical Strategy

- *Unexpected Shock*: Sub-prime mortgage crisis (Aug. 2007-08)
 - Prior to 2007, most money market instruments had similar yields
 - Large decline in collateral values of money market instruments
 - Some instruments became riskier (expansion in risk-taking opportunities)
 - Strong incentives to take on more risk (“yield chasing”)
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Expansion in Risk-Taking Opportunities



Empirical Strategy

- *Unexpected Shock*: Sub-prime mortgage crisis (Aug. 2007-08)
 - Use variation in “ability” to provide implicit guarantees
 - Guarantee after shock depends on sponsor’s capital
 - Sponsor capital determined by mutual fund organization
 - All sponsors are part of larger mutual fund organization
 - Some mutual fund organizations are affiliated with banks
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Results: The Tale of Two Funds

- Reserve Primary Fund
 - Oldest fund in the money market fund industry
 - Known for its safe approach to investing
 - Sponsored by Reserve Funds

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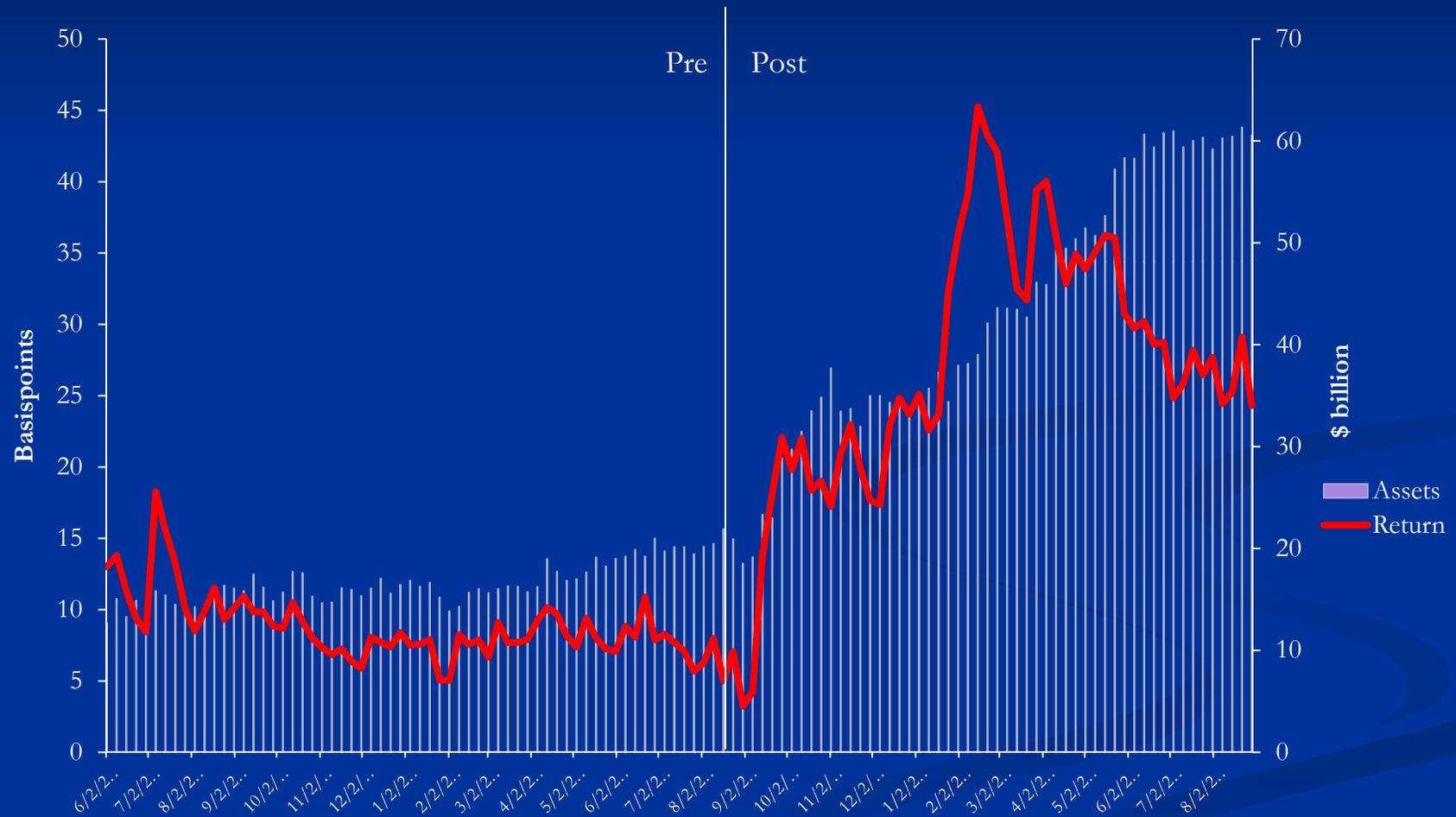
- Columbia Cash Reserves Fund
 - Large, well-known fund
 - Sponsored by Bank of America

