Banks and Markets
After the Financial Crisis

-An Inevitable Cognitive Failure

-Banks' Capital and Insolvency

-Banks' and Hedge Funds' Capital

-Banks' Capital and Compensations

-The Importance of Failure

-Rebuilding Markets

A COGNITIVE FAILURE

- The economy is a complex dynamic evolving system populated by fallible agents with imperfect knowledge.
- Financial regulation and large financial institutions have become themselves complex systems.
- The financial crisis was caused by massive unavoidable cognitive failure by regulators and bankers.
- We need to switch to new paradigms to understand what happened, why it will happen again, and hopefully be more resilient when it will.
- Misunderstood financial permissivism caused the financial crisis.

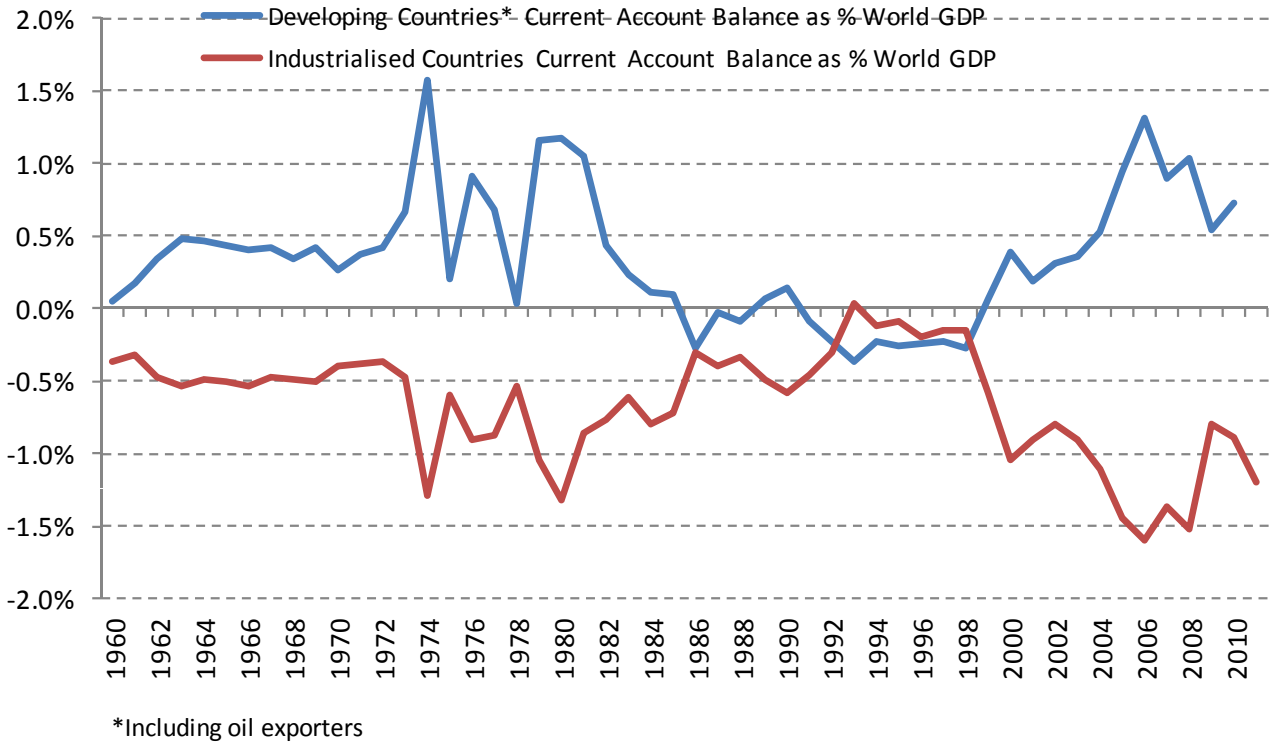
FINANCIAL CRISIS: FALSE CAUSES
Moral Hazards were not relevant

- Performance Bonuses
  No one had more personal alignment with their companies than Fuld at Lehman and Cayne at Bear Stearns. Each of them personally lost USD 1 billion.

- Too Big To Fail
  No evidence any firm consciously exploited the advantage by increasing its risks and profits. All operated always well within regulatory limits.

- Regulatory Capture
  Well, maybe some moral hazard here…

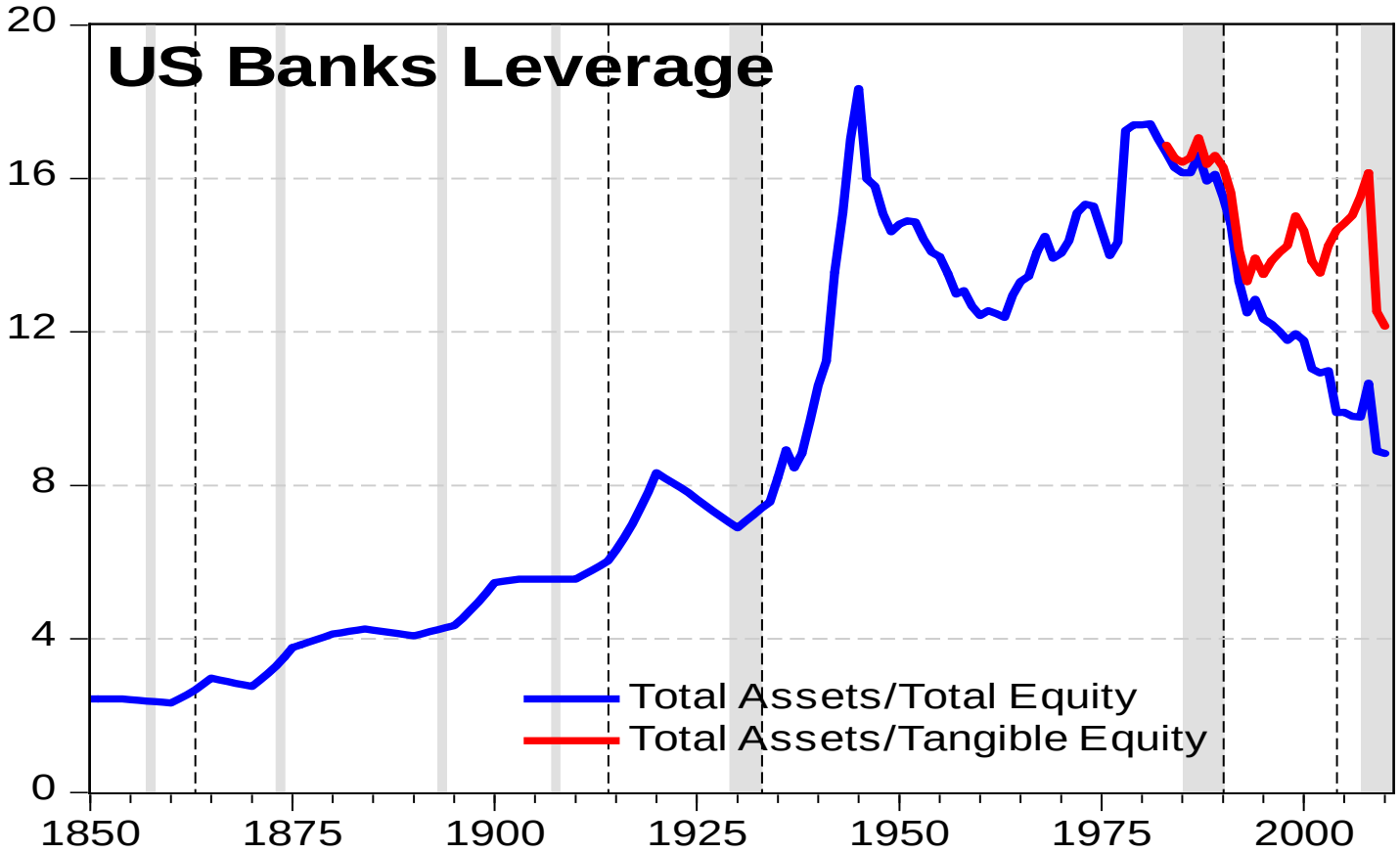
FINANCIAL CRISIS : TRUE CAUSES
International imbalances have played a primary role.



