

Beyond Regulatory Arbitrage: Novel Evidence from ABCP market

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Outline

- 1 Motivation
- 2 This Paper
- 3 Empirical Analyses & Results
- 4 Discussion

Shadow Banking

- ▶ Shadow banking produced a material portion of money-like instruments before the financial crisis, in response to growing demand from institutional investors as MMMFs.
- ▶ Banks created shadow banking entities (such as ABCP conduits) to attract money market financing without increasing regulatory capital.
- ▶ Prior empirical work has (mostly) focused on regulatory arbitrage
- ▶ Asset risk and insolvency concerns caused a run on ABCP market in Aug-2007.

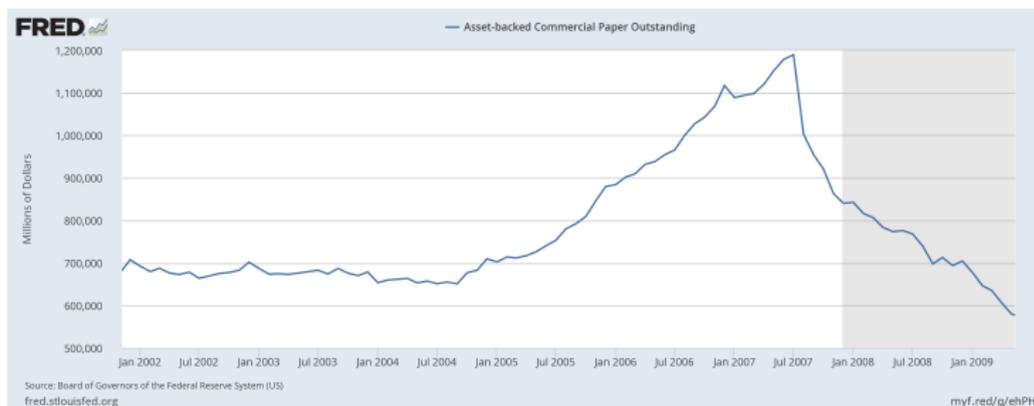
"For the first time in more than 10 years, conduits were drawing liquidity regularly to repay CP and participants were asking more questions surrounding conduits' assets". Capital IQ, Nov. 20, 2008

In this paper:

- ▶ What are drivers of risk-taking in the shadow banking?
- ▶ What led to the deterioration of the quality of collateral backing money-like claims?

ABCP Market Growth and ...Run

- ▶ In January 2007, USD ABCP amount outstanding accounted for \$1.3 trillion.