Results: The Tale of Two Funds

- Reserve Primary Fund
 - Oldest fund in the money market fund industry
 - Known for its safe approach to investing
 - Sponsored by Reserve Funds (**little capital**)

- Columbia Cash Reserves Fund
 - Large, well-known fund
 - Sponsored by Bank of America (**significant capital**)

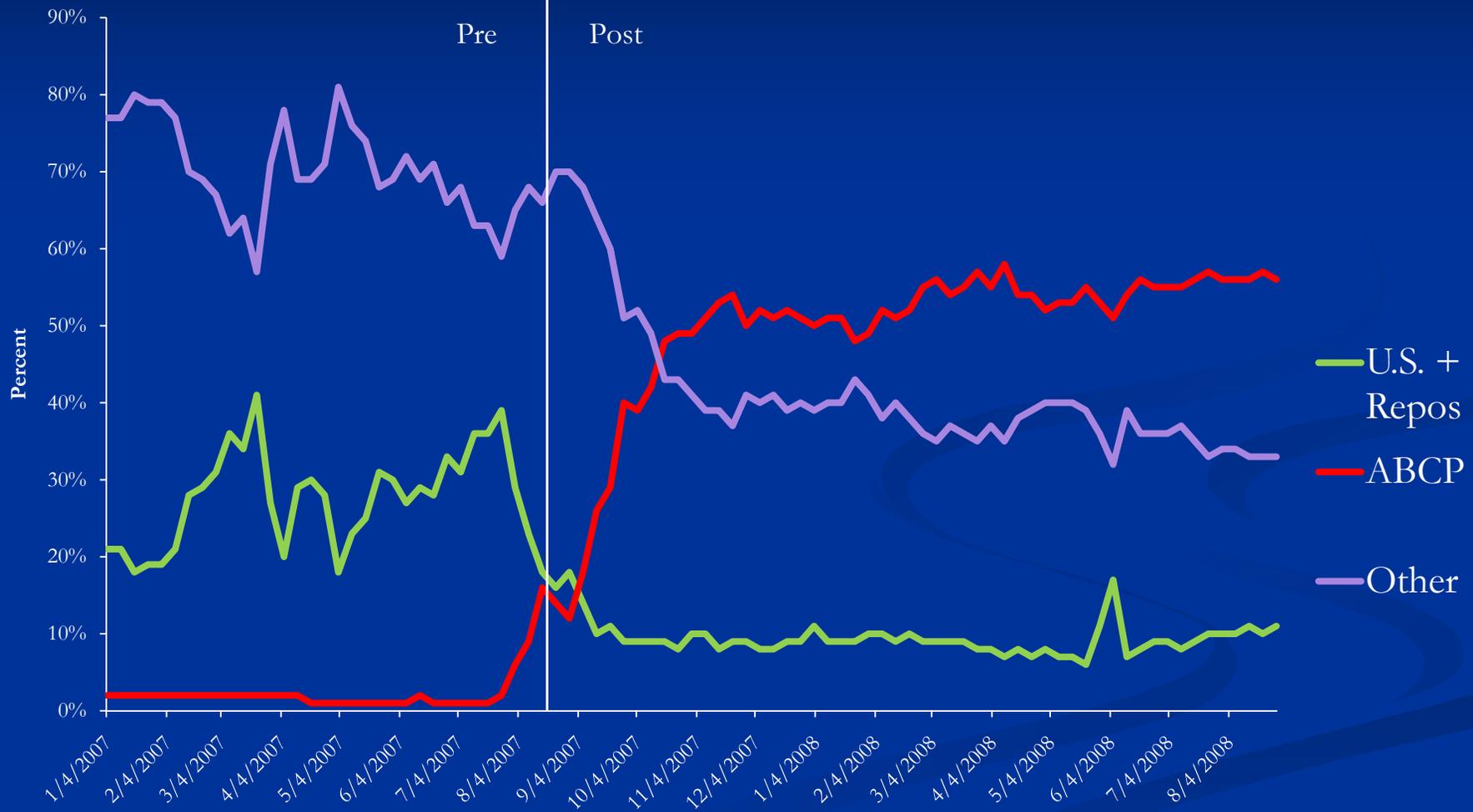
Reserve Primary: Assets and Return



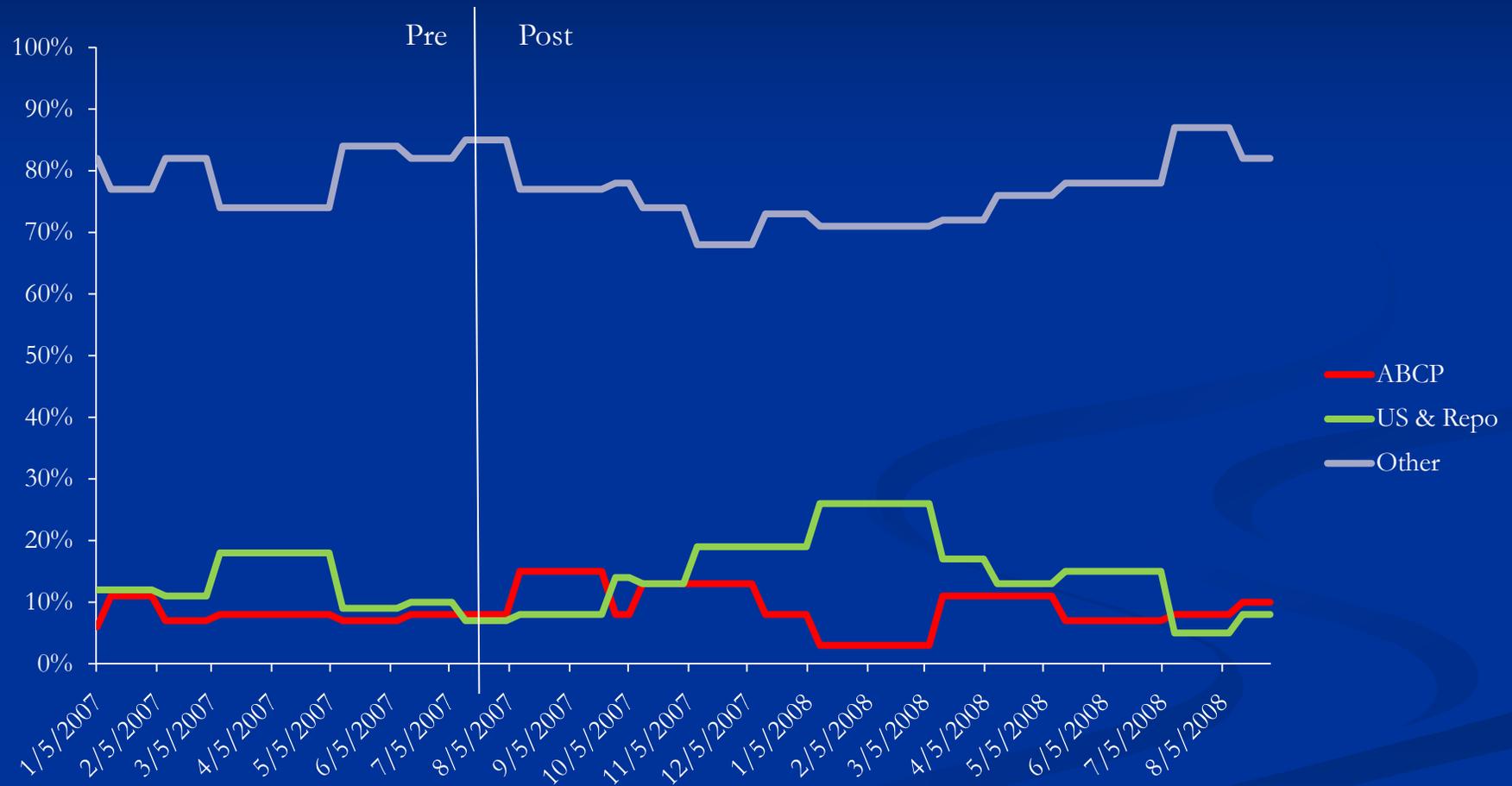
Columbia Cash Reserves: Assets and Return



Reserve Primary: More Risk Taking



Columbia Cash: No Change in Risk Taking



Sponsors with Capital Provided Guarantees

- Lehman's bankruptcy triggered a market-wide run on the money market fund sector
- Financial support provided post-Lehman
 - None for Reserve Primary Fund (liquidated)
 - Financial support for Columbia Cash by Bank of America (~\$600 million for all BOA money funds)
- Eventually, all funds bailed out by the government

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Data

- Data:
 - iMoneyNet money market data: asset values, returns, holdings
 - CRSP mutual fund data
 - Compustat data: implicit guarantees (sponsors' equity)
 - SEC data on fund support

- Time Period:
 - Weekly data for the period 2005-2009

- Sample:
 - All institutional, prime money market funds

Largest Money Market Funds (Table 1, 2007)

Fund		Sponsor			
Name	Assets	Name	Equity	Rating	Congl.
J.P. Morgan	88.4	J.P. Morgan	55.8	A+	Y
Columbia Cash Reserves	41.3	Bank of America	57.1	AA-	Y
BlackRock Liquidity	34.4	Blackrock	0.4	A+	N
Fidelity Instit	27.7	Fidelity	0.0	NR	N
Goldman Sachs FS Prime	27.1	Goldman Sachs	30.1	AA-	Y
Morgan Stanley Inst	26.3	Morgan Stanley	32.0	A+	Y
Dreyfus Instit Cash	25.5	Deutsche Bank	5.0	A+	Y
Columbia MM Reserves	22.0	Bank of America	57.1	AA-	Y
Federated Prime	22.0	Federated	0.0	NR	N
AIM STIT Liquid Assets	21.5	AIM Advisors	0.0	NR	N

