

Global Financial Plumbing

An Introduction To The Shadow Banking System

Gordon Schücker



Kritische
Wirtschaftswissenschaften
Göttingen

BPIRT	29.51	▲+1.05	▼-3.69%
GOH	42.03	-1.28	▼-3.14%
AITA	23.16	+0.63	▲+2.80%
JTAS	37.24	+0.96	▲+2.65%
RCA	20.19	▼-2.36	▼-10.47%
AECT	18.75	▲+7.53%	▲+5.97%
XNC	34.12	-5.71	▼-16.74%
PEQ	26.91	-4.12	▼-15.31%
XV	16.06	-0.70	▼-4.36%



-0.33

Stock Sectors

3 Month % Change

Communications	-0.86%
Consumer Durables	+5.65%
Consumer Non-Durables	+2.88%
Commercial Services	+6.41%
Health Technology	+2.53%
Minerals	+6.61%
Services	+5.52%
Transportation	+11.73%
Utilities	+5.11%
Other	-1.51%
Real Estate	+9.11%
Technology	+3.91%

Nov	C
20 WK	
High	9.2
Low	3.2
T/N	57
Return	9
MktVol.	24

Realize that everything connects to everything else.

– Leonardo da Vinci

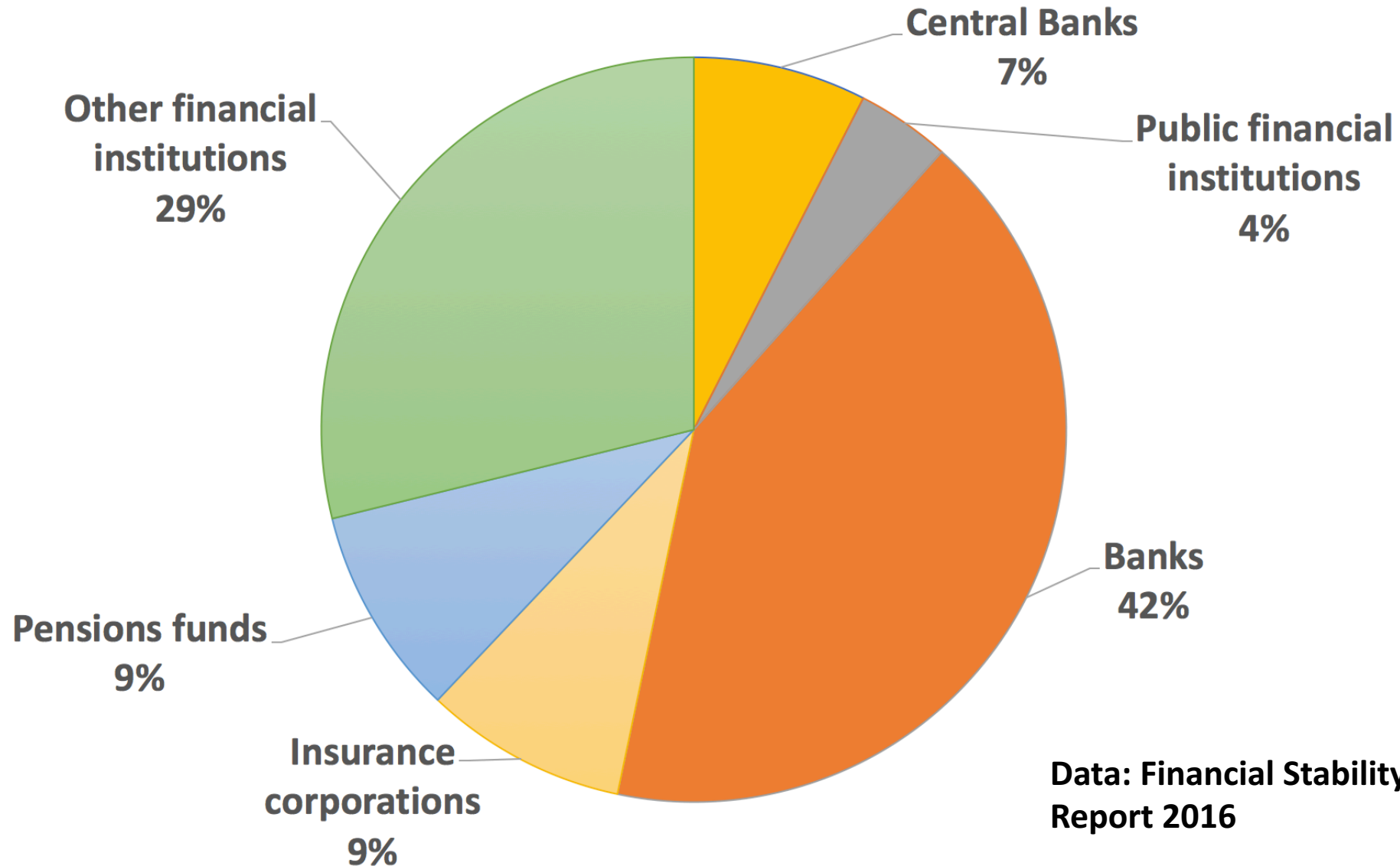
- 1. Introduction to the shadow banking system**
- 2. Interactions on global financial markets**

1. Introduction to the shadow banking system

2. Interactions on global financial markets

Mapping of the global financial system

Total global financial assets: \$321 trillion (410% of world GDP)



**Data: Financial Stability Board
Report 2016**

Definition of the shadow banking system



- Vague term with many possible definitions
- One possible broad definition of the *shadow banking system*:
All bank-like activities and entities outside of the traditional banking system
- Complex system, obviously impossible to cover in its entirety in one lecture

Introduction video | '08 crisis visualized

The Crisis of Credit Visualized by Jonathan Jarvis



What is money?



30 year US government bond certificate

- Nobody agrees
- “Traditional” measures of money supply
 - M0, M1, M2 (various measures combining currency in circulation, bank deposits and checking accounts)
- How about a US government bond?
 - Highly liquid (= can easily be converted to currency)
 - Satisfies the three main functions of money: *medium of exchange, unit of account and store of value*

What is money? | View of the Federal Reserve

*The problem is that we cannot extract from our statistical database what is true money conceptually, either in the transactions mode or the store-of-value mode. One of the reasons, obviously, is that the proliferation of products has been so extraordinary that the true underlying mix of money in our money and near money data is continuously changing. As a consequence, while of necessity it must be the case at the end of the day that inflation has to be a monetary phenomenon, **a decision to base policy on measures of money presupposes that we can locate money.** And that has become an increasingly dubious position.*

– Alan Greenspan, FOMC Policy Meeting June 28, 2000, Federal Reserve

Collateral as building block in financial markets

- **Collateral:** something pledged as security for repayment of a loan, to be forfeited in the event of a default.
E.g. a house in a mortgage.

*Collateral is one of the building blocks on which the financial markets are constructed. Used for a number of purposes – [...] including **secured funding with market counterparties and central banks**, [...] - the role of effective collateral management in monetizing assets has never been more important.*

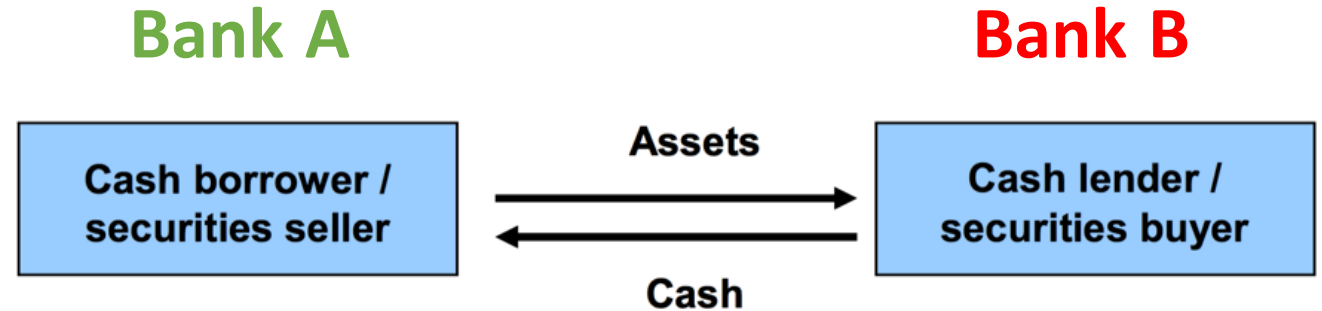
– Manmohan Singh, Collateral and Financial Plumbing (2014)

Repo | Investopedia explanation video



Repurchasing Agreement

- A **repurchasing agreement (repo)** is a transaction that combines the selling of a security with the promise to buy it back at a later point in time at a fixed price.



- Example: **Bank A** sells a government bond for \$100 to **Bank B** with the promise to buy it back for \$101 in one year.
- **A repo is effectively a secured loan.** The implied interest rate on a repo is called the **repo rate**. In the above example it is 1%.

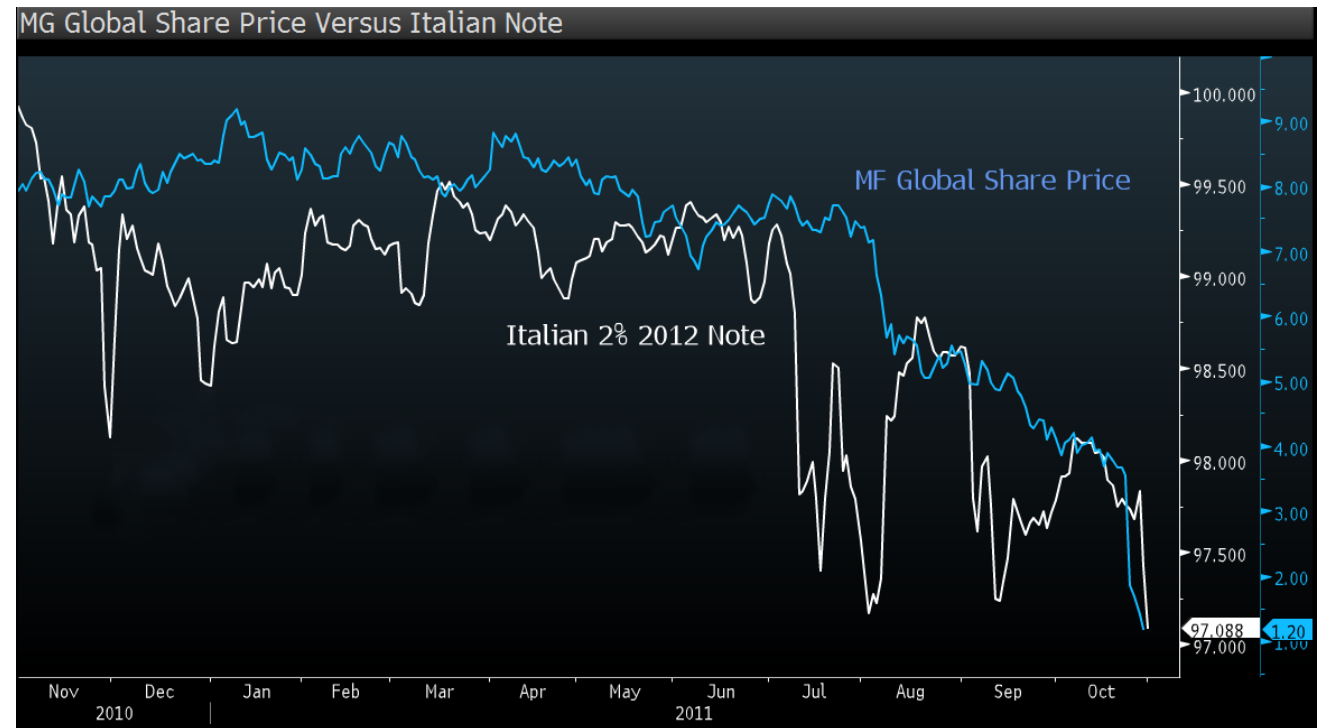
Repo | Market size



- Major source of financing on Wall Street.
- **Daily trading volume in the repo market in 2008 on average about \$7 trillion, vs. \$80 billion on the New York Stock Exchange**
(US GDP in 2008: about \$14 trillion)
- About \$12 trillion in repo outstanding world wide as of today

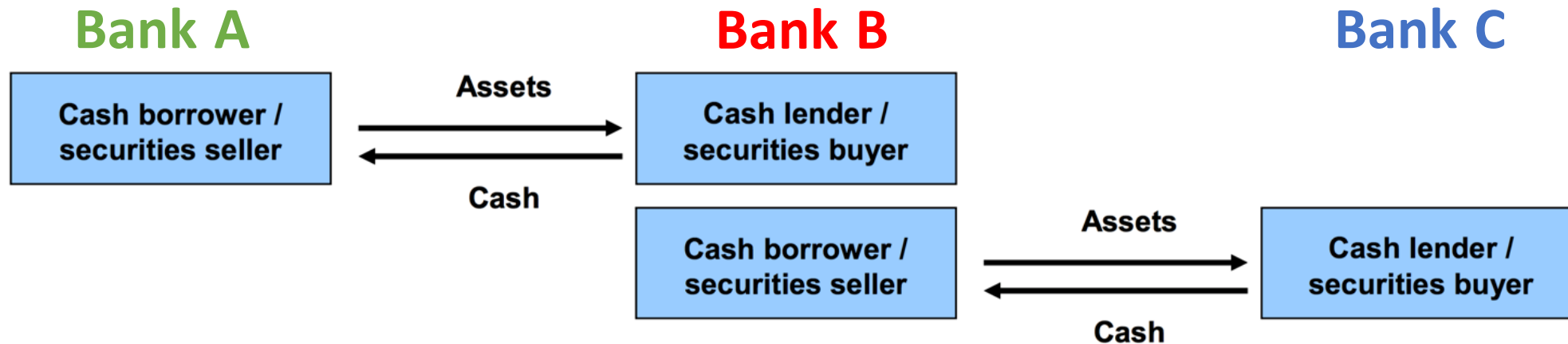
“Fractional repo banking” | Shadow money multiplier

- Purchase new assets from repo proceeds to increase leverage.
- Example:
 - Leg 1: buy government bonds
 - Leg 2: repo these to secure funding
 - Leg 3: use proceeds to buy new government bonds
 - repeat the cycle
- The (exemplified) MF Global trade that went wrong in 2011:
 - Above trade with buying of Italian bonds having **2% interest rate** and a **repo rate of 0.5%**.
 - Trade idea: profit from interest rate differential and bet on government rescue.
Result: bankrupting \$6 billion trade.
(Difference between genius and rogue trader: 9 months, i.e. elapsed time until “bailed out” of Italian government.)



