Capital Markets and Bank Deleveraging
—The Collateral Angle

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Views are of the author only and not attributable to the IMF

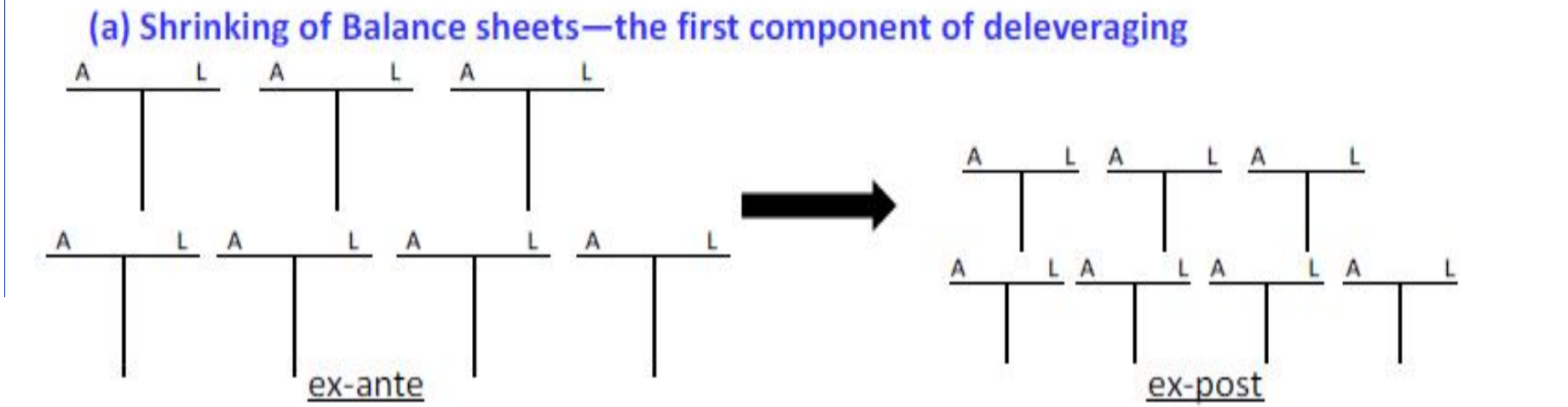
Importance of looking at the (other) Deleveraging

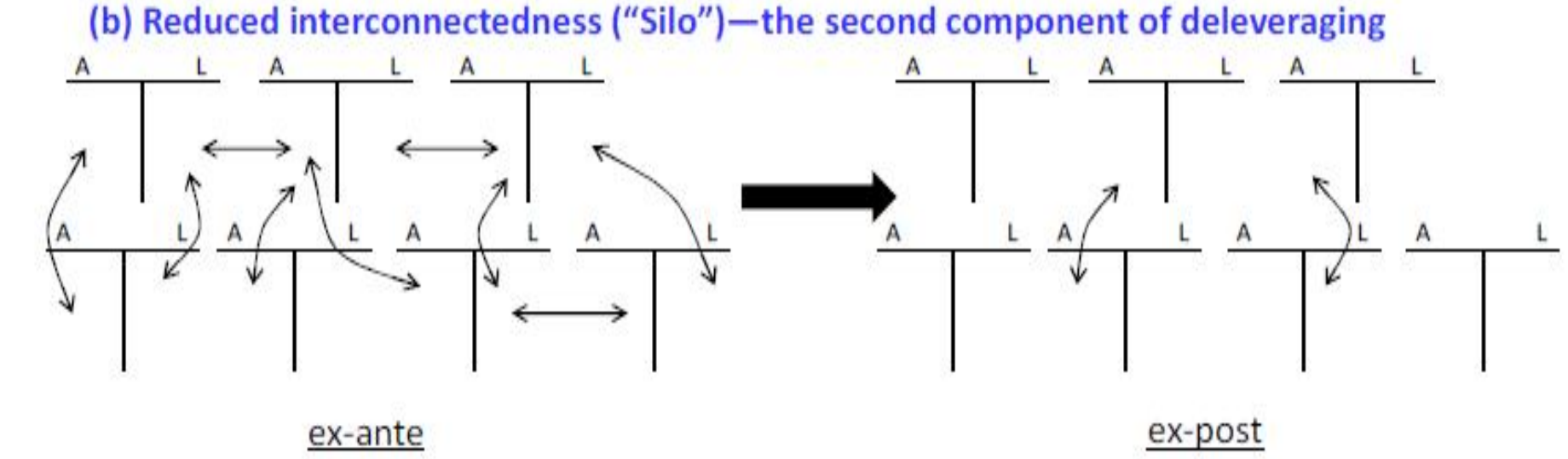
- The balance sheet shrinkage is being postponed—Euro area bank balance sheets may have increased by up to €500bn since the end of November, 2011 helped by the liquidity injection from ECB's 3-year LTROs (net of reduced MROs).

- But de-leveraging of the financial system due to the shortening of 're-pledging chains' as a proxy for interconnectedness of the financial system has not (yet) received attention; **this deleveraging is not being postponed by the markets despite the recent official sector support.**

<<The two LTROs of the ECB were around €1 trillion. However, since MROs gave way to the LTROs, the net liquidity impact from the LTROs was more like €500 billion.>>

Figure 1: Deleveraging Components—Balance Sheet and Interconnectedness





Pledged Collateral for re-use does not appear on B/S but only footnotes

The typical language, in all large banks active in collateral funding appears (roughly) as follows:

As of December 2009 and November 2008, the fair value of financial instruments received as collateral by the firm that it was permitted to deliver or re-pledge was $561 billion and $578 billion, respectively, …….

The suppliers of collateral to the 'street'(or dealers

- The key sources that provide collateral to the street are (a) hedge funds, (b) custodians on behalf of pension, insurers, asset managers, official sector accounts (SWFs, central banks etc).