Summary Statistics (Table 2, January 2007)

Cross-section	All	Low Equity	High Equity
Fund Characteristics			
TNA (\$mil)	6,052 (10,367)	5,074 (7,555)	7,031 (12,547)
Spread (annualized %)	0.22 (0.43)	0.21 (0.22)	0.22 (0.56)
Age (years)	12.7 (6.4)	14.0 (6.8)	11.4 (5.7)
Annual Expenses (%)	0.31 (0.19)	0.34 (0.20)	0.28 (0.20)
Observations	146	73	73

Response to a Large Shock

1. Expansion in risk-taking opportunities
2. Flow-performance relationship
3. Impact of capital on risk taking before/after + high/low capital sponsors (diff.-in-diff. estimation)

Expansion of Risk-Taking Opportunities

- Evidence on average riskiness of money market instruments
 - **Safe asset classes:** U.S. Treasury & Agency, Deposits, and Repos
 - **Risky asset classes:** Commercial Paper, Floating Rate Notes, and Bank Obligations

$$\text{Spread}_{it+1} = \alpha_i + d_t + \beta_j \text{Asset Class}_{jit} + \beta_c \text{Controls}_{it} + \varepsilon_{it+1}$$

- Unit of observation: Fund-Week
 - Spread_{it+1} : Fund Return relative to 1-month Treasury Bill Rate
 - Asset Class_{jit} : Asset Class (in percentage points)
 - Controls_{it} : Log(Size), Expenses, Age, Flows, Log(FamilySize)
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Returns and Asset Categories (Table 3)

	Spread _t	
	Post (1)	Pre (2)
Asset-backed CP _{t-1}	0.765*** (0.077)	0.169*** (0.029)
Repurchase Agreements _{t-1}	0.131* (0.075)	0.148*** (0.035)
Controls	Y	Y
Week Fixed Effects	Y	Y
Fund Fixed Effects	N	N
Observations	7,717	7,585
R-squared	0.92	0.82

Note: Standard errors clustered at fund level

Benefits of Risk Taking

- Estimate flow-performance relationship

$$\text{Flow}_{it+1} = \alpha_i + d_t + \beta_1 \text{Spread}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it+1}$$

- Flow_{it+1} : Fund flow from t to t+1
- Spread_{it} : Fund return minus 3-month Treasury Bill Rate
- Controls_{it} : Fund size, expense ratio, fund age, fund family size

Flow-Performance Relationship (Table 4)

Period	Fund Flow _{i,t+1}	
	Post (1)	Post (2)
Spread _{i,t}	0.010** (0.004)	0.020** (0.009)
Log(Equity) _i *Spread _{i,t}		-0.001 (0.001)
Log(Equity) _i		0.002 (0.002)
Controls	Y	Y
Observations	7,725	7,725

Economic significance: One std. dev increase in spread associated with 37% increase in fund size/year

Note: Standard errors clustered at fund and week level

Identification: Choice of Sponsor Capital

- Sponsor capital unlikely to be chosen in anticipation of money market fund risk taking
 - Some fund mutual organization are affiliated with other large financial conglomerates (chosen prior to 2007)
 - Affiliation chosen based on characteristics of entire mutual fund organization (e.g., for diversification)
 - Money market funds represent small share of revenue income; Change in risk-taking opportunities was unexpected