“Fractional repo banking” | Rehypothecation

- **Rehypothecation:** Reuse of pledged collateral to secure funding.
- Example:
 - Leg 1: **Bank A** repos a government bond to secure funding from **Bank B**.
 - Leg 2: **Bank B** repos a government bond to secure funding from **Bank C**.
Bank B reused government bonds from **Bank A**.
- This creates so called **collateral chains**.



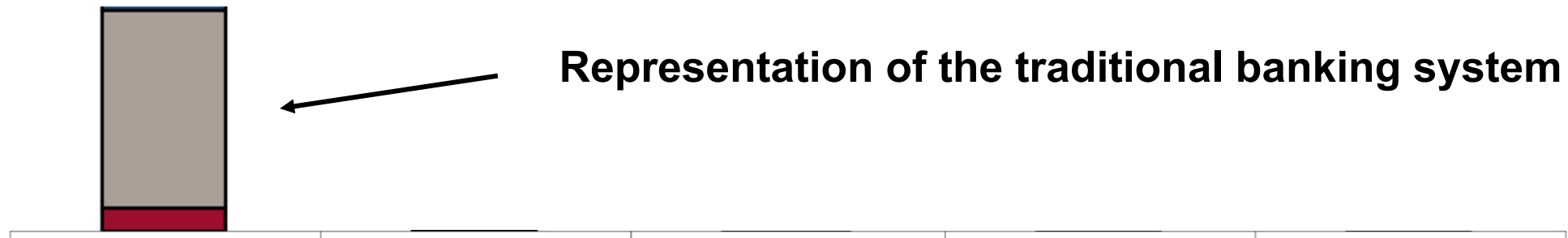
Repo | Accepted collateral and shadow money

- Accepted collateral for repo transactions:
 - often “high quality assets” such as government bonds
 - mortgage backed securities (MBS)
 - But “anything” is possible, even stocks.
- Since repos enable to transform assets into cash they can be considered as money or ***shadow money***.
- Depending on the quality of the collateral, repo funding might not be 100% of the value of the collateral.
 - For example \$100 in government bonds might only secure \$90 dollar in cash. This reduces risk for the lender in case the collateral loses value.



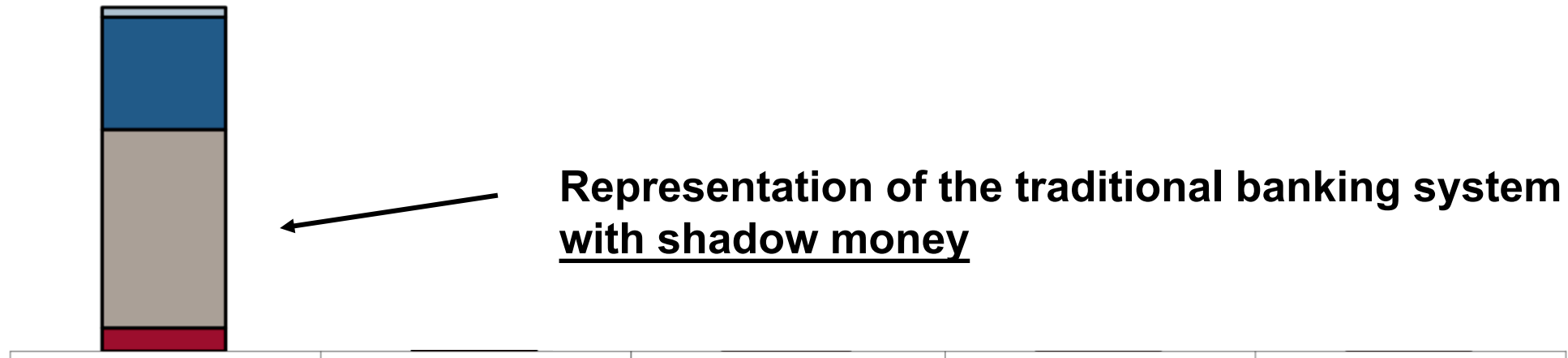
Stylized map | Traditional and shadow money

- Inside Money (bank created money)
- Outside Money (central bank reserves and cash)



Stylized map | Traditional and shadow money

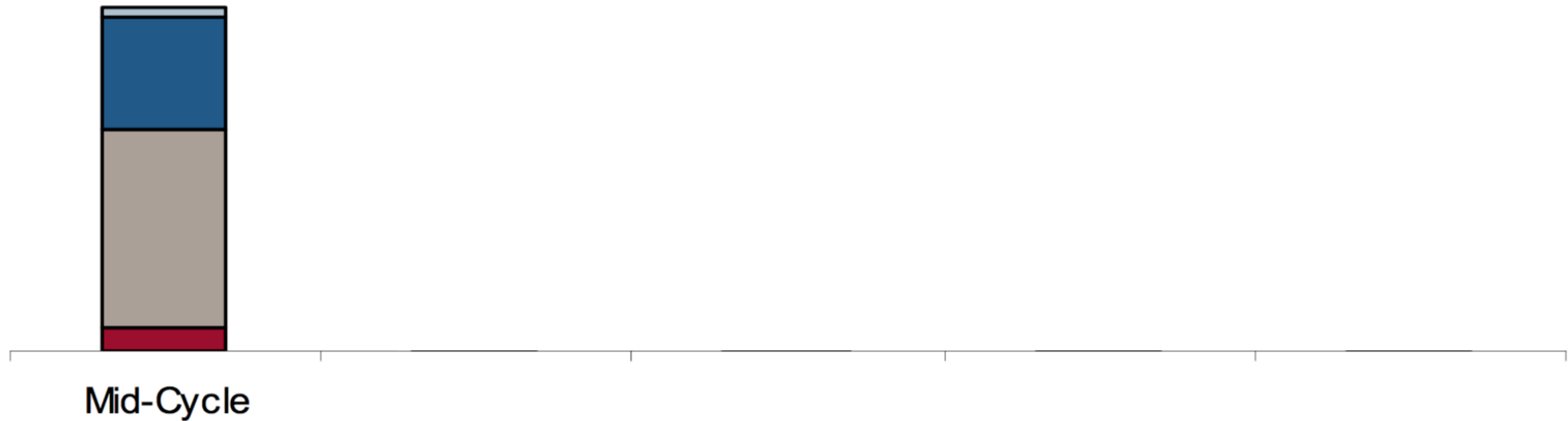
- Private Collateral Money (private collateral available for repo, e.g. mortgage backed securities)
- Public Collateral Money (public collateral available for repo, e.g. government bonds)
- Inside Money (bank created money)
- Outside Money (central bank reserves and cash)



Stylized map | Credit boom & bust with shadow money

- Private Collateral Money
- Public Collateral Money
- Inside Money
- Outside Money

Beginning of a credit cycle...

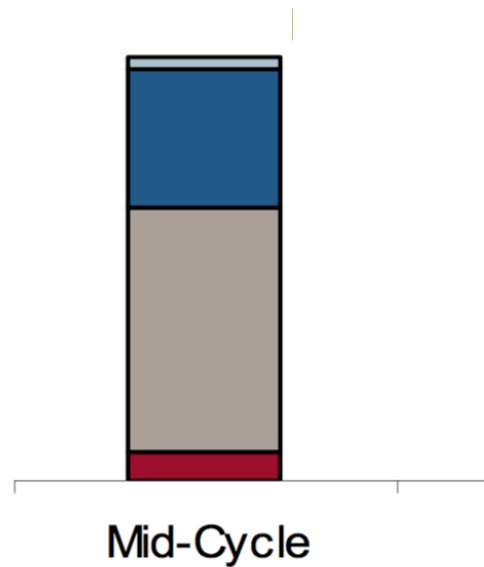


Source: Credit Suisse

Stylized map | Credit boom & bust with shadow money

- Private Collateral Money
- Public Collateral Money
- Inside Money
- Outside Money

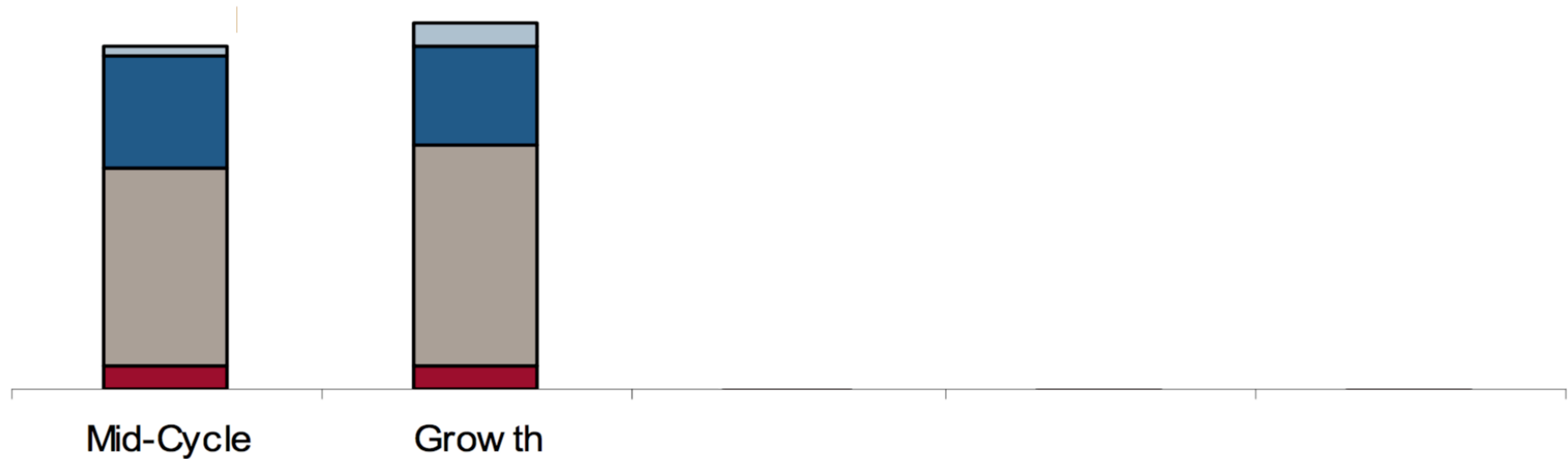
Growth phase with mild CPI inflation...



Stylized map | Credit boom & bust with shadow money

- Private Collateral Money
- Public Collateral Money
- Inside Money
- Outside Money

... banks create new loans, some entities start to repo riskier assets to “enhance” their returns...

