

# Understanding the Run on the Shadow Banking System

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# Outline

- 1) The Evolution of the U.S. Financial System
  - i. New non-bank institutions have evolved playing a similar role to that of depository institutions.
  - ii. The transformation of illiquid assets into liquid assets and the role of short-term funding
  - iii. The role of leverage ratios and asset growth of nonbank financial institutions.
- 2) The determinants of balance sheet growth of nonbank banks
- 3) The conduction of monetary policy in the U.S. through a monetary policy rule regression
- 4) The inherent fragility of nonbank banks' liabilities
- 5) Policy implications

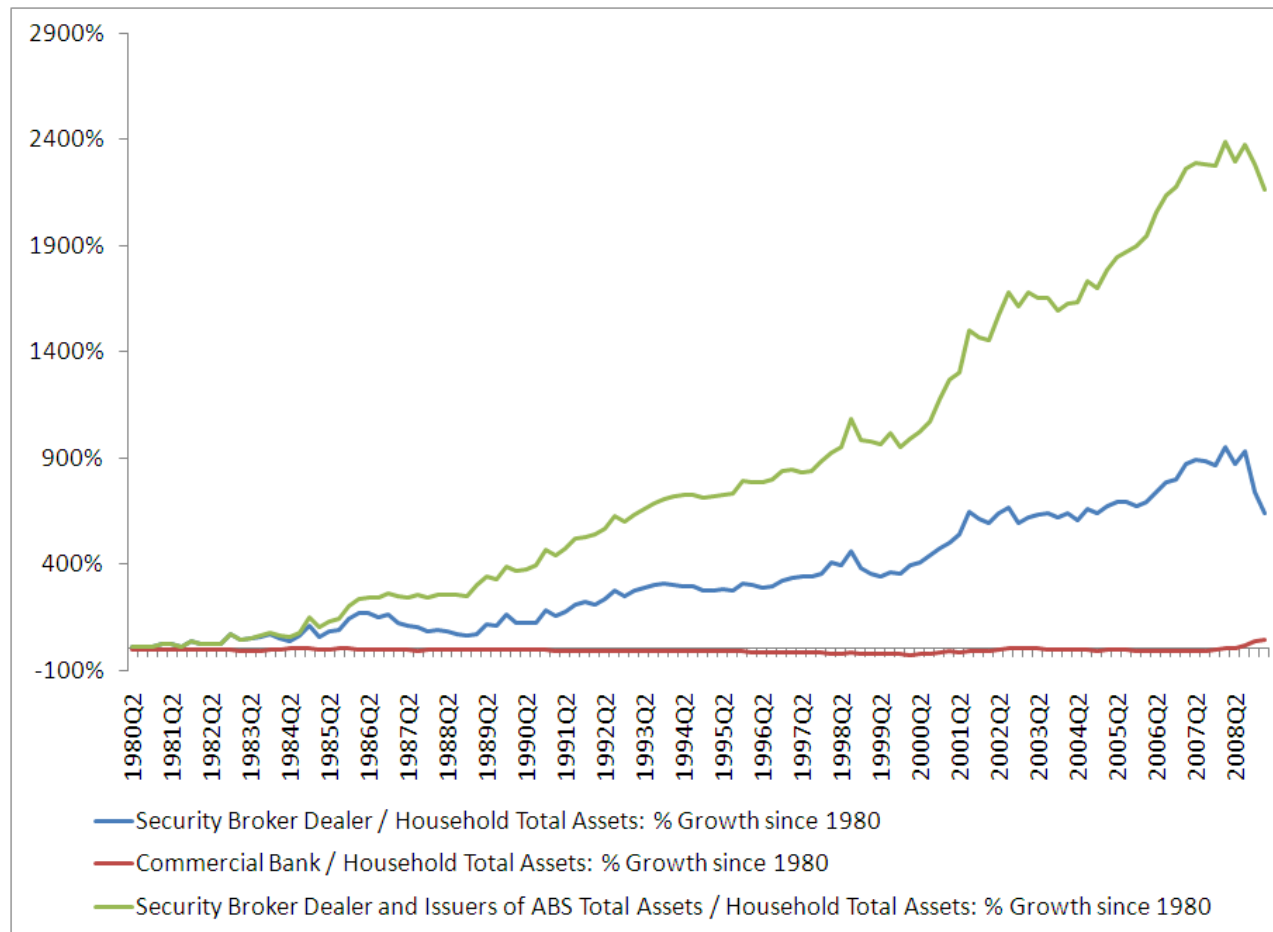
# The Transformation of the U.S. Financial System

- 1) The Evolution of the U.S. Financial System
  - i. New non-bank institutions have evolved playing a similar role to that of depository institutions.
  - ii. The transformation of illiquid assets into liquid assets and the role of short-term funding.
  - iii. Keynes reminded us: “It forgets that there is no such thing as liquidity of investment for the community as a whole.” (Keynes 1936:155)
  - iv. Ability to initiate mortgages vs funding capabilities and the monetarist experiment
  - v. Fund income vs fee income from moving assets (e.g. Kregel, 2009b, 2008c; Wray 2007)
  - vi. The market for securitization: enormous increase in the demand for collateral in derivative markets, repo markets and in modern real time gross settlement system. (BIS, 2001; Gorton, 2009:10); moving assets Kregel 2008:19
  - vii. Exponential growth of securitization Gorton 2009 Tymoigne 2009b, 2009c
  
- 2) Nonbank financial institutions –Shadow Banks- outside regulatory structure, reliance on uninsured short-term funding and no access to the Fed’s discount window. D’Arista 1993 ; McCulley 2009, Tobias and Shin 2009b, Gorton 2009, Kregel 2007, 2008