Capital and Risk Taking

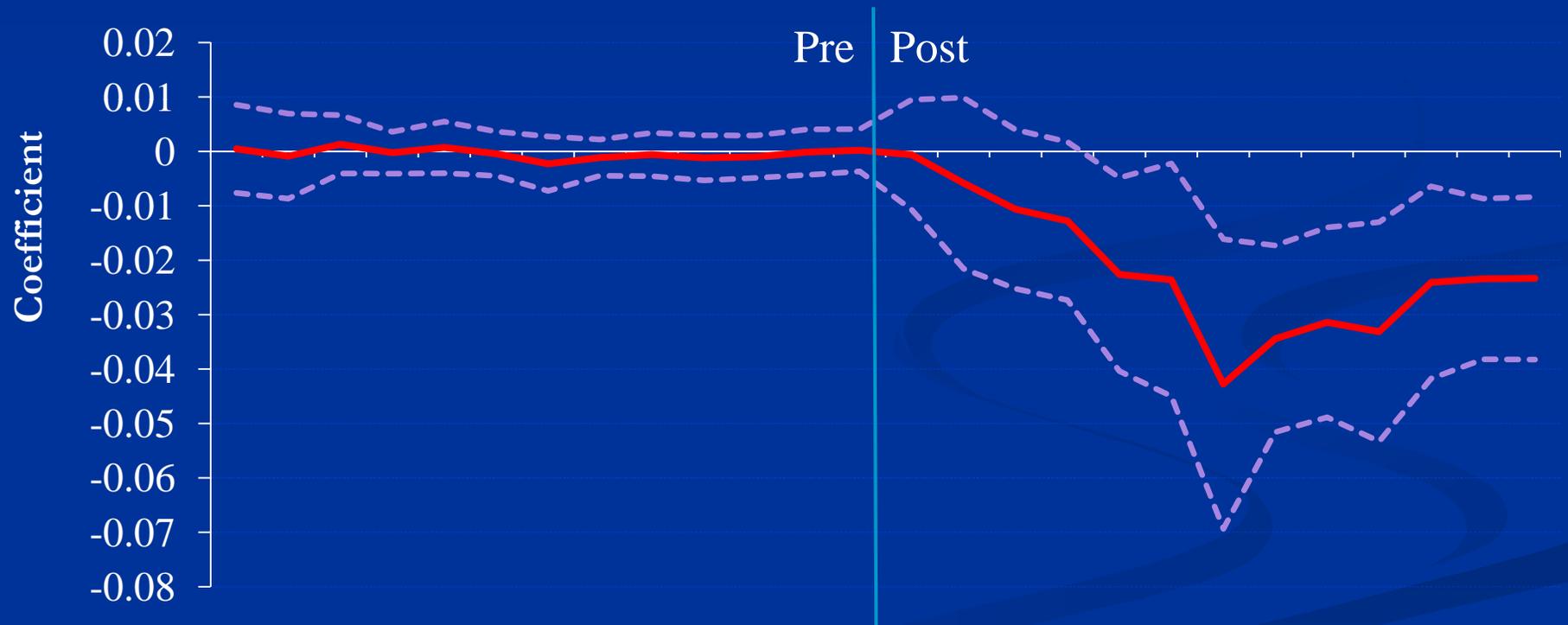
- Estimate impact of equity capital on risk taking:

$$\text{Risk}_{it+1} = \alpha_t + \beta_1 \text{Log(Equity)}_i + \beta_2 \text{Controls}_{it} + \varepsilon_{it+1}$$

- Four (weekly) measures of risk:
 - Fund spread (Return – Tbill rate)
 - Holdings risk (share of risky assets: ABCP, CP, Obligations, FRNs)
 - Concentration risk
 - Portfolio maturity
- Log(Equity): Sponsor's equity as of January 2007