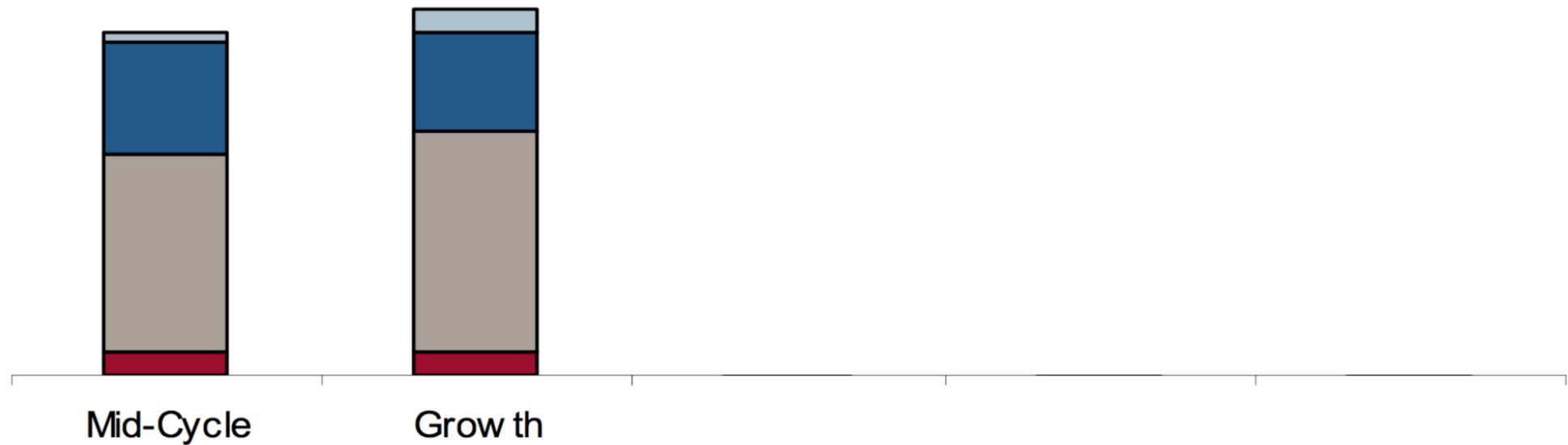


Source: Credit Suisse

Stylized map | Credit boom & bust with shadow money

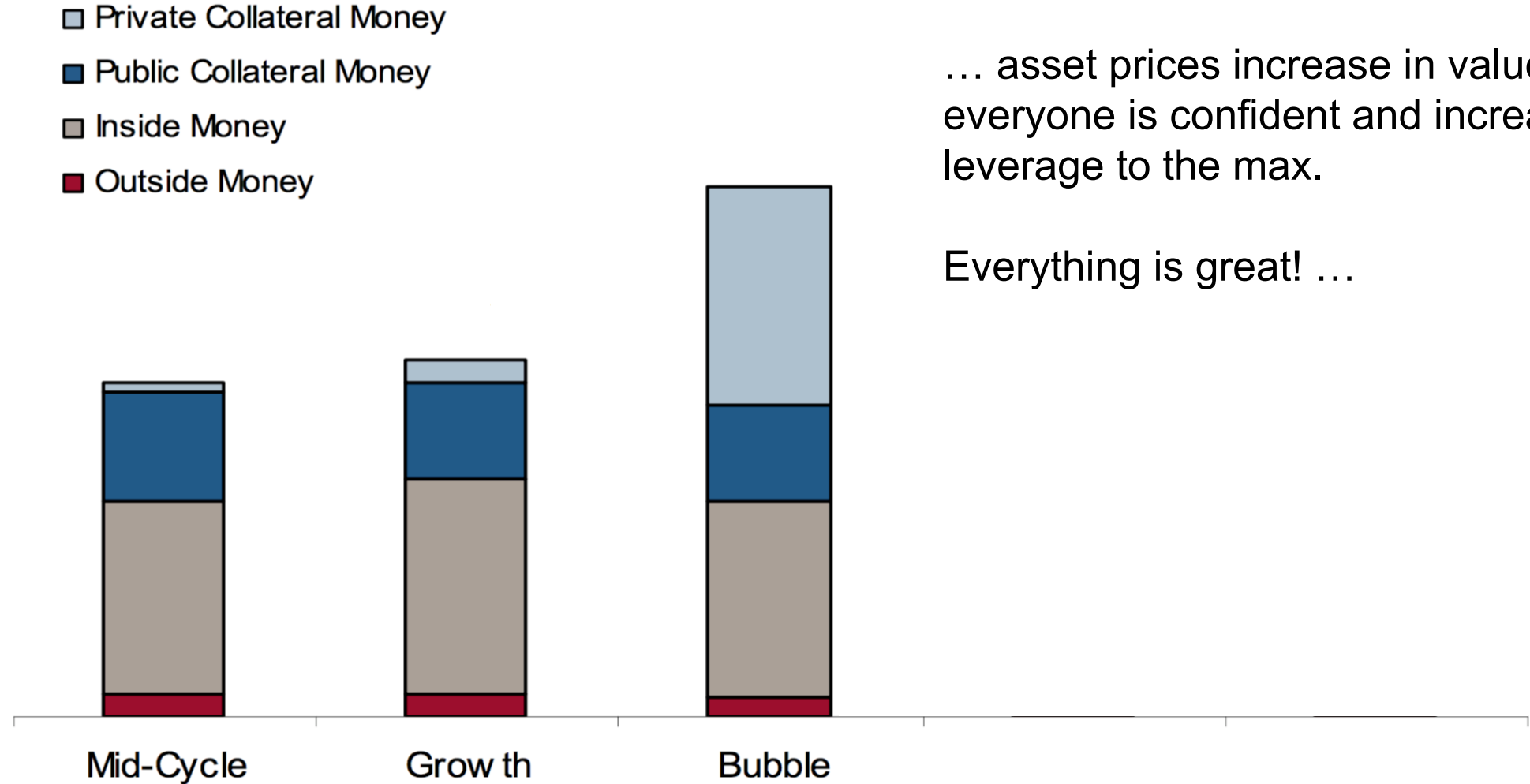
- Private Collateral Money
- Public Collateral Money
- Inside Money
- Outside Money

... entering the bubble phase...



Source: Credit Suisse

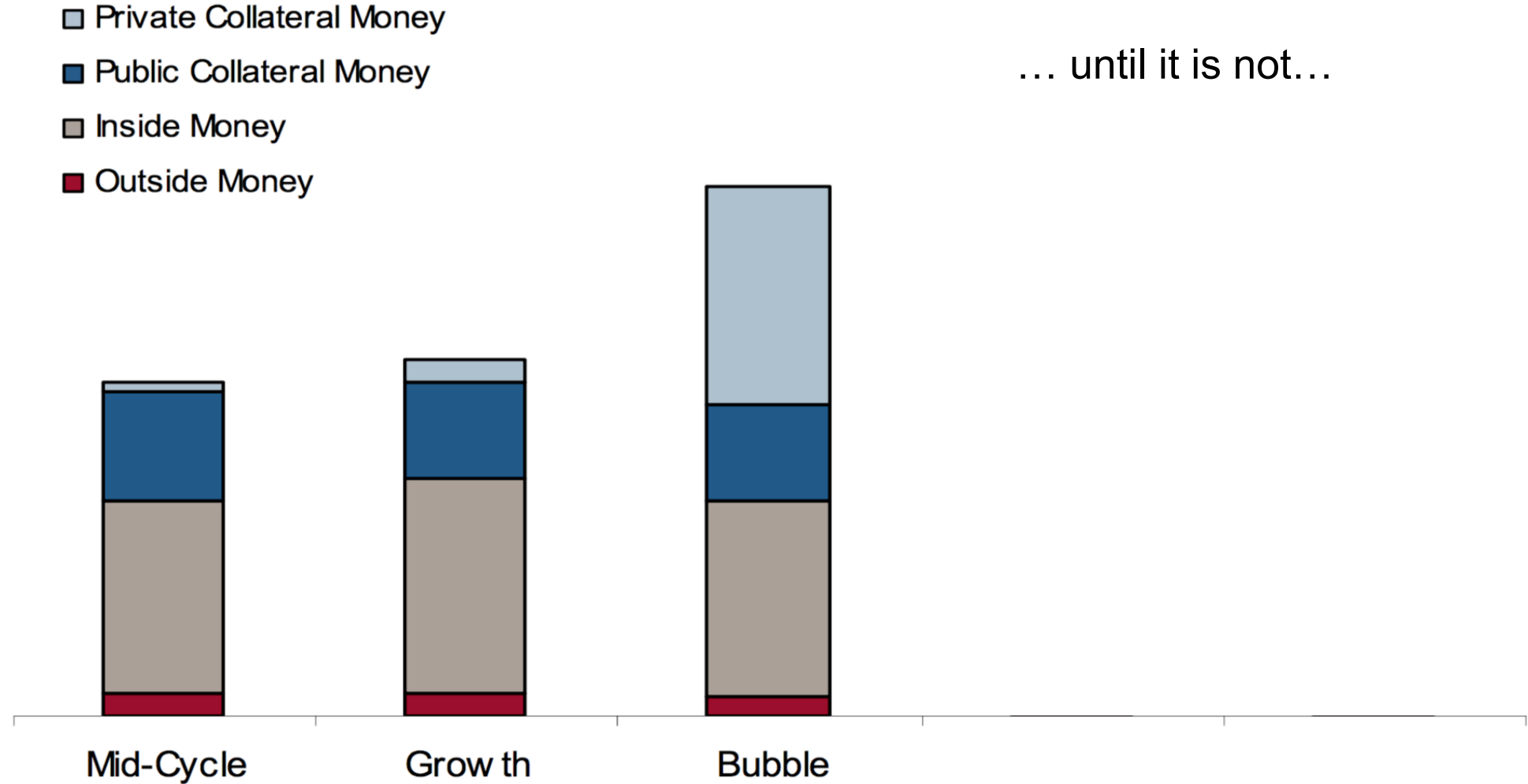
Stylized map | Credit boom & bust with shadow money



... asset prices increase in value,
everyone is confident and increases
leverage to the max.

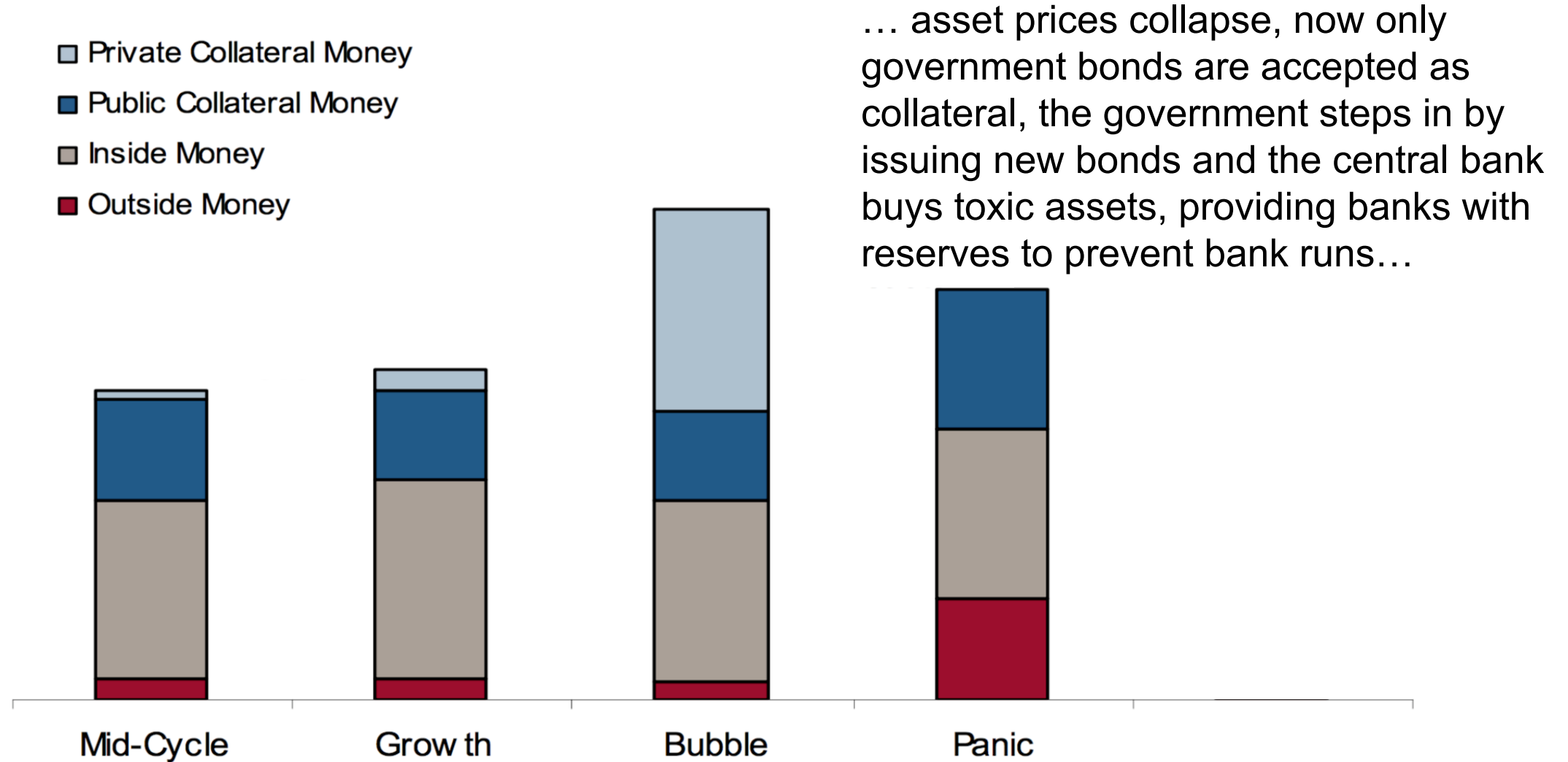
Everything is great! ...