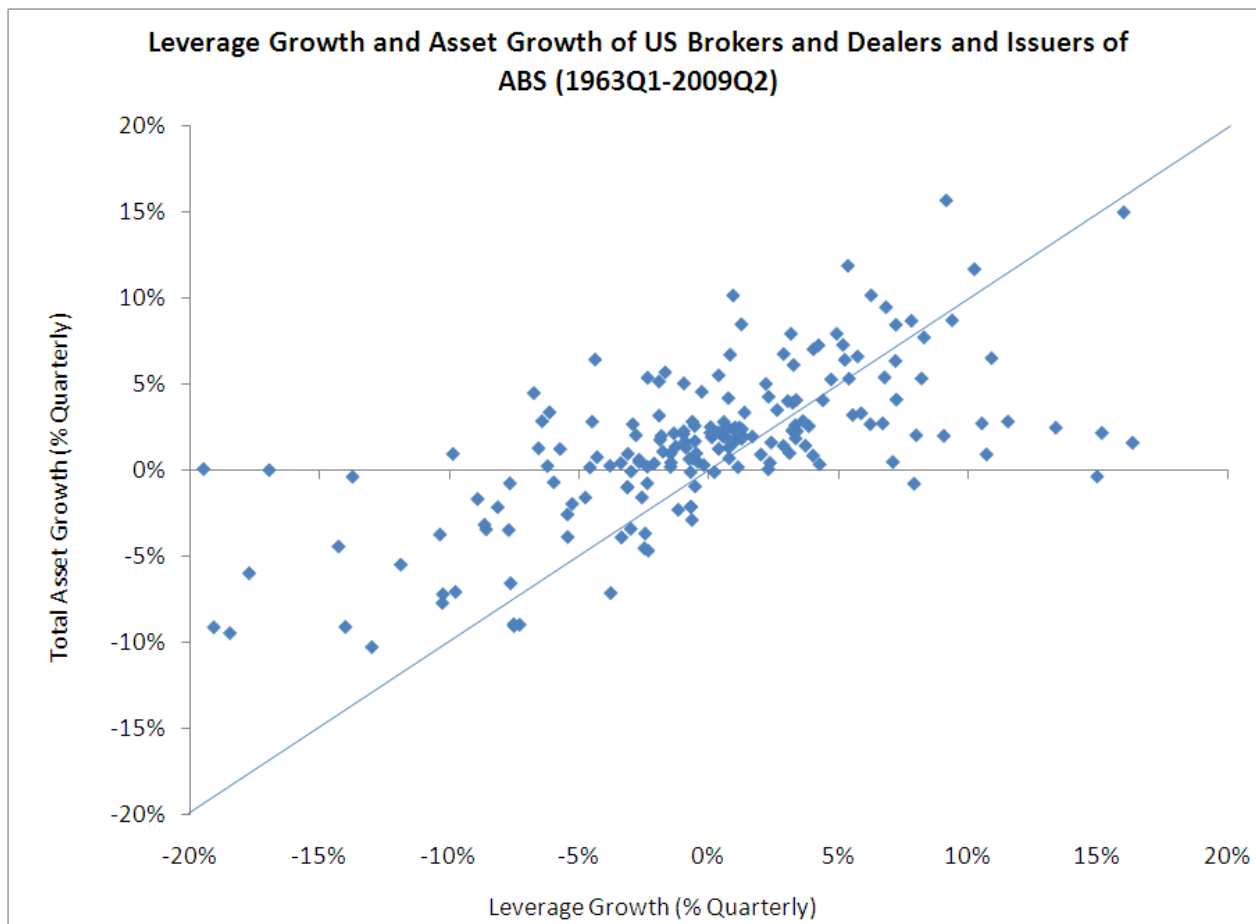
# The Shadow Banking System

- 1) Short-term funding included commercial paper, reverse repos, and asset backed commercial paper, and credit lines from traditional banks (not always available)
- 2) Nonbank banks: no official liquidity facilities
- 3) The role of leverage ratios and asset growth of nonbank financial institutions. (Kregel 1997, 2008a, 2008c, 2009b; Wray 2008a, 2009b; Tymoigne 2009b)
  - i. For instance, at the most aggressive investment bank, leverage ratios reached 33 to 1, that is for every dollar in equity capital the firm had borrowed 33.
  - ii. Leveraging tiny margins, good financing (no haircut), potential for profit/loss.
  - iii. Identifying mispriced risks, convergence trades/ pairs of trades, hedge other risks
  - iv. Low bond yields led to borrowing to increase returns.
  - v. Growth in Broker-Dealer and issuers of ABS assets after the ‘monetarist’ experiment
  - vi. Short-term paper is issued to fund the acquisition of the long-term structured assets

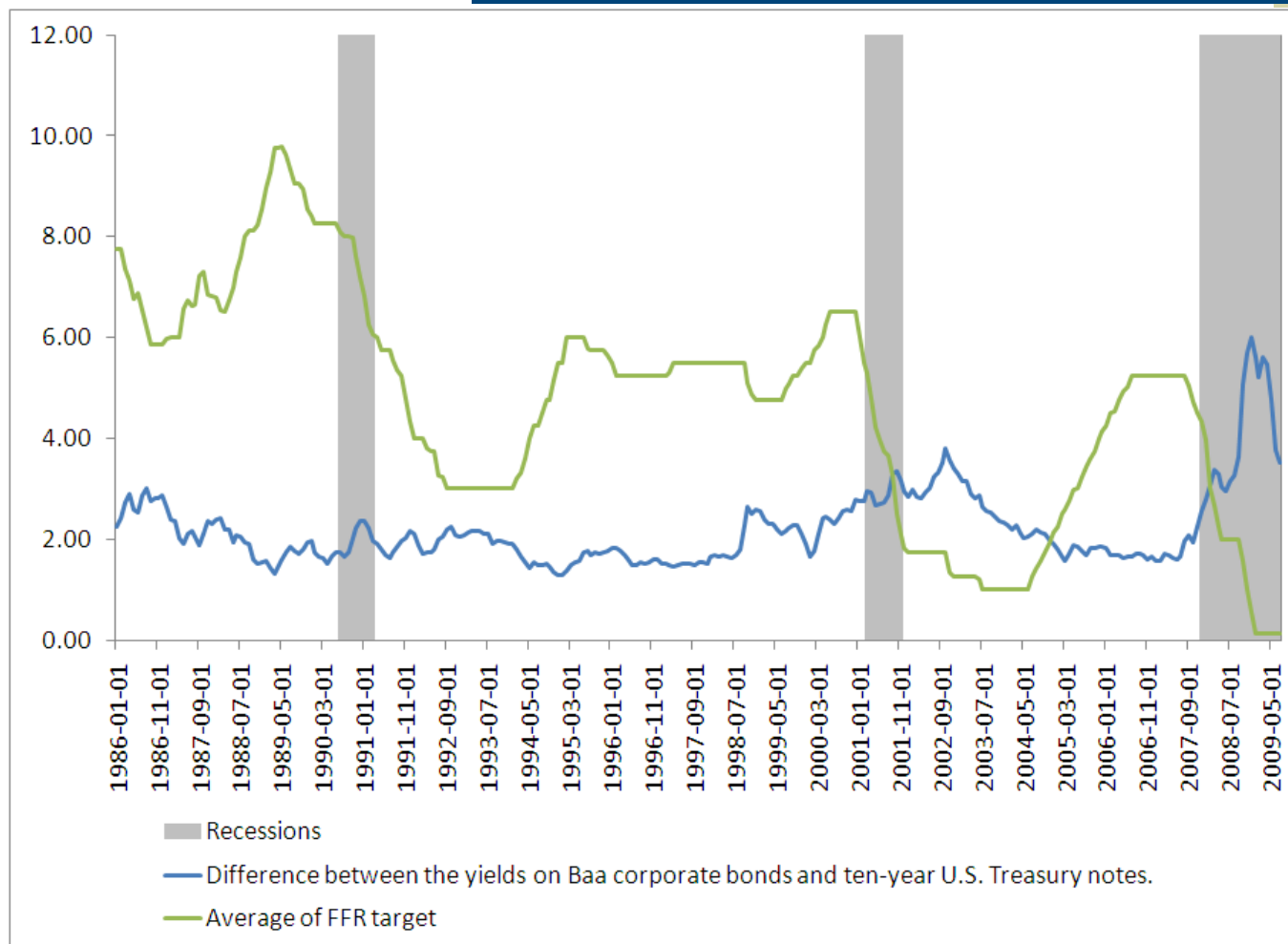
# Security Broker Dealer and Issuers of ABS Asset Growth since 1980