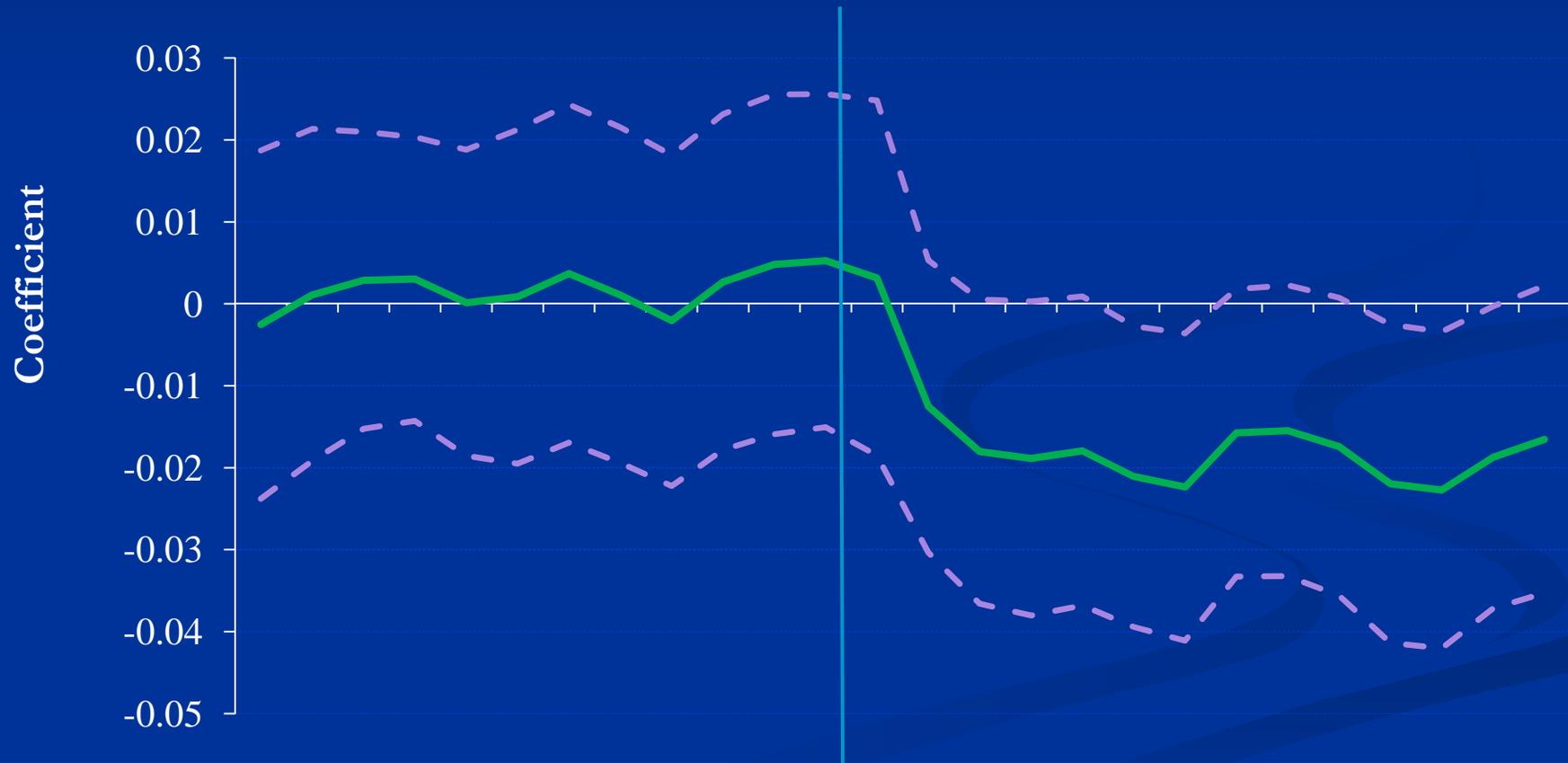
More Equity Capital => Lower Spread

Regression of Spread on Log(Equity)



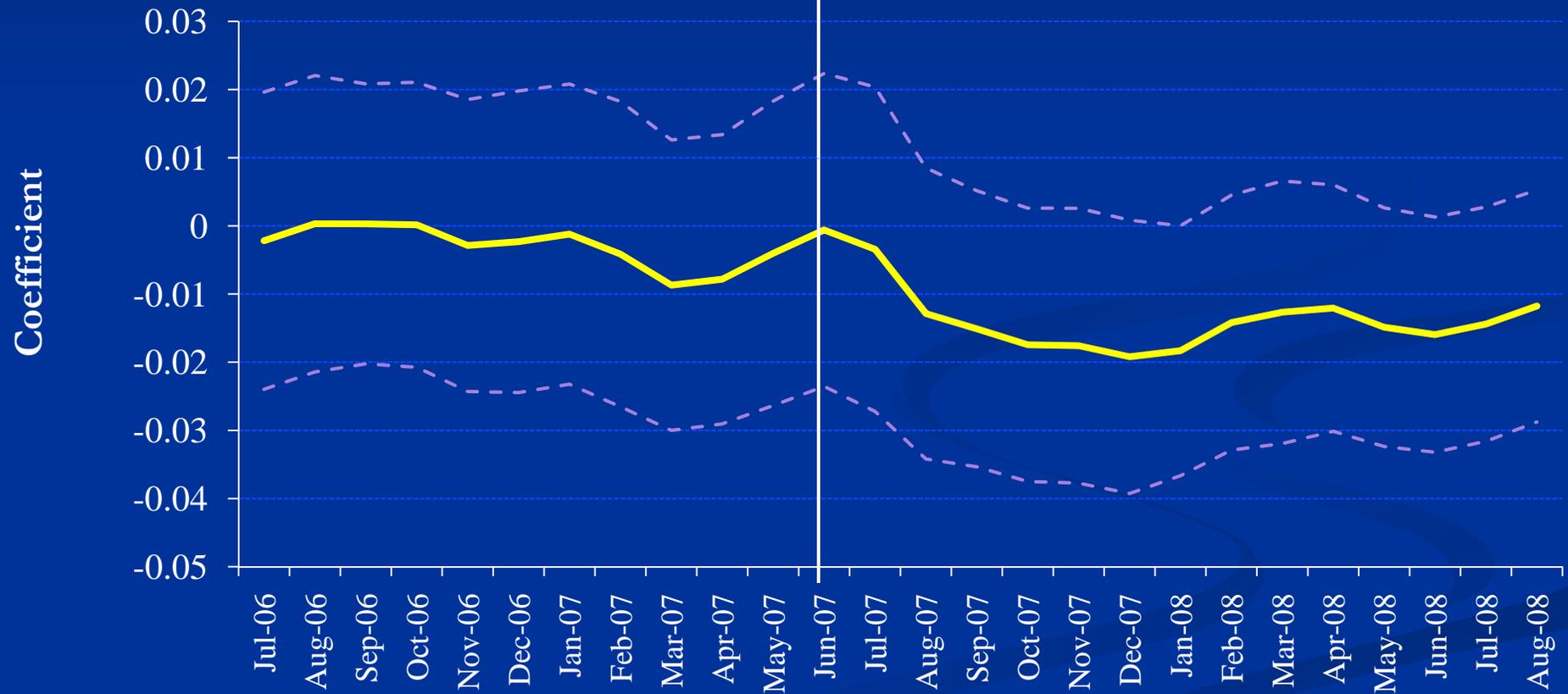
More Equity Capital => Less Holdings Risk