Stylized map | Credit boom & bust with shadow money



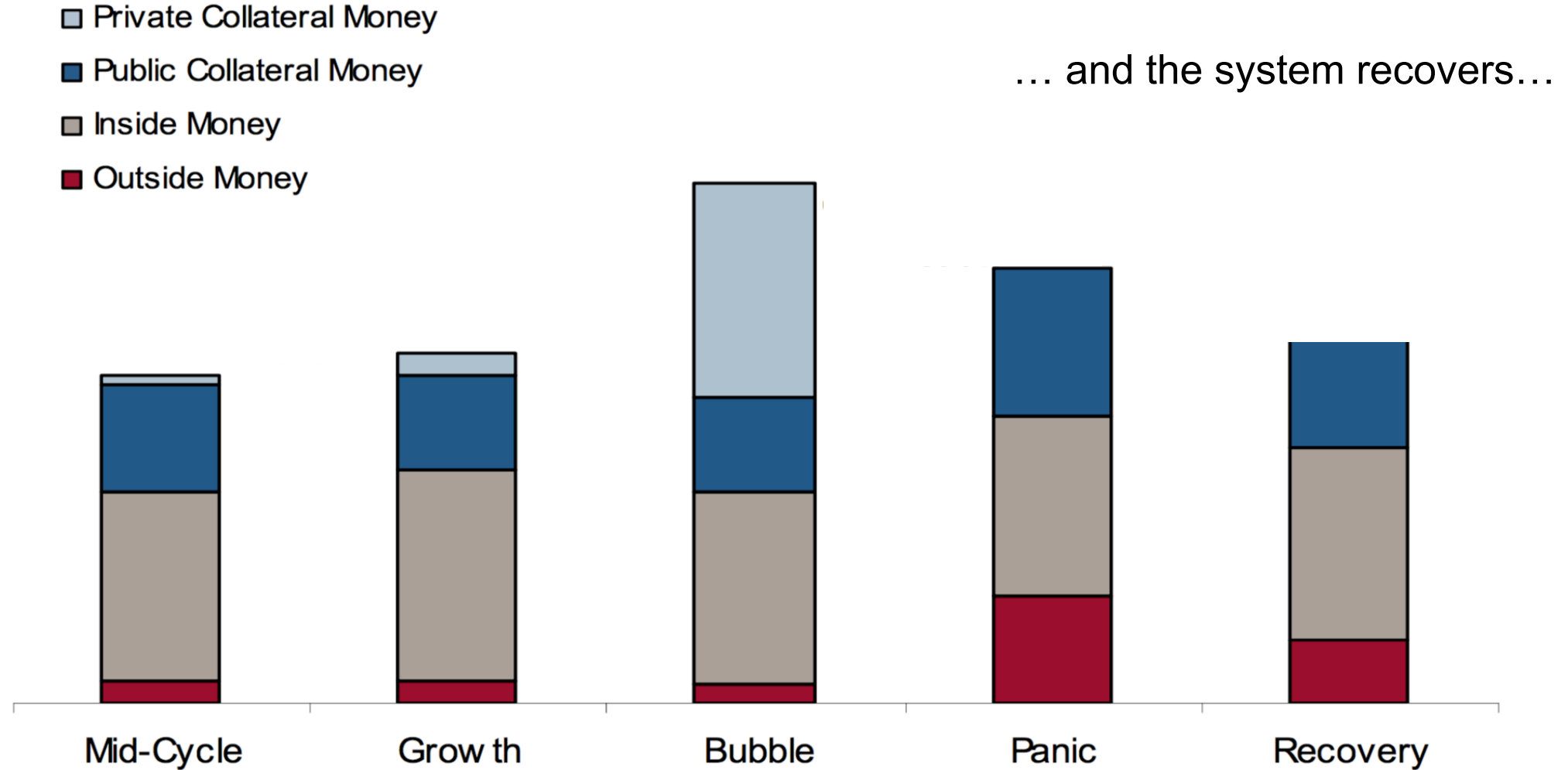
Source: Credit Suisse

Stylized map | Credit boom & bust with shadow money



Source: Credit Suisse

Stylized map | Credit boom & bust with shadow money

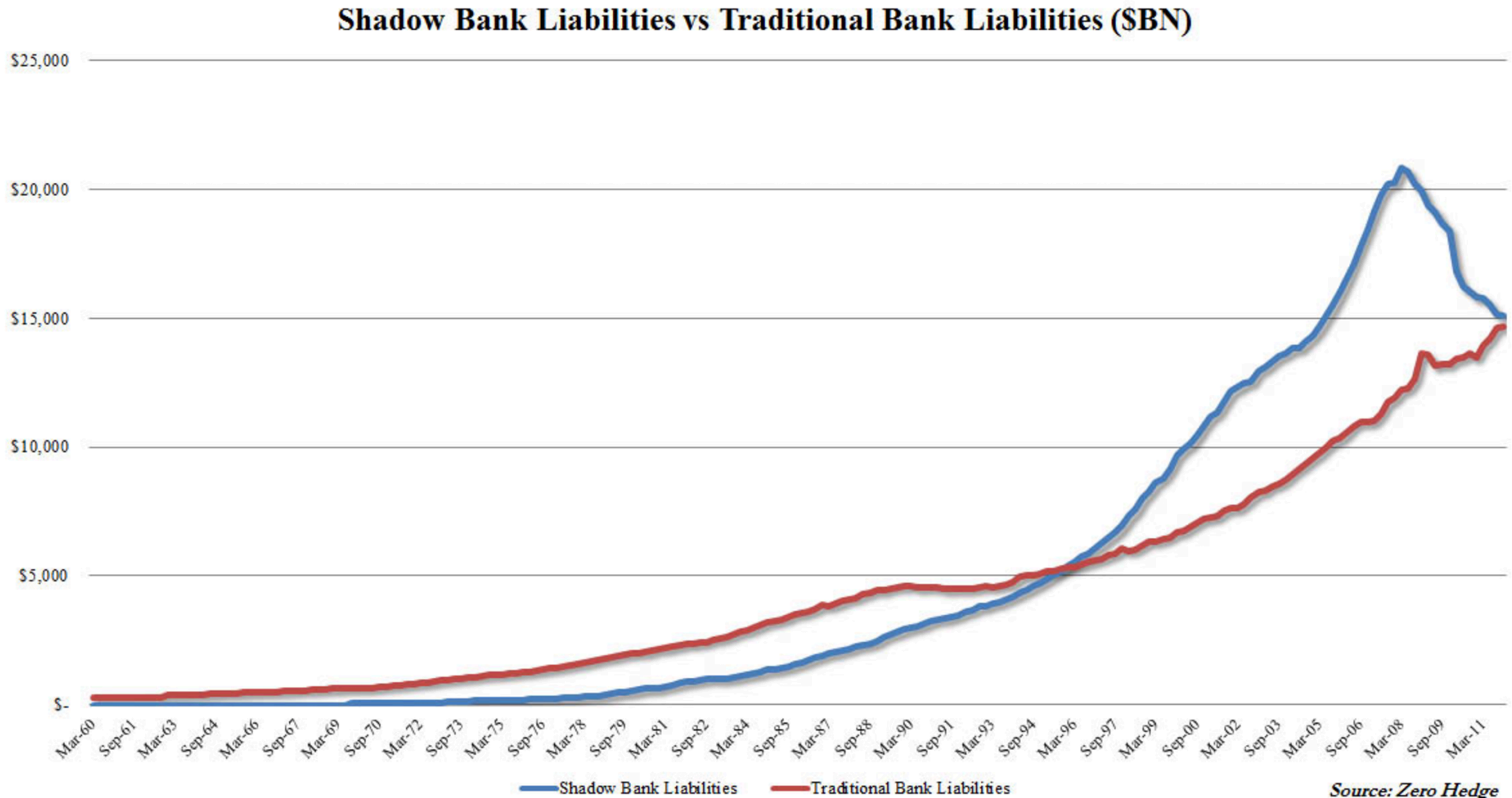


Source: Credit Suisse

Risks in the shadow banking system

- Some entities might not have access to central bank funding or government bailouts. (Especially not when located in a different jurisdiction.)
- Bank-like activities are subject to the same risks present with traditional banking.
- Example of bank-like activity: **maturity transformation**, i.e. borrowing on a short term basis while lending on a long term basis. Possibility of **“a run on a shadow bank”**.
 - Lehman Brothers financed most of its operations via 7 days repos, when trust “evaporated”, long term “investments” (such as subprime mortgage portfolios) had to be “fire sold” leading to its bankruptcy (and the near collapse of the entire global financial system).
- Moral hazard in a subprime CDO. Use of NINJA-mortgages (no income, no job, no asset) in ‘08. Issuer does not bear the consequences of his decisions as risk is sold to someone else.

Traditional vs shadow banking in the US during the '08 crisis

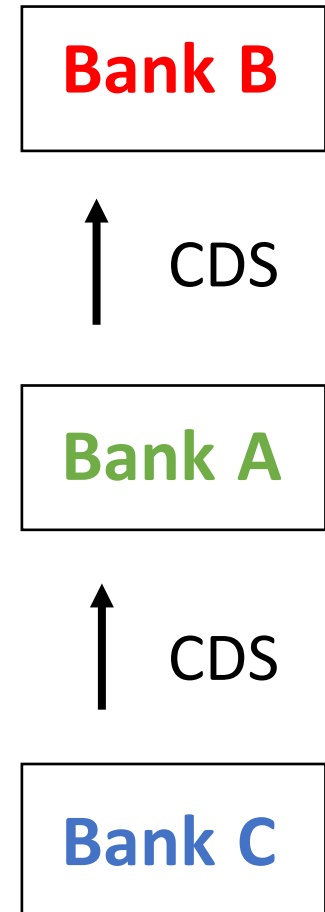


Derivative world| credit default swap example (CDS)

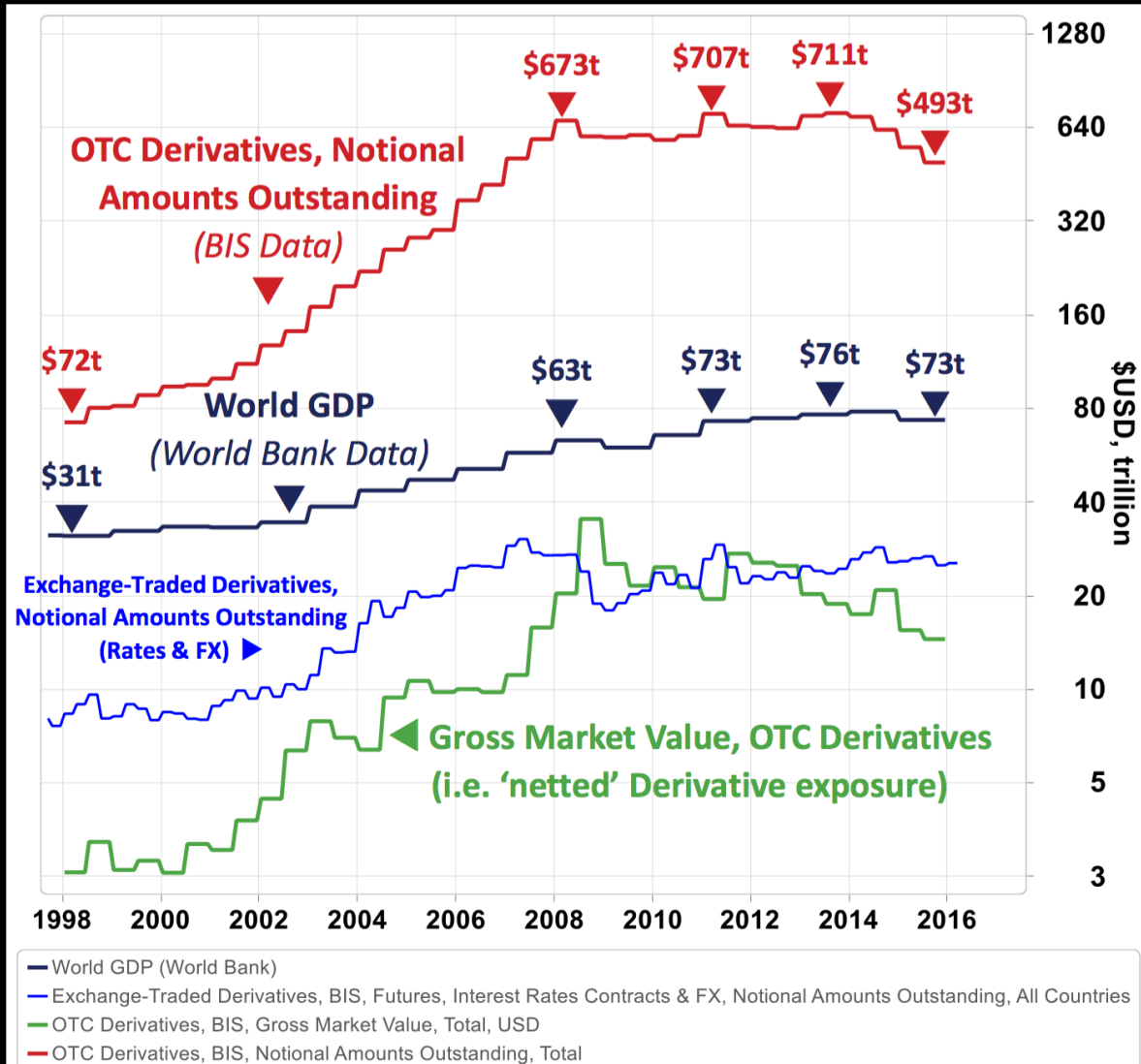
- From the introductory video: AAA collateralized debt obligation (CDO) tranche yielding 4%. Possibility to **insure it via CDS for a 1% fee**.
- Guaranteed 3% return, **assuming the CDS issuer does not fail**.
- CDS issuer (simplified) payouts: **\$1 profit** if CDO tranche does **not default**. **\$103 loss** if CDO tranche **defaults**. (Also called “picking up nickels in front of steamrollers”.)
- Max possible derivative loss is called the **notional exposure** (i.e. \$103 in the above example).
- American International Group Financial Products (AIG-FP) had **\$2.7 trillion** in notional CDS outstanding at the height of the subprime mortgage crisis.