As before the banking crisis of 1982, that led to the Basel I regulations, international trade imbalances had created vast pools of savings that had to be recycled through the financial system. In the period leading to the 1982 crisis American banks, limited in their national ambitions by US regulations, recycled petro dollars into Latin America. Before the current crisis, banks where crowded out of the best credit markets (US Treasury and corporate AAA) by SWF and moved into riskier investments.

But why are banks always getting into troubles?

FINANCIAL CRISIS : TRUE CAUSES
Financial Permissivism



(a) National Banking Act – 1863
(b) Creation of Federal Reserve – 1914
(c) Creation of Federal Deposit insurance Corp – 1933
(d) Implementation of Basel risk-based capital requirement – 1990
(e) Implementation of Basel II risk-based capital requirement – 2004

Shaded Areas point out US banking crisis
Source: Federal Deposit Insurance Corporation

INSOLVENCY RISK

WHY IS CAPITAL NEEDED?

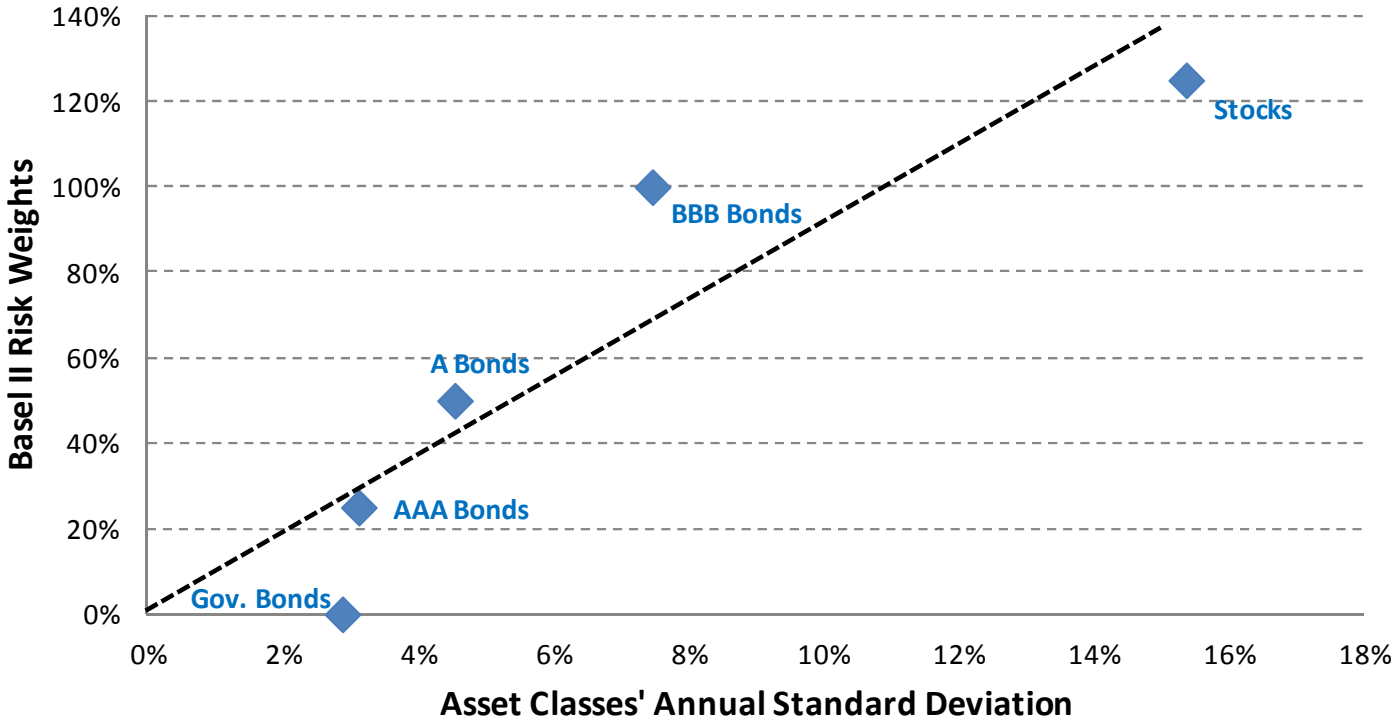
Capital is needed to absorb losses before they affect other liabilities and cause insolvency.

HOW PROBABLE ARE LOSSES?

For normally distributed returns, there is a 50% probability of encountering losses higher than 1 annual standard deviation every 4 years, and of suffering losses larger than 2 annual standard deviation every 30 years.

RISK WEIGHTING ASSETS

- Basel's Bank Capital Requirements are mainly based on Risk Weighted Assets
- Every asset class is assigned a risk weight either by the regulator (Standard) or by banks' internal models.



CAPITAL AND RISK WEIGHTED ASSET

	Gov Bonds	AAA Bonds	A Bonds	BBB Bonds	Stocks
Annual StDev	2.9%	3.1%	4.5%	7.5%	15.3%
Basel II - Risk Weight Coeff.	0%	25%	50%	100%	125%
Basel II Minimum Capital	-	2%	4%	8%	10%
Basel II - Allowed Leverage	∞	50	25	12.5	10
Basel III Minimum Capital (including capital buffers of 5% of RWA)	-	3%	6.5%	13%	16.3%
Basel III - Allowed Leverage	∞	30	15	8	6

While the risk weighting scaling is broadly coherent with volatility scaling, Basel requirements at around one annual standard deviation of the assets they refer is perplexing. And this is before exploiting the benefits of diversification and considering fat tails risk.