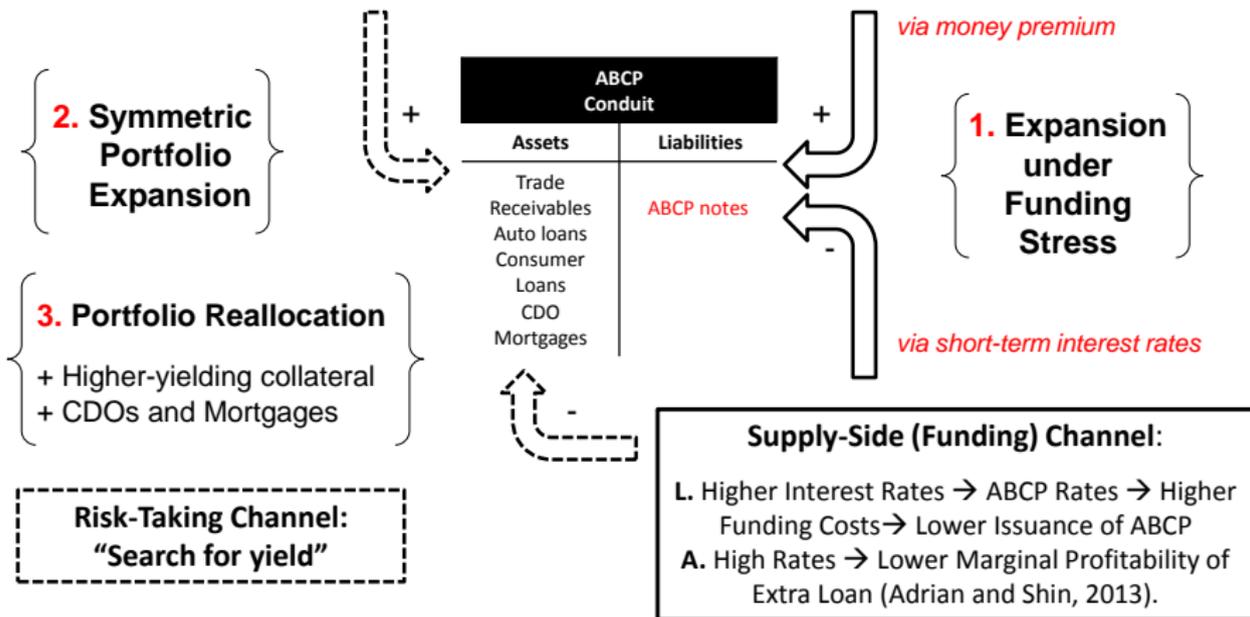


- ▶ Current view:
 - ▶ Regulatory Arbitrage (Acharya et al., 2013) & Too-big-to-fail distortions (Acharya and Richardson, 2009);
 - ▶ Higher demand for safe assets led to more securitization (Sunderam, 2014) but good collateral become exhausted (Gennaioli et al., 2013);

Our Story

Demand-Side Channel:

- L. Higher Demand for Money-like Assets → Higher Issuance of ABCP (Sunderam, 2014)
- A. Higher Demand for Money-like Assets → Higher Securitization (Gennaioli et al., 2013)



Results Preview

- I. ABCP net issuances and net transactions (collateral purchases) grow in response to increases in the aggregate demand for safe assets but under funding stress.
 - ▶ Additional test: Difference-in-differences test to provide clean evidence of the funding channel and mitigate endogeneity concerns.

- II. On the portfolio holdings, we find a substitution between high credit quality, short-term, liquid assets with riskier, long-term, illiquid assets, such as MBS and CDO.
 - ▶ Additional test: Higher holdings of MBS are associated with higher funding received from the TAF liquidity facility after the run.

Our Contribution

- ▶ Uncover the role of risks behind the production of privately-produced safe assets in the shadow banking.
- ▶ Novel channel of transmission of monetary policy similar to banks' risk-taking channel but in the shadow banking system (and reverse).
- ▶ Provide insights on markets experiencing similar growth patterns (i.e. CLOs, WMPs).

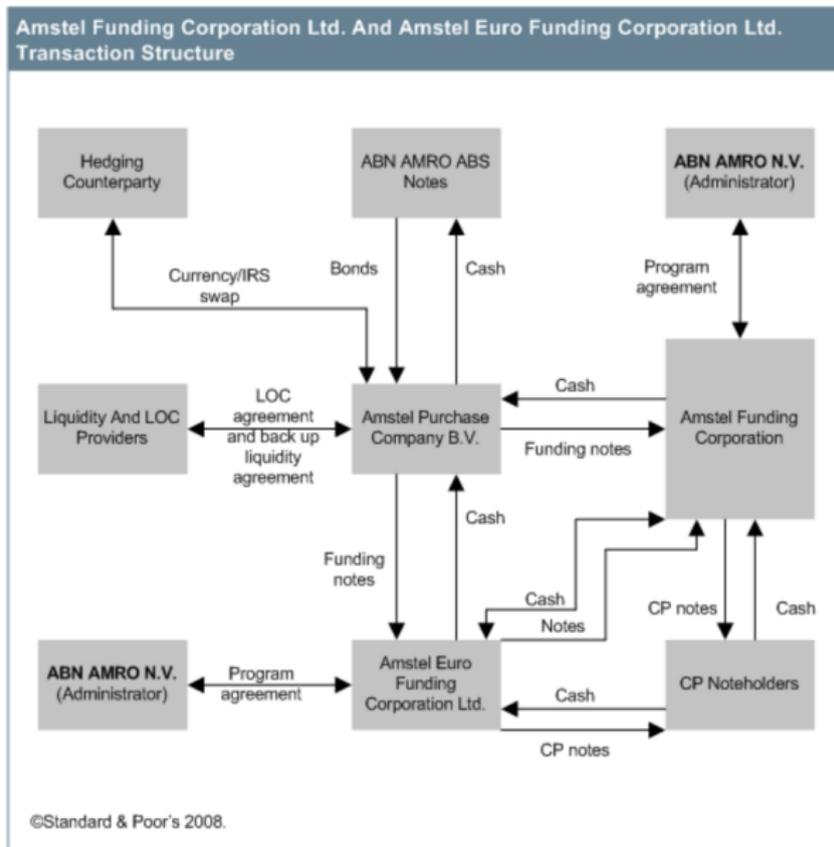
Key Dataset

- ▶ A micro-level entity-based dataset of ABCP active on the ABCP USD market.