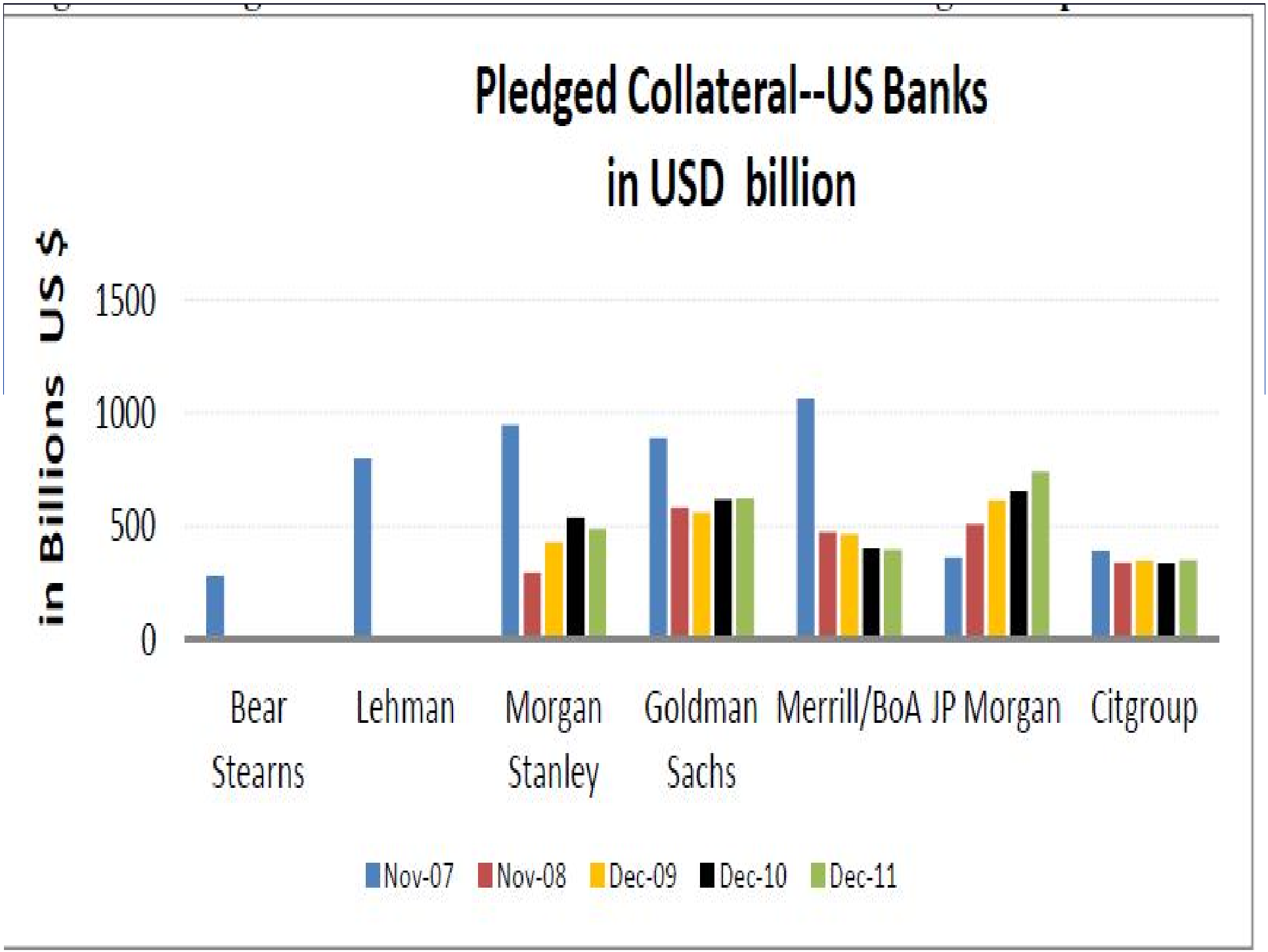
- Generally, hedge funds are the largest supplier of collateral to the "street" that intermediates the bank/nonbank nexus.

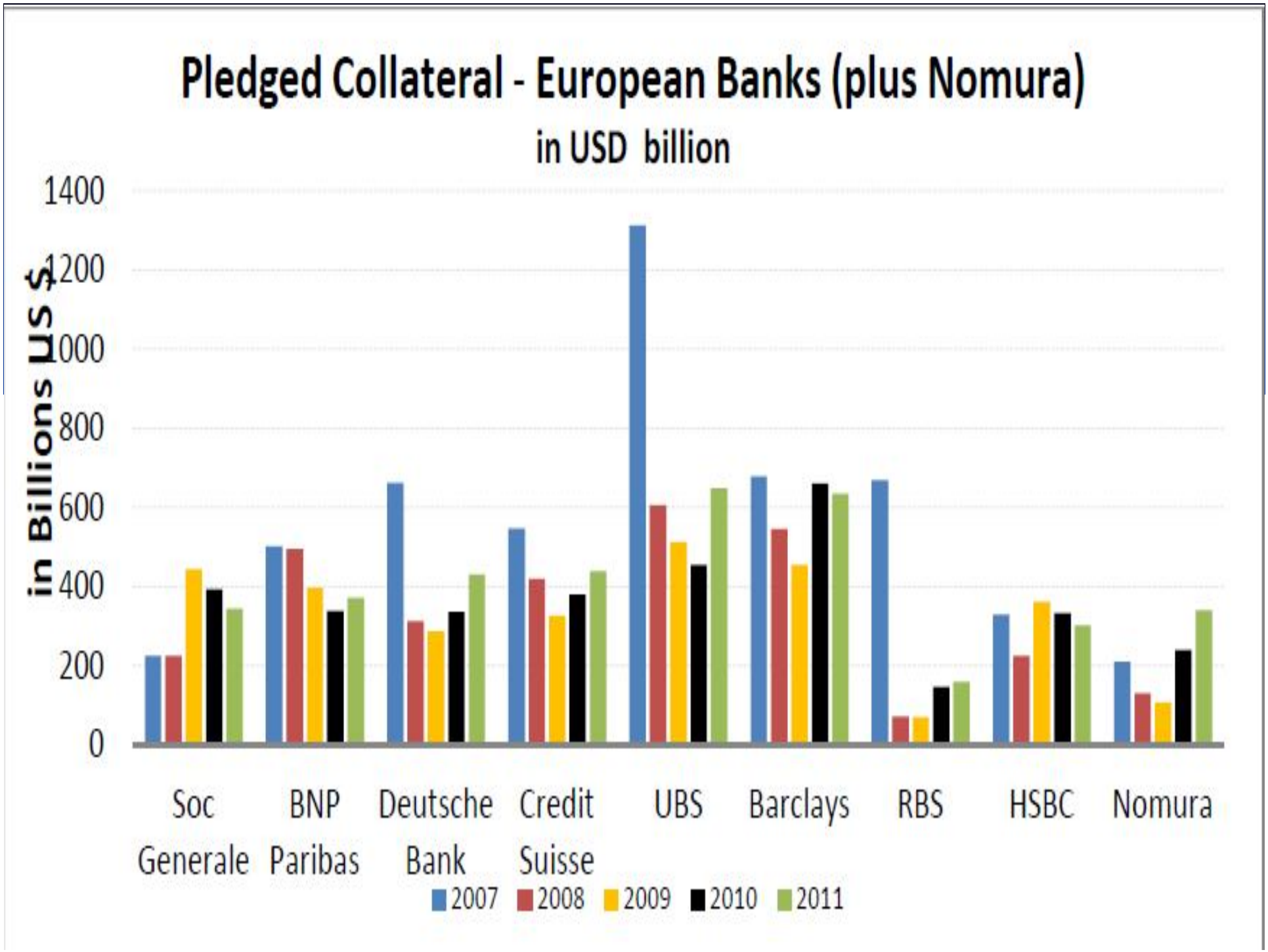
- Others such as pension funds, insurers, official sector accounts generally "lend" their collateral for short tenor to enhance the overall return to their securities.