A SAMPLE BANK BALANCE SHEET

Equity/RWA (Tier 1 Ratio)	12.5%
RWA/TA	45%
Leverage	17.7

Risk Equivalent Bank Balance Sheet

	Nominal	*Basel II coef*	*Risk Weighted*
Stocks	354.0	125%	442.5
AAA Bonds	1416.0	25%	354.0
Tot Assets	1770		796.5
Tier 1 Capital	100		

A typical bank has a portfolio that has the same risk as one leveraged 3.5x in equities and 14x in AAA bonds. Other than in regulated banks, portfolios with so much risk do not exist because they would not survive long.

A SAMPLE HEDGE FUND BALANCE SHEET

Sample Aggressive HF Balance Sheet	Positions	Basel II RW	RWA
Stocks Long	120	100%	120
Stocks Short	60	100%	60
Stocks Net	60		
Gov Bond , 8y duration	100	0%	0
Corp Bond BBB 3y duration	30	100%	30
Foreign currency	50		
Interest rate risk			29.0
Currency risk			62.5
Total Assets	310		
Total Risk Weighted Assets			302
Equity	100		

Equity/RWA	*33.2%*
RWA/TA	*97%*
Leverage	*3.1*

Min Capital according to Basel III (13% of RWA including add on) = 39.3 so an aggressive HF has 2.5x the minimum capital prescribed to banks

AN AGGRESSIVE HF WOULD HOLD AT LEAST TWICE AS MUCH CAPITAL AS A BANK

	Bank	HF
Equity/RWA (Tier 1 Ratio)	12.5%	33.2%
RWA/TA	45%	97%
Leverage (TA/Eq)	17.7	3.1
Capitalisation (Eq/TA)	5.6%	32%
Assets' Volatility	4-6%	10-15%

Banks, also under Basel III, will have capital equal to only roughly one annual standard deviation of their assets.
This gives bank a 50% chance of becoming insolvent every 4 years.
Aggressive HF have 2-3 annual standard deviation of capital at least.

THE ACTUAL SITUATION

	EU Banks Top 61 (€bn)	US Banks Top 18 ($bn)
Total Assets	29'076	12'031
Risk Weighted Assets	9'680	7'461
RWA/TA	33.3%	62.0%
Tier 1 Cap	1'199	962
of which tangible common eq.	1'028	828
T1/RWA (Tier 1 Ratio)	12.4%	12.9%
T1/TA	4.1%	8.0%
Leverage (TA/T1)	24x	12.5x
Tangible Leverage	28x	14.5x

European Banking Authority - Capital Exercise Oct.12 - Q212 Balance Sheets

Federal Reserve - Stress Test March 13 - Q312 Balance Sheets

US banks are less leveraged but on a riskier portfolio (also because of different accounting standards on derivatives netting).

CAPITAL AND ASSETS' VOLATILITY

	Gov Bonds	AAA Bonds	A Bonds	BBB Bonds	Stocks
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	61 EU Banks	19 US Banks	
Annual StDev	3-4%	5-6%	
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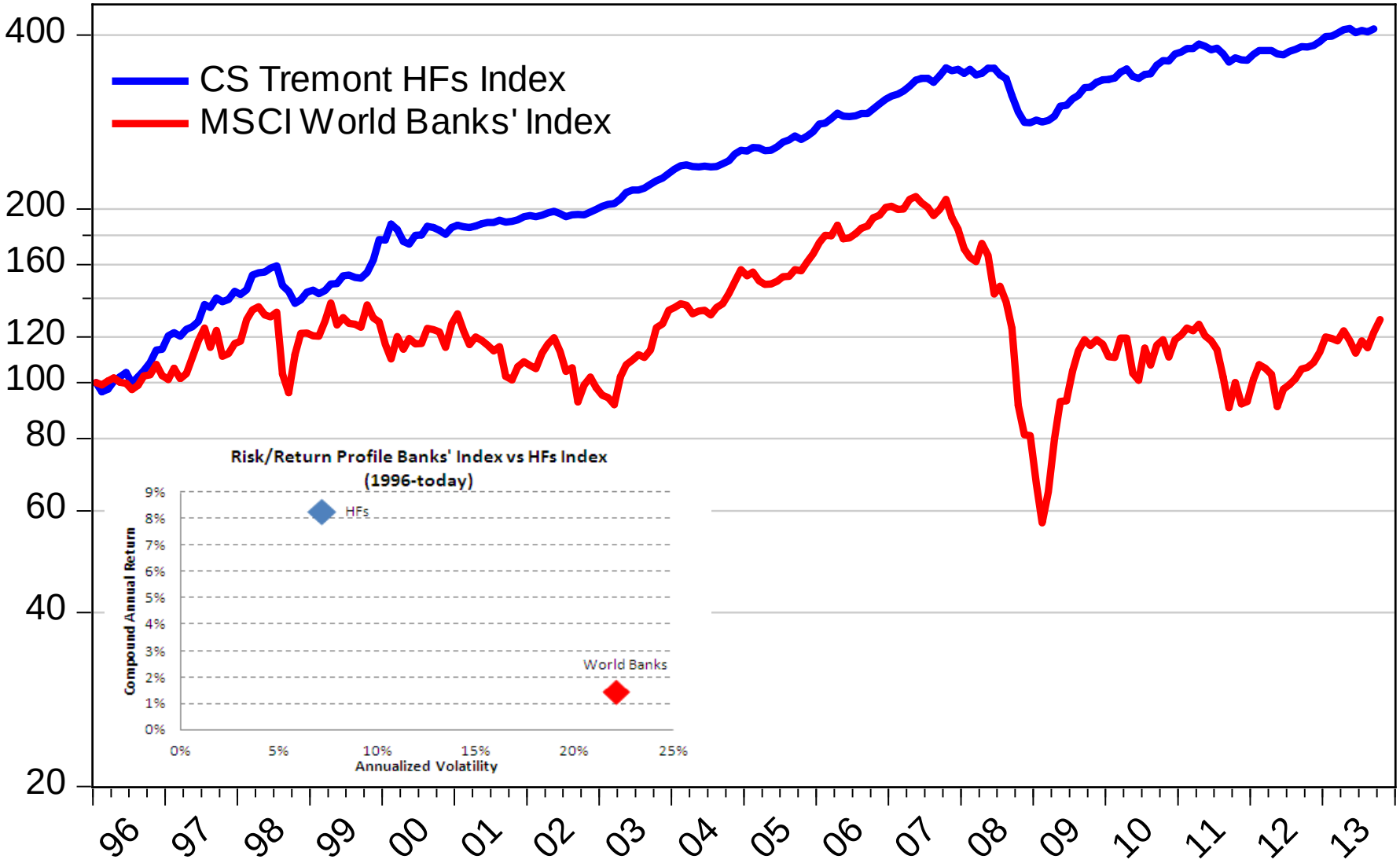
Actual Capital	4.1%	8.0%	
Basel II Minimum Capital	2.7%	5.0%	(8% of RWA)
Basel II - Allowed Leverage	38	20	
Basel III Minimum Capital (including capital buffers of 5% of RWA)	4.3%	8.1%	(13% of RWA)
Basel III - Allowed Leverage	23	12	