Data collection and Sample

- ▶ Data from Capital IQ:
 - ABCP Amount Outstanding - 20031m1 - 2007m3
 - Portfolio Holdings - 20041q2 - 2007q1
 - Collateral Transactions - 20031m1 - 2007m3
 - Institutional features (rating, type, sponsor)
- ▶ Final Sample:
 - 74 ABCP conduits (funding structure) issuing on USD market
 - 49 Sponsoring Banks
 - Sample coverage: about 50% of the ABCP Market in 2007.

Amstel ABCP Conduit sponsored by ABN AMRO



Expansion Under Funding Stress

Dynamic Panel Regression - Iterative bootstrap-based bias correction. Model:

$$\Delta \log(ABCP)_{ijt} = F_i + \lambda_t + \beta \Delta \text{fed rate}_t + \gamma \Delta (Tbill - OIS)_t + \delta X_{ijt-1} + \epsilon_{ijt} \quad (1)$$

Dependent Variable: Net Issuance of ABCP notes

	(1)	(2)	(3)	(4)
	$\Delta \log(ABCP)_t$	$\Delta \log(ABCP)_t$	$\Delta \log(ABCP)_t$	$\Delta \log(ABCP)_t$
	β / SE	β / SE	β / SE	β / SE
$\Delta \text{ fed rate}_t$	-0.073*** (0.026)		-0.012 (0.030)	0.023 (0.034)
$\Delta (Tbill - OIS)_t$		-0.095*** (0.019)	-0.091*** (0.021)	-0.094*** (0.021)
$\Delta \text{ fed rate}_{t-1}$				0.076** (0.029)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes
Observations	2859	2859	2859	2859
No. of Conduits	74	74	74	74

Standard errors are adjusted for global serial correlations. All variables - except rates - are winsorized at 5%.
Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Robust to: Time-varying conduit-level controls, macro controls, Sponsor FE, Rating FE, exclusion of "new" players.

Symmetric Portfolio Expansion

- ▶ Net_{ijt} = net amount of collateral/transactions entering the portfolio.

$$Net_{ijt} = F_i + \lambda_t + \beta \Delta fed\ rate_t + \gamma \Delta (Tbill - OIS)_t + \delta X_{ijt-1} + \epsilon_{ijt} \quad (2)$$

	(1) Net β / SE	(2) Net β / SE	(3) Net β / SE	(4) Net % β / SE	(5) Net % β / SE	(6) Net % β / SE
$\log(ABCP)_{t-1}$	-36.319 (28.867)	-43.668 (33.073)	-45.046 (33.069)	-0.027*** (0.010)	-0.030*** (0.010)	-0.030*** (0.010)
$\Delta \log(ABCP)_{t-1}$		2.246 (52.187)	5.568 (53.077)		0.008 (0.009)	0.009 (0.009)
$\Delta fed\ rate_t$	-348.669** (165.689)	-361.303** (165.493)	-134.677 (192.768)	-0.056** (0.021)	-0.058*** (0.021)	-0.026 (0.021)
$\Delta (Tbill - OIS)_t$			-339.018*** (84.751)			-0.048*** (0.011)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.10	0.10	0.10	0.07	0.07	0.07
Observations	2973	2898	2898	2973	2898	2898
No. of Conduits	72	72	72	72	72	72

OLS estimation. SE clustered by conduit and time. All variables - except rates - are winsorized at 5%. In Columns 4 to 6, the dependent variable is in percentage terms of the portfolio. Significance levels:
 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

- ▶ Re-estimated as dynamic panel, results are unchanged.