Re-use of Collateral—some issues

- Collateral can be bonds or equities—as long as it has a market clearing price and collateral is not illiquid (e.g., US Treasuries, IBM shares etc). Collateral that moves (or is reused) does not have to be AAA only

- English Law (or non-NY law) offers a market clearing price for the demand and supply of excess collateral that is not available in the U.S. There has been recent regulatory efforts attempt to minimize regulatory arbitrage—ex, "cap" rehypothecation like in the U.S.; however this is unlikely to change


Pledged Collateral--US Banks
in USD billion
in Billions US $
1500
1000
500
0
Bear Stearns
Lehman
Morgan Stanley
Goldman Sachs
Merrill/BoA
JP Morgan
Citgroup
Nov-07
Nov-08
Dec-09
Dec-10
Dec-11


Pledged Collateral - European Banks (plus Nomura)
in USD billion
in Billions US $
1400
1200
1000
800
600
400
200
0
Soc Generale
BNP Paribas
Deutsche Bank
Credit Suisse
UBS
Barclays
RBS
HSBC
Nomura
2007
2008
2009
2010
2011

Collateral from Hedge Funds

Hedge Funds largely finance their positions in two ways.

- **First**, they can either pledge collateral for reuse to their prime broker in lieu of cash borrowing/leverage from the PB (rehypothecation)
- **Second,** HFs also fund their positions via repo(s) with dealers who may or may not be their PBs.

- HFs take leverage from their PB in lieu of the collateral—usually for equity-related strategies < In the U.S., SEC's Rule 15c3a and Regulation T generally limits PB's unlimited use of rehypothecated collateral from a client. Non US jurisdictions such as UK via English Law do not have any limits.

- HFs also fund themselves by repo-ing out their collateral to other dealers (other than their PBs). Typically, *fixed income arbitrage* and *global macro* strategies seek higher leverage and this is done via repo financing.

The "non-hedge fund" source of collateral

Table 1: Securities Lending, 2007-2011

Collateral Received from Pension Funds, Insurers, Official Accounts etc. (US dollar, billions)					
	2007	**2008**	**2009**	**2010**	**2011**
Securities Lending vs. Cash Collateral	1,209	935	875	818	687
Securities Lending vs. Non-Cash Collateral	486	251	270	301	370
Total Securities Lending	**1,695**	**1,187**	**1,146**	**1,119**	**1,058**

source: RMA

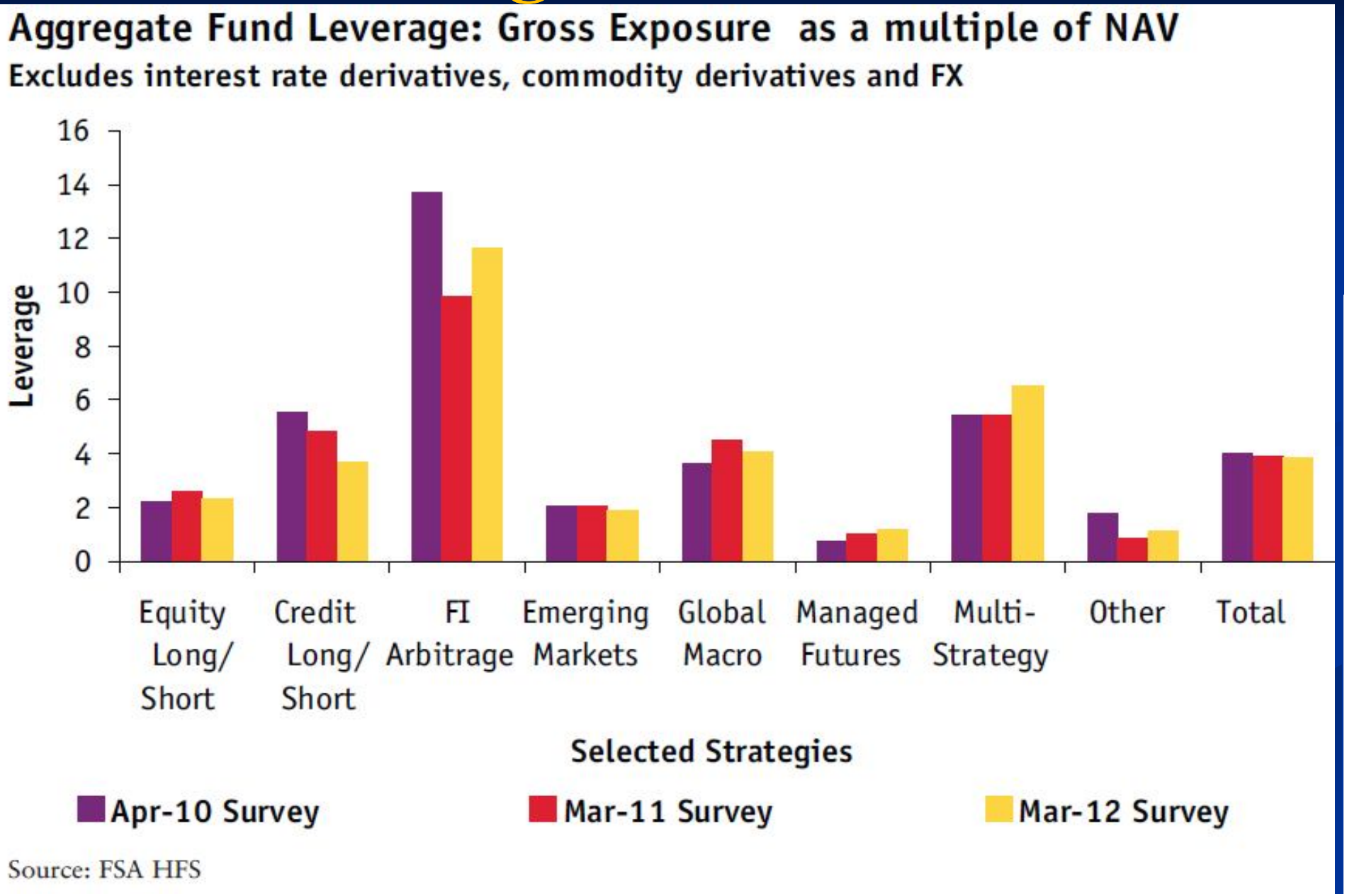
Securities Lending—another primary source of collateral

- We distinguish between primary sources of securities lending rather than the total securities currently on loan.

- We use RMA's data source , which includes only primary sources of securities lending from clients such as pension, insurers, official sector accounts and some corporate/money funds. A recent paper by *Bank of England's Quarterly* (September, 2011) states that about $ 2 trillion of securities were on loan but this includes secondary holdings also (i.e., this counts the bank to bank (or secondary market activity also).

