What's Wrong with Banking and What to Do About It

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Stanford University
June, 2015

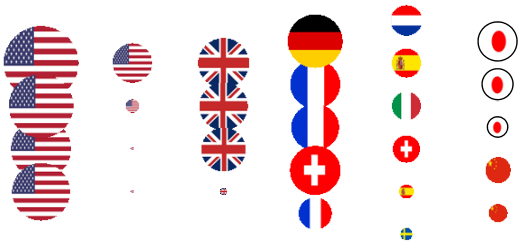
https://www.gsb.stanford.edu/faculty-research/excessive-leverage
http://bankersnewclothes.com/

What's Wrong with Banking?

- System is too fragile and inefficient due to
  - Opacity, complexity, and interconnectedness
  - Excessive reliance on (short term) debt
  - Severe governance problems and distortions *that are not solved in markets*.
- *Flawed laws and regulations.*
- *Politics and lack of accountability*.

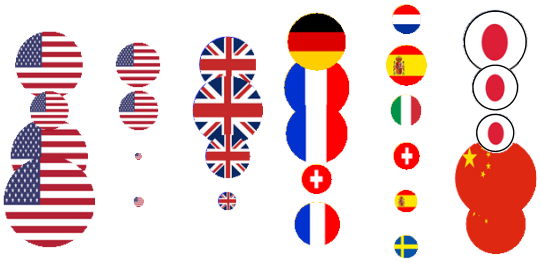
Size of 28 Global Banks

2006: $37.8 trillion total



Average
$1.35 trillion

2013: $49.2 trillion total



Average
$1.76 trillion

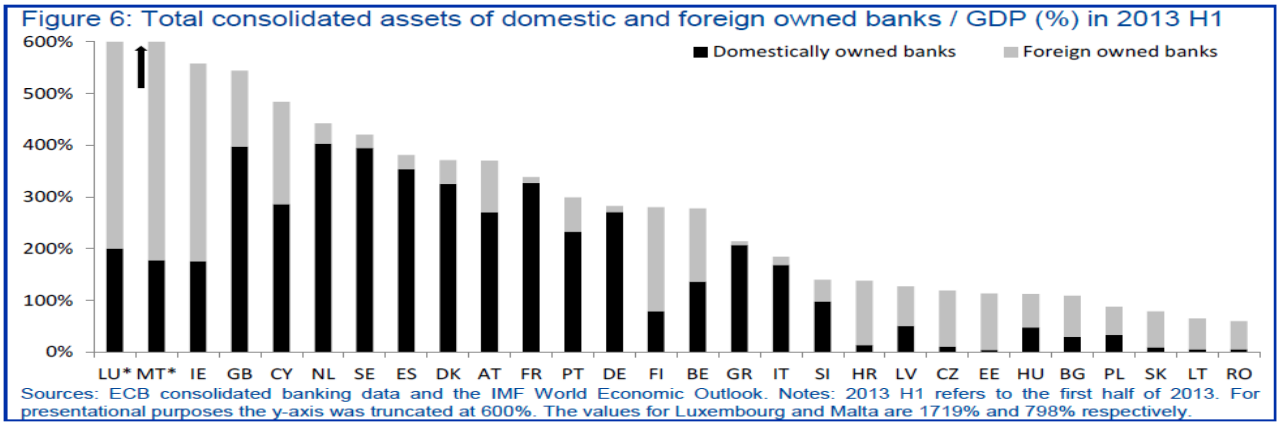
Sources: SNL Financial, FDIC, bank annual reports, Bank of England calculations.

The Largest Corporations in the World by Asset Size (Forbes, 5/2014)

Fannie Mae
ICBC
HSBC Holdings
BNP Paribas
Mitsubishi UFJ Financial
China Construction Bank
JPMorgan Chase
Agricultural Bank of China
Bank of China
Deutsche Bank
Barclays
Credit Agricole
Bank of America
Freddie Mac
Citigroup
Mizuho Financial
Royal Bank of Scotland
Société Générale
Wells Fargo
Banco Santander
Sumitomo Mitsui Financial
ING Group
Lloyds Banking Group
UniCredit Group
UBS
AXA Group
Credit Suisse Group
Allianz
Bank of Communications
London Stock Exchange
Goldman Sachs Group
MetLife

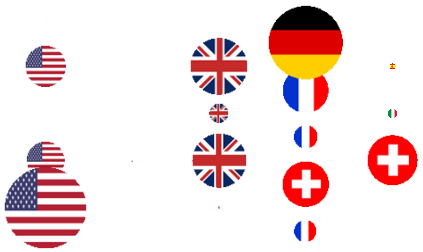
"Too Much" Finance/Banking?

"Is Europe Overbanked?" Report of ESRB Academic Scientific Committee, June 2014



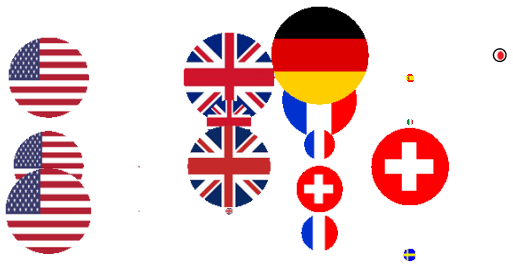
Derivatives for 21 Banks

2006: $409 trillion (notional)



Average
$19 trillion

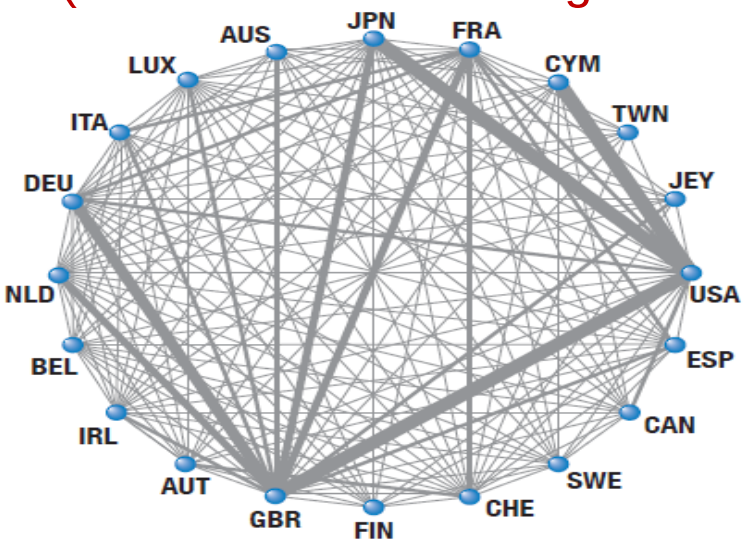
2013: $661 trillion (notional)



Average
$31 trillion

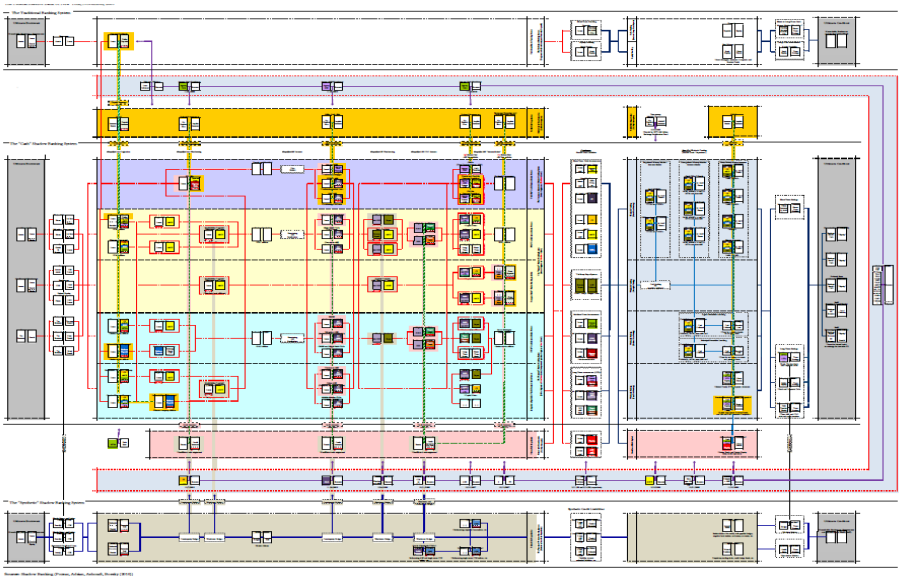
Sources: SNL Financial, FDIC, bank annual reports, Bank of England calculations.

Global Banking Network
(Cross-Border Banking Claims)



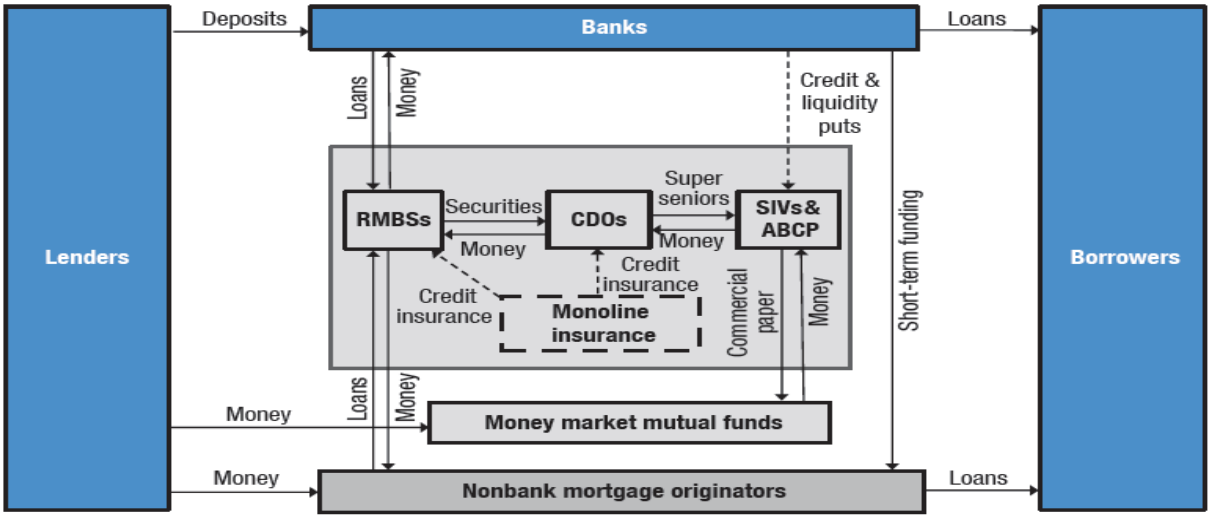
IMF Global Stability Report, April 2014

"Shadow Banking," Pozsar, Adrian, Ashcraft and Boesky, 2010



The US System

IMF Financial Stability Report 10/2014, Figure 2.1.1



SPVs Hide Relevant Exposures to Risk

Cash $$$$

Sponsor (e.g., bank holding company)

Implicit (non-contractual) support and credit enhancement.