PF Reallocation by Rating Class - AAA Holdings

$$\Delta \% \text{ Portfolio Holdings}_{ijt} = F_i + \lambda_t + \beta \Delta \text{ fed rate}_t + \gamma \Delta (\text{Tbill} - \text{OIS})_t + \delta X_{ijt-1} + \epsilon_{ijt}$$

	(1)	(2)	(3)
	Δ AAA	Δ AAA	Δ AAA
	β / SE	β / SE	β / SE
$\log(\text{ABCP})_{t-1}$	-0.012 (0.015)	-0.012 (0.015)	-0.012 (0.015)
$\Delta \text{ fed rate}_t$	-0.075** (0.025)		-0.236 (0.228)
$\Delta (\text{Tbill} - \text{OIS})_t$		-0.095 (0.076)	0.311 (0.443)
Time FE	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes
R^2	0.178	0.177	0.179
Observations	432	432	432

OLS Estimation. Quarterly data from 2004q2-2007q1. SE clustered by time and conduit. Conduits variable are winsorized at 5%. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

PF Reallocation by Rating Class

$$\Delta \% \text{ Portfolio Holdings}_{ijt} = F_i + \lambda_t + \beta \Delta \text{ fed rate}_t + \gamma \Delta (\text{Tbill} - \text{OIS})_t + \delta X_{ijt-1} + \epsilon_{ijt}$$

	(4)	(5)	(6)	(7)	(8)
	Δ AA A	Δ BBB BB B	Δ Below/NR	Δ Not rated	NA
	β / SE	β / SE	β / SE	β / SE	β / SE
$\log(ABCP)_{t-1}$	-0.018 (0.011)	-0.016 (0.013)	0.017 (0.020)	0.011 (0.018)	0.033 (0.033)
$\Delta \text{ fed rate}_t$	-0.527** (0.199)	0.239 (0.139)	-0.734*** (0.170)	-0.003 (0.195)	0.603** (0.257)
$\Delta (\text{Tbill} - \text{OIS})_t$	0.989** (0.336)	-0.522** (0.214)	1.269*** (0.335)	-0.065 (0.451)	-0.954* (0.478)
Time FE	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes	Yes
R^2	0.111	0.135	0.168	0.151	0.124
Observations	460	376	420	312	401

OLS Estimation. Quarterly data from 2004q2-2007q1. SE clustered by time and conduit. Conduits variable are winsorized at 5%. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

PF Reallocation by Collateral Type

$$\Delta \% \text{ Portfolio Holdings}_{ijt} = F_i + \lambda_t + \beta \Delta \text{ fed rate}_t + \gamma \Delta (\text{Tbill} - \text{OIS})_t + \delta X_{ijt-1} + \epsilon_{ijt}$$

	(1) Δ Auto β / SE	(2) Δ CDO β / SE	(3) Δ Commercial β / SE	(4) Δ Consumer β / SE	(5) Δ Credit cards β / SE	(6) Δ Trade β / SE	(7) Δ Mortgage β / SE	(8) Δ Other β / SE
$\log(ABCP)_{t-1}$	0.025** (0.006)	0.002 (0.027)	-0.027 (0.013)	-0.020* (0.008)	-0.004 (0.006)	0.026 (0.014)	-0.034 (0.017)	-0.006 (0.023)
$\Delta \text{ fed rate}_t$	-0.065 (0.071)	0.251** (0.061)	-0.020 (0.013)	0.481*** (0.035)	-0.017 (0.068)	-0.114 (0.077)	0.558*** (0.077)	-0.219 (0.104)
$\Delta (\text{Tbill} - \text{OIS})_t$	0.134 (0.117)	-0.479* (0.159)	-0.028** (0.007)	-0.933*** (0.079)	0.100 (0.110)	0.259 (0.131)	-1.172*** (0.105)	0.494** (0.132)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.125	0.199	0.176	0.284	0.108	0.107	0.169	0.208
Observations	444	455	376	363	405	476	517	460

OLS Estimation. Quarterly data from 2004q2-2007q1. SE clustered by time and conduit. Conduits variable are winsorized at 5%. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Term Auction Facility Programme

- ▶ Established in December 2007, ended in March 2010.
- ▶ Only Depository Institutions were eligible.
- ▶ No. TAF loans = Proxy of sponsoring banks' liquidity needs.