Regression of Holdings Risk on Log(Equity)



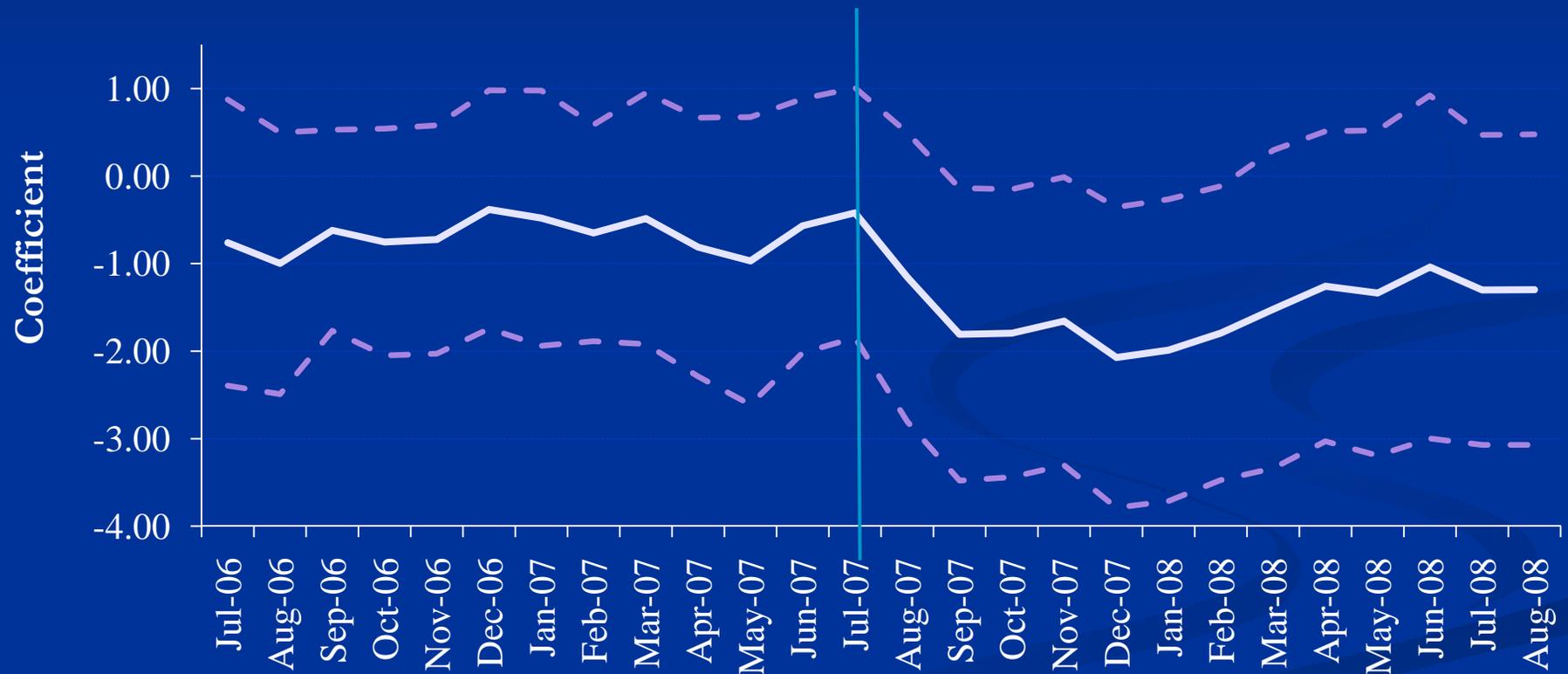
More Equity Capital => Lower Concentration

Regression of Concentration Risk on Log(Equity)



More Equity Capital => Shorter Maturity

Regression of Maturity Risk on Log(Equity)



Equity Capital and Risk Taking (Table 5)

	Spread _{i,t+1}	Holdings Risk _{i,t+1}	Concentration Risk _{i,t+1}	Maturity Risk _{i,t+1}
Log(Equity) _i *Post _t	-0.019***	-0.020***	-0.012*	-0.896**
	(0.006)	(0.007)	(0.006)	(0.403)

Economic Significance:

One st.dev. rise in equity leads to ~20% drop in c-x st.dev. of risk

Note: Standard errors clustered at sponsor and week level

Direct Evidence on Guarantees

- Ex-post evidence on guarantees in the wake of a market-wide crisis (due to Lehman's bankruptcy)
- Were sponsors with more capital more likely to support funds?
- Were investors less likely to ask for redemptions from funds sponsored by companies with more capital?