Derivative example | Why notional matters

- Reconsider the same CDS example.
- AAA tranche CDO with 4% yield, CDS insurance for 1%
- **Bank A** buys a CDS on the above CDO from **Bank B**.
Bank A sells a CDS on the same CDO to Bank C.
- **Netted exposure** of **Bank A** is **zero**. (Any profit or loss is transferred from **Bank B** to **Bank C** via **Bank A**).
- However, the **notional exposure** of **Bank A** is \$103 as it might have to payout **Bank B** \$103 if the CDO defaults while **Bank C** also defaults and is not able to pay **Bank A**.
- As soon as a someone defaults on his promise to pay, “netted” exposures become notional exposures quickly for everyone.



Outstanding over the counter (OTC) derivatives

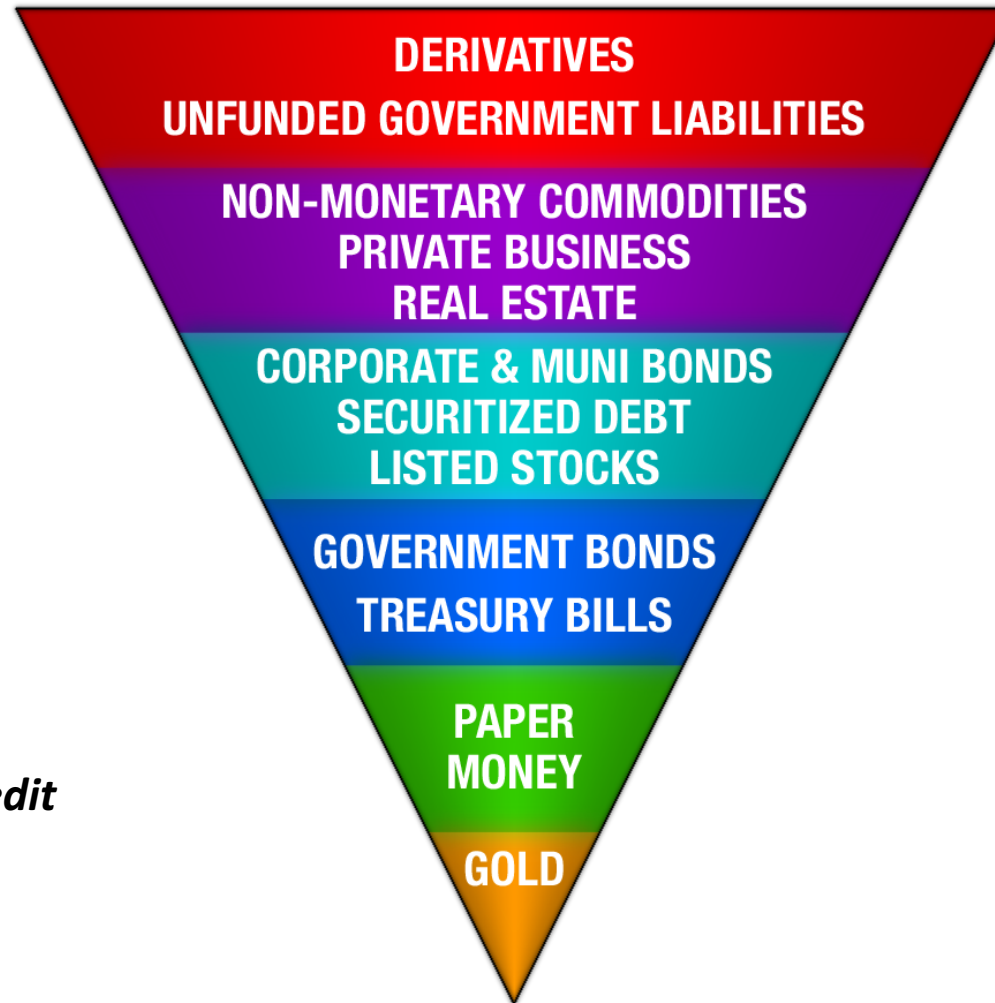


Shadow government debt | Agency debt & promises



- *Agency debt* is debt issued by government agencies. **This debt is off balance sheet to the federal government.** (i.e. this debt is not counted in the \$20 trillion of the US government)
 - Two most known are mortgage lenders Fannie Mae and Freddie Mac. (several trillions in debt.)
- Similar in other jurisdictions.
- Unfunded pension liabilities. (Depending on estimates, up to several hundred trillion dollars globally.)
- GDP “likes” to be “manipulated” upwards (e.g. Greece including the shadow economy into GDP numbers).

Exter's Pyramid | Hierarchy of Risk



More trust required
Less liquid (harder to sell)
Further away from “real” wealth

*Gold is money,
everything else is credit*
– JP Morgan

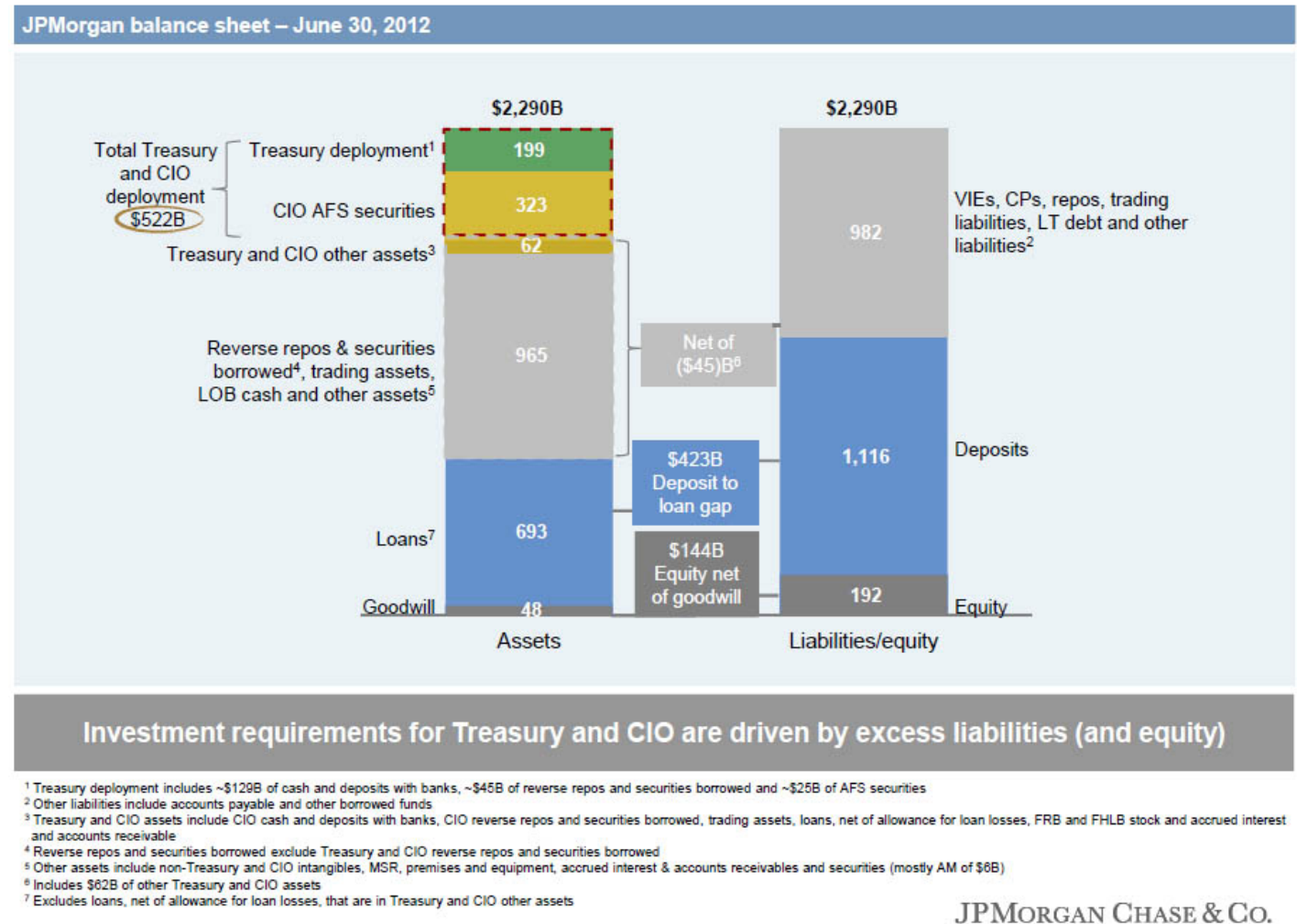
Less trust required
More liquid (easier to sell)
Closer to “real” wealth

1. Introduction to the shadow banking system

2. Interactions on global financial markets

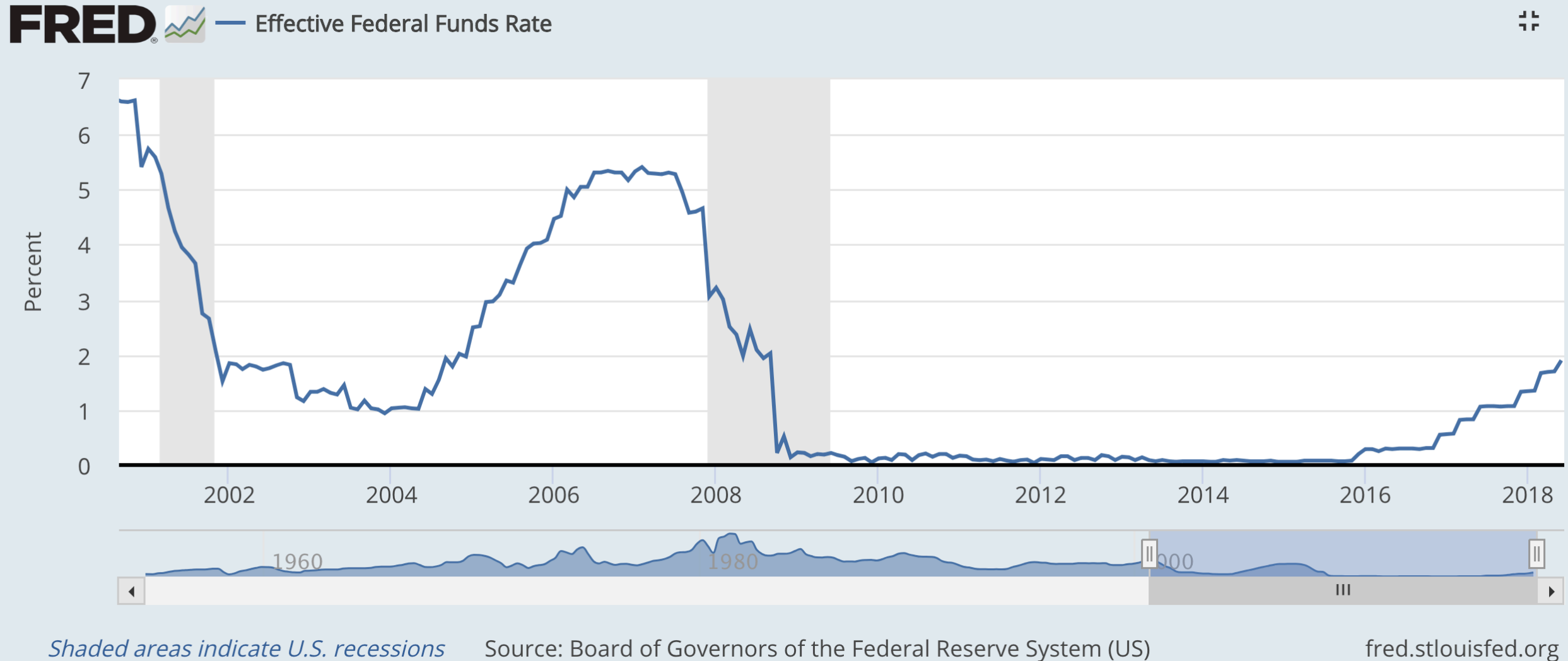
Traditional banks vs. shadow banking system

- Obvious high interconnectedness
- Traditional banks also use instruments such as repos and derivatives.
- Traditional banks use various loopholes to bypass regulation. E.g. J.P. Morgan Chase lost \$5 billion trading credit default swaps in the summer of 2012, while supposedly “hedging” (= enter trades for insurance purposes only and not for generating profits).