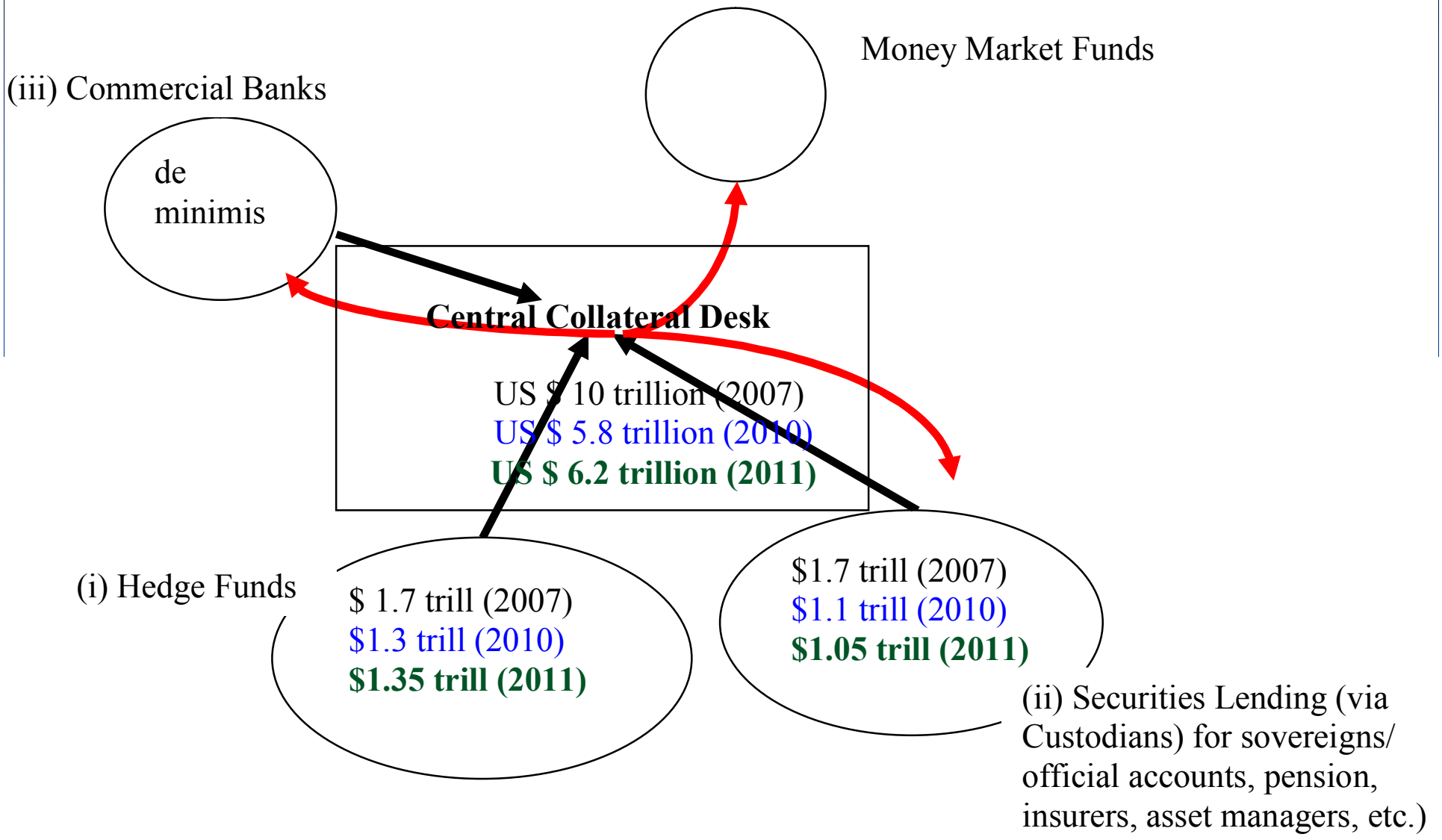
- Securities lending differs from a repo transaction where the motivation is generally to borrow or lend cash. In terms of legality, in a repo there is an outright sale of the securities accompanied by a specific price and date at which the securities will be bought back. On the other hand, securities lending transactions generally have no set end date and no set price—so more flexible and usually used to cover shorts in the market.

HF leverage: source FSA, UK



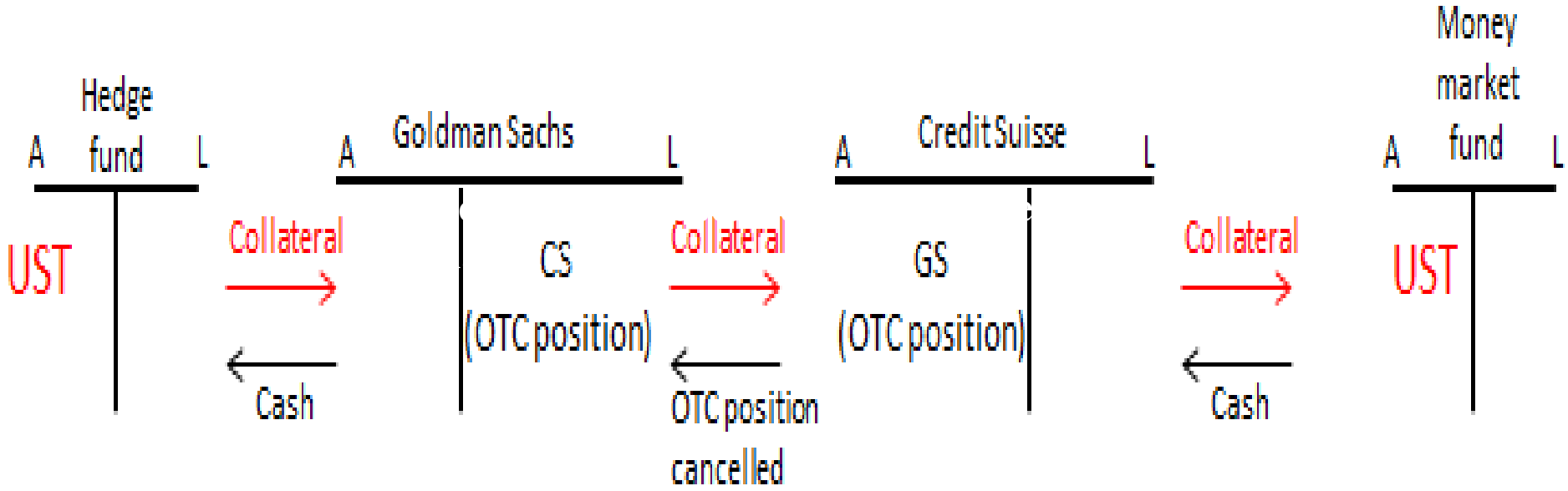
Source: FSA HFS

Figure 5: The Sources and Uses of Collateral—Summary (2007, 2010 and 2011)



Red curve lines = "users" of collateral
Black straight lines = "suppliers" of collateral

An example of repeated use of collateral (that leads to collateral chains)



Methodology to calculate re-use/velocity factor

- Our understanding is that there are 12-14 large banks active in collateral management globally. We may have missed a couple of banks but believe we have picked up about 90% + of the pledged collateral that is received from primary sources such as hedge funds, pension and insurers, asset managers and official accounts.

- We then take the total collateral received as of year say end-2007 (almost $ 10 trillion) and compare it to the primary sources of collateral (the two key buckets identified –hedge funds and other non-banks).