HEDGE FUNDS ARE 3 TIMES LESS RISKY THAN BANKS



BANKS AND HEDGE FUNDS CAPITAL

- Banks have been regulated into holding too little capital for their business and banks' capital valuation in equity markets has been accordingly very volatile rising rapidly with gains and being almost entirely wiped out in the crisis.
- Hedge funds are unregulated financial intermediaries which have been free to run their business with the capital they deemed appropriate.
- Banks have been three times as volatile (risky) as hedge funds suggesting banks should have at least 3 times more capital than they currently have, to be as risky as hedge funds.
- Unregulated hedge funds not only turned out to be substantially less risky than banks but also had far better returns. They had, though, similarly fat compensation, suggesting that the problems do not lie in compensation structures but in capital requirements.

BANK CAPITAL AND EXCESSIVE COMPENSATION

- The problem of excessive compensation in big banks can be read as one of insufficient capital which leads to unreasonably high pre bonus ROE (due to both fat "R" and too small "E") which managements reduce to publishable ROE by pocketing the difference.
- The "R" is bigger than it should be also due to the "Too Big To Fail" rent position big banks enjoy as OTC market makers in securities and derivatives. There can be no differentiation between front running and market making when dealing with captive clients as in current oligopolistic OTC markets.
- The "E" is too small due to the grossly underestimated minimum capital requirements the banks have been regulated into. This was the devastating result of years of pondering by the sort of internationally coordinated regulatory effort, from which solution to the current predicament is still expected.

2010 COMPENSATION LEVELS AND ROE

Top US Banks	Total employees	Avg Actual Compensation (USD)	Actual ROE	ROE if Av. Compensation Fin Sector - (1)	ROE if Av. Compensation Fin Sector & 2x Capital	ROE Adjusted/ROE Actual
Goldman Sachs	35,700	443,725	11.5%	29.6%	14.8%	1.3
Morgan Stanley	62,542	256,596	9.0%	15.4%	15.4%	1.7
Wells Fargo	272,200	99,971	10.5%	16.3%	8.1%	0.8
JPMorgan	239,831	117,266	10.3%	16.3%	8.2%	0.8
Bank of America	288,000	122,045	-1.8%	9.1%	4.5%	-2.5
Citigroup	260,000	93,962	6.7%	9.7%	4.9%	0.7
Average US	193,046	188,927	7.7%	16.1%	9.3%	0.5
Top European Banks	Total employees	Avg Actual Compensation (USD)	Actual ROE	ROE if Av. Compensation Fin Sector - (1)	ROE if Av. Compensation Fin Sector & 2x Capital	ROE Adjusted/ROE Actual
Barclays	147,500	124,747	7.3%	16.9%	8.5%	1.2
Societè Generale	160,704	78,748	10.4%	11.6%	5.8%	0.6
Credit Agricole	87,520	114,464	3.0%	9.0%	4.5%	1.5
DB	102,062	164,361	5.4%	21.5%	10.8%	2.0
BNP Paribas	205,348	97,415	12.3%	17.7%	8.8%	0.7
Credit Suisse	50,100	279,545	13.6%	18.5%	9.3%	0.7
UBS	64,617	251,200	17.2%	18.2%	9.1%	0.5
Average EU	116,836	158,640	9.9%	16.2%	8.1%	1.0
TOT AVERAGE	154,941	173,784	8.8%	16.1%	8.7%	0.7

(1) ROE if Avg compensation was USD 75000

CAPITAL AT NORMALIZED COMPENSATION

- Had banks paid in 2006 the average compensation of USD 75’000 for the financial sector (US Bureau of Labour; average US wages in all sectors were USD 39’200), a sample of the major US and European banks would have reported ROE of 31.5% versus the 19.5% ROE they actually reported given the excessive compensation they actually paid.
- In 2010 reported ROE fell to 8.8%. Of the decline from 19.5% in 2006, roughly 4% was lost due to higher capital and 7% due to worse business conditions. Again, had banks paid in 2010 only average compensation, the reported ROE would have been 16.1%, way too high for a business then enjoying government support.
- At about twice the current capital levels, banks would report roughly the same ROE as they now do if they paid only, as they should, average financial sector compensation of $75’000.
- Some bankers, like DB’s Ackermann, still boast they have a collection of businesses earning ROEs of over 20%. If they had zero capital, ROE would be infinite…

HOW MUCH MORE CAPITAL DO BIG BANKS NEED?

Compared to the capital they now have, big banks would seem to need:

- Financial analysis derived guess: about 2 times their current capital.
- Hedge Fund comparison derived guess: about 2 times.
- Compensation derived guess : about 2 times.

THE IMPORTANCE OF FAILURE

"New Economic Thinking recognizes that economic agents, and economists, have imperfect understanding, are prone to error and face a complex dynamic system"
(INET Vision Working Group – WIP – November 2013)

In such an environment, failure is an inescapable part of the process of human progress and knowledge accumulation. Early recognition and correction of mistakes improves resilience, as do buffers and shock absorbers such as bank capital or social safety networks.

Intrinsic fallibility and radical uncertainty.