CIO = Chief Investment Office = JPM internal "hedge fund"

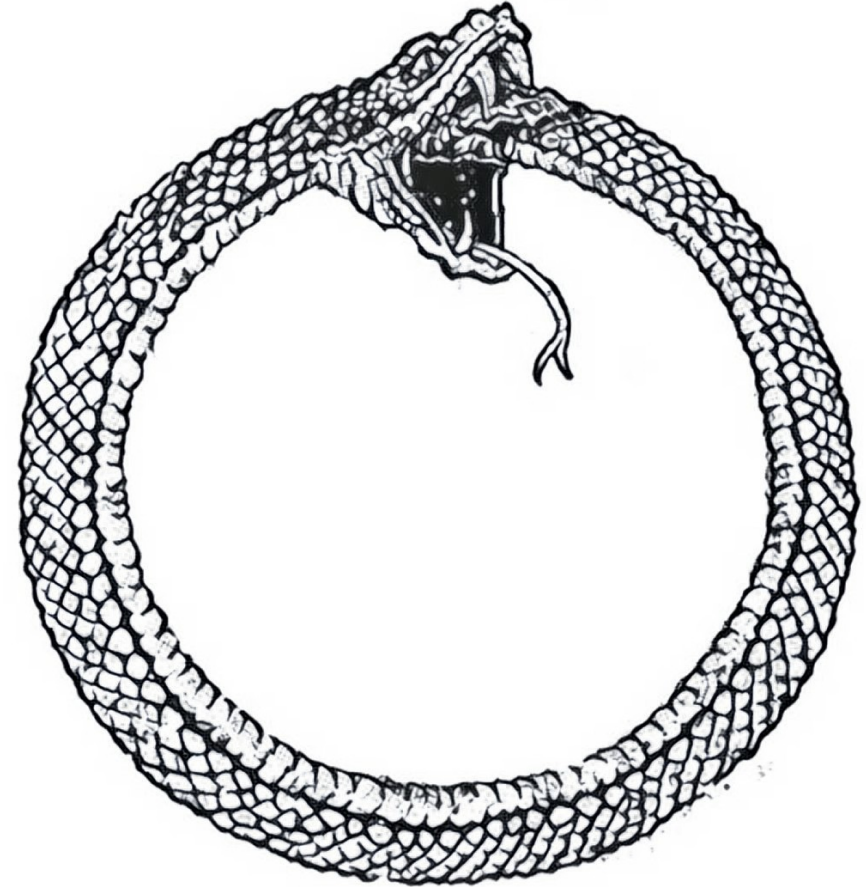
Moral hazard due to low interest rates?



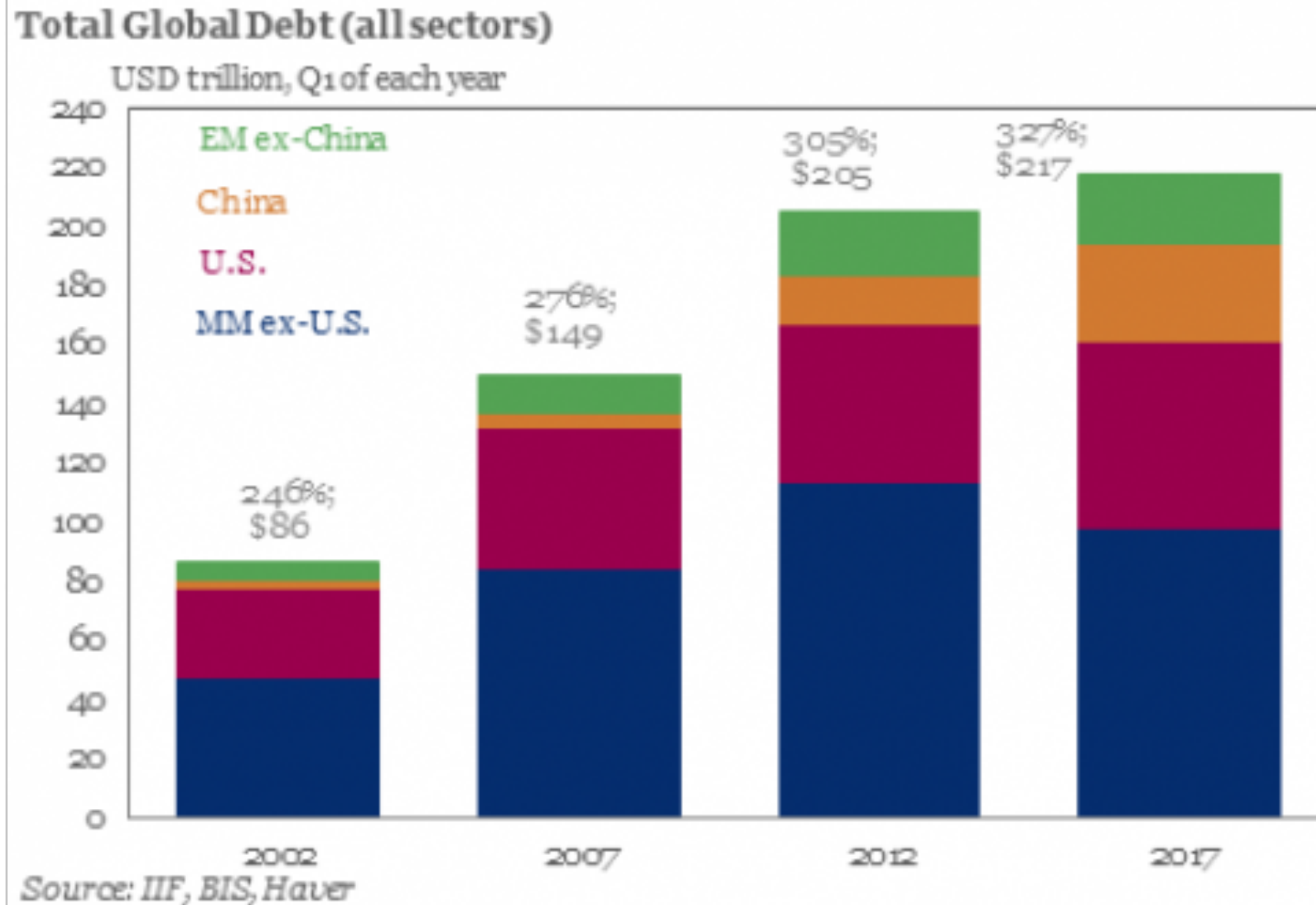
Federal Funds Rate = key interest rate for banks set by the Federal Reserve

“Reach for yield” pushes everyone into risky assets

- Pension funds promise 6 – 7% returns. They now sell equity insurance products.
- Subprime auto is the new thing (same as with subprime mortgages but with cars).
- Companies issue debt to buy back their own stock (financial engineering high returns).
- Electronic Traded Funds (ETFs) enable many retail investors to buy stocks.
- Government and global debt exploding (in particular in China).



The bigger picture | Global debt never decreased

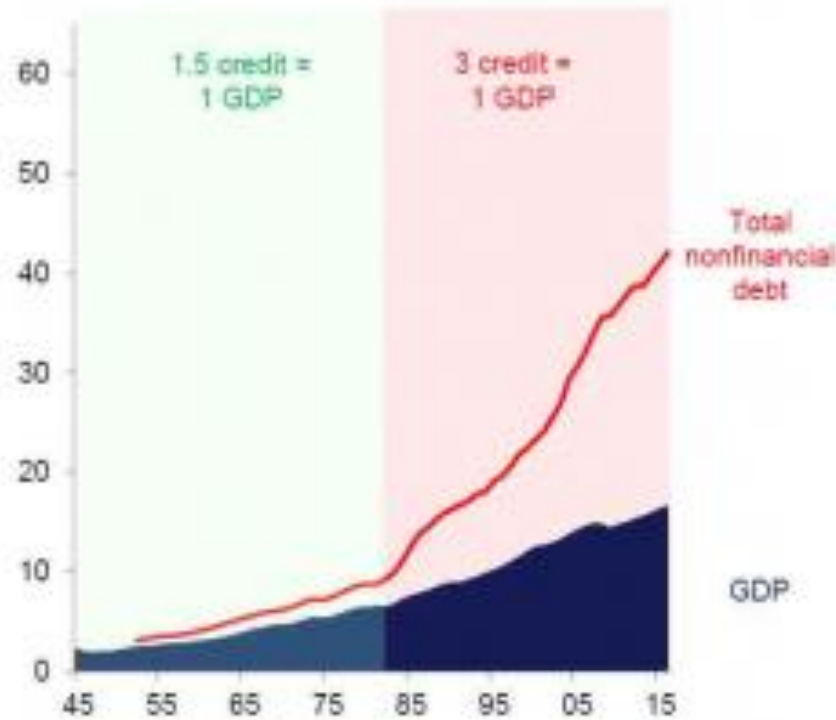


Credit addiction | US vs China

Central banks' response to the lack of inflation?

The US' credit addiction began in 1982

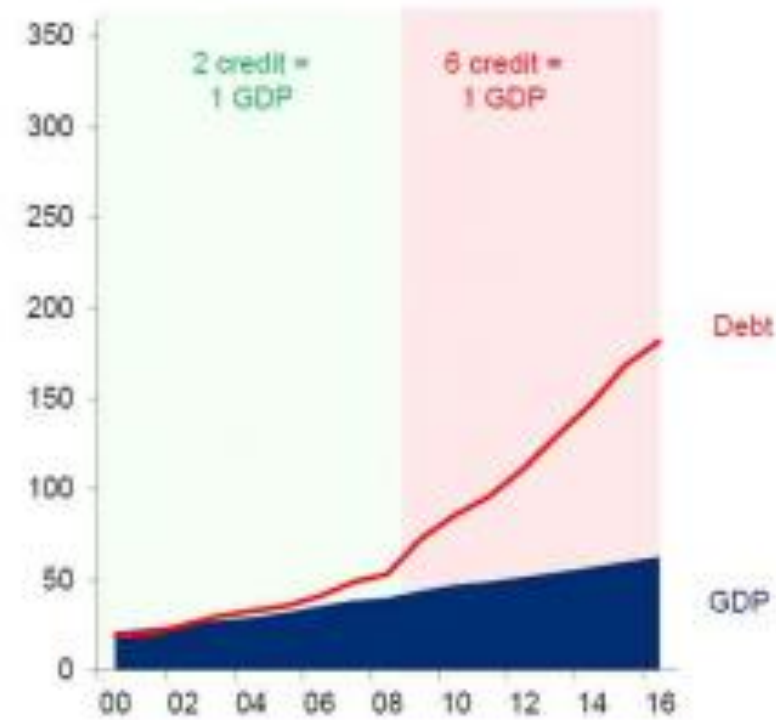
Real value of US GDP vs debt, in 2009 \$



Source: Federal Reserve, BEA, CB Research

In China it was 2009

Real estimated value of Chinese GDP vs debt, in 2015 yuan



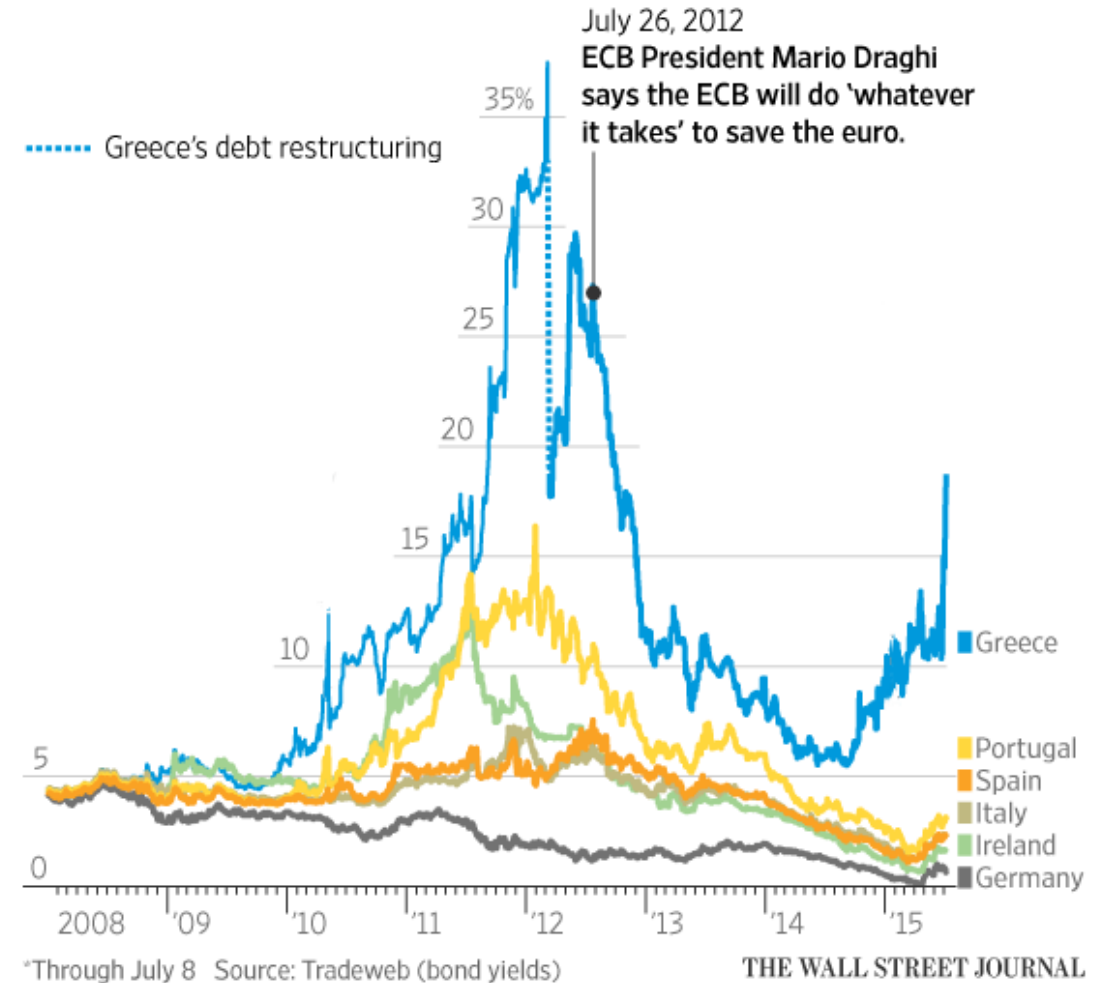
Source: PSOC, BIC, CB Research. For more colour, see e.g. [Can China Really Retain Credit?](#), M. Patis, Jan17.