- The ratio of the two is the re-use rate or velocity of collateral (intuitively, the connections the "street" takes to connect the supply of collateral to the demand for collateral in the financial market)

Summary of "source" collateral, velocity/chain, and overall collateral

Table 2: Sources of Pledged Collateral, Velocity and Overall Collateral

Year	Sources		Total Source	"Chain" (velocity)	Overall collateral <"total source" times "chain"> (in trillions USD)
	Hedge Funds (in trillions USD)	Others (in trillions USD)			
2007	1.7	1.7	3.4	3	10
2010	1.3	1.1	2.4	2.4	5.8
2011	1.3	1.05	2.4	2.5	6.2

Source: Velocity of Pledged Collateral—Update, Singh (2012)

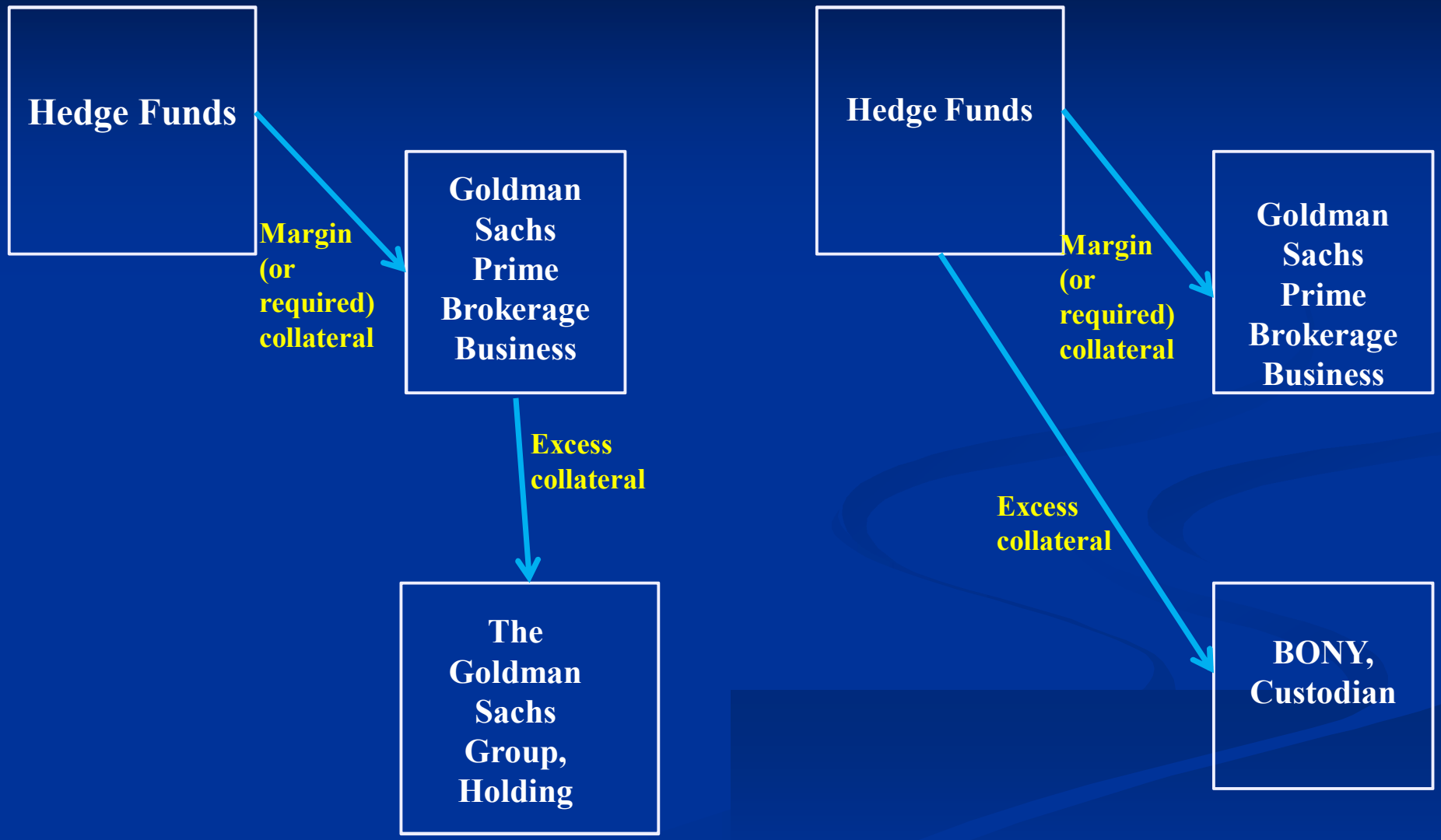
Are there any other buckets that are sources of pledged collateral – Tri Party Repo or SIVs

- The tri-party repo market ($1.8 trillion) in the US is via one of two clearing banks, BoNY Mellon and JP Morgan. Though not explicit, a backstop by the Fed is assumed by the market. Similar sized market in Europe also in multiple currencies.

- **However, such pledged collateral sits with custodians and is not rehypothecable to the street**.—only to the primary dealer club! The collateral is segregated and identifiable in case of default of the collateral provider. This also explains that haircuts during the 2008 crisis were minimal when dealing within the tri-party system, relative to the 'street'.

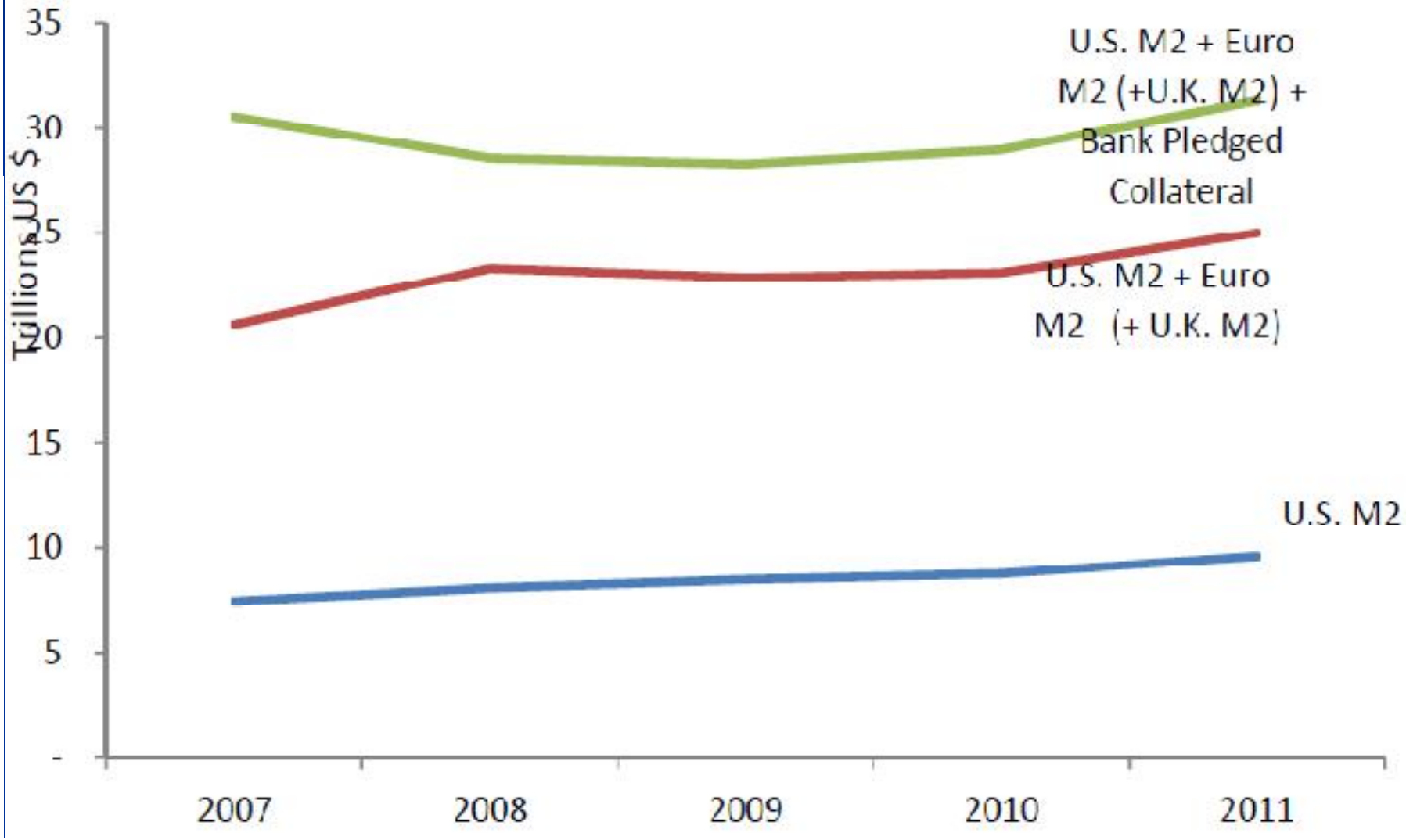
- **SIVs--** these structures were securitization-based and against specific pieces of collateral**; thus it was difficult to raise funding by pledging collateral from such vehicles**