SPV

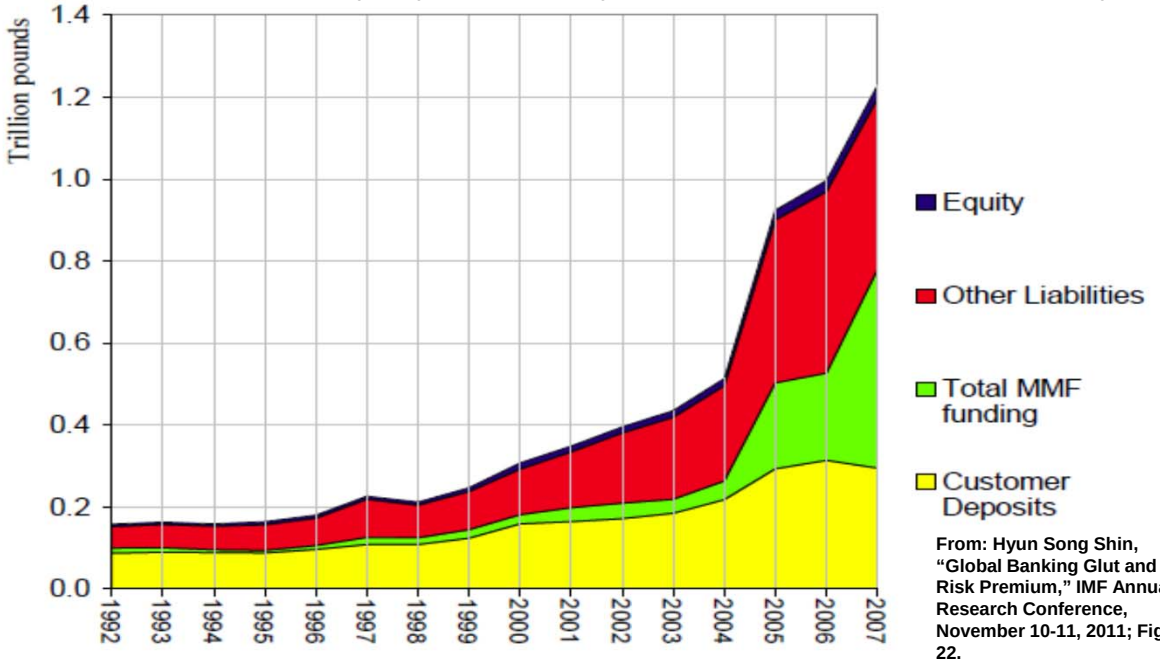
Assets

Liabilities

"Bankruptcy Remote"

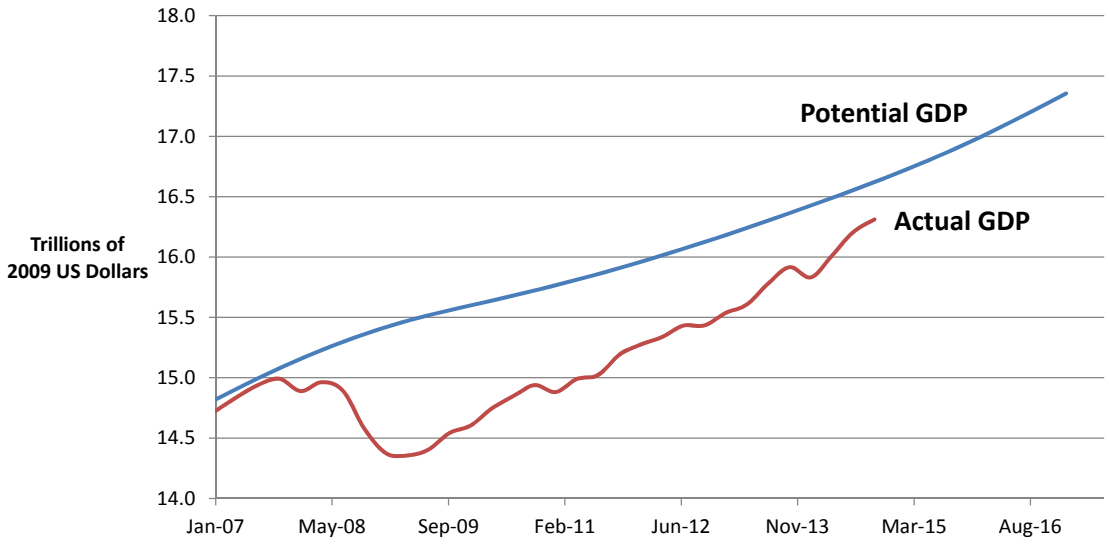
In case of bankruptcy of the sponsor, creditors of the sponsor have no access to assets of SPV.

Total Liabilities and Equity of Barclays 1992-07 (Source: Bankscope)

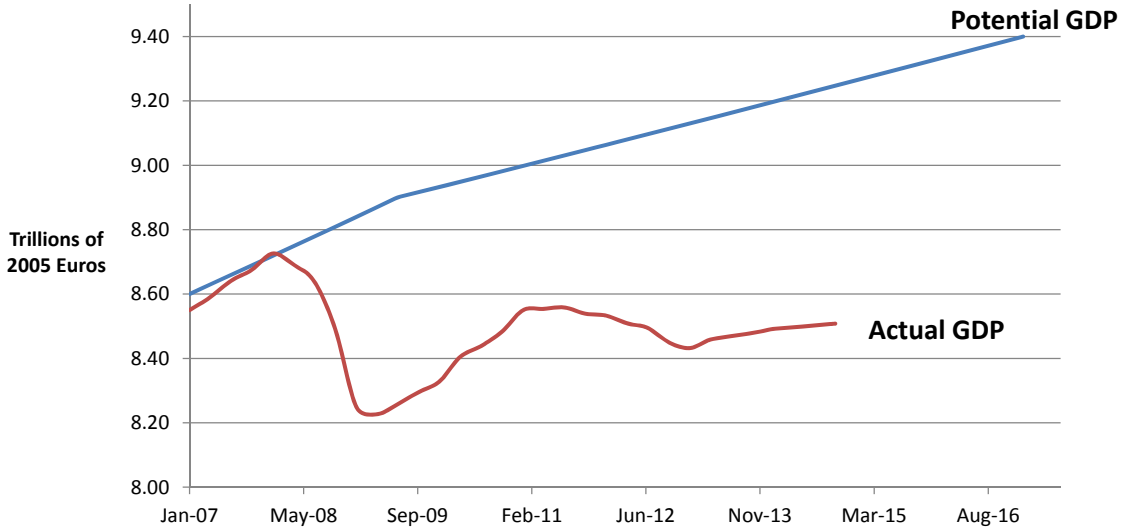


From: Hyun Song Shin, "Global Banking Glut and Loan Risk Premium," IMF Annual Research Conference, November 10-11, 2011; Figure 22.

Loss in the US



Loss in the Eurozone



JPMorgan Chase Balance Sheet
Dec. 31, 2011

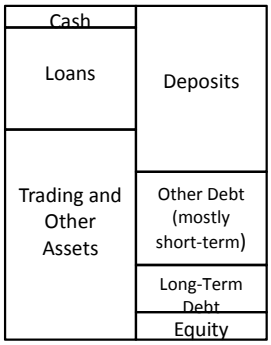
Loans = $700B <
Deposits = $1.1T

Other debt (GAAP): $1T
Other debt (IFRS): $1.8T

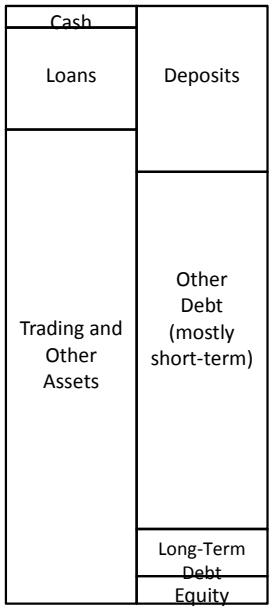
Equity (book): $184B
Equity (market): $126B

Significant off-balance-sheet commitments

GAAP Total $2.26Trillion



IFRS Total $4.06 Trillion



Lenders or Hedge Funds?

Table 4: Loans-to-total assets ratios of selected banks in 2012

Bank	LTA
Credit Agricole	18%
Deutsche Bank	20%
Barclays	29%
Societe Generale	29%
UniCredit	60%
Erste Group	62%
CaixaBank	65%
Svenska Handelsbanken	69%

Source: Bloomberg.

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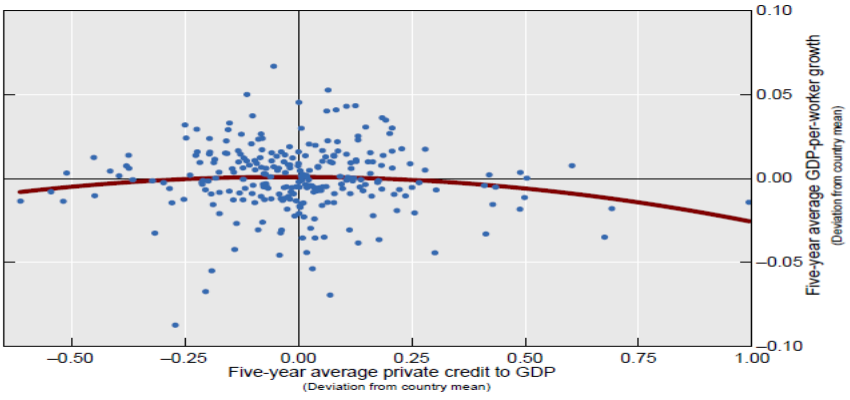
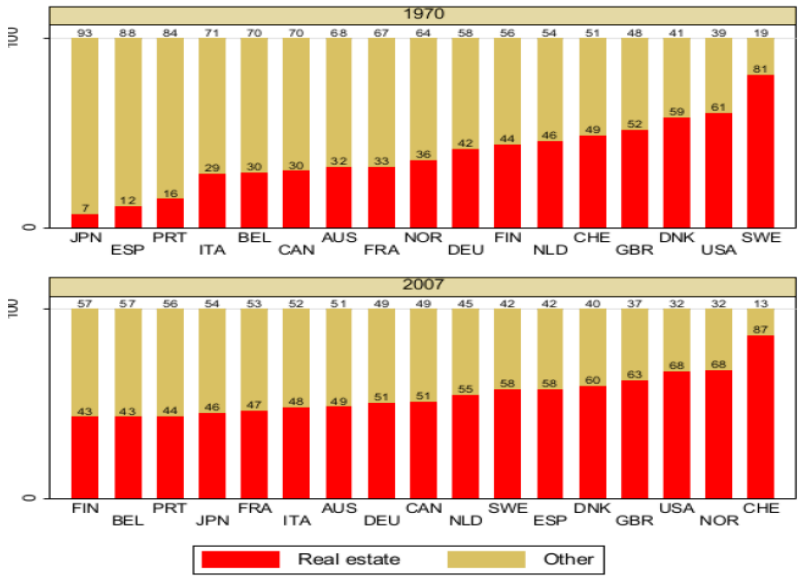
More Finance (Credit) = More Growth?