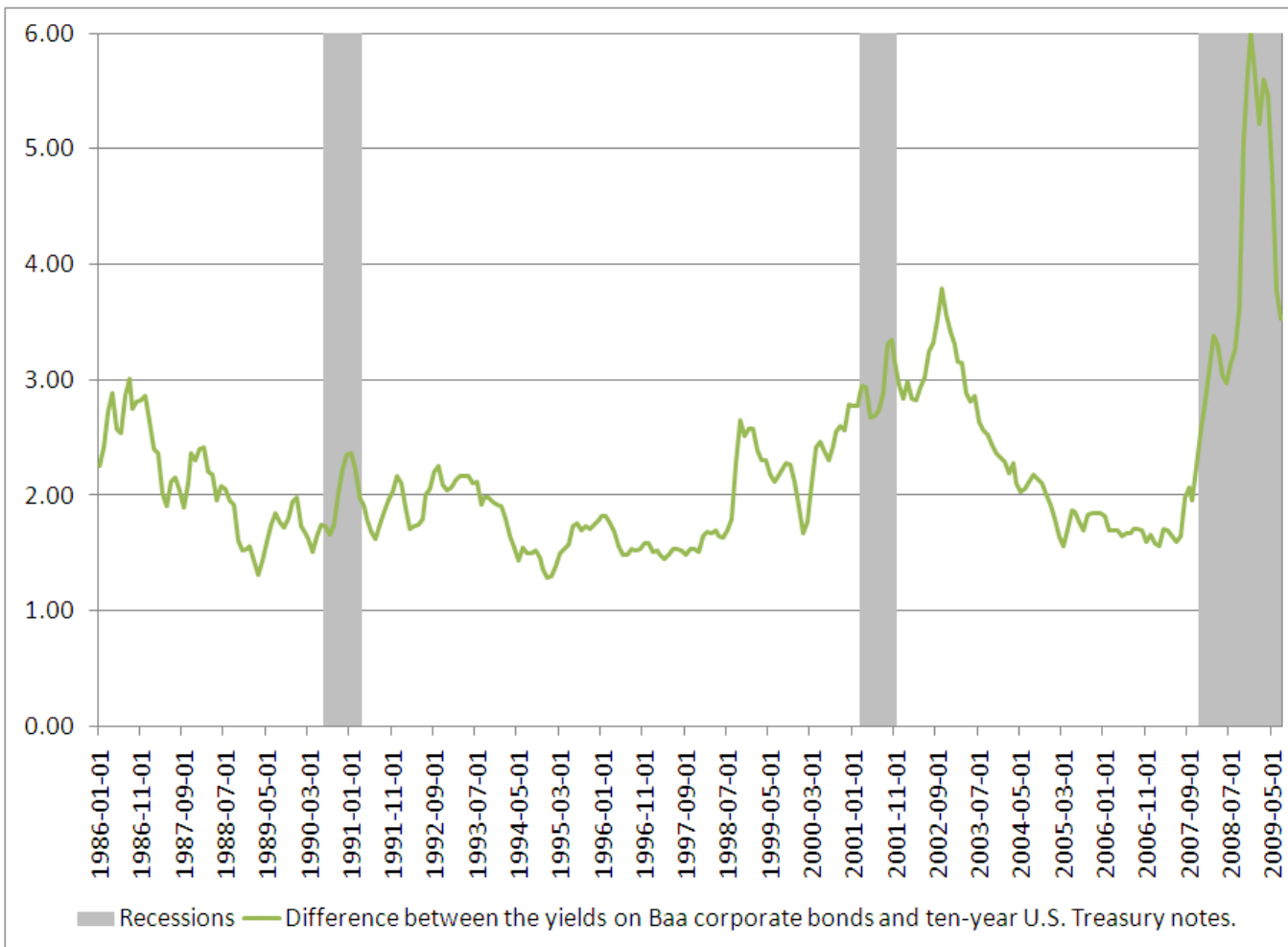
# Leverage is procyclical



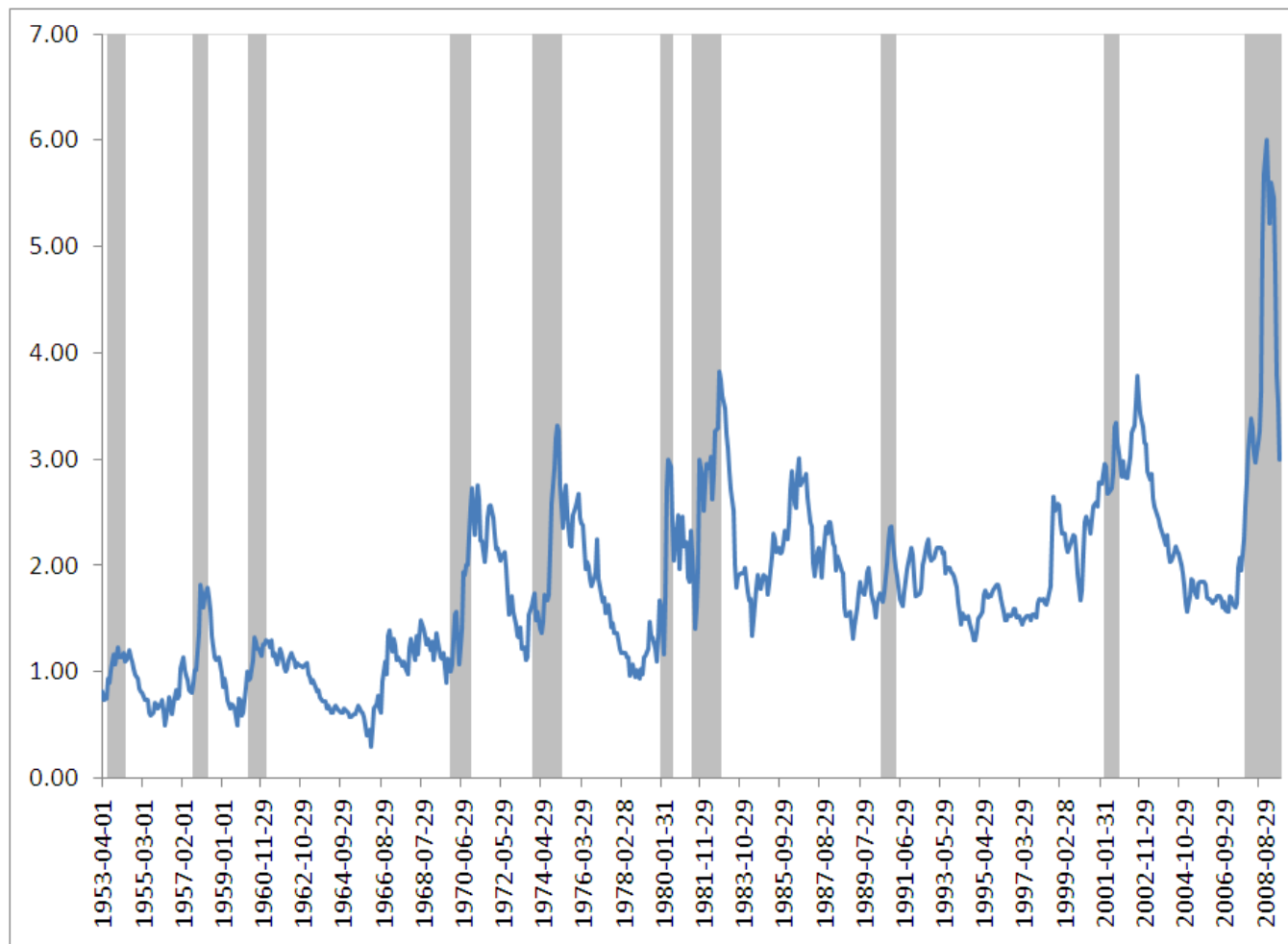
# FFR target and Baa/10-year spread



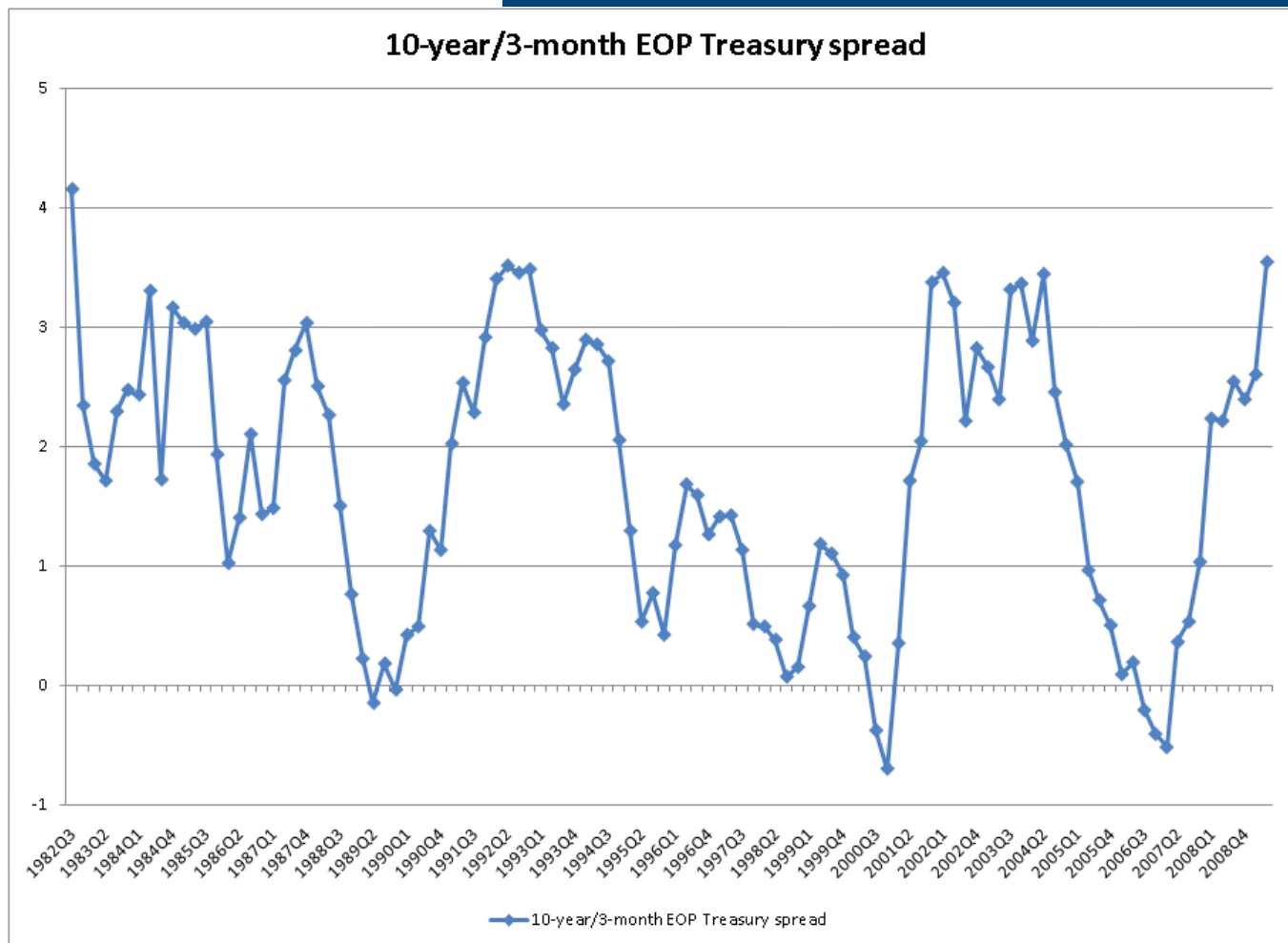
# Risk premium on Baa corporate bonds (Baa/10-year U.S. Treasuries, 1986Q1-2009Q2)



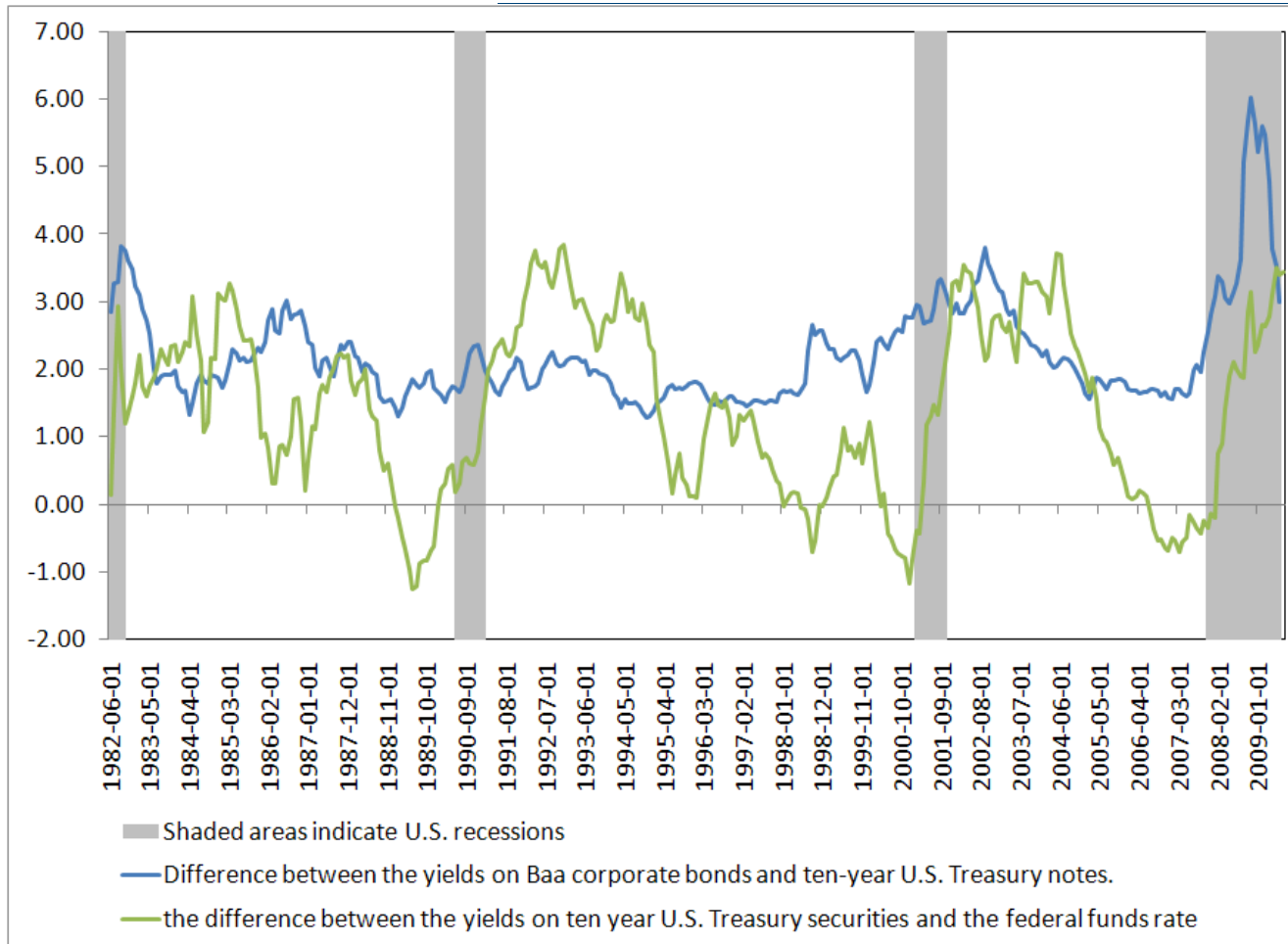
# Risk premium on Baa corporate bonds (Baa/10-year U.S. Treasuries, 1953Q2-2009Q2)



# Term Spread



# Term Spread



# What determines the growth of broker-dealer balance sheets?

BO1=e1 R1 W1 Y1 AC1 AJ1 BI1

**Fed Funds Target** (1Q change)

PCE Core Inflation (1Q lag)

S&P500 Return (1Q lag)

S&P500 Volatility VIX (1Q lag)

10-year/3-month (1Q lag)

**Baa/10-year** (1Q lag)

Real GDP Growth (1Q lag)

Variable	DF	Estimate	Standard Error	t Value	Approx Pr >  t	Variable Label
Intercept	1	49.3777	12.3499	4.00	0.0001	
E1	1	-10.5542	3.2169	-3.28	0.0015	E1
R1	1	-1.9470	2.2206	-0.88	0.3831	R1
W1	1	0.0401	0.1281	0.31	0.7547	W1
Y1	1	-0.1879	0.2680	-0.70	0.4853	Y1
AC1	1	-1.0723	1.7359	-0.62	0.5384	AC1
AJ1	1	-12.8186	3.8759	-3.31	0.0014	AJ1
BI1	1	0.2225	1.3950	0.16	0.8737	BI1

where BO1: Asset Growth of Security Brokers and Dealers

# What determines the growth of broker-dealer and issuers of ABS balance sheets?

BS1=e1 R1 W1 Y1 AC1 AJ1 BI1

**Fed Funds Target** (1Q change)

PCE Core Inflation (1Q lag)