Excess Collateral—HF and PB relation



Money and Collateral

Figure 5: Overall Financial Lubrication—M2 and Pledged Collateral



Policy issues on financial lubrication

- Comparing the pledged collateral market to monetary aggregates like M2—overall financial lubrication after Lehman had a structural break; did "Taylor rule" fail?

- velocity of collateral vs velocity of money; rebound in pledged collateral market preferred to more QE—latter may have quasi-fiscal costs

- "Demand/supply "**wedge" -- new regulatory demands of collateral between $2-4 trillion vs. shrinkage of $4-5 trillion since Lehman**

Table 5. Federal Reserve Bank Consolidated Balance Sheet end-2006

(In billions of dollars)

Assets		Liabilities	
Government Securities	784	FR Banknotes	783
Liquidity providing repos	41	Reverse repos w/ foreign entities	30
Foreign Exchange	21	Bank deposits	19
Gold	11	Government deposits	5
Other assets (net)	11	Capital and reserves	31
Total	868	Total	868

Source: Federal Reserve Bank Annual Report 2006 and author's calculations.

Table 6. Federal Reserve Bank Consolidated Balance Sheet end-2008

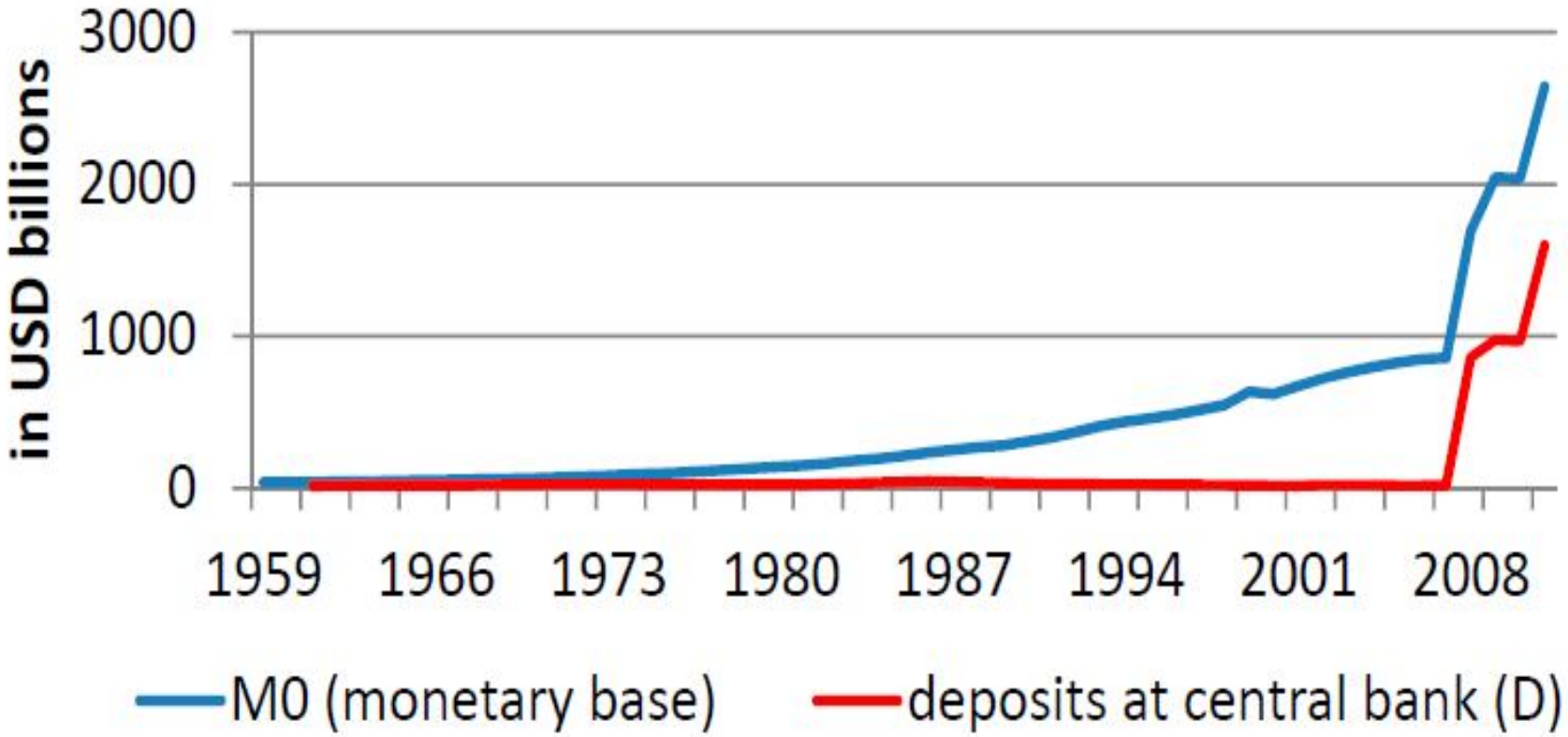
(in billions of dollars)

Assets		Liabilities	
Government and GSE Securities	502	FR Banknotes	853
Foreign Exchange Swaps	554	Reverse repos w/foreign entities	88
Term Auction Credit	450	Bank deposits	860
Commercial paper funding facility	335		
Other loans	194		
Liquidity providing repos	80	Government deposits	365
Maiden Lane LLC holdings	77	Other Liabilities (net)	22
Foreign Exchange (other)	27		
Gold	11	Capital and Reserves	42
Total	2230	Total	2230

Source: FRB 2008 Combined Financial Statements and author's calculations.