Source: "Reassessing the Impact of Finance on Growth," Stephen Cecchetti and Enisse Kharroubi, 2012



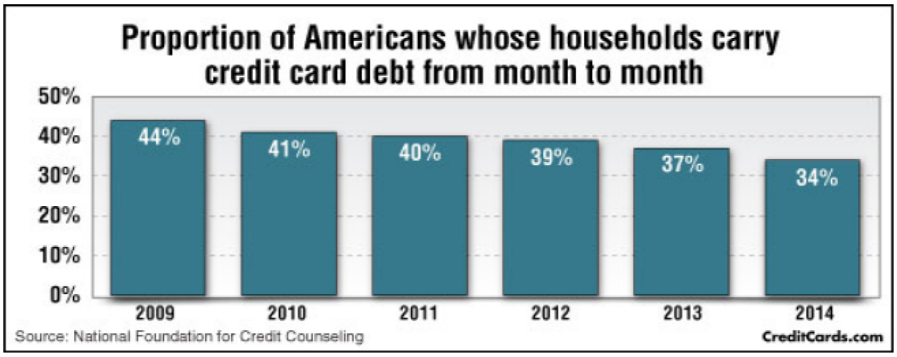
The Great Mortgaging

Jorda, Taylor and Schularick, 2014

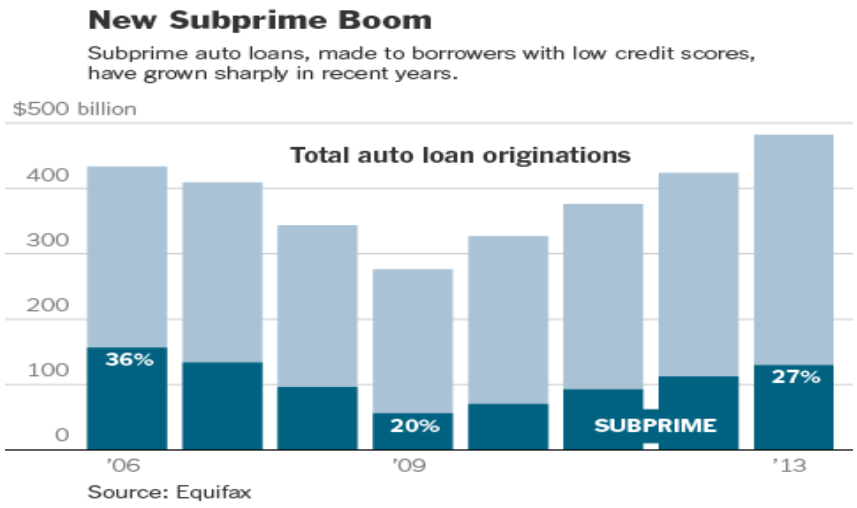


Credit Card Debt Surges in US

- $60B in new credit-card debt in 2014 Total is 55% higher than 2013.
- 18% say they expect never to pay off their debt

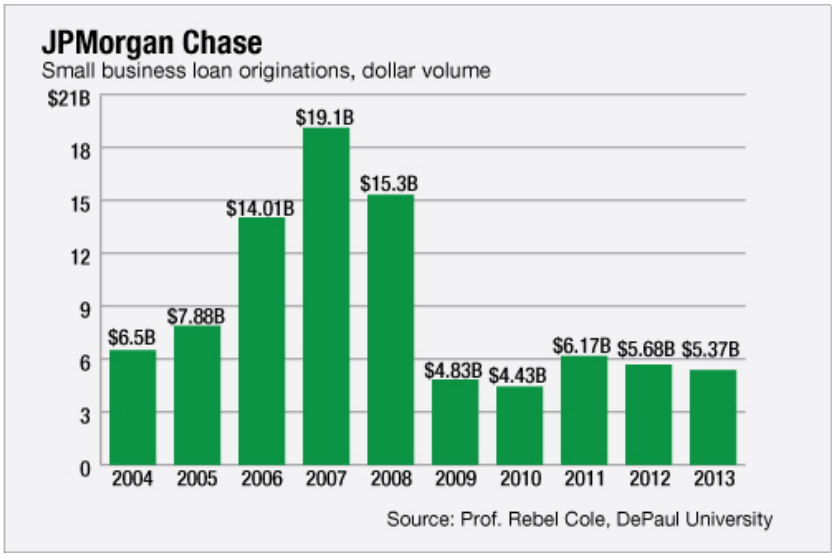


Subprime Auto Loans: Productive Credit?



By Contrast: JPM Small (up to $1m) Business Loans

(Data from bank reports per CRA)



Complex Institutions with Many Non-Financial Subsidiaries

Table 2.2: Breakdown by industry of subsidiaries of G-SIBs, 2013 (2007 in parenthesis)

	Banks	Insurance companies	Mutual & pension funds/nominees/ trusts/trustees	Other financial subsidiaries[1]	Non-financial subsidiaries[2]	Total subsidiaries
Bank of America	72 (32)	17 (24)	584 (396)	322 (282)	915 (673)	**1,910** **(1,407)**
Barclays	54 (49)	16 (21)	465 (309)	380 (239)	824 (385)	**1,739** **(1,003)**
BNP Paribas	103 (88)	68 (74)	323 (102)	760 (433)	1,338 (473)	**2,592** **(1,170)**
Citigroup	111 (101)	41 (35)	456 (706)	650 (584)	1,039 (1,009)	**2,297** **(2,435)**
Credit Suisse	30 (31)	4 (4)	89 (91)	52 (63)	67 (101)	**242** **(290)**
Deutsche Bank	68 (54)	8 (9)	541 (458)	618 (526)	889 (907)	**2,124** **(1,954)**
Goldman Sachs	15 (7)	10 (4)	74 (48)	121 (151)	200 (161)	**420** **(371)**

"Corporate Structures, Transparency and Resolvability of Global Systemically Important Banks"
Jacopo Carmassi and Richard J. Herring, Aug. 2014

	Banks	Insurance companies	Mutual & pension funds/nominees/ trusts/trustees	Other financial subsidiaries[1]	Non-financial subsidiaries[2]	Total subsidiaries
HSBC	89 (85)	37 (37)	309 (246)	298 (381)	832 (485)	**1,565** **(1,234)**
JPMorgan Chase	54 (38)	13 (17)	305 (229)	205 (145)	518 (375)	**1,095** **(804)**
Morgan Stanley	19 (19)	12 (22)	245 (225)	236 (170)	799 (616)	**1,311** **(1,052)**
Royal Bank of Scotland	33 (31)	5 (29)	162 (168)	206 (450)	393 (483)	**799** **(1,161)**
Société Générale	95 (81)	20 (13)	97 (93)	405 (270)	296 (387)	**913** **(844)**
UBS	28 (29)	4 (2)	108 (121)	152 (66)	166 (199)	**458** **(417)**
Total by industry	**771** **(720)**	**255** **(310)**	**3,758** **(3,490)**	**4,405** **(4,263)**	**8,276** **(6,729)**	**17,465** **(15,512)**
% by industry	**4%** **(5%)**	**1%** **(2%)**	**22%** **(22%)**	**25%** **(27%)**	**47%** **(43%)**	**100%** **(100%)**

Note: May 2013 and December 2007.
Source: Bankscope. Majority-owned subsidiaries.
[1] 'Other financial subsidiaries' include hedge funds, private equity and venture capital subsidiaries.
[2] 'Non-financial subsidiaries' include all companies that are neither banks nor insurance companies nor financial companies. They can be involved in manufacturing activities but also in trading activities (wholesalers, retailers, brokers, etc.). We have allocated foundations and research institutes to this category as well.

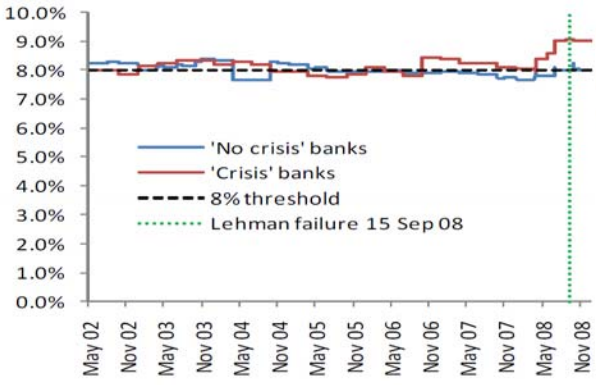
"What's Inside America's Large Banks?"

Jesse Eisinger and Frank Partnoy, *Atlantic*, Jan 2013

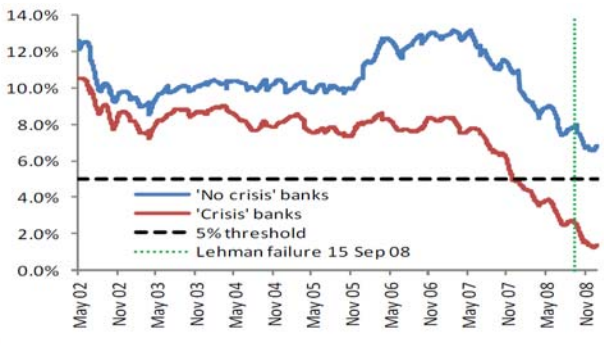
- Quote executives: large banks [are] "complete black boxes." Investors: "uninvestable."
- Kevin Warsh: "Investors can't truly understand the nature and quality of the assets and liabilities. They can't readily assess the reliability of the capital to offset real losses. They can't assess the underlying sources of the firms' profits. The disclosure obfuscates more than it informs, and the government is not just permitting it but seems to be encouraging it."