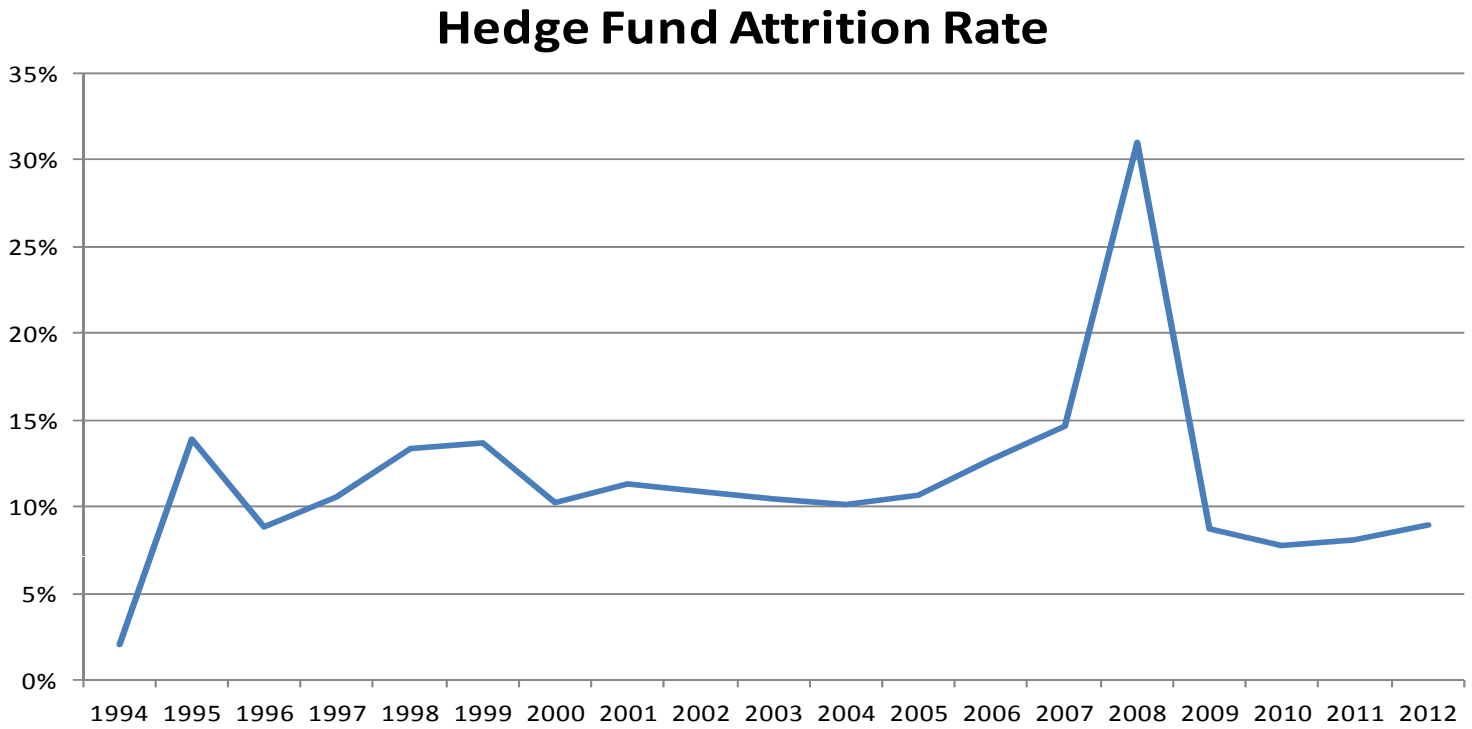
HEDGE FUNDS FAILURES

Failure, among HF, is defined as funds ceasing to exist. This “Attrition” usually occurs simply because returns don’t match investors’ expectation.

It very rarely occurs because of an insolvency. Notable exemptions were LTCM (1998) and Peloton (2009) which where among the very few HF that allowed their risk to balloon towards banking levels.

In a crisis, HF fail because disappointed investor redeem entirely after losses exceed expectations. This happens when a fund loses 3-4 times its annual standard deviations. An aggressive HF with a 12% annual standard deviation will probably be redeemed to oblivion if it suffers a drawdown of -50% or so.

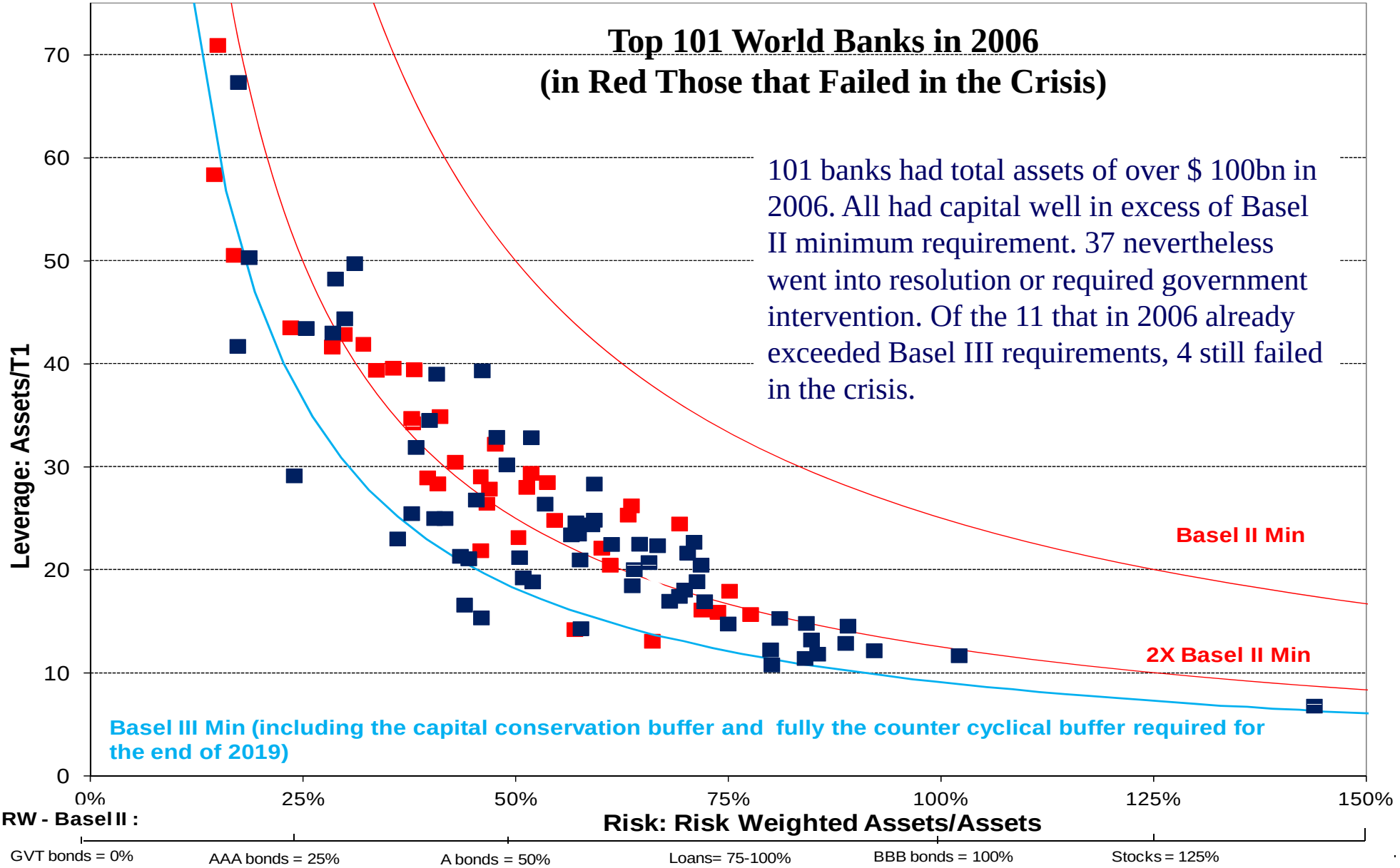
CREATIVE DESTRUCTION



Note: Attrition rate is the % of funds in a database that disappear each year, thus overestimating the actual shutdown rate. Source: CISDM (from 1994 to 2009), HFR (from 2010 to 2012).