S&P500 Return (1Q lag)

S&P500 Volatility VIX (1Q lag)

10-year/3-month (1Q lag)

**Baa/10-year** (1Q lag)

Real GDP Growth (1Q lag)

Variable	DF	Estimate	Standard Error	t Value	Approx Pr >  t	Variable Label
Intercept	1	24.5562	8.1017	3.03	0.0032	
E1	1	-4.3597	1.9993	-2.18	0.0320	E1
R1	1	1.7207	1.5266	1.13	0.2629	R1
W1	1	0.0872	0.0808	1.08	0.2833	W1
Y1	1	-0.0201	0.1660	-0.12	0.9039	Y1
AC1	1	-1.1862	1.1564	-1.03	0.3079	AC1
AJ1	1	-6.3270	2.4443	-2.59	0.0114	AJ1
BI1	1	0.6774	0.8862	0.76	0.4468	BI1

where BS1: Asset Growth of Security Brokers and Dealers and Issuers of Asset-Backed Securities

# What determines the growth of shadow banks' balance sheets?

CA1=e1 R1 W1 Y1 AC1 AJ1 BI1

**Fed Funds Target** (1Q change)

PCE Core Inflation (1Q lag)

S&P500 Return (1Q lag)

S&P500 Volatility VIX (1Q lag)

**10-year/3-month** (1Q lag)

**Baa/10-year** (1Q lag)

**Real GDP Growth** (1Q lag)

Variable	DF	Estimate	Standard Error	t Value	Approx Pr >  t	Variable Label
<b>Intercept</b>	1	14.7854	3.6712	4.03	0.0001	
<b>E1</b>	1	-2.3421	0.8886	-2.64	0.0100	E1
<b>R1</b>	1	0.3299	0.7039	0.47	0.6405	R1
<b>W1</b>	1	0.0567	0.0360	1.57	0.1195	W1
<b>Y1</b>	1	-0.0322	0.0736	-0.44	0.6634	Y1
<b>AC1</b>	1	-1.2414	0.5262	-2.36	0.0206	AC1
<b>AJ1</b>	1	-2.2508	1.0915	-2.06	0.0423	AJ1
<b>BI1</b>	1	1.2381	0.3968	3.12	0.0025	BI1

where CA1: Asset Growth of Finance Companies, Security Brokers and Dealers, Issuers of Asset-Backed Securities, Funding Corporations

# Monetary Policy is *Pro-Cyclical* Relative to Shadow Banks' Asset Growth

e1=G1 R1 BI1 AI1

**Fed Funds Target** (lag, 1Q change)

PCE Core Inflation (1Q lag)

Real GDP Growth (1Q lag)

**Asset Growth**

Variable	DF	Estimate	Standard Error	t Value	Approx Pr >  t	Variable Label
<b>Intercept</b>	1	0.5240	0.2752	1.90	0.0604	
<b>G1</b>	1	0.4405	0.0999	4.41	<.0001	G1
<b>R1</b>	1	-0.0526	0.0432	-1.22	0.2267	R1
<b>BI1</b>	1	0.0563	0.0355	1.58	0.1170	BI1
<b>AI1</b>	1	-0.2863	0.0850	-3.37	0.0012	AI1

where E1 is the FF target change and CB1: Finance Companies, Security Brokers and Dealers, Issuers of Asset-Backed Securities, Funding Corporations

# Monetary Policy is *Pro-Cyclical* Relative to Shadow Banks' Asset Growth

Federal funds rate and Taylor rule with and without response to risk premium shock, 2003-2008



Source: Barbera and Weise, 2008:32



# The Development of a Crisis



- 1) “The normal functioning of a unit with short-term debt outstanding requires the insurance, or sale, of new short-term debt in order to fulfill commitments. A run occurs when potential lenders, or buyers of liabilities, believe that there is a significant chance that payments on the issuer’s debt will not be made on schedule. At such times, the borrowing firm cannot induce loans or the purchase of its liabilities by offering higher interest rates.” (Minsky, 1986:47)

# The Repo Market

## Repo Transaction using T-accounts

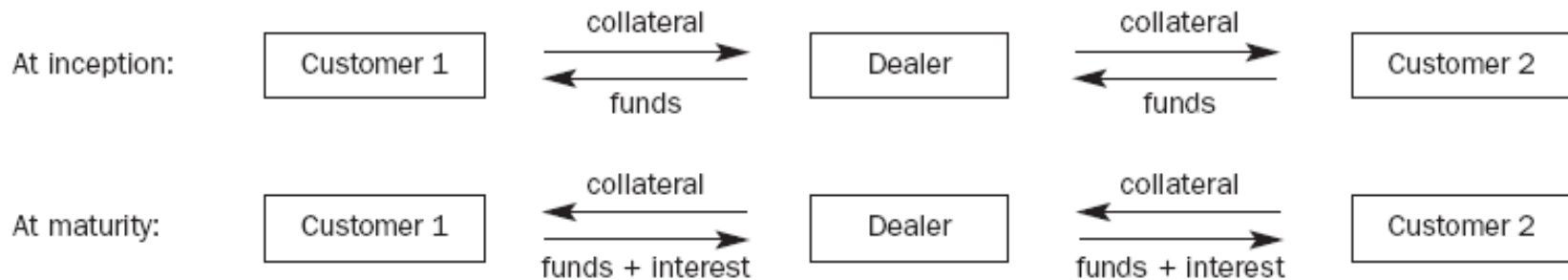
Customer A		Dealer B	
Assets	Liabilities	Assets	Liabilities
- Cash		+ Cash	
+ Collateral		- Collateral	

Customer A		Dealer B	
Assets	Liabilities	Assets	Liabilities
+ Cash		- Cash	
+ interest		- interest	
- Collateral	+ Net worth	+ Collateral	- Net worth

# The Repo Market

## CHART 2

### A Dealer's Matched Book Transaction



A dealer's matched book transaction involves simultaneous offsetting repo and reverse transactions. From customer 1's perspective the transaction is a repo while from customer 2's perspective the transaction is a reverse. The dealer collects a fee for the intermediation service by keeping some of the interest that customer 1 pays.