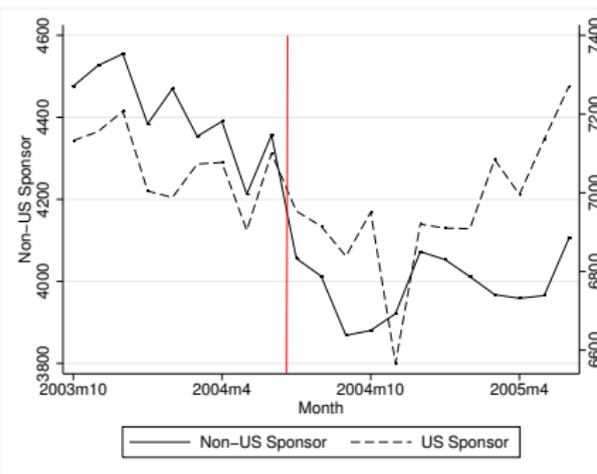
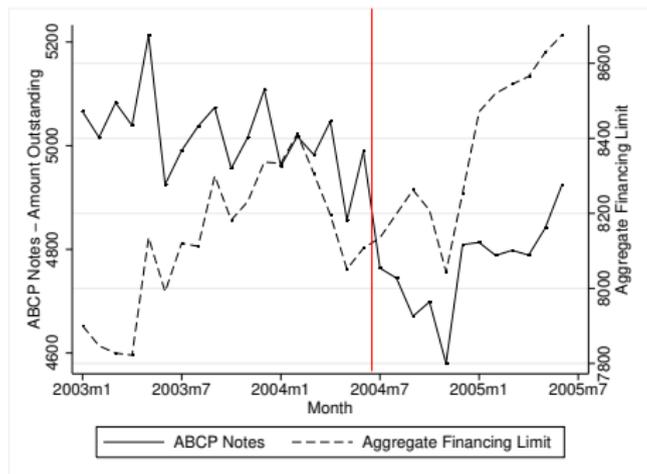
	(1)	(2)	(3)
	No. TAF loans	No. TAF loans	No. TAF loans
	β / SE	β / SE	β / SE
A-1+	-1.274*** (0.303)	-0.931*** (0.288)	-1.221*** (0.305)
Arbitrage	-0.198 (0.292)	-0.111 (0.543)	-0.260 (0.343)
Liq. providers (ln)	0.061** (0.028)	0.043 (0.029)	
Mortgage (%)	3.088*** (0.820)		3.328*** (0.776)
CDO (%)		1.711 (1.852)	-1.159 (1.384)
Constant	2.878*** (0.251)	3.160*** (0.242)	3.186*** (0.192)
N	42	43	40
R ²	0.371	0.171	0.324

Cross-sectional OLS Regression. Mortgage and CDO at December 2006. Robust standard errors. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Funding Channel

Identification concern: policy rates may react to conduits' collateral.

- ▶ Shock: Fed decision to increase the rate in June 2004 (Negative).
 - ▶ Before the boom of ABCP market and raising of MMMFs demand.
 - ▶ ABCP's portfolio are small, invested in receivables and in the shadow.



- ▶ Non-US sponsored conduits operating with lower margins are expected to be more affected and lower their issuance more than US-sponsored conduits.

Difference-in-Differences Test

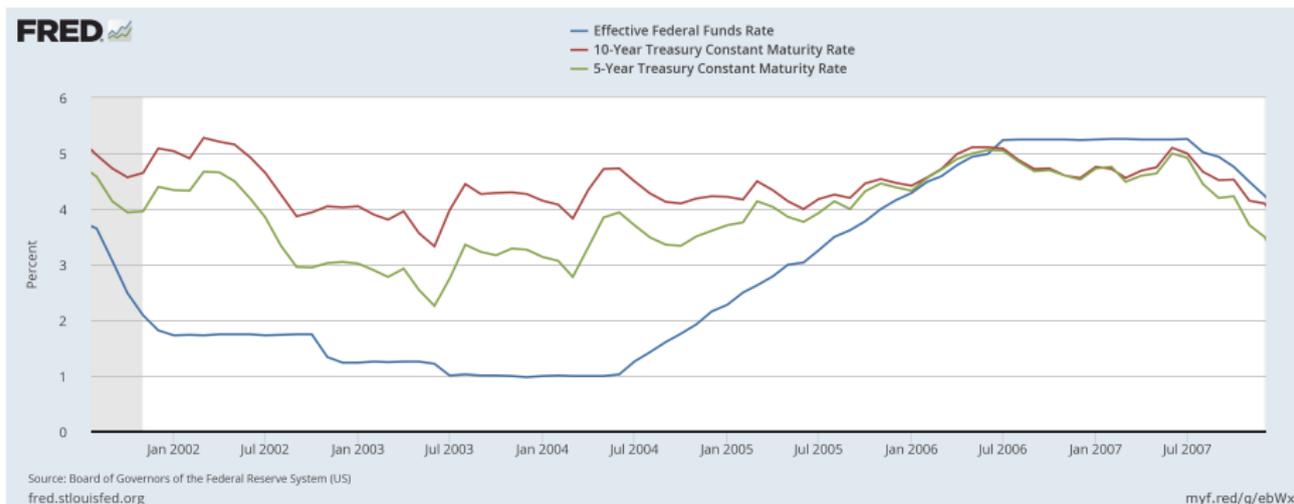
$$\log(ABCP)_{ijt} = \alpha + F_i + \beta POST_t + \gamma US\ Sponsor_i + \lambda POST_t \cdot US\ Sponsor_i + \epsilon_{ijt} \quad (3)$$