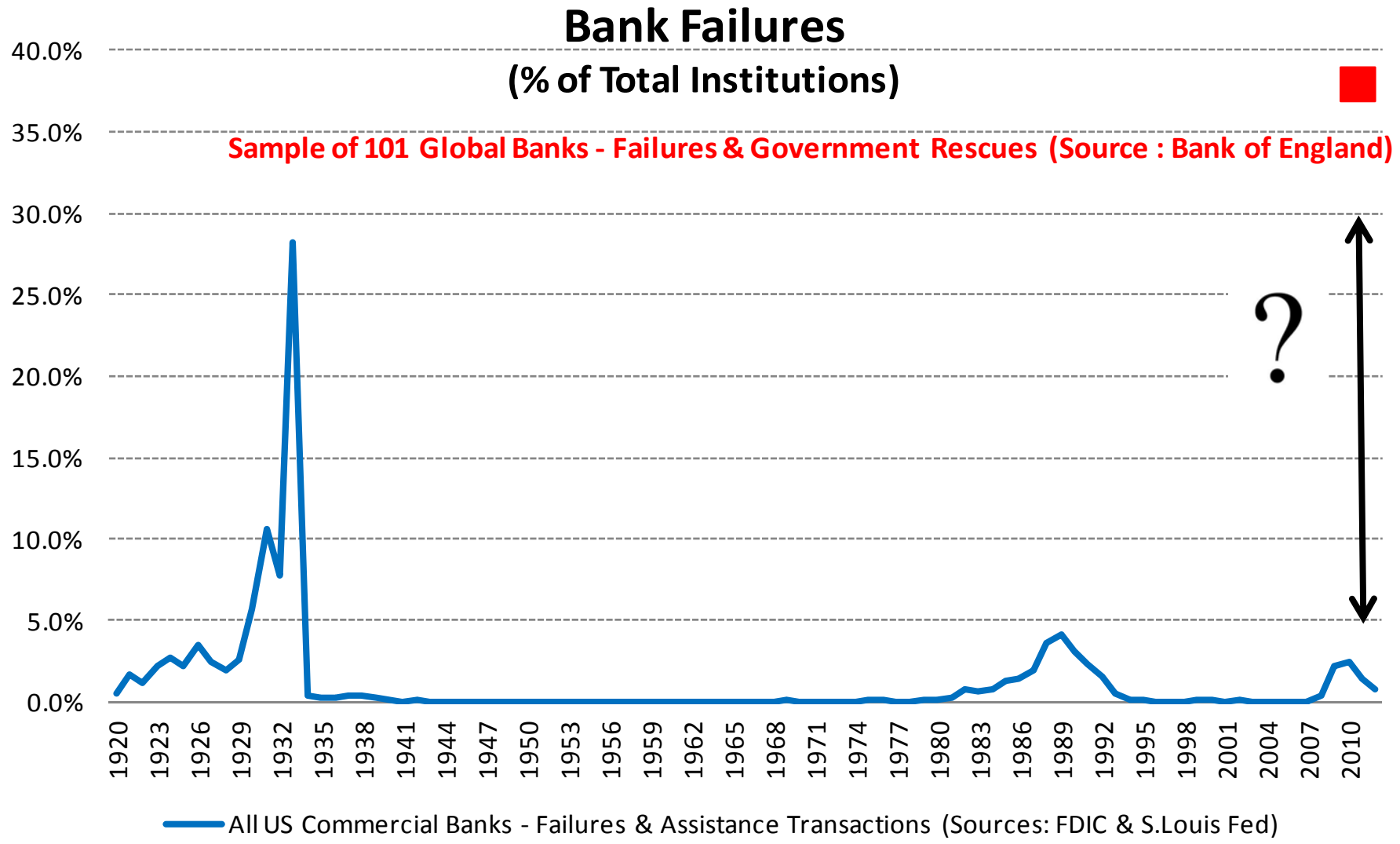
Failure among HF is a frequent event that should never have systemic consequences (LTCM did).

FAILURE AMONG BANKS



Source of Data : Bank of England

DISTORTING CONSERVATISM



Failure is a matter of definitions…

BANK FAILURE DEFINITION

"The solvency of a bank depends on whether the value of its assets, ***if held to maturity*** , is sufficient to meet its obligations to depositors and holders of other bank debt" (John Vickers, "Some Economics of Banking Reform" Dec, 2012 – emphasis added).

If banks are to rely on markets, rather than taxpayers, for their funding, they must remain solvent on a **mark-to-market** basis.

The fuzzy and unworkable concept of "value if held to maturity" relies on estimates made by economic agents that are bound to be even more biased than the market (the management that brought the bank in trouble, the authority whose supervision failed).

A butterfly effect: an apparently small mistake in the regulator's definition of bank solvency has triggered the biggest financial hurricane in 80 years.

WHAT MARKETS DO WE WANT?

- From efficient markets as an hypothesis to more efficient markets as an objective. Markets have no better alternative: but how do we improve them?
- In most countries, markets' supervisors (SEC, CFTC, CONSOB) have lost influence in favour of banks' supervisors (Fed, Bank of Italy) who generally have little market culture. Many lessons historically learned by exchanges have hence been forgotten with disastrous consequences.
- Network theory should provide the theoretical framework to validate old lessons and highlight new dangers. For instance the current hubs and spokes financial network configuration is notoriously prone to catastrophic failures.
- The entanglement of the relationship between large intermediaries, the Exchanges and sophisticated customers such as hedge funds prevents the latter two from raising questions and making suggestions on how to improve on some evident market criticalities and dysfunctions.
- This special moment in history would require more commitment and engagement on how to improve markets by those that have benefited so much from them.

CREDIT DIFFERENCES LEAD TO OLIGOPOLISTIC TRADING

- Markets prefer to trade on a forward basis as it facilitates leverage. Futures and derivatives prove it.
- Forward settlement of transactions brings about counterparty credit risk.
- In unregulated OTC markets, trading will gravitate towards the intermediaries with the best credit: the Too Big To Fail are by definition, but not by merit, the best credits and, as fragile hubs of all trading, become Systemically Important Financial Institutions (SIFI).
- Concentrating trading on a handful of SIFI intermediaries gives them a sample of orders large enough to make market making indistinguishable from front running. This explains why Goldman Sachs, Bank of America, Morgan Stanley, etc. can achieve quarter after quarter of "trading" profits without losing in any single day, which statistically should be almost impossible.
- A 2-3% market share might offer a statistically significant sample sufficient to engage in front running activity. We probably need at least 50-100 roughly equally large intermediaries, not half a dozen SIFIs.
- (Self)regulated Exchanges had understood long ago that all market participants must have equal credit to improve price discovery and avoid concentration.
- On Exchanges, margining and centralised clearing historically solved the credit problem. No participant, product or intermediary should be exonerated from posting margins to their counterparty.