QE has led to increase in money but it comes back to the central bank

Figure 1: Monetary Base and Deposits at Central Bank (1959-2011)



Source: Federal Reserve Bank of St. Louis FRED database and authors' calculations.

Monetary Policy Issues

- Large banks do an excellent job with the collateral they receive that is pledged for re-use. The "re-use factor"—analogous to the concept of the "velocity of money"—proxies for the liquidity impact of collateral. Hence a shortage of acceptable collateral would have a negative cascading impact on lending similar to the impact on the money supply of a reduction in the monetary base.

- In the U.S. and Europe, both the Fed and ECB consider many information variables when determining monetary policy. ECB still uses this metric and both U.K. and ECB also publish M3 measure. Post Lehman, there has been a "break down" of Taylor rule, we need to augment the tool kit beyond M2.

- Data on pledged collateral that may be re-pledged and the intensity of the use of that collateral churning factor should be considered by the major central banks within the global financial system. Since cross-border funding is a basic pillar for large banks for efficient arbitrage of their funding operations, the state of the pledged collateral market needs to part of monetary policy also.

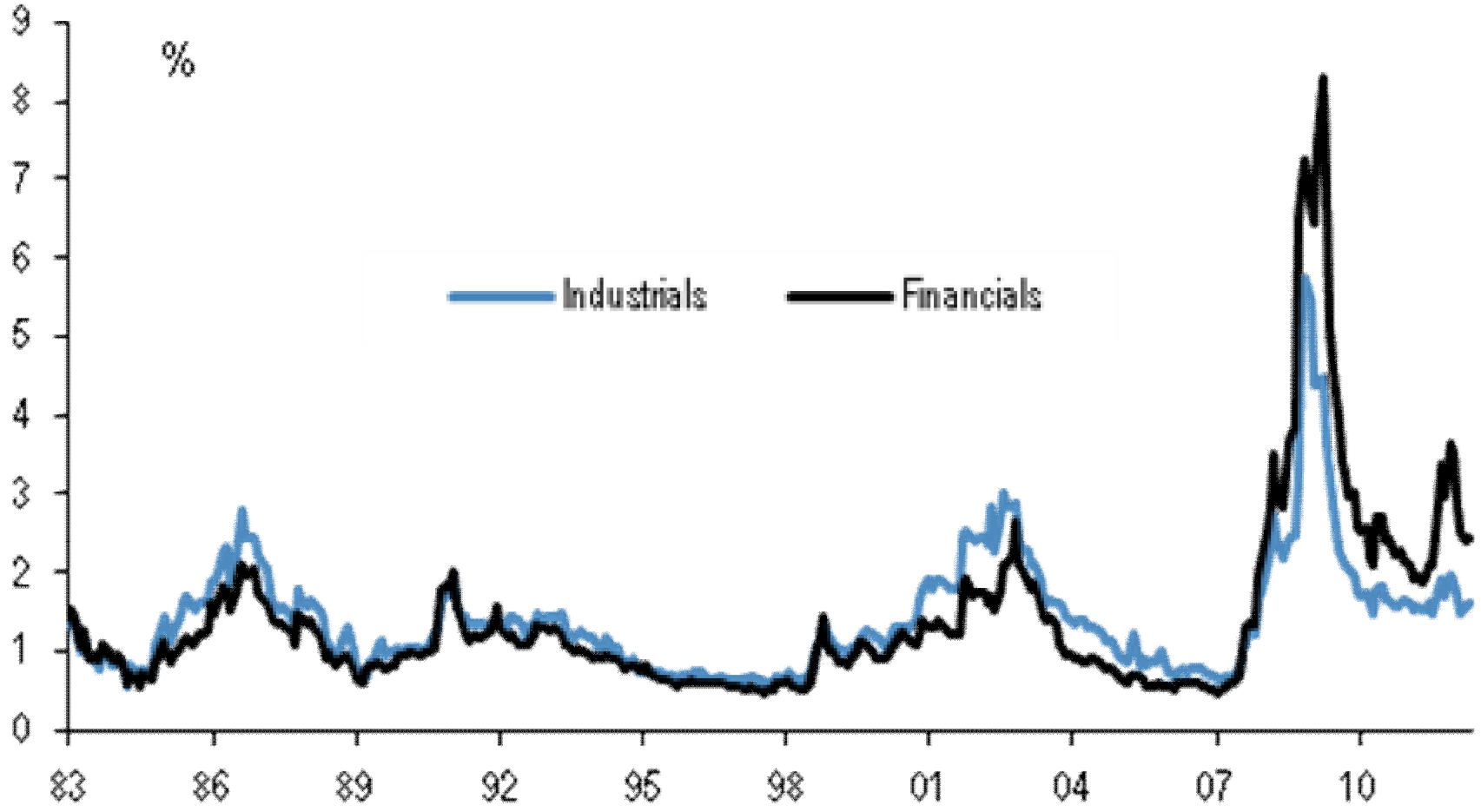
Why, despite rate cuts, the Cost of Credit (in spreads) is higher relative to 2006