	(1) $\log(ABCP)_t$ β / SE	(2) $\log(ABCP)_t$ β / SE	(3) $\log(ABCP)_t$ β / SE	(4) $\log(ABCP)_t$ β / SE
US Sponsor	0.401*** (0.016)	0.310*** (0.014)	0.291*** (0.016)	0.305*** (0.006)
POST	-0.049*** (0.011)	-0.051*** (0.011)	-0.039** (0.013)	-0.082*** (0.019)
US Sponsor x POST	0.041** (0.017)	0.044** (0.014)	0.030* (0.014)	0.060** (0.020)
High rating (A-1+)			0.601*** (0.016)	0.574*** (0.014)
Non-US Assets			-0.391*** (0.035)	-0.350*** (0.027)
Arbitrage x POST				0.093 (0.067)
High rating (A-1+) x POST				0.084*** (0.016)
US Sponsor x Non-US Assets				-1.808*** (0.033)
Non-US Assets x POST				-0.065* (0.031)
Constant	8.278*** (0.007)	7.722*** (0.039)	7.485*** (0.042)	7.488*** (0.042)
Conduit-type FE	No	Yes	Yes	Yes
Observations	455	455	455	455
R ²	0.068	0.113	0.270	0.282

4 months window. SE clustered by time. All variables - except rates - are winsorized at 5%. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust to time and conduit FE.

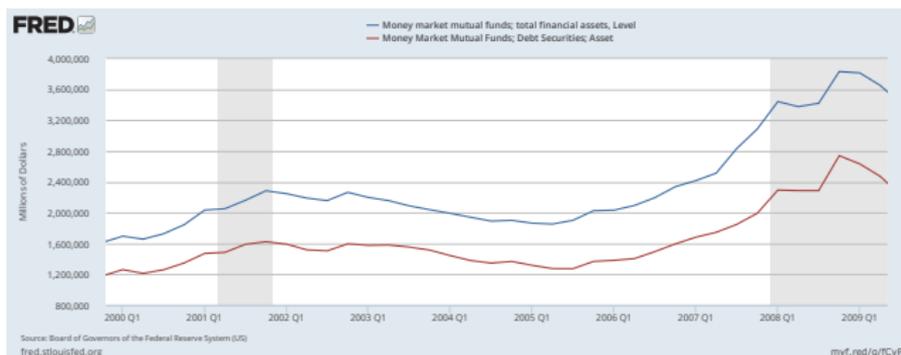
- ▶ Both institutional demand and monetary policy play a role in explaining the deterioration of the quality of the collateral.
- ▶ Expansion under stress led to a **search for yield** outside the formal banking system, with implications for the stability of the financial markets but also for banks.
- ▶ ABCP as hidden liabilities of sponsoring banks:
 - ⇒ ABCP growth required increasing amount of liquidity facilities from banks (to maintain the rating).
 - ⇒ Banks become more exposed to the **risks** of the shadow banking system.
- ▶ Several avenues for future research:
 - ▶ Are ABCP conduits an extension of the credit intermediation of sponsoring banks?
 - ▶ Is there a risk-taking channel extending from the traditional banking system to the shadow banking system?

Term Spread



- ▶ The term spread becomes smaller and smaller and then negative.

Money Market Mutual Funds



- ▶ Insured deposit alternatives dominate institutional cash pools' investment portfolios relative to deposits.
- ▶ The principal reason for this is not search for yield, but search for principal safety and liquidity (Pozsar, 2011). ◀◀