Introduction to Financial Technology – Unlock the Block Hackathon 2018

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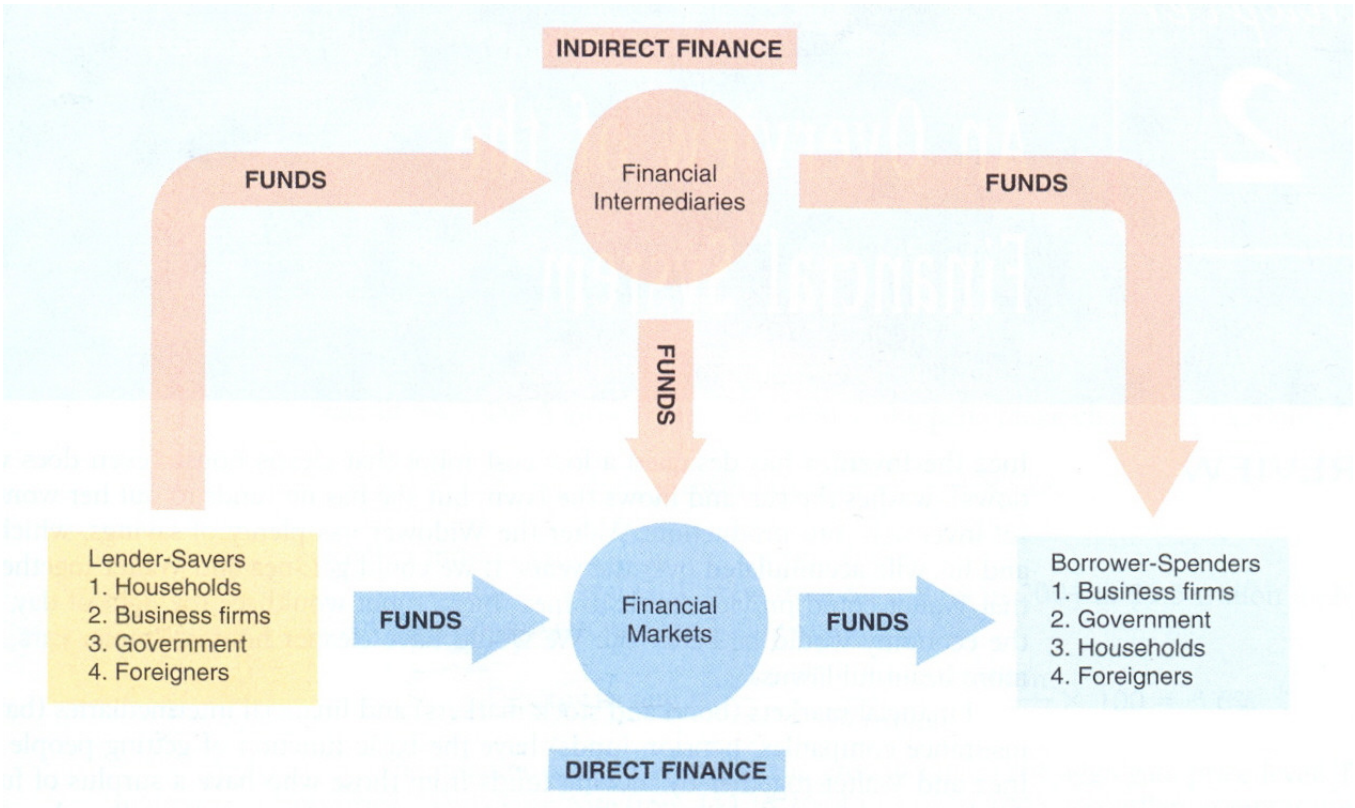
This version: 2018-01-20

Banks, What are They Good for?

What are financial intermediaries?

... entities that acts as the middleman between two parties in a financial transaction, such as a commercial bank, investment banks, mutual funds and pension funds.