They simply stopped worrying about credit

Central bank's implicit bailouts

- “Whatever it takes” by Mario Draghi: European Central Bank (ECB) promises to buy up to unlimited amounts of EU government bonds (**except Greek bonds**) in order to “stabilize” their interest rates.
- Federal Reserve buys large amounts of US government bonds and other debt instruments (program called *quantitative easing* or QE).
- Stock buying by the Bank of Japan and the Swiss National Bank.

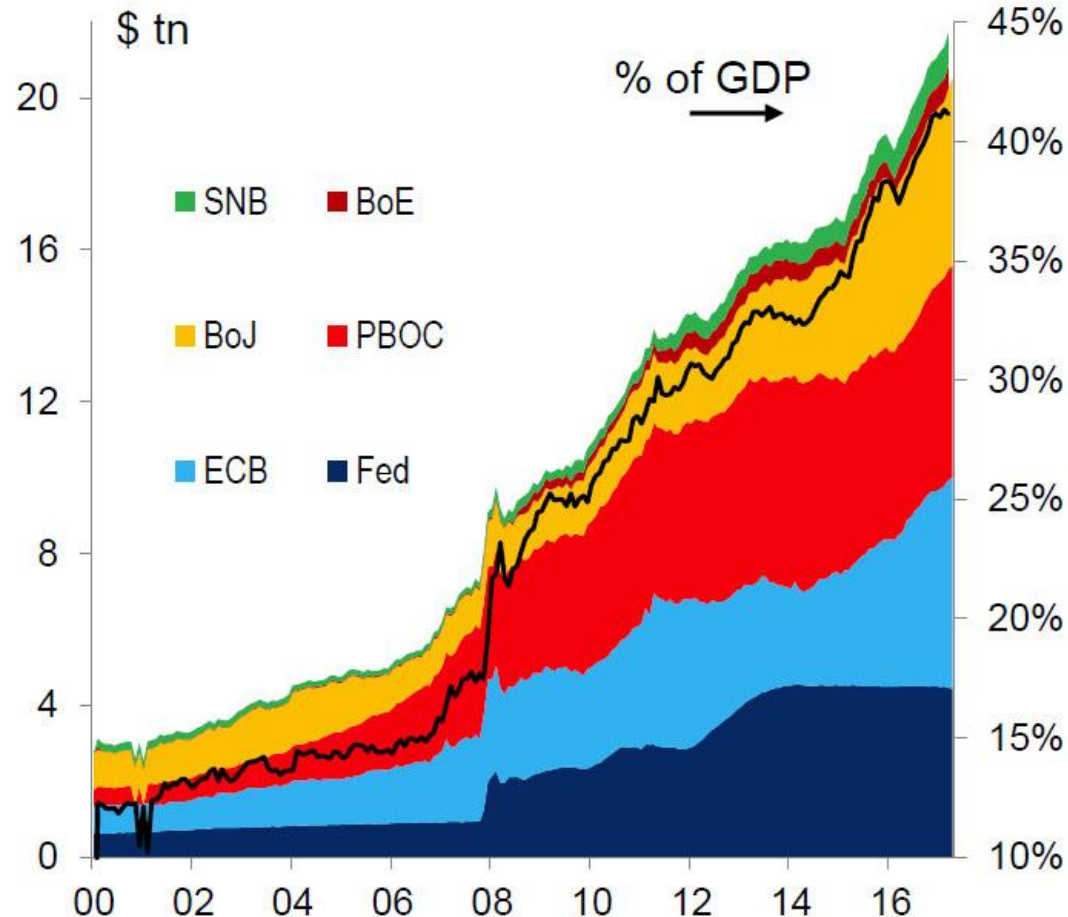
Interest rates on EU government bonds



Central banks are buying a lot...

A \$20tn stockpile

Global CB balance sheet assets



Source: National central banks.

CB = central bank
SNB = Swiss National Bank
BoE = Bank of England
BoJ = Bank of Japan
PBOC = People's Bank of China
ECB = European Central Bank
Fed = Federal Reserve Bank

... and lifting asset prices...

FRED

— All Federal Reserve Banks: Total Assets (left)
— S&P 500 (right)



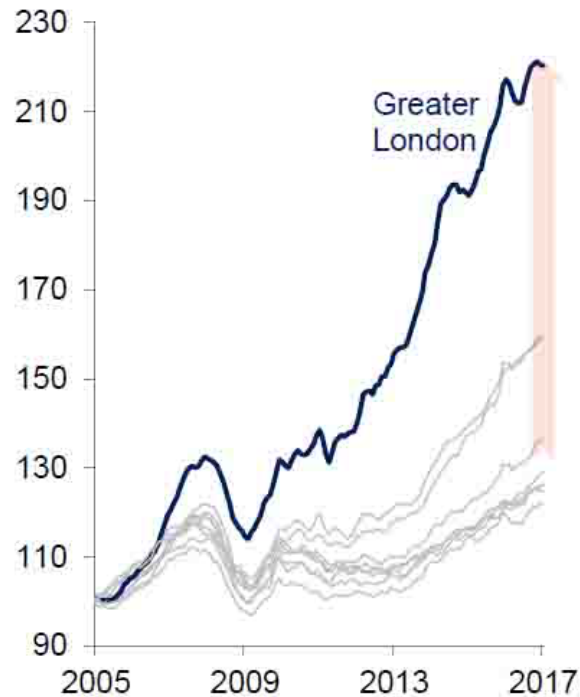
Sources: Board of Governors, S&P DJI

fred.stlouisfed.org

... lifting all* asset prices?

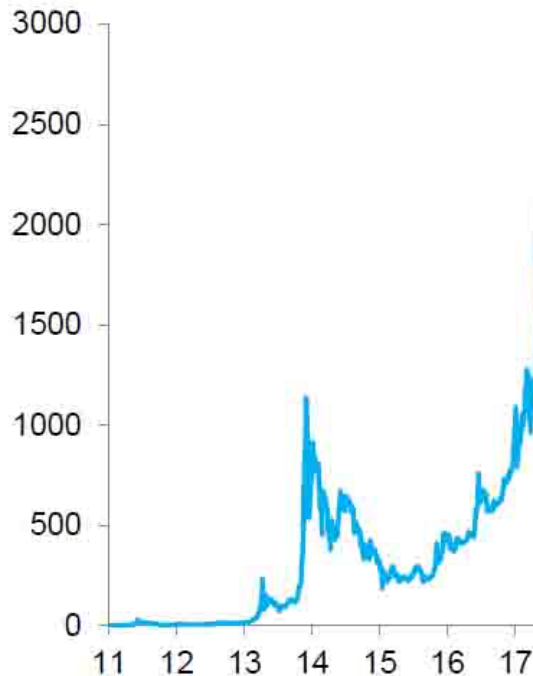
Facilitating recovery comes at a high cost to the future (iv)

Location, location, location
UK property prices by region, Jan-05=100



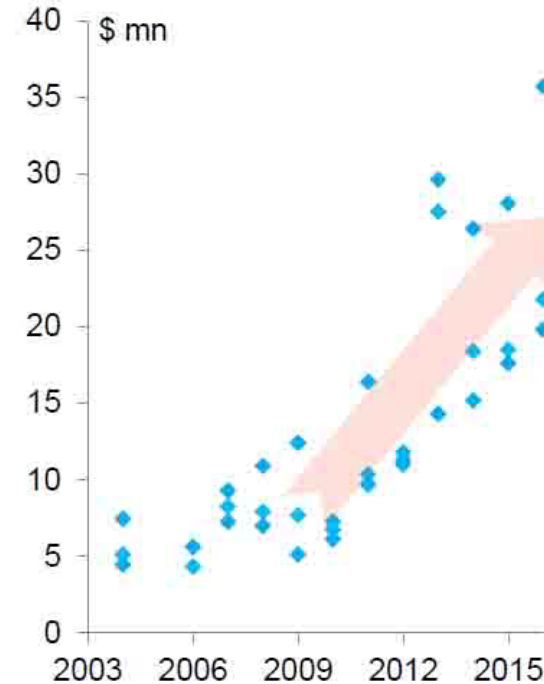
Source: Citi Research, Haver.

Bit by bit by bit?
Bitcoin spot, \$



Source: Citi Research, Bloomberg.

Old cars selling like never before
3 most expensive cars sold at auction per year



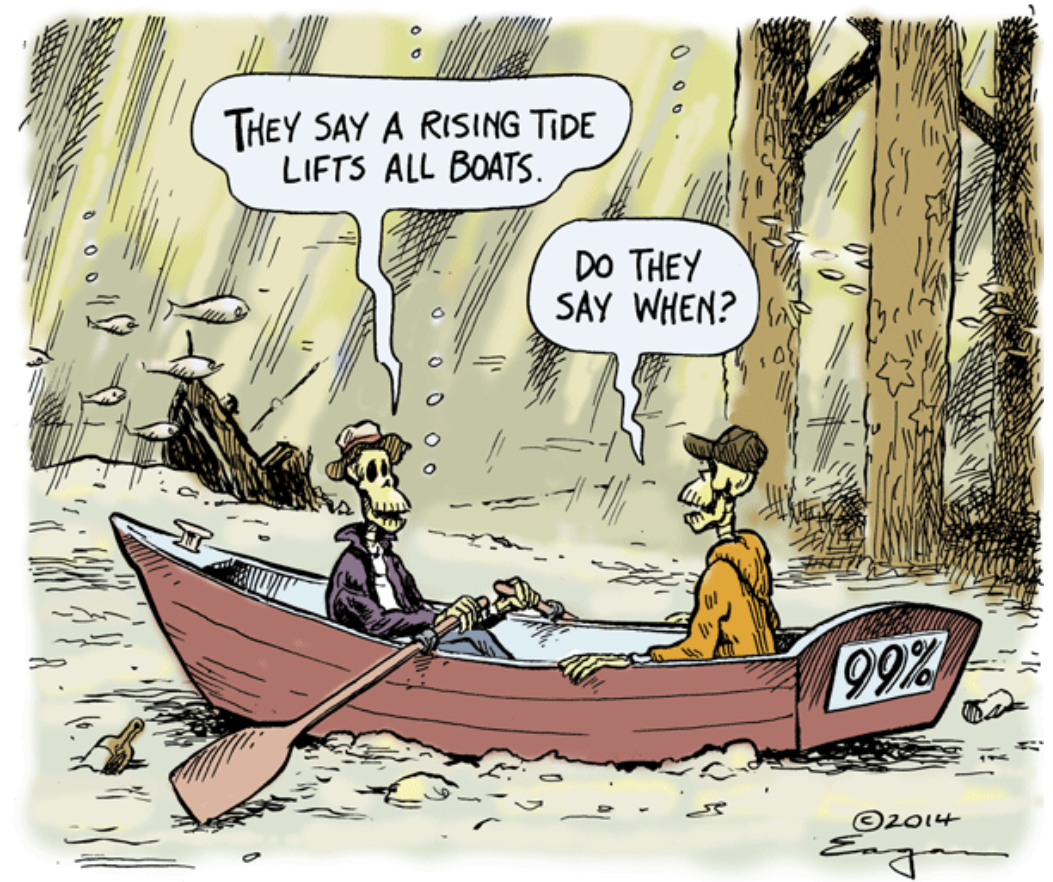
Source: Wikipedia.