# The Repo Market



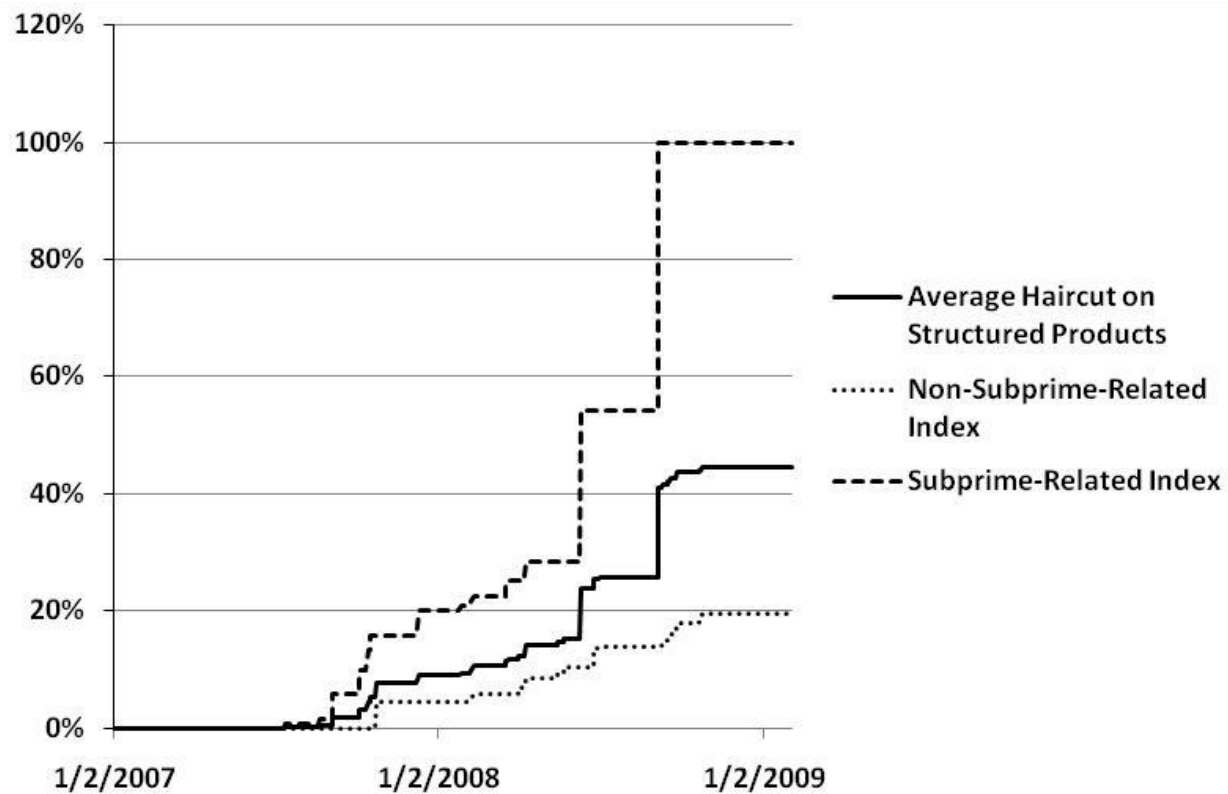
- 1) The increase in “Haircuts” and margins have limited the maximum leverage which impairs the ability to profit on tiny spreads
- 2) These institutions may be forced to sell, raise equity, or borrow
- 3) “GC repo rates began to fall vis-à-vis OIS rates of comparable maturity, reflecting increased demand for safe government securities. By contrast, repo rates for riskier types of collateral rose as the appetite for holding anything but the highest-quality collateral dropped.” (Hördahl and King, 2008:39).
- 4) Inversion of the yield curve squeezed interest spreads leading to a fall in profitability and in the value of their assets.

# The Repo Market: Haircuts on Repo Agreements (percent)

Securities	Apr-2009	Aug-2009
U.S. Treasuries	0.25	3
Investment-grade bonds	0-3	8-12
High-yield bonds	10-15	25-40
Equities	15	20
Senior leveraged loans	10-12	15
Mezzanine leveraged loans	18-25	35+
Prime MBS	2-4	10-20
ABS	3-5	50-60

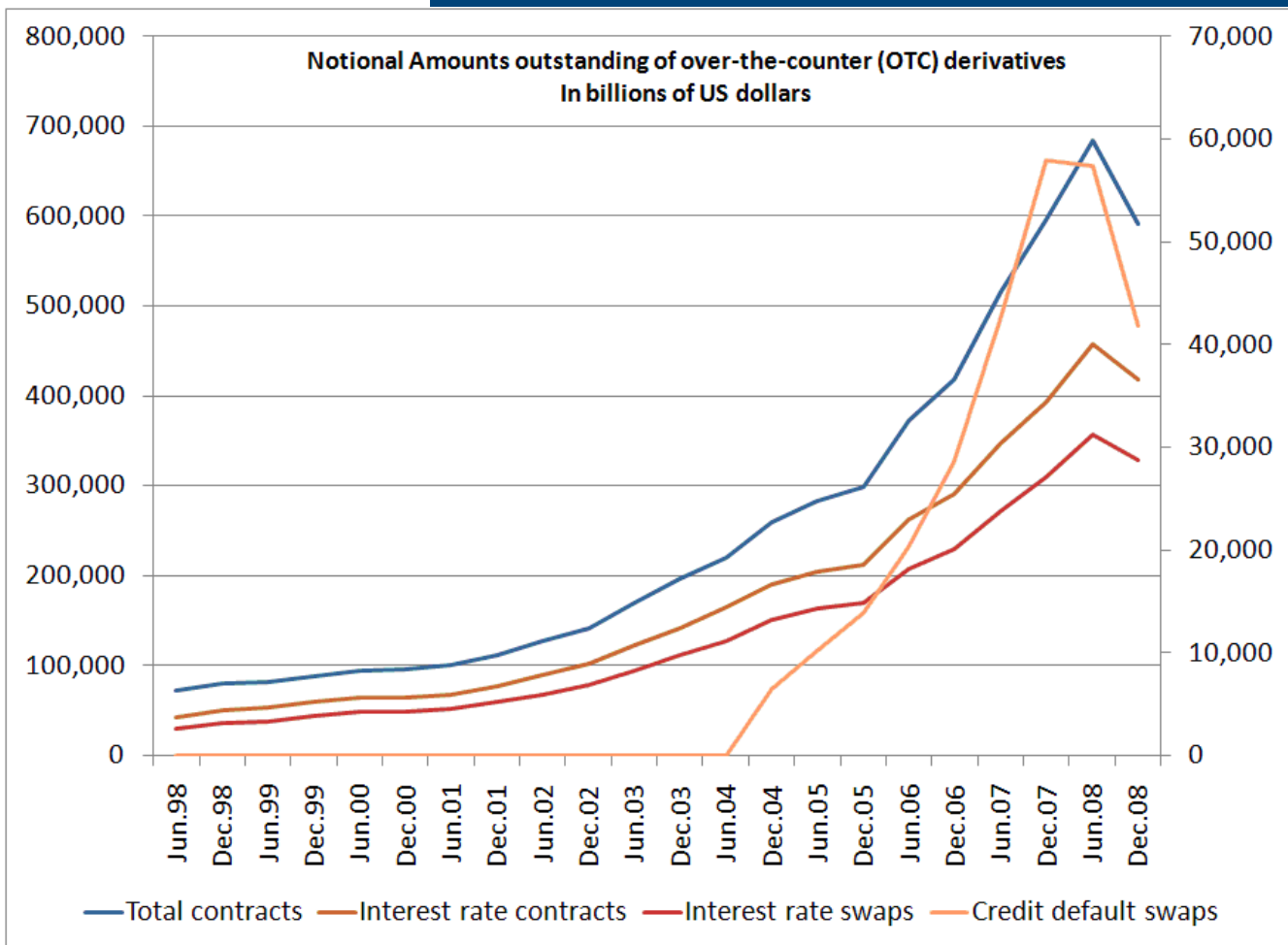
Source: IMF Global Financial Stability Report, April 2008:23