The "Fortress Balance Sheet" Myth

Accounting measures don't show crisis



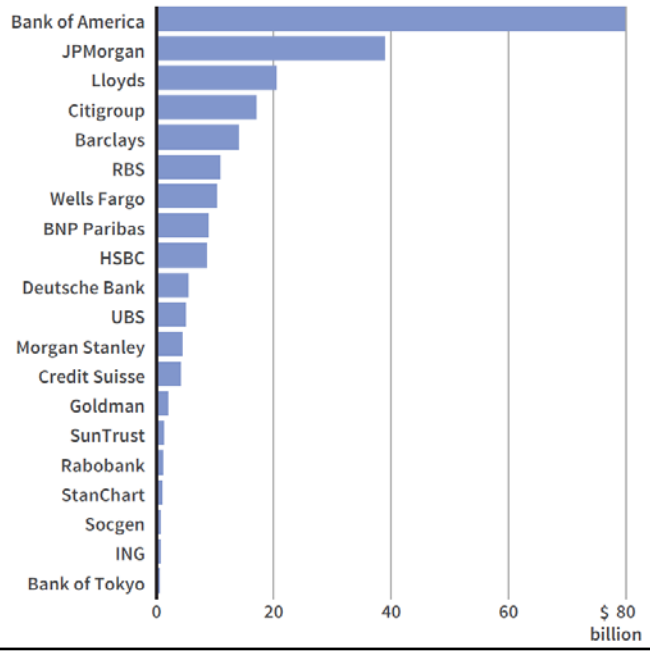
High market values can mislead



From: Andrew Haldane, "Capital Discipline," January 2011)

What About Governance and Controls?

- JPM Dimon: The "portfolio hedge" was "flawed, complex, poorly reviewed, poorly executed and poorly monitored."
- "Controls were not in place."
- JPM restated results: traders "mis-marked" positions
- Who is responsible? Who is accountable?
- "Several finance practices are wasteful if not fraudulent." Luigi Zingales, "Does Finance Benefit Society?" Jan/2015.



Fines: Cost of Doing Business?

Top 20 banks paid $235B since 2008

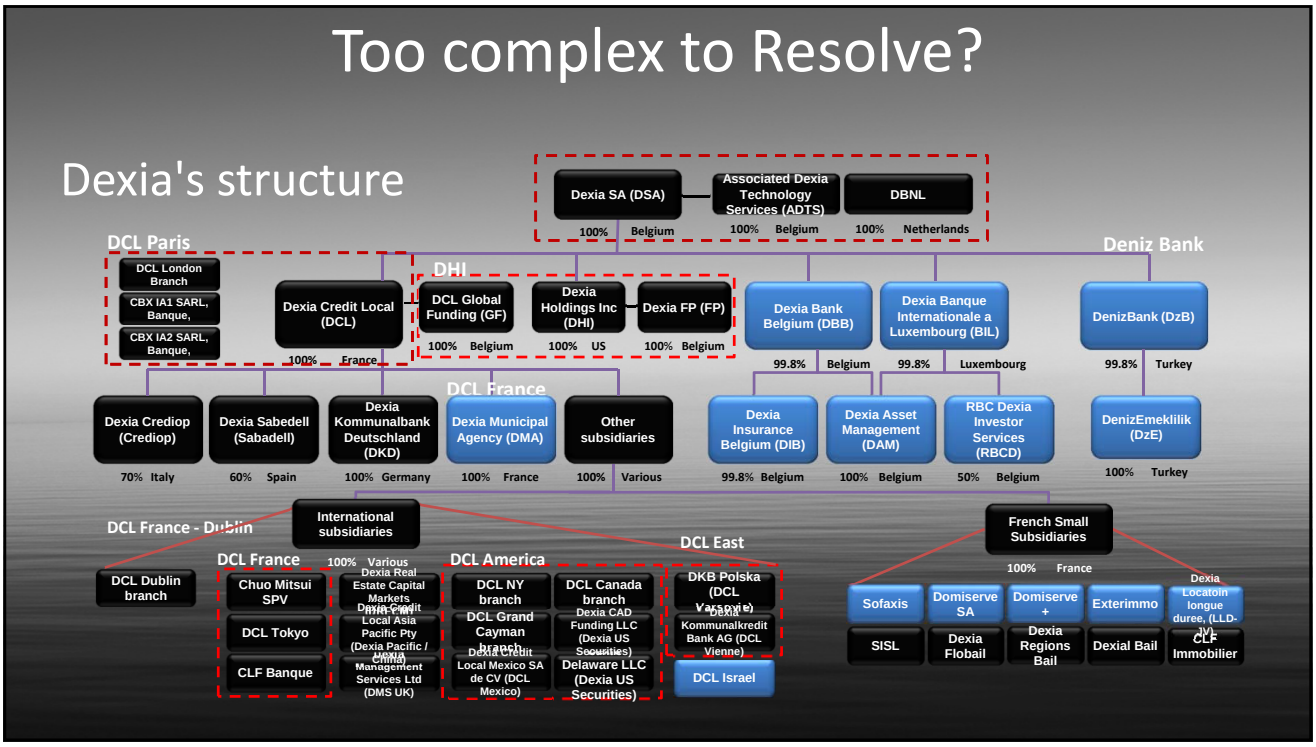
Are Auditors Doing Their Job?

- None of the bailed out, failed, or forcibly acquired financial services firms in US or UK received a "going concern" qualification from their auditors prior to needing significant financial support from taxpayers and/or nationalization (i.e. AIG, Citi, RBS).
- External auditor PwC gave JPM a clean opinion on its financials and internal controls over reporting for 2011.

"Let Them Fail?"

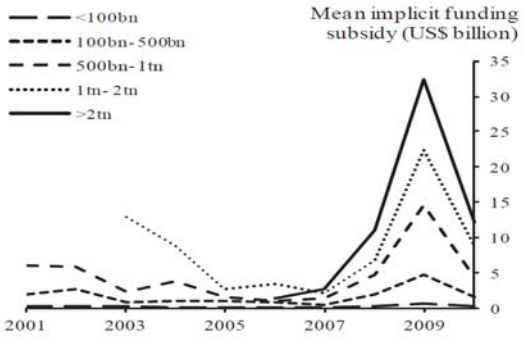
- "Fail" is too late: instability would precede insolvency
- Bankruptcy or resolution are disruptive and harmful in the best case, whoever is paying the direct costs.
- Won't work if entire industry is weak.
- Enormous legal challenges cross border.
  - FSB 2014 "Key Attribute of Cross-Border Resolution" has huge wish-list of legal and regulatory steps.
  - IMF 2014: failure of cross-border SIFI "not a viable option"

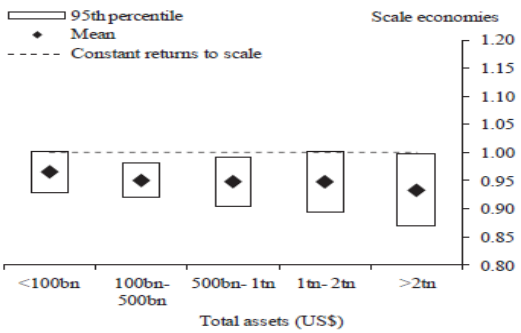
Too complex to Resolve?



Big is Beautiful?

- Substantial evidence for large subsidies to "systemic" banks.
- *No evidence of scale economies above $100B adjusting for subsidies.*





Davies, Richard, and Belinda Tracey, "Too Big to Be Efficient? The Impact of Implicit Funding Subsidies on Scale Economies in Banking," *Journal of Money, Credit and Banking*, Feb 2014.

Equity Lowers Chance of Distress, Crisis, Harm

Too Much Leverage

More Equity

Equity: Self Insurance at Market Prices; Huge Benefits

- Reduces likelihood of distress, default, crisis, bailouts.
- Reduces likelihood of liquidity problems and runs.
- Shifts downside risk to shareholders who get upside.
- Reduces "deleveraging multiples," distress sale intensity.
- Reduces TBTF subsidies, counters perverse incentives.
- Improves investment decisions: reduces excessive risk taking, likelihood of credit crunch from debt overhang.
- Helps "transmit" monetary policy to real economy.

The Mantra

"Equity is Expensive"

To whom? Why?
Only in banking?

From Banking Textbook

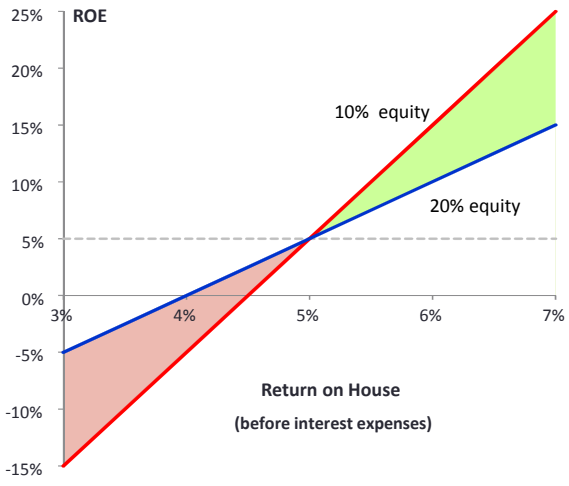
"Bank capital is costly because, the higher it is, the lower will be the return on equity for a given return on assets."

FALSE !

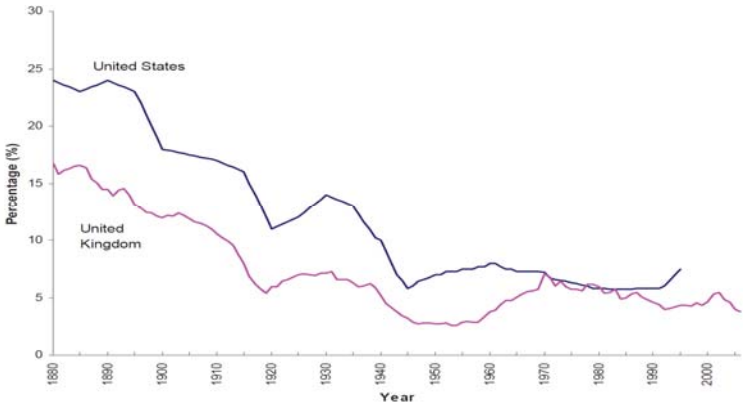
Frederic S. Mishkin, 2013, *The Economics of Money, Banking and Financial Markets,* 3rd Edition, p. 227,

Equity, Risk, and Return on Equity (ROE)

- More equity in mix
  - Reduces ROE in good times, *and raises ROE in bad times*
  - Reduces risk
  - Reduces *required ROE*.
- ***ROE does not measure shareholder value!***
  - Targeting ROE may harm shareholders (Ch. 8 *BNC*)
  - Shareholders can create leverage on their own.