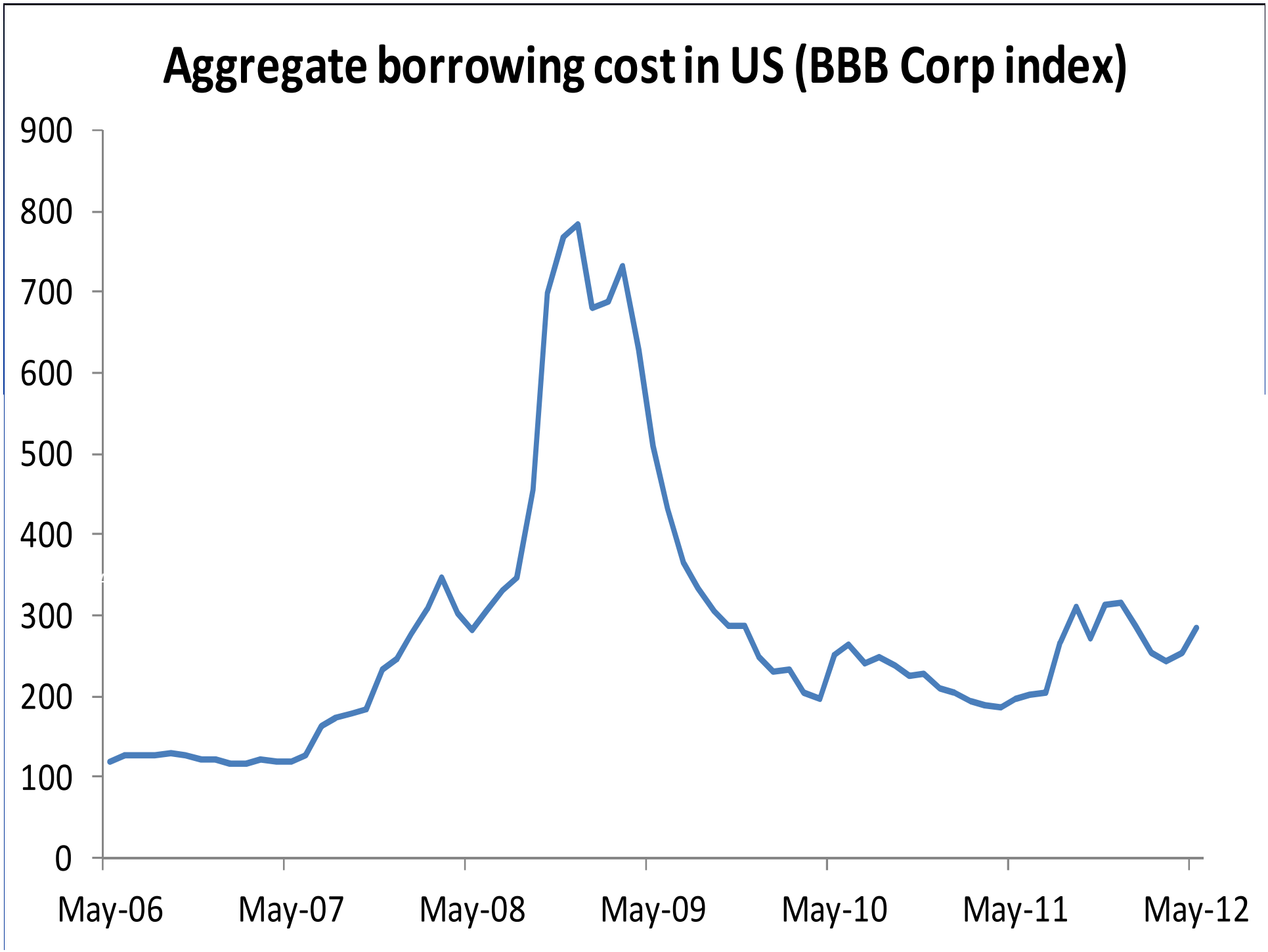
- This second component of deleveraging is contributing towards the higher credit cost to the real economy. In fact, relative to 2006, the primary indices that measure aggregate borrowing cost are well over **2.5 times in the U.S. and 4 times in the Eurozone** (see Figures)

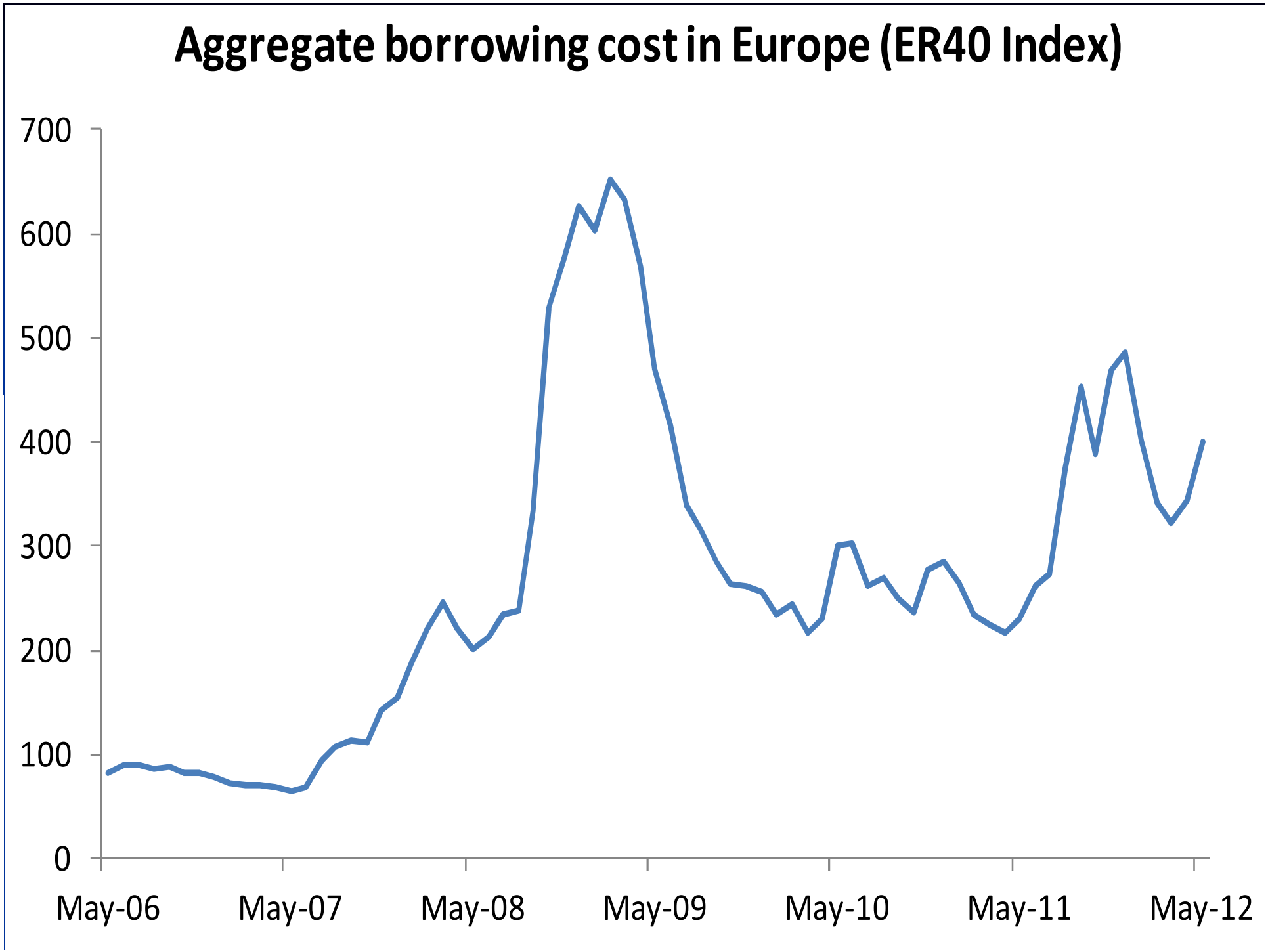
- This is after adjusting for the central bank rate cuts which have lowered the total cost of borrowing for similar corporates (e.g., in the U.S., from about **6% in 2006 to about 4% at present).**

Financials borrowing cost post-Lehman, is now higher than non-financials

(source :Barclays investment grade)




Aggregate borrowing cost in US (BBB Corp index)
900
800
700
600
500
400
300
200
100
0
May-06
May-07
May-08
May-09
May-10
May-11
May-12


Aggregate borrowing cost in Europe (ER40 Index)
700
600
500
400
300
200
100
0
May-06
May-07
May-08
May-09
May-10
May-11
May-12