Financial intermediaries

Examples

- Financial advisors
- Credit Union
- Mutual funds/Investment trusts
- Insurance Companies
- Pension funds
- Commercial banks
- Investment banks

Financial intermediaries

- Transform assets
- Manage risks
- Process information and monitor borrowers
- Offer access to a payment system, public good

Why care?

- Facilitate economic growth: mobilising savings so that consumption can be higher in the future as a result of investments made today.
- Global growth: Sending savings from countries with little room for further investment, to countries with more room than current savings can satisfy.

Why regulate?

"We regulate finance over and above the way we regulate other industries because finance exhibits market failures that can have devastating consequences"

- financial market malfunction $\rightarrow$ the real economy $\Downarrow$
- Example: Global financial crisis was triggered by problems in the US subprime mortgage market, but it led to German GDP shrinking by 6 percent in the first quarter of 2009 and the biggest drop in global trade since the 1930s.

Why regulate?

Two principal drivers of market failures in finance that require regulation *....there are others as well*

- Asymmetrical information
  - Consumer protection - balance the interests of unsophisticated consumers of financial products and their sophisticated sellers
- Social externalities
  - overall consequence of an activity is not captured by the private interests of those involved in the activity.
  - $\rightarrow$ internalise with social taxes? (Pigouvian reponse)
  - .. costs of financial system failures are $>$ costs to the shareholders of a bank failure. $\Rightarrow$ regulatory response: provide government insurance for depositors and higher capital requirements than banks would otherwise wish to hold

Banks are different

- Banks accept *deposits*
- Banks lend to each other
  - Bank A may borrow from Bank B to lend one of its customers a loan to buy a car from a customer of Bank B....

    why does this matter?
  - when one shoe shop fails it might be good for another shoe shop (they do not lend to each other)
  - Failure of one bank $\rightarrow$ undermine other banks
  - Bank runs
  - A single bank failure could lead to a collapse of the financial system

Types of regulatory instruments

- ceilings on deposit interest rates
- restrictions on entry, size, and mergers
- investment restrictions
- deposit insurance
- capital requirements
- monitoring and bank supervision

The Architecture of Financial Regulation

There are four pillars of financial regulation:

- Encourage innovation and efficiency
- Provide transparency
- Ensure safety and soundness
- Promote competitiveness in global markets

Limitations of Regulation

Limitations to regulating the financial system:

- Asymmetric information
  George Akerlof: Lemon's market
- Costly state verification
  Robert Townsend: no disclosure until default, then full disclosure
- Missing markets
  Public goods: non-excludable/-diminishable/-rejectable

1. Modification of laissez-faire approach:
   - Create appropriate tools for systemic risk regulation
   - Price implicit public subsidies
   - Create bankruptcy tools

2. Glass-Steagall approach:
   - Legacy investment banks are converted into bank holding companies
   - Reverts them into broker-dealer status

3. Carve outs:
   - Management of in-house hedge funds
   - Creation of off-balance-sheet affiliates
   - Large propriety trading positions in cash securities and derivatives
   - Principal investors in non-financial activities

4. Limit the size of financial conglomerates that incorporate commercial banking units

Why Financial Intermediaries Matter

a) Reducing Transaction Costs

- FI have *economies of scale*:

  getting information about demanded and provided funds, assessing risks, bargaining, designing and enforcing contracts, buying/selling stock shares – these tasks can be accomplished by FI with much lower transaction costs by specialized information processing abilities, large transaction volumes, specific human capital (expertise)

- FI have *economies of scope*:

  FI provide additional services like risk diversification, optimizing portfolios, and consulting. Sometimes these services need the same infrastructure and the same human capital. Hence it *may* reduce cost when one FI provides these services.

Why Financial Intermediaries Matter

b) Dealing with Risk:

- Risks: Investment projects may fail, borrowers may become insolvent.
- Reducing the risk by pooling them, reducing the risks arising from asymmetric information problems (see below).
- Reducing the risk by selling assets with differert risk/return structures which are prefered by the lender/saver (asset transformation, e.g. time deposit, fund shares).
- Trading risky assets means that also risks are traded, all prices contain a "risk premium".