Capital and Support/Redemptions (Table 6)

	Support	Redemptions
Log(Equity) _i	0.065*** (0.024)	-0.016** (0.006)
Controls	Y	Y
Observations	140	140

Note: Standard errors clustered at sponsor level

Identification Test: Retail Funds

- However, results could be driven by interaction of unobserved sponsor characteristics interacted with *post*.
 - e.g., Quality of risk management
 - Look at the effects on retail funds – “placebo” group
 - Retail funds have the same sponsor structure
 - Flows less sensitive to returns (smaller stakes, higher transaction costs)
 - Similar to a triple-difference approach
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Capital and Risk Taking, Placebo (Table 6)

	Spread _t		Holdings Risk _t		Concentration Risk _t		Maturity Risk _t	
	Retail	Inst.	Retail	Inst.	Retail	Inst.	Retail	Inst.
	(1)	(2)	(3)	(4)	(5)	(6)	(5)	(6)
Log(Equity) _i	-0.003	-0.019***	0.006	-0.018**	-0.008	-0.015*	1.040	-1.542*
	(0.015)	(0.006)	(0.015)	(0.008)	(0.017)	(0.009)	(1.012)	(0.792)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Week FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	5,869	7,717	5,866	7,717	5,866	7,717	5,866	7,717
R-squared	0.85	0.89	0.18	0.11	0.15	0.13	0.15	0.13
DD: Log(Equity) _{t-1}		-0.016		-0.024**		-0.007		-2.571***
× Institutional		(0.012)		(0.011)		(0.015)		(0.993)

Note: Standard errors clustered at sponsor and week level

Identification Test: Government Intervention

- After Lehman's default government provided explicit guarantee to all money market funds
- Explicit guarantee mitigated the role of implicit guarantees
- => The effect on risk taking should become smaller
- Test this prediction by comparing three sub-periods:
(1) Jul.06-Jul.07; (2) Aug.07-Aug.08; (3) Jan. 09-Nov. 09

Government Intervention post-Lehman (Table 7)

	Spread _t (1)	Holdings Risk _t (2)	Concentration Risk _t (3)	Maturity Risk _t (4)
Log(Equity) _{t-1}	0.000 (0.002)	0.002 (0.009)	-0.003 (0.011)	-0.646 (0.623)
Log(Equity) _{t-1} ×Post _t	-0.019*** (0.006)	-0.020*** (0.007)	-0.012** (0.006)	-0.896** (0.403)
Log(Equity) _{t-1} ×Post-Lehman _t	-0.011 (0.013)	0.008 (0.009)	0.018** (0.009)	-0.083 (0.647)
Fund Controls	Y	Y	Y	Y
Week F.E.	Y	Y	Y	Y
Observations	21,087	21,087	21,087	21,087
R-squared	0.938	0.139	0.159	0.159

Note: Standard errors clustered at sponsor level

Additional Tests (1)

- Credit rating/Affiliation as measures of implicit guarantee
 - Owners with higher credit rating more able to raise capital in case of distress
 - Owners with more diverse operations more able to raise capital
 - Look at the credit rating/diversity of the fund owner instead of TTE
 - The results are qualitatively and quantitatively similar – supporting the guarantee story
 - Fund flow volatility drives risk taking
 - Differences in volatility of fund flows explains fund risk taking
 - Control for pre-period standard deviation and lagged standard deviation of fund flows
 - Results on risk taking remain almost unchanged
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Additional Tests (2)

- Reputation costs at the family level
 - Reputation costs of the entire family may affect incentives to take risk
 - Families with larger non-money market assets face greater reputation costs
 - Controlling for fraction of mmfs in other assets does not affect the results
 - Career concerns
 - Managerial career concerns may affect incentives to take risk
 - Chevalier and Ellison (1997) use age/tenure as proxies for career concerns
 - Controlling for managerial tenure does not affect the results
 - Managerial Compensation
 - Differences in compensation may drive differences in individual risk taking
 - Also, they may explain differences in flow-performance relationship
 - Controlling for compensation does not alter the risk results
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Conclusion

- Implicit guarantees reduce risk taking in money market funds
 - A new, microeconomic view on the role of implicit guarantees and bailouts
 - Literature largely focused on macroeconomics of bailouts (the role of government)
 - Guarantees by financial institutions do not necessarily increase risk taking (Volcker rule on commercial banks)
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Basic Intuition: Players and Timing

- Players: managers, sponsors, and investors
 - Fund sponsors perfectly aligned with fund managers
 - 2 types of sponsors: high-capital (HC) and low-capital (LC)
 - HC have ability to provide support to managers; LC don't
 - Fund investors solely condition their flows on past performance (little incentives to get info; “yield chasers”)
 - At time 1, managers choose their levels of risk (r_H or r_L)
 - At time 2, possibility of a run: HC decide whether to provide support
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Basic Intuition: Payoffs

- If a fund survives, it maintains its franchise value, γ
 - If a fund experiences a run, liquidation cost of $\delta(r)$
 - HC can preserve franchise value by bailout out the fund
 - H1: HC internalize expected losses and take on less risk
 - H2: HC more like to provide guarantees in case of a run
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