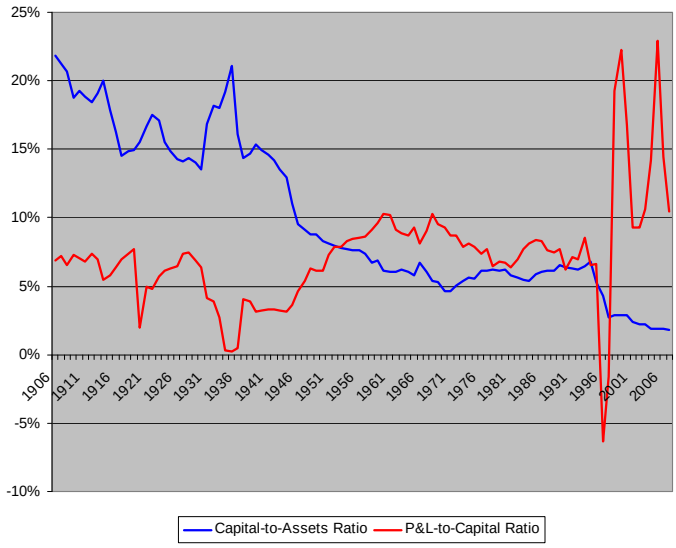
History of Banking Leverage in US and UK



- 19th century: banks were partnerships with unlimited liability; equity often over 50% of assets.
- Bank equity did not have limited liability everywhere in the US until 1940s.
- Equity ratios declined consistently to single digits.
- Growing "safety nets" played a role.
- Similar patters elsewhere.

Alesandri and Haldane, 2009; *US: Berger, A, Herring, R and Szegö, G (1995). UK: Sheppard, D.K (1971), BBA, published accounts and Bank of England calculations.*

High Leverage, Huge Profit Volatility
(Case of Swiss Banks)



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- Government and Taxpayers
- Shareholders
- Bond Holders
- Depositors

Debt Creates Conflicts of Interest and Distorts

- When debt is in place, shareholders no longer maximize total firm value and may overinvest or underinvest:
  - take negative NPV projects that benefit themselves, harm creditors and lower the value of the firm.
  - forego positive NPV projects that would benefit creditors and increase total value of the firm.
- Covenants attempt to counter the incentives, otherwise inefficiency reflected in cost of borrowing.

Another Force: The Leverage Ratchet Effect

- What about subsequent *funding* decisions once debt is in place? Conflict with creditors means shareholders
  - favor leverage increase even if it reduces firm value *and even if new debt just be junior to existing debt*.
  - resist leverage reduction even when it would enhance firm value.
- *Leverage creates a distortion in future leverage decisions*
- See "The Leverage Ratchet Effect," Admati, DeMarzo, Hellwig and Pfleiderer (2014, under revision)

The Leverage Ratchet Effect

- … explains why distressed firms don't recapitalize, instead make payouts to shareholders and issue more debt, which increases the risk of costly bankruptcy.
- … is stronger than underinvestment; shareholders avoid recapitalization no matter how beneficial it is to firm.
- … interacts and reinforces other agency conflicts.
- … implies that *without ability to commit to future funding decisions, leverage creates inefficiencies that lower the total value of the firm* (in addition to any collateral harm).

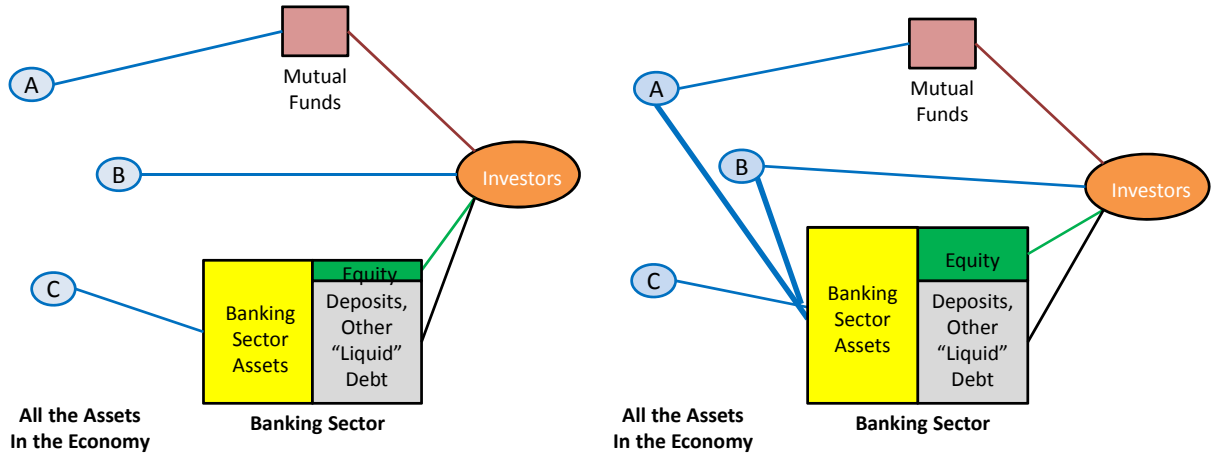
Some Facts

- Non-banks make risky, long term, illiquid investments.
- Without regulations
  - US average: 70% equity/assets (market value).
  - Nonbanks, including REITs and hedge funds, rarely have less than 30% equity (if healthy)
- Profits are popular source of unborrowed funding.
  - Berkshire Hathaway, Google, Microsoft.
- Banks with (sometimes much) less than 10% equity make routine payouts to shareholders.

Liquid "Production" and Equity

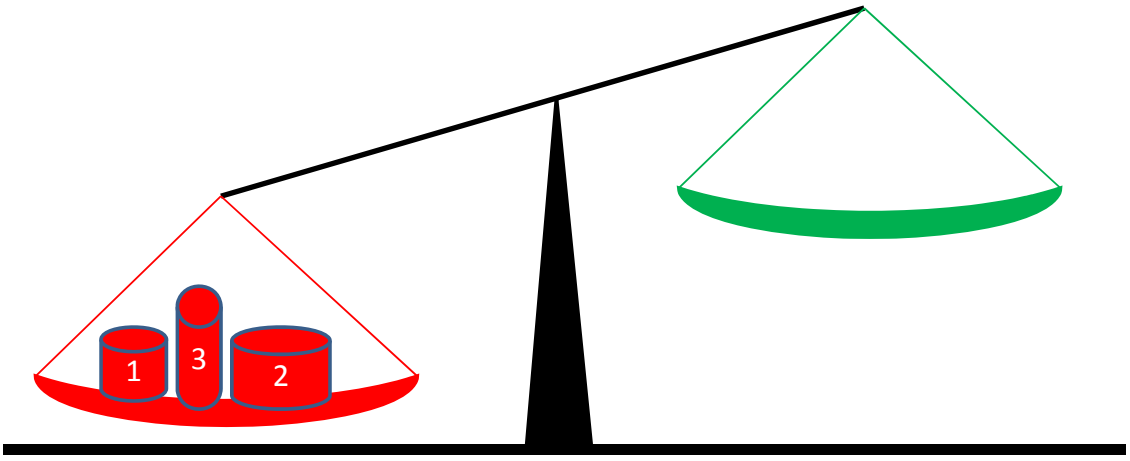
- When banks take risk, who should bear the downside?
- Is 75% debt not "high" enough leverage? Why 95%?
- High leverage *harms* "liquidity production:" *Default prospect increases likelihood of runs*.
- *Liquidity, like risk and credit, should be priced in markets; mispricing can cause excessive production*.
- See *Bankers New Clothes (BNC)*, Chap. 10, Admati et al, "Fallacies, Irrelevant Facts and Myths," (2013, Section 7).

A Beneficial Shuffle of Claims



- *Rearranging claims aligns incentives, reduces distortions, corrects mispricing.*
- *Size of financial firms and industry should be determined in undistorted markets.*

Private Considerations

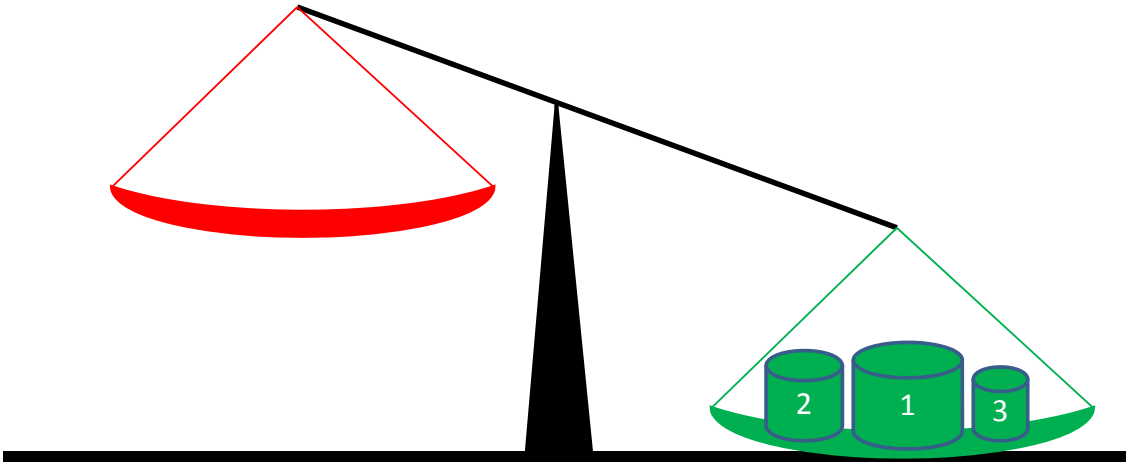


DEBT

1. Leverage Ratchet
2. Tax subsidies
3. Safety net benefits
4. ROE fixation

EQUITY

For Society, Excessive Leverage is "Expensive!"