Why Financial Intermediaries Matter

c) Dealing with asymmetric information

- **Adverse Selection:**
  - Hidden characteristics of a potential borrower (e.g.) before a contracting.
  - Borrower knows his risk better than the lender.
  - If lender offers a contract which is optimal for a borrower with average risks, this may be unattractive for those with good risks. This may result in a market failure.
- **Moral Hazard:**
  - Hidden action of a borrower (e.g.) after contracting.
  - Borrower tales the money to engage in a prject that is undesireable for the lender. This reduces the probability for a successfully returned credit.
- FI may alleviate this problem e.g. by screening, collaterals, optimal design of contracts. Again, they have the resources to do that with low transaction costs.

Why Financial Intermediaries Matter

Depository institutions (banks):

- Accept deposits from individuals and institutions as liabilities, providing loans and mortgages as assets.
- Example: Commercial banks, thrifts (saving and loans associations, mutual saving banks, credit unions).

Contractual savings institutions:

- Accept premiums and contributions from government, firms and individuals as liabilities, investment in bonds, stocks and government securities.
- Example: life insurance, pension funds, retirement funds

Investment intermediates:

- Selling commerical stocks, bonds or shares as liabilities, providing business loans and investment in stocks and bonds as assets.
- Example: Finance companies, mutual funds, private equity funds

What is a balance sheet

- A summary of the assets and liabilities of a business (bank)
- A snapshot of assets and liabilities at a particular point in time
- A balance sheet always balances - double entry bookkeeping
  - Assets are *owned* by the bank
  - Liabilities are *owed* by the bank

Banks as Financial Intermediaries

The Bank's Balance Sheet

Assets	Liabilities

▶ Reserves (required, excess)
▶ Cash
▶ Securities/Bonds
  ▶ firm bonds
  ▶ governmental bonds
▶ Loans
  ▶ industrial
  ▶ consumer
  ▶ real estate
  ▶ inter-bank
  ▶ other
▶ Other assets (e.g. physical assets)
	▶ (Checkable) Overnight deposits
	▶ Nontransaction desposits
	  ▶ Time deposits
	  ▶ Redeemable deposits (saving accounts)
	▶ Borrowings
	  ▶ Inter-bank loans
	  ▶ Central bank loans
	  ▶ Other
	▶ Bank Capital

Frictions in Financial Markets

Banks as financial intermediaries

a) Liquidity Management

- For deposit outflows the bank needs liquid assets like cash or reserves.
- If there are not enough liquid positions on the asset side the bank needs expensive overnight loans or has to sell other assets, or it becomes illiquid. These are costs of deposit outflows.
- Problem: If customers receive a signal of liquidity problems they also wish to draw their deposits. This enforces the liquidity problem and may lead to bankruptcy.
- Liquidity management has to balance the liquidity of assets with the deposit position on the liability side. More generally: Given a probability distribution of inflows and outflows on the liability side, the asset side should be structured to meet the obligations to the depositors.

- The higher the expected deposit outflows and/or the higher the cost of deposit outflows are the more excess reserves are required.

b) Asset Management

- Management of risk and return of the assets (portfolio approach). Finding the mix of risky and riskless assets with the highest expected utility (assumption: risk aversion).
- The liquidity considerations (see a)) can be seen as an additional restriction to portfolio management.
- Portfolio theory is a core concept in (financial) economics. Details are given in the next subsection.

c) Liability management

- Deposits are not "given" and not the only source of funds. Decision how to acquire which types of liabilities.
- Differences of liabilities:
  - Hows fast could an additional liability be acquired?
  - Probability of outflows
  - Costs = interest rates (e.g. for time deposits, for inter-bank or central bank loans)
- Development of new financial instruments (e.g. certificates of deposits (CD) which are similar to bonds)

d) Bank Capital Management

- Most assets have risks: Credits may fail, bonds prices may fall. Hence, the value of the asset side is volatile.
- With a certain probability the losses of the asset side may exceed the bank capital: the bank becomes insolvent.
- Actual development: Large bank crisis in the USA in 2008. About 500 Billion Dollar asset values (especially housing loans and mortgages) had to be written off.
- The higher the bank capital (in percent of the liability side), the lower is the risk of insolvency.
- But: The return on equity (RoE) of the bank owners (return on assets / bank capital) is c.p. lower when the bank capital has a higher share of the liability side $\rightarrow$ trade-off!