# The Repo Market



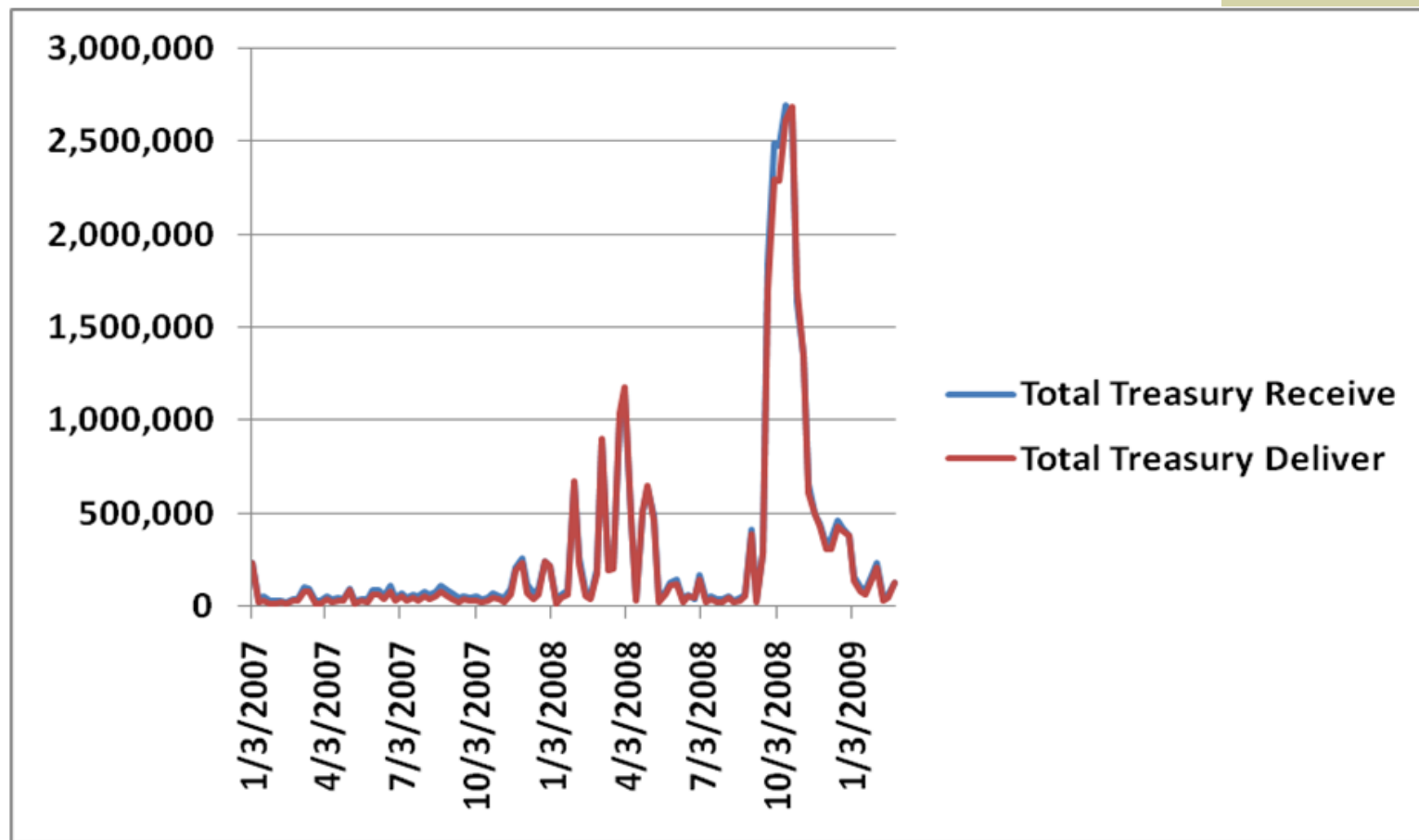
Source: Gorton and Metrick, 2009b:7

# OTC Derivatives



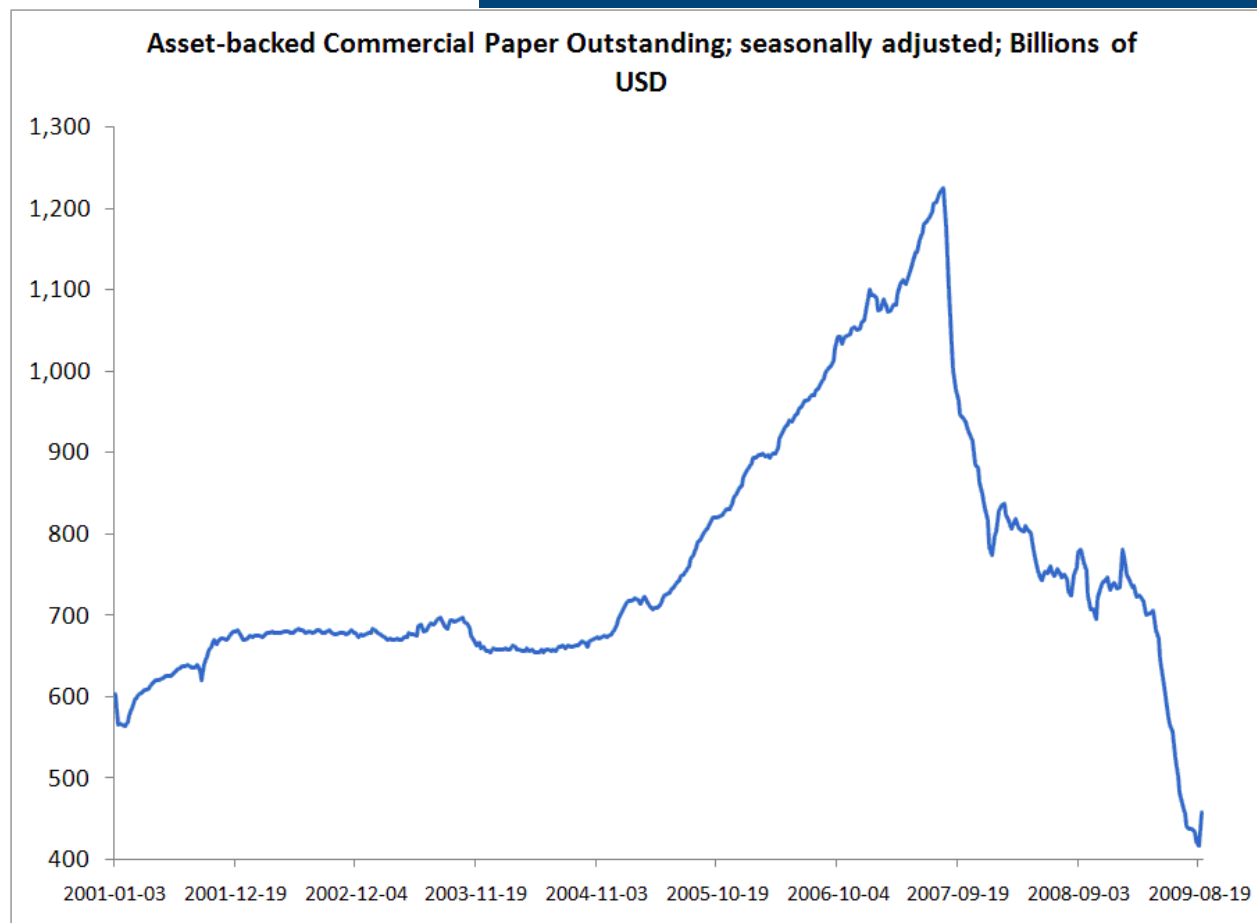
Source: BIS 2009

# Shortage of collateral



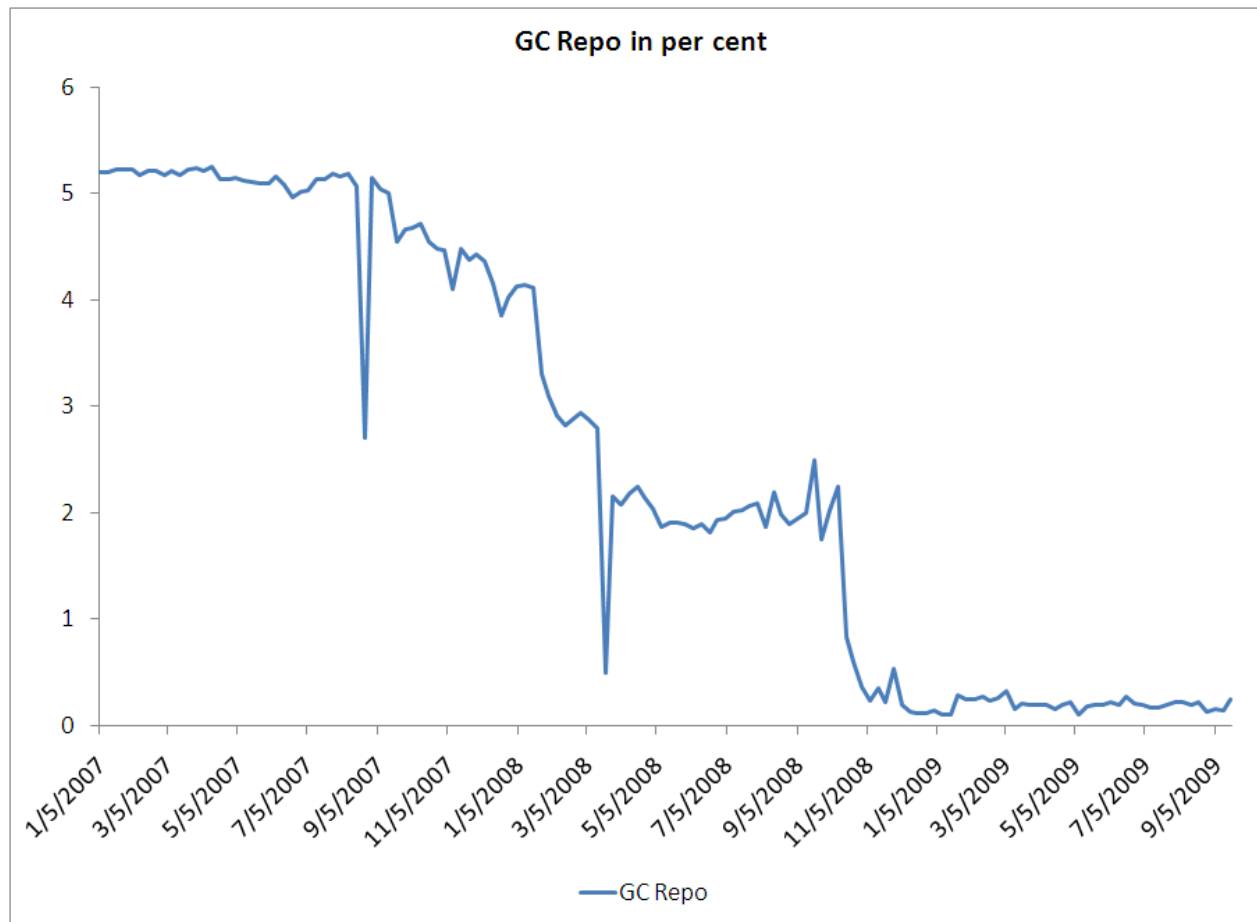
Source: Gorton and Metrick (2009)

# Asset-backed Commercial Paper Outstanding, SA



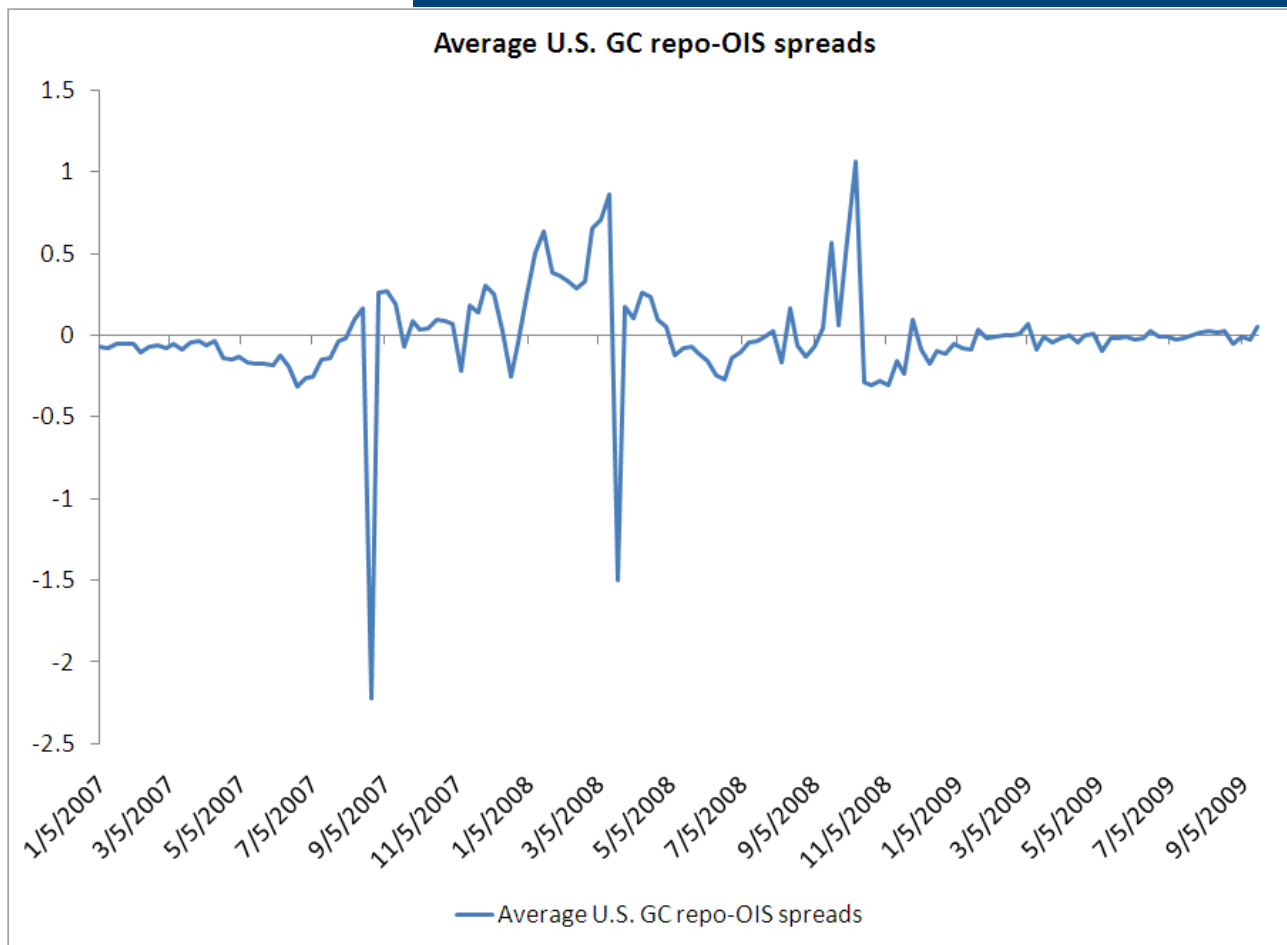
Source: Federal Reserve

# The Repo Market: as the demand for the collateral increases, the repo rate falls



Source: Bloomberg

# The Repo Market



Source: Bloomberg



# Policy Implications

- ◆ Link between monetary policy and financial stability
- ◆ Shadow banks: Reregulate financial institutions outside regulatory structure. Reliance on uninsured short-term funding and no access to the Fed's discount window.
- ◆ Role of the central bank: satisfy the liquidity desires of the private financial system. Lend reserves at the discount window to all qualifying institutions. Lender-of-last-resort functions
- ◆ Regulation and supervision. Hyman Minsky: “The second facet of the Federal Reserve’s lender-of-last-resort action follows from the right of an insurer to require reasonable and prudent behavior of the insuree.” (Minsky, 1986:51)



# Conclusions



- ◆ Changes in the overnight interest rate target have an important impact on balance sheets of nonbanks banks. long/short arbitrage
- ◆ Monetary policy is pro-cyclical relative to Shadow Banks Asset Growth. Tightening cycles lead to an inversion of the yield curve
- ◆ Monetary policy fine tuning is increases the fragility of the U.S. financial system.
- ◆ Changes in funding conditions/cost of leverage lead to cash flow and liquidity strains, especially for highly leveraged institutions.
- ◆ Role of the Central Bank providing lending facilities –wide range of eligible collateral, provide liquidity on demand.
- ◆ Flaws in the U.S. financial system’s regulatory structure, capital adequacy, supervisory system.