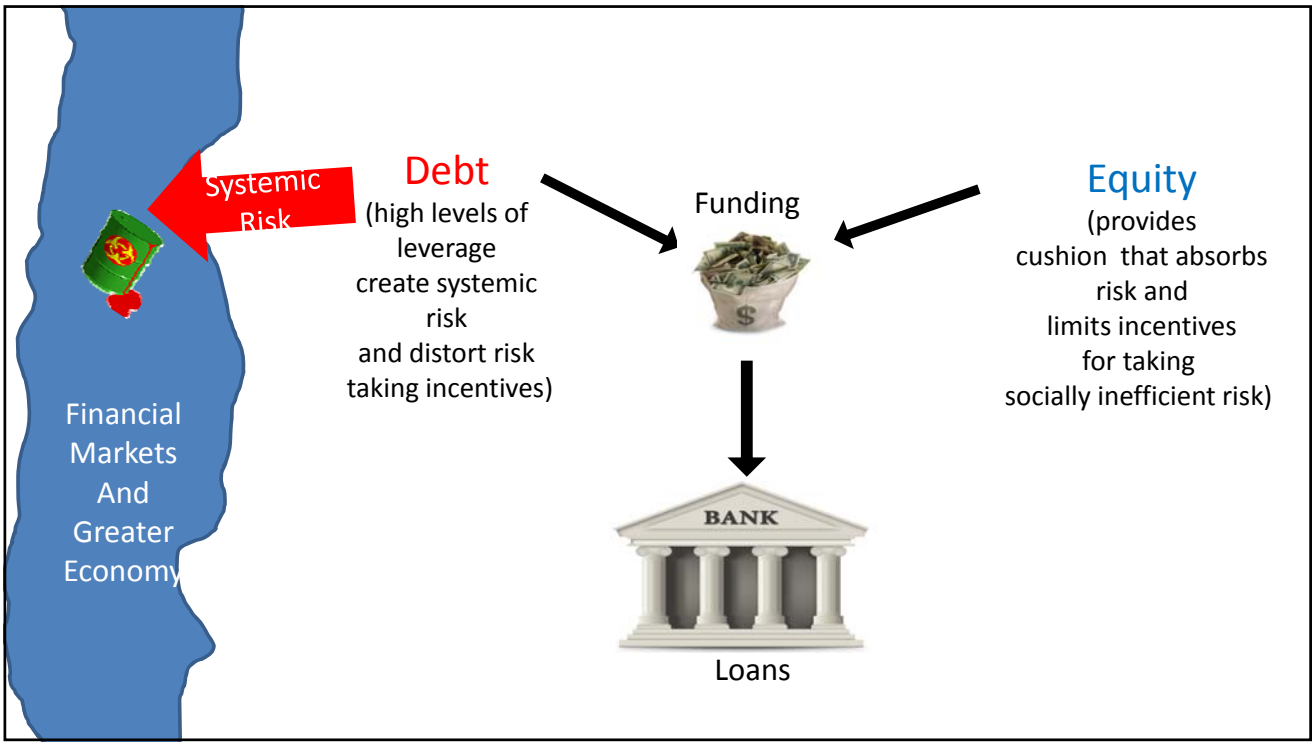


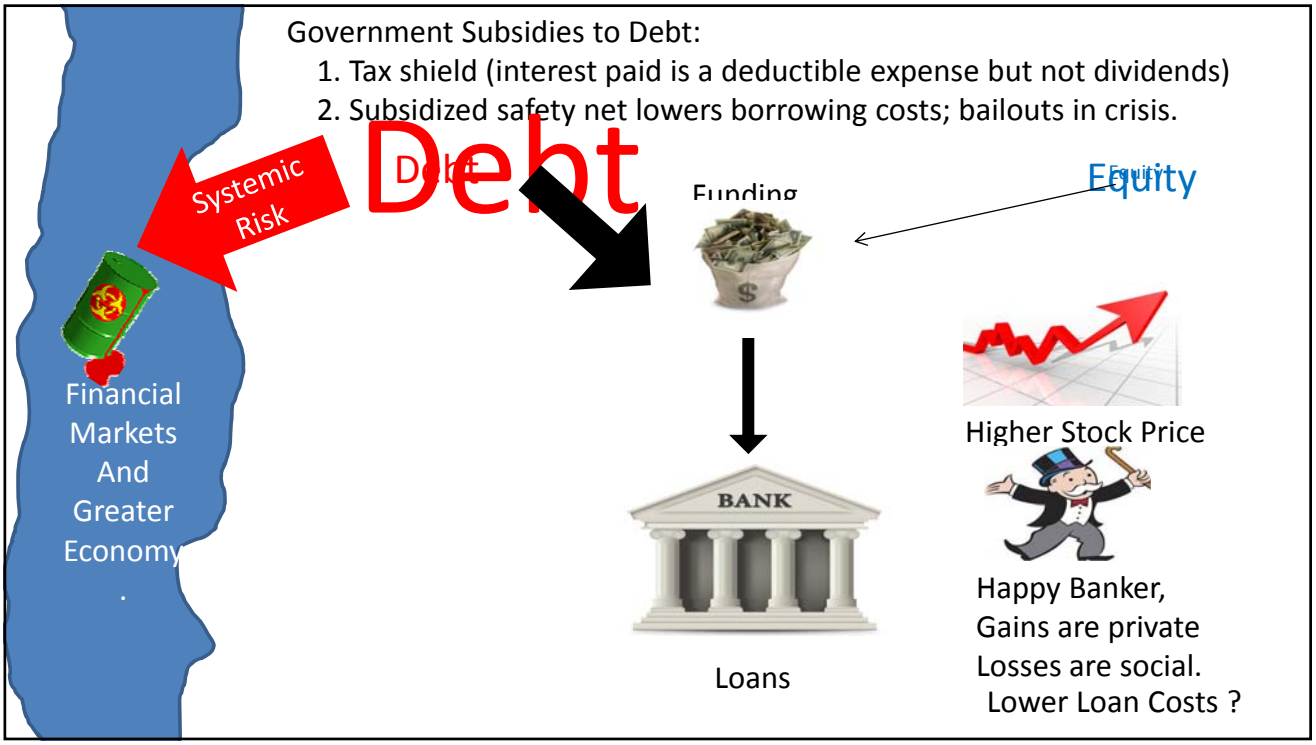
DEBT

1. ~~Leverage Ratchet~~
2. ~~Tax subsidies~~
3. ~~Safety net benefits~~
4. ~~ROE fixation~~

EQUITY

1. Reduces systemic risk
2. Reduces cost of distress, default, crisis
3. Reduces excessive risk taking incentives
4. Better able to lend after losses


Systemic Risk
Debt
(high levels of leverage create systemic risk and distort risk taking incentives)
Funding
Equity
(provides cushion that absorbs risk and limits incentives for taking socially inefficient risk)
Financial Markets And Greater Economy
BANK
Loans


Government Subsidies to Debt:
1. Tax shield (interest paid is a deductible expense but not dividends)
2. Subsidized safety net lowers borrowing costs; bailouts in crisis.
Systemic Risk
Debt
Funding
Equity
Financial Markets And Greater Economy
Higher Stock Price
BANK
Loans
Happy Banker,
Gains are private
Losses are social.
Lower Loan Costs ?

Banks are Special in…

- … having passive creditors, such as depositors, and many supporters, including in central banks, governments, elsewhere.
- … getting away with so much recklessness.

Perverse Subsidies

- *Reducing subsidies is not a social cost*.
- Blanket subsidies to all debt of TBTF firms are distorting and harmful, perversely enabling and rewarding inefficient growth and more recklessness.
- If subsidies are deemed desirable we should look for different delivery methods.
- *More equity corrects distortions in credit markets*.
- See Admati July 2014 Senate testimony, Chapter 9, *BNC*, Sections 4, 9, "Fallacies, Irrelevant Facts, and Myths…"

How Much Equity?

- Basel II and Basel III Capital Requirements
  - Tier 1 capital Ratio: Relative to risk-weighted assets:
    - Basel II: 2%,
    - Basel III: 4.5% - 7%.
    - Definitions changed on what can be included.
  - Leverage Ratio: Relative to total assets:
    - Basel II: NA
    - Basel III: 3%.
    - US: 5% for large BHC, 6% for insured subs.
- Requirements based on flawed analyses of tradeoffs.

Is Basel III "Tough?"

"Tripling the previous requirements sounds tough, but only if one fails to realize that tripling almost nothing does not give one very much."

"Basel III, the Mouse that Did Not Roar," Martin Wolf, *Financial Times*, Sep 13, 2010

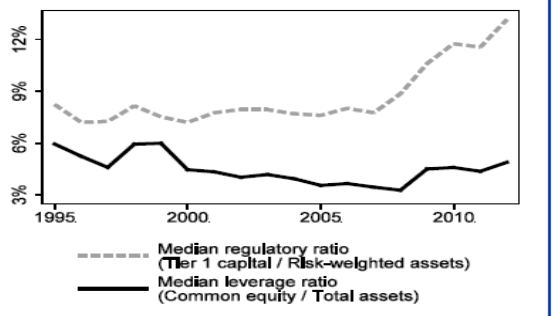
"How much capital should banks issue? Enough so that it doesn't matter"

"Running on Empty," John Cochran, *Wall Street Journal*, March 1, 2013

Basel Regulatory Ratios ("Capital" to Risk-Weighted Assets) Don't Measure Leverage!

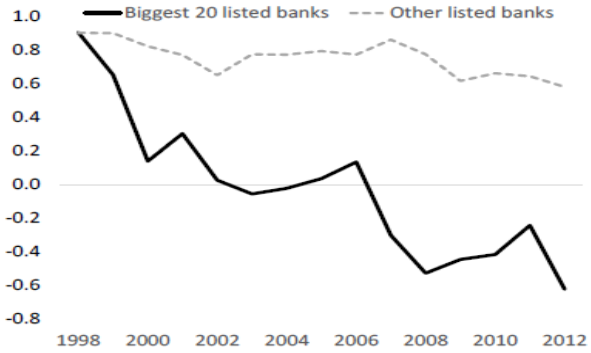
ESRB Academic Scientific Committee report, June 2014

Figure 14: Book leverage ratio versus regulatory capital ratio (median of top 20 banks)



Source: Bloomberg. Note: The plotted lines show the median regulatory ratio and median leverage ratio in a balanced sample of the largest 20 EU banks.

Figure 15: Correlation of E/TA and T1/RWA

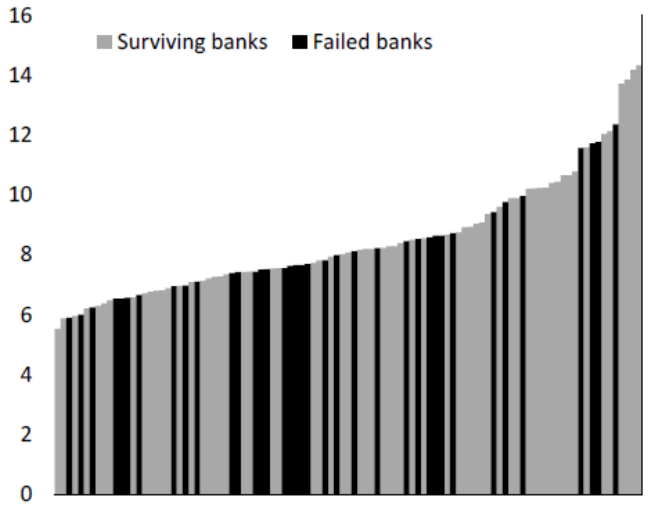


Source: Bloomberg.

Basel Regulatory Ratios Don't Predict Failure!

ESRB Academic Scientific Committee report, June 2014

Figure 17: Global banks' T1/RWA (%) in 2006



Source: Haldane and Madouros (2012), Capital IQ, SNL Financial, published accounts, Laeven and Valencia (2010) and Bank of England calculations. Special thanks to Andy Haldane and Vas Madouros for providing their data.