NOT ALL PRODUCTS MIGHT BE TRADABLE

- Credit Default Swaps sellers are writers of options and naked writing of options requires careful margining (and has historically been a fatal source of funding).
- The S&P500 may move up or down by 50% or so in a year, and will do so in relatively small increments that makes appropriate margining possible. CDS may go from 1% to 100%, a 3 orders of magnitude move, and will do so in gaps, making reasonable margining almost impossible.
- A reasonable clearing house should ask sellers of CDS margins so high that the product would lose its appeal.
- This is just fine, since sellers of protection (those who should pay the margin, but currently don't) are probably using the product as a funding mechanism and are not properly accounting for the risk they run, just as AIG did. Given the shape of the distribution of credit returns, appropriate margin or accounting might be impossible.
- When overused, asymmetrical returns products, like options, tend to skew the return profile of the asset class they refer to, by creating dangerous feedback loops. Portfolio insurance in the 1987 NYSE crash is a case in point. Open interest in asymmetrical products should be disclosed and monitored. The amount of Credit Default Swaps outstanding versus the amount of credit risk is another example.

COST OF TRADING

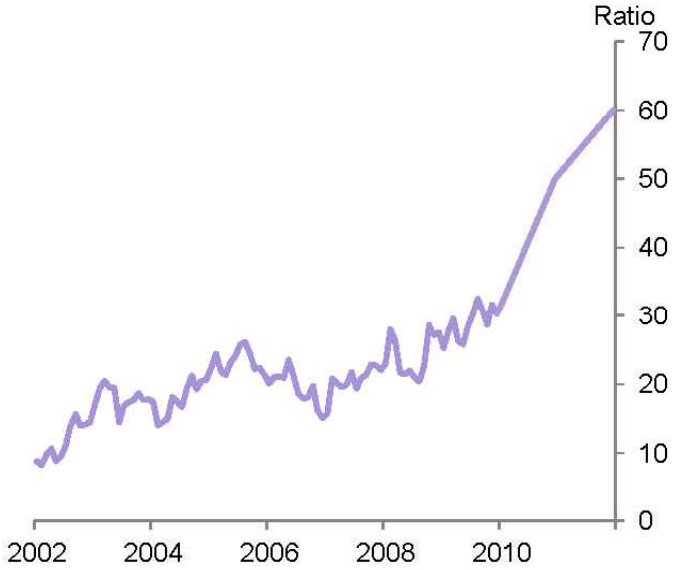
- High Frequency Trading that dominates trading on Exchanges might be based on marginal information that may actually be fraudulent.
- The anachronistic collapse of the average order size on Exchanges and the grossly abnormal risk-free returns of HFT point towards severe inefficiencies that must be corrected.
- Exchanges seem to have lost track of their higher, almost sacred, purposes and duties of ensuring fair markets in favour of the transaction fee profits generated by their largest customers.
- One could envisage a world wide trading protocol (similar to the internet's communication protocol) that, coupled with a safer clearing process, might replace today's trading venues.
- There probably is a relationship between the cost of trading an asset and the quality of the information on which the marginal transaction is made. The lower the cost, the lower the quality since wrong decisions can be cheaply reversed. Low trading costs lead to short termism.
- A "Tobin Tax" might raise the quality of the information on which the marginal transaction is made and lengthen the time horizon of trading activity. Calibrating a tax that would decrease liquidity is difficult given the feedback loop between direct trading costs, including the tax, and indirect costs, such as price impact of orders, which are determined by liquidity.

HIGH FREQUENCY TRADING

The race to zero

Year	Estimated trade execution speed
1970s	Around 10 minutes
1990s	Around 2 minutes
Today	Around 250 microseconds

Order cancellations



- Breaking the speed limit

BANK OF ENGLAND

7

COGNITIVE FAILURES OF REGULATORS

- Basel II regulation allowed banks to operate with amazing low minimum capital requirements.

- Banks' capital requirements were set lower than the annual volatility of banks' assets. It would seem logical to set prudential minimum capital requirements for banks at a multiple, not a fraction, of the annual volatility expected for the assets on banks' balance sheets…

	EU BANKS Top 90 (€bn)	US Banks Top 19 ($bn)
Total Assets	27,473	12,188
Risk Weighted Assets	11,360	7,356
RWA/TA	41%	60%
Tier 1 cap	1,218	907
of which tangible common eq.	754	741
T1/RWA (Tier 1 Ratio)	10.7%	12.3%
T1/TA	4.4%	7.4%
Leverage (T1/TA)	22x	13x
Tangible Leverage	36x	16x

- As a consequence, banks are three times as risky as hedge funds, unregulated financial intermediaries who have been free to run their business with the capital they deemed appropriate.

	Gov Bonds	AAA Bonds	A Bonds	BBB Bonds	Stocks
Annual StDev	2.9%	3.1%	4.6%	7.5%	15.8%
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- A theoretical "aggressive HF" balance sheet, seen through Basel rules, would show a Tier 1 ratio of 28%, more than almost twice the capital required by Basel III.

- Excessive compensations in banking is also a direct consequence of grossly underestimated regulatory capital requirements.

	90 EU Banks	19 US Banks	
Annual StDev	3.7-5%	5-6%	
Basel II - Risk Weight Coeff.	41%	60%	
Basel II Minimum Capital	3.3%	4.8%	(8% of RWA)
Basel II - Allowed Leverage	30	21	
Basel III Minimum Capital (including capital buffers of 5% of RWA)	5.3%	7.8%	(13% of RWA)
Basel III - Allowed Leverage	19	13	

COGNITIVE FAILURES OF REGULATORS

2) Destroying the EU Common Market:

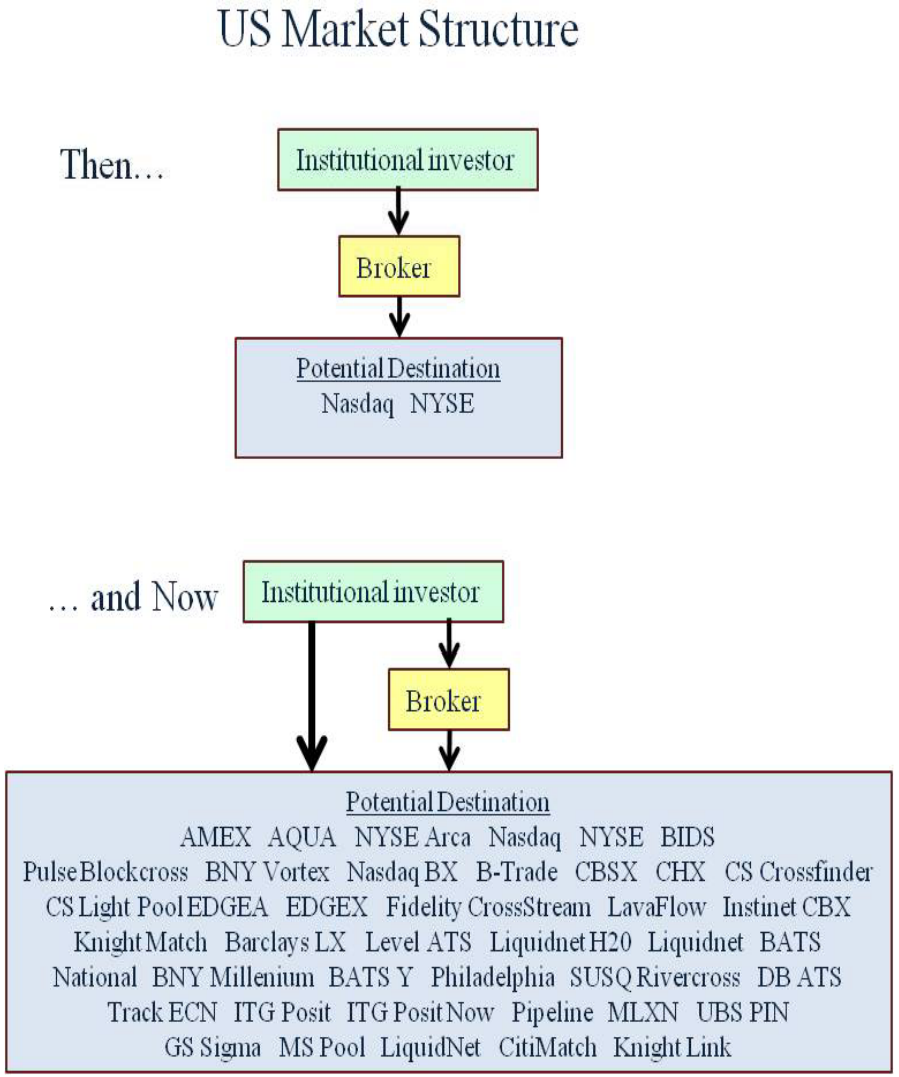
- The 2008 financial crisis caught European technocrats unprepared to deal with a banking crisis.
- A European plan to resolve insolvency and recapitalize banks had not been developed. Mrs. Merkel decided in 2010 to fall back to national bail outs.
- Banks now forced to rely on national governments as lender of last resort.
- Sovereign risk emerges and banks become segmented nationally. No bank has a better credit than its country of incorporation.

End 2011 (Eur Bn)	Deutsche Bank	Banca Intesa
Total Assets (TA)	2164	639
Risk Weighted/Assets (RWA)	381	325
Total Equity (TE)	55	47
Leverage (TA/TE)	39.6	13.6
Risk (RWA/TA)	18%	51%
MTM Asset volatility (Annual St. D.)	2-3%	4-5%
Robustness (TE/TA)	2.5%	7.4%
LTRO liquidity (% TA)	0.5%	5.6%

COGNITIVE FAILURES OF REGULATORS

3) Destroying Financial Markets:

- Allowing OTC trading degraded markets into oligopolistic domains where the Too Big To Fail rent is extracted. Misunderstanding the importance of credit in forward contracts.
- The proliferation of trading venues conflicts with price discovery and MIFID's best execution requirement.
- Regulators blind to potential new problems until they glare: High Frequency Trading and orders fragmentation.
- EU antitrust anachronistically blocks market concentration (the NYSE/Deutsche Boerse deal).
- But EU antitrust blind to dominant position abuses (Banks against Euronext on CDS).
- No oversight of new product and contracts and heavy interference subsequently. The case of CDS.
- MIFID misunderstands the fund industry: inducements or volume discounts?



COGNITIVE FAILURES OF MARKETS' PARTICIPANTS

- Bankers bankrupt banks, and lost a fortune
- Misperceived Risk/Return asymmetries
  - Debt vs Equity
  - AAA vs High Yield
- Diversification benefits are a fallacy of composition
- Simplify financial products
- Are the principles of Islamic Finance derived from the experience of long forgotten financial crisis?

REGULATORY RESPONSES, SO FAR

There are good and bad regulations and good and bad deregulations.

In the '30ies

Within 2 years, banks had failed or had been nationalised. Banks and markets were overhauled.

Glass – Steagall 1933, 37pp.

Securities and Exchange Act 1934, 478pp. (after 78 years of updates)

Now

Banks after 4 years are being kept afloat by taxpayers' subsidies and accounting gimmiks. Banks and markets haven't changed.

Basel I 1988, 30pp.

Basel II 2004, 347pp.

Basel III 2010, 616 pp.++

Dodd-Frank, 8'843pp. so far. Will reach 30'000pp.

But a few, within the Bank of England, the IMF and the BIS are awakening to the gross inadequateness of the response so far.

REGULATING FINANCIAL MARKETS

- Markets as complex evolving systems. Man made ecosystems and just as prone to potentially catastrophic changes
- Competition, not regulation, is the solution to cognitive limits and fallibility. Simplification helps. History is a great guide.
- Change in paradigm for financial stability: from the protection of intermediaries' static stability to the preservation of markets' dynamic functionality.
- Some key interacting variables:

  - Agents' degrees of freedom and responsibility (encourage biodiversity)

  - Agents' incentives (game theory, behavioural economics…)

  - Marginal returns' nature (beware increasing marginal returns)

  - Network architecture of agents' connections (beware hub & spoke)

- The dynamic properties of complex financial system (volatility, creative destruction) implies trade offs: long term emerging efficiency might require the acceptance of volatility over time frames conflicting with the desire of politicians, authorities and bankers to see their mandates renewed.

Antonio Foglia is a Board Member of Banca del Ceresio, a private bank in Lugano, Switzerland and of its subsidiaries in London and Milan.

After earning a degree in Political Economy from Bocconi University in Milan, he worked in Tokyo, New York and London to complete his training. He has been professionally involved in Private Banking and with Hedge Funds since the mid-1980's. In addition to co-managing several leading multimanager Hedge Funds, including Leveraged Capital Holdings N.V., the world's oldest offshore multimanager fund, and Global Managers Selection Funds, the largest Italian Fund of Hedge Funds, Antonio Foglia is or was also a director of several Hedge Funds, including George Soros' Quantum Endowment Fund.

Antonio Foglia is a member of the Swiss Society for Financial Market Research and of the Italian Financial Analysts' Association. He served three terms on the Foundation Board of the Swiss Finance Institute, is a member of the Scientific Committee of Italy's Confindustria and a Trustee of the Central European University.

Articles by Antonio Foglia appear on Italy's leading newspapers Corriere della Sera and il Sole 24 Ore.

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afoglia@belgrave.com