Wealth effect stretching farther and farther afield

“Trickle Down Economics” according to Ben Bernanke

*Easier financial conditions (= low interest rates) will promote economic growth. For example, lower mortgage rates will make housing more affordable and allow more homeowners to refinance. Lower corporate bond rates will encourage investment. **And higher stock prices will boost consumer wealth and help increase confidence, which can also spur spending.** Increased spending will lead to higher incomes and profits that, in a virtuous circle, will further support economic expansion.*

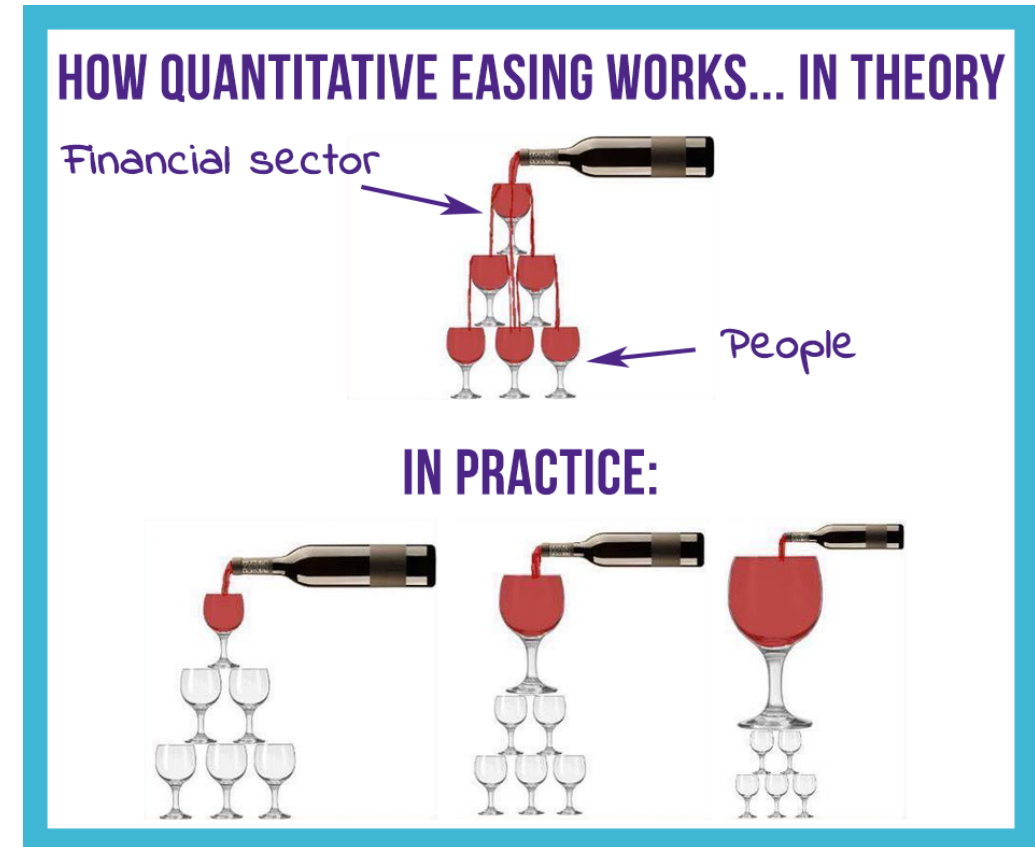
– Ben Bernanke, at the time chairman of the Federal Reserve, Op-Ed in the Washington Post (Nov. 2010)



Central banks causing inequalities | No trickle down effect?

- Bank of England finds that large central bank asset purchases increase inequalities.
- *The most relevant period for assessing wealth effects is the one since mid-2014, as it is mostly **asset purchases that are viewed as creating asset price inflation.** [...] For the euro area, there has been an absolute gain: households of all wealth levels have seen their wealth increase as a share of their mean income. [...] **Wealthier households, however, benefited more in relative terms compared with poorer households.***

– European Central Bank Annual Report 2016



Conclusion | Update economics?

- Repoliticize finance – decisions with massive consequences are taken behind “closed doors”.
- Update economics, in particular stop relying on only 3 letter economic models?
- Current central bank policies not working. Alternatives currently discussed:
 - (officially) finance government spendings
 - Helicopter money
 - fund (green) infrastructure projects



Conclusion | Vision about the future required

- Ultimately money is backed by current existing tangible collateral and **faith in the future**.
- Think about what future we want
- If there is a vision / plan, the probability is higher that this future is achievable.
- Possible goal for example: a world powered by 100% renewable.
- **In the end, what matters is what the money is used for.**
- **Caveat: There is no such thing as unlimited unconditional free money...**

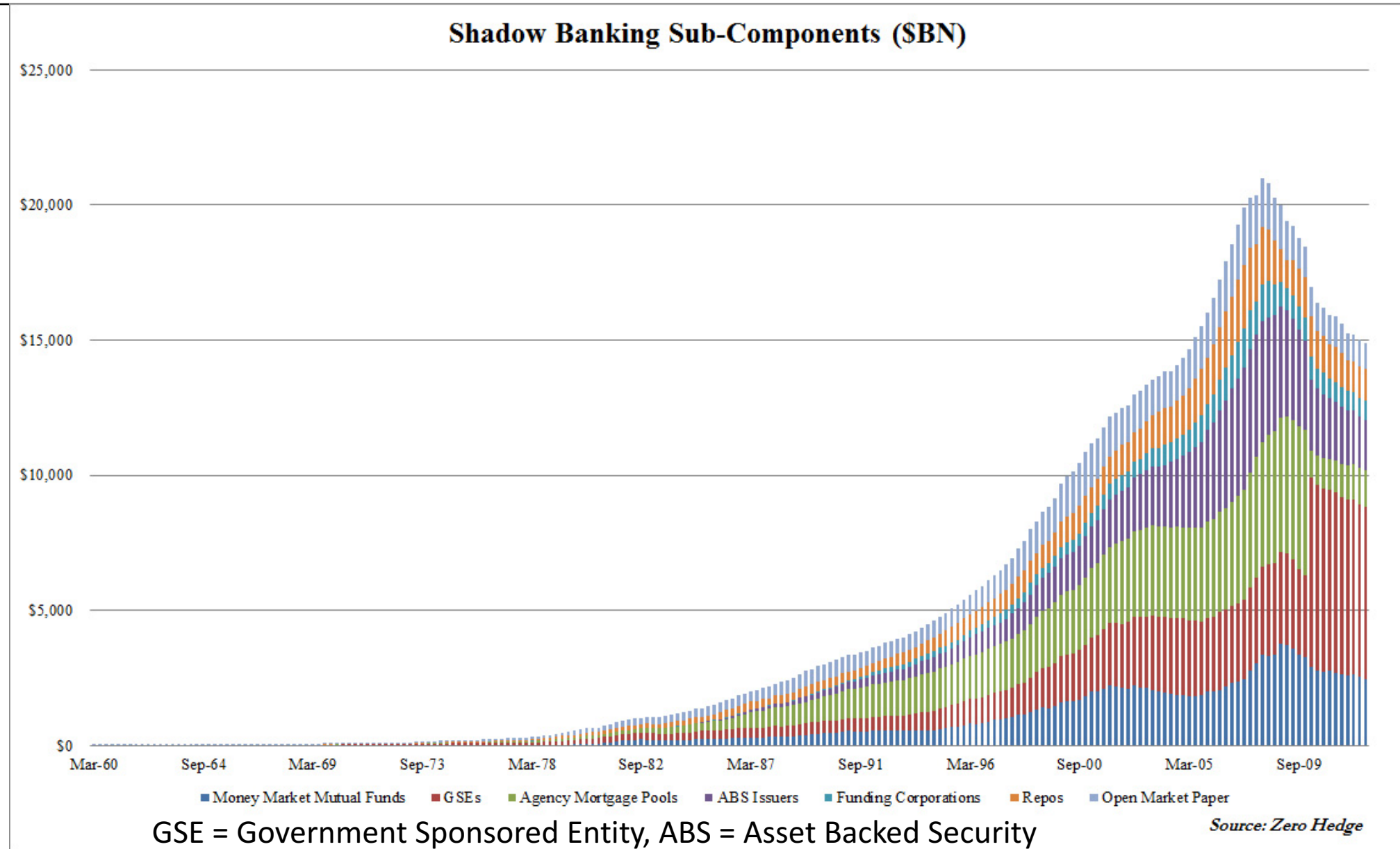
optimistic	US, 1950s-1960s	US, 1982-2007
pessimistic	China, present	Japan, 1990s-present Europe, present
	determinate	indeterminate

– Peter Thiel in “Zero to One: Notes on Startups, or How to Build the Future”

Thank you for listening!

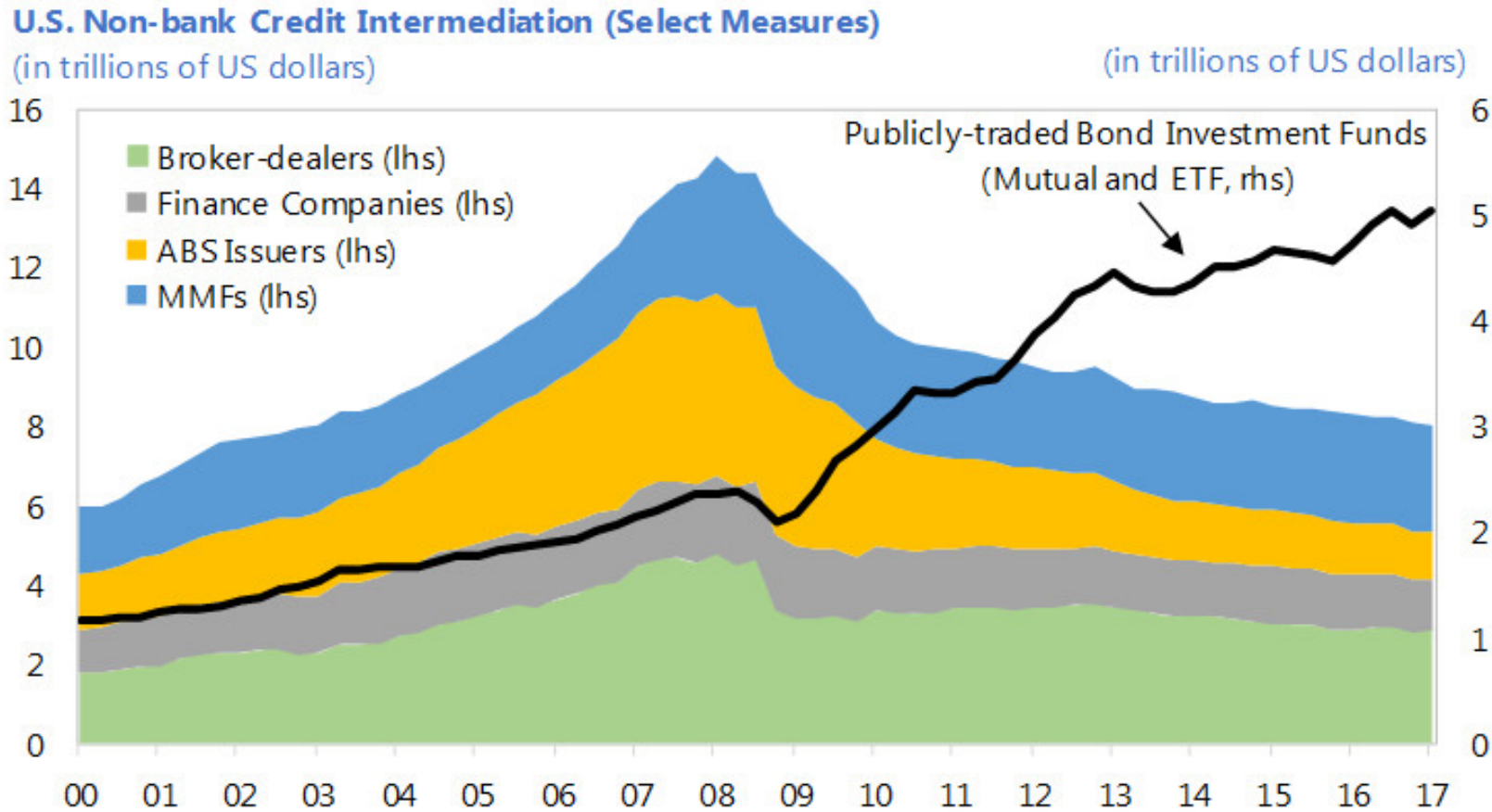
Questions?

Bonus Chart | US shadow banking sub-components



Bonus Chart | The rise of publicly traded funds

Figure 2. U.S. Non-Bank Credit Intermediation, by Vehicle Type



Source: Federal Reserve Board, Flow of Funds.

MMF = Money Mutual Fund, ABS = Asset Backed Security, ETF = Electronic Trade Funds

For more depth, sources & recommendations, I provide links to everything under
<https://gordonschuecker.com/shadow-banking-2018/>

(As link like [these](#) do not work with PowerPoint...)