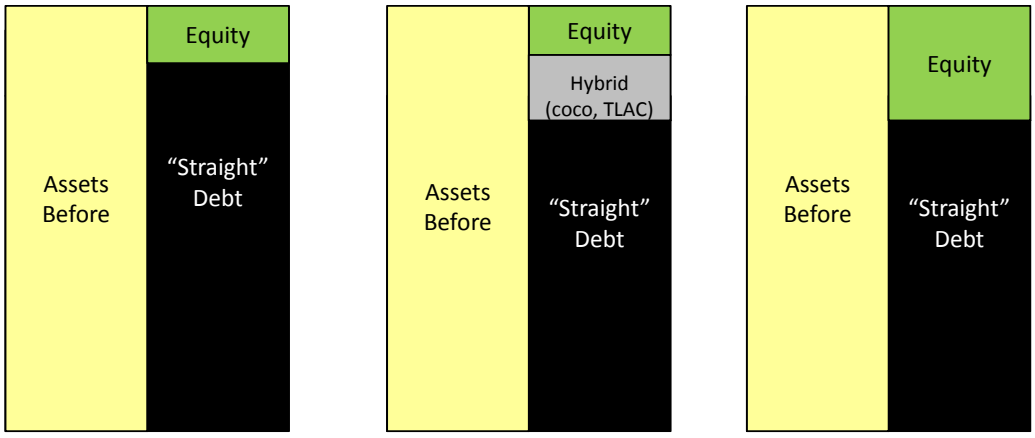
Risk weighting is highly problematic

- Complex, illusion of "science," key risks and correlations ignored.
- Manipulable
  - internal models
  - inflated credit ratings
  - off-balance-sheet commitments;
  - Derivatives; credit insurance
- Distort investments, e.g., favor government over business lending
- *With equity levels so low, risk weights intensify leverage and risk ratchet effect .*
- Added fragility and interconnectedness (see, e.g., *BNC*, Chap 11).

More Flaws in Basel Approach

- Hybrid alternatives are complex, unreliable, unnecessary.
  - Unreliable loss absorption; haven't worked in the past.
  - Maintain overhangs and inefficiencies.
  - Triggers are problematic and destabilizing
  - Must worry about whether holders can absorb losses
  - *Dominated by equity for purpose of regulation*.
- If hybrids create equity "just in time," prevent costly bankruptcy, should all firms use them instead of equity?

"Anything but Equity"



Making Equity Regulation Work

- Require 30% equity/total assets, allowed to drop to 20%.
  - Crude and safe. *No science behind current numbers*
  - *Huge measurement challenges for exposures.*
  - Various signals can guide "*prompt corrective action*."
- *Ban payouts to shareholders, especially if TBTF!*
- Viable banks can raise equity at appropriate prices.
  - Market "stress test" of business model, disclosures.
  - Inability to raise equity clear signal of weakness

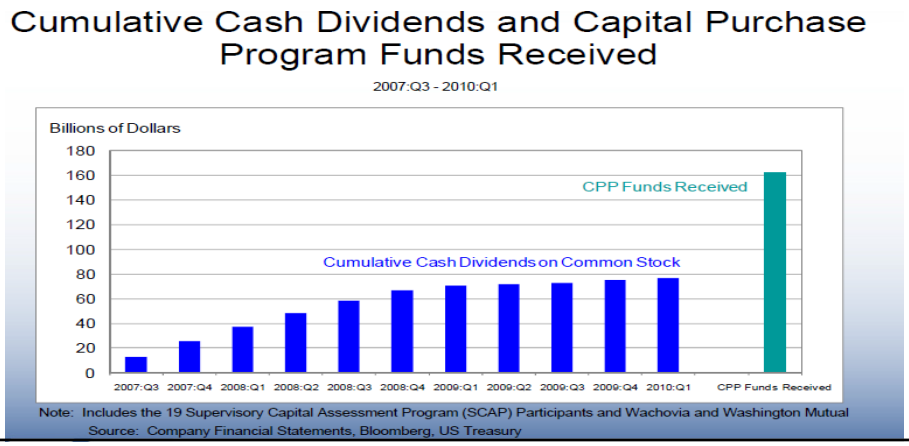
Failed Approaches

- Excessive forbearance ("just a liquidity problem")
  - Solvency problems are more harmful, dangerous and costly than liquidity problems; must be recognized and dealt with promptly.
  - Weak/zombie banks are dysfunctional; lending suffers from lenders' debt overhang.
  - *Supporting banks with more debt may not help*!

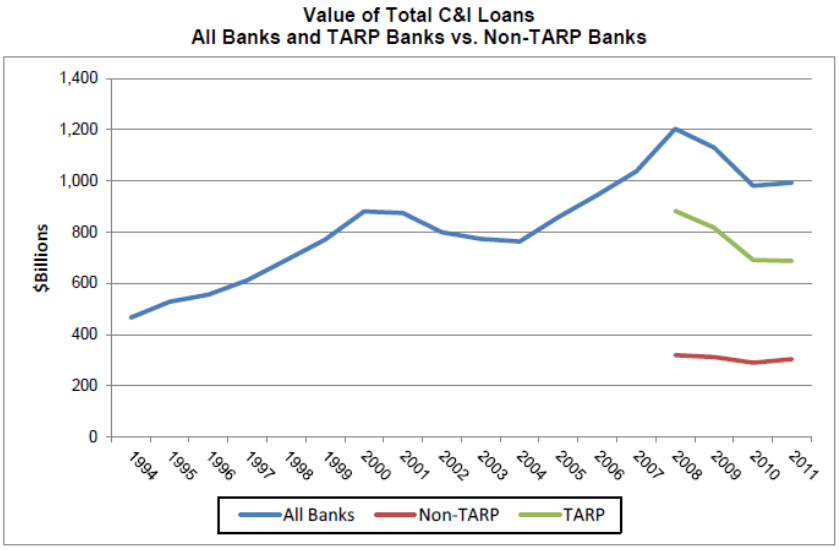
Regulators Failed to Intervene as Crisis Looms

From: "Dividend Policy and Capital Retention: A 'Systemic First Response'," Eric Rosengren, Federal Reserve Bank of Boson, October 2010

- Dividend amounts Mid 2007-2008 top 19 almost half TARP (bailouts)
- TARP was effectively *debt with strings* after dividends had depleted *equity*



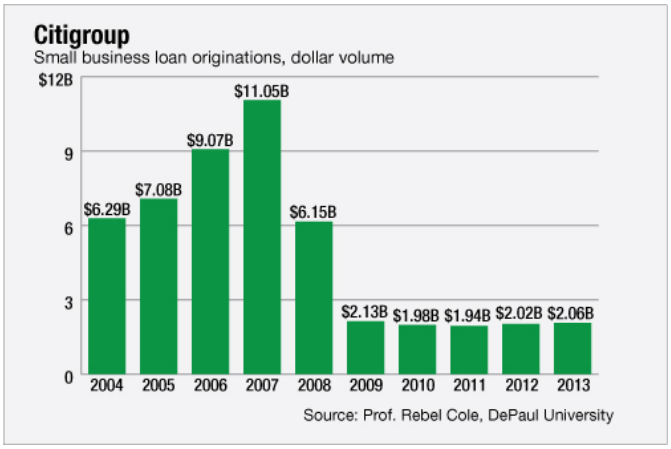
TARP Failed to increase Business Lending



"How Did the Financial Crisis Affect Business Lending in the US?" Rebel Cole, 2013

Citigroup Small Business Lending

Total (GAAP) Assets in 2013 $1.88T, Lots of Derivatives



(See also: "Citigroup: A Case Study in Managerial and Regulatory Failure," Arthur Wilmarth, 2013; *Zombie Banks*, Yalman Onaran, 2012, Mayo, Bair, Barofsky books.)

Are Stress Tests Reassuring?

- Projected ratios are poor indicators of health.
- Tests don't properly address contagion dynamics.
  - Huge opacity and layers of connections.
  - Endogenous correlations (counterparty/underlying).
  - Models may fail.
- Benchmarks based on false presumption that equity is scarce and "costly."

Invalid "Level Playing Field" Argument

- Banks compete with other industries for inputs, including talent; *Outsized subsidies distort markets*.
- Banks can endanger an entire economy (Ireland, Iceland, Cyprus).
- The argument creates a harmful "race to the bottom."
- See e.g., Chapter 12 *BNC*.

Shadow Banking is a Flawed Excuse

- "Regulatory arbitrage" is key to system complexity.
  - Regulated banks sponsor entities in the "shadows."
- The largest institutions are "shadow hedge funds."
- Some institutions/activities, e.g., money market funds, need better regulation; some don't need much.
- *Enforcement challenge is invalid argument against essential and highly beneficial regulation.*
  - Allow robbery? Give up tax collection?

Financial Regulation: an Unfocused Mess

- *Living wills*: 10,000+ page to give obvious answer
- *Volcker Rule:* impossible to implement as written.
- *LCR*: assumptions false when relevant.
- *Central clearing of derivatives:* systemic CCP, too opaque.
- *Resolution*: not credible, harmful.
- Devil is in the details, Implementation and enforcement.
- Major problem: narratives and spin, lack of political will.

What to Do? Key Approaches:

- Better disclosure rules for *all* relevant institutions.
- Much higher equity requirements bring huge benefits.
  - Focus on *simpler* measures and buffers.
  - Educate equity investors that chasing ROE is flawed.
  - Hope for natural breakup, better governance.
- Regulators must track exposures; intervene promptly.
- Examine counterproductive tax and bankruptcy codes.

Political Will?

"Banks are still the most powerful lobby on Capitol Hill. And they frankly own the place."

Senator Richard Durbin (D-Ill), 2009

The Lobbying Cry

"Every dollar of capital is one less dollar working in the economy"

Steve Bartlett, Financial Services Roundtable, Sept 2010

NONSENSE

"Credit and Growth will Suffer"

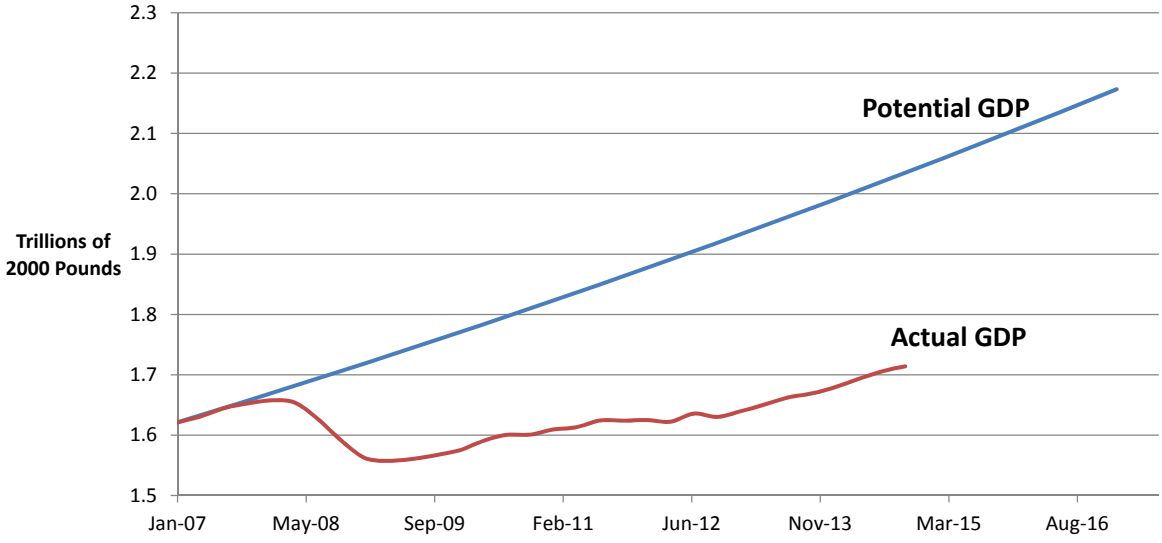
Credit and growth suffered dramatically in the crisis and haven't fully recovered. Was "too much" equity the cause?

"just about whatever anyone proposes, no matter what it is, the banks will come out and claim that it will restrict credit and harm the economy…. It's all bullshit."

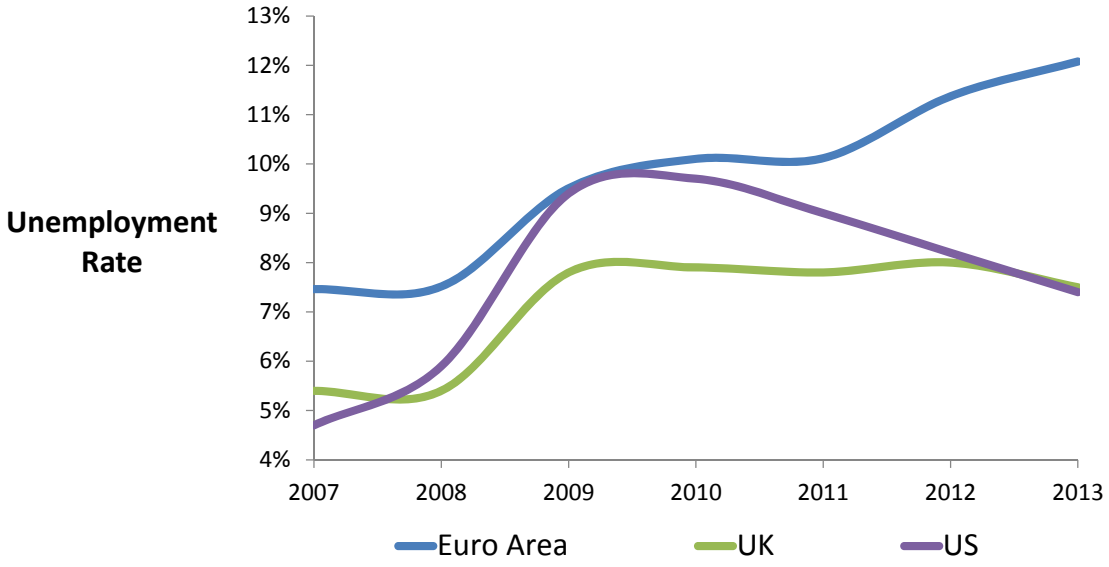
Paul Volcker to Senator Ted Kaufman, Jan. 15, 2010
The Payoff: Why *Wall Street Always Wins*, Jeff Connaughton, 2012

Recall: Growth *Has Suffered and Not Recovered*

Loss in the UK

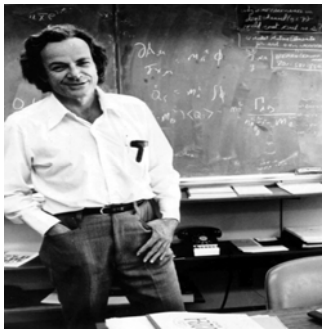


Unemployment



"Science is what we have learned about how to keep from fooling ourselves."

Richard Feynman



True for economists?

See "Chameleons:
The Misuse of Theoretical Models
in Finance and Economics,"
Paul Pfleiderer, 2014

Distorted maps are bad at guiding travel.

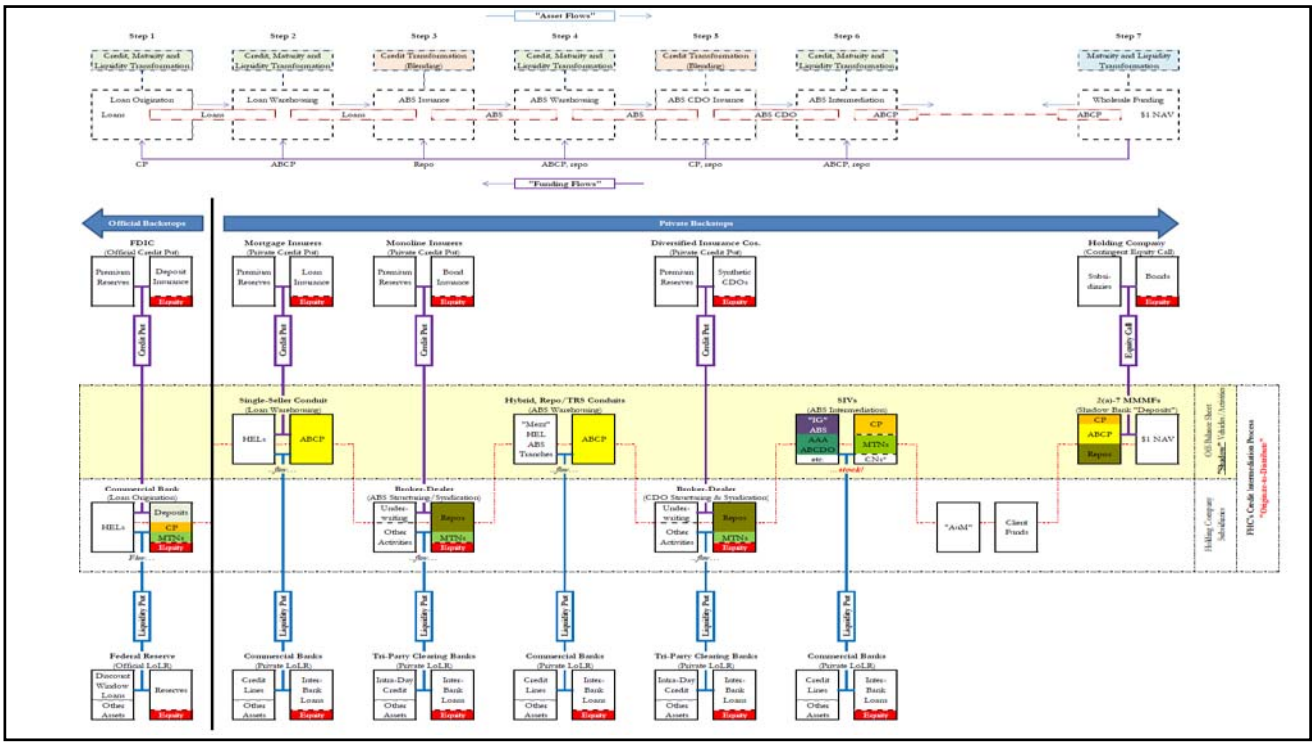
"While it often seems that financial stability has no natural constituency, that constituency is actually all of us … including policy makers as well as businesses, households, [and] financial firms."

Eric Rosengren, President & CEO, Federal Reserve Bank of Boston,
"Money Market Funds Still Need Reform," *Wall Street Journal*, April 26, 2012

"The few who understand the system will either be so interested in its profits or be so dependent upon its favours that there will be no opposition from that class, while the great body of people, mentally incapable of comprehending the tremendous advantage that capital derives from the system, will bear its burdens without complaint, and perhaps without even suspecting that the system is inimical to their interests."

The Rothschild brothers of London, 1863

FLIGHT RECORDER
DO NOT OPEN
AC
AMPERS
AUXILIARY
FLIGHT RECORDER


"Asset Flows"
Step 1
Credit, Maturity and Liquidity Transformation
Loan Origination
Loans
Step 2
Credit, Maturity and Liquidity Transformation
Loan Warehousing
Loans
Step 3
Credit Transformation (Tranching)
ABS Issuance
ABS
Step 4
Credit, Maturity and Liquidity Transformation
ABS Warehousing
ABS
Step 5
Credit Transformation (Tranching)
ABS CDO Issuance
ABS CDO
Step 6
Credit, Maturity and Liquidity Transformation
ABS Intermediation
ABCP
Step 7
Maturity and Liquidity Transformation
Wholesale Funding
ABCP
$1 NAV
CP
ABCP
Repo
ABCP, repo
CP, repo
ABCP, repo
"Funding Flows"
Official Backstops
Private Backstops
FDIC
(Official Credit Put)
Premium Reserves
Deposit Insurance
Equity
Credit Put
Mortgage Insurers
(Private Credit Put)
Premium Reserves
Loan Insurance
Monoline Insurers
(Private Credit Put)
Premium Reserves
Bond Insurance
Diversified Insurance Cos.
(Private Credit Put)
Premium Reserves
Synthetic CDOs
Holding Company
(Contingent Equity Call)
Subsidiaries
Bonds
Equity Call
Single-Seller Conduit
(Loan Warehousing)
HELs
ABCP
Hybrid, Repo/TRS Conduits
(ABS Warehousing)
"Most" HEL ABS Tranches
ABCP
SIVs
(ABS Intermediation)
"IG" ABS
CNA ABCDO
etc.
CP
MTNs
CNs*
2(a)-7 MMMFs
(Shadow Bank "Deposits")
CP
ABCP
Repos
$1 NAV
Off Balance Sheet
"Shadow" Vehicle Activities
Commercial Bank
(Loan Origination)
HELs
Deposits
CP
MTNs
Equity
Broker-Dealer
(ABS Structuring / Syndication)
Under-writing
Other Activities
Repos
MTNs
Equity
Broker-Dealer
(CDO Structuring & Syndication)
Under-writing
Other Activities
Repos
MTNs
Equity
"Asset"
Client Funds
Holding Company Subsidiaries
FDIC's Credit intermediation Process
"Originate-to-Distribute"
Liquidity Put
Federal Reserve
(Official LoLR)
Discount Window Loans
Other Assets
Reserves
Equity
Commercial Banks
(Private LoLR)
Credit Lines
Other Assets
Inter-Bank Loans
Equity
Tri-Party Clearing Banks
(Private LoLR)
Intra-Day Credit
Other Assets
Inter-Bank Loans
Equity