Adverse Selection Problems

Information Asymmetries:

- before contracting: hidden characteristics $\rightarrow$ adverse selection
  - buying shares or bonds of a firm $\Rightarrow$ characteristics are not known to the buyer
  - providing a loan to a borrower with unknown ability to pay back the loan (credit risk)

  $\Rightarrow$ decision is based on expectations about the characteristics
  $\Rightarrow$ expectations are built on prior and posterior information
  $\Rightarrow$ limited possibilities to reveal the unknown characteristics
  $\Rightarrow$ Pooling vs. Separating equilibria
- after contracting: hidden action $\rightarrow$ moral hazard

  Firm uses the funds for financing projects which are more risky than indicated in the negotiation with the lender or buyer of a share. The latter can not observe this, but they can expect that there is an incentive for moral hazrd.

Adverse Selection Problems

The original version: Market for used cars

"I agree, it's a lot of bang for the buck. And thumping, whining, clicking, clacking, clanging, grinding, buzzing and rattling."

Market for used cars

- Cars have a different quality q (from "very good" $q = b$ to "bad" $q = 0$, bad cars = "lemons")
- The seller is privately informed about the quality $q \in [0, b]$.
- The seller will accept any price $p \geq q$.
- The buyer is willing to pay any price $p \leq \alpha \cdot q$ with $\alpha > 1$.
- For any given q there exists a price $\in [q, \alpha q]$ where buyer and seller mutually benefit from the deal.

- **But:** The buyer is not able to observe q
  $\Rightarrow$ building expectations $E[q]$.

Adverse Selection Problems

Assume that the quality q is *uniformly distributed* on $[0, b]$. This is known by the buyer. For any used car the expected quality is hence $E[q] = b/2$. Therefore

$$p(E[q]) \leq \alpha \cdot \frac{b}{2}$$

Two cases:

- *Case 1:* $\alpha \geq 2$. Then the buyer is willing to pay $p \geq b$ and all cars will be sold.
- *Case 2:* $1 < \alpha < 2$. Then the market breaks down!

Adverse Selection Problems

Market breakdown:

- For $\alpha < 2$ the buyer will never pay $p = b$.
- No high quality cars ($q = b$) will be sold. They can be removed from the interval (e.g. $q \in [0, b - \epsilon]$).
- This can be anticipated by the buyer. The expected average quality decreases (e.g. $E[q] = (b - \epsilon)/2$).
- The willingness to pay also decreases.
- The remaining best quality cars leave the market.
- and so forth... ("race to the bottom")

Adverse Selection Problems

Financial Markets:

- Firm needs funds to finance a risky project. The funds can be obtained by debt or equity. Assume that the firm demands for a loan L.
- The (risk neutral) firm is willing to pay an interest rate i_L which does not exceed the expected return of the project r.
- The bank will provide the loan L when the interest rate covers at least the interest rate for a secure asset i_S plus the risk premium RP.
- Assume that the loan is either returned successfully with probability $1 - p$ or it fails completely with probability p. The minimum risk premium is therefore:

$$L(1 + i_S) = L(1 + i_L)(1 - p) + 0 \cdot p \tag{1}$$

$$\Rightarrow \quad RP = i_L - i_S = \frac{p}{1 - p}(1 + i_S) \tag{2}$$

Adverse Selection Problems

- Problem: p is *private information* of the firm = not known by the bank!
- Offering a loan contract with an interest rate i_L (and risk premium) based on the *expected* probability $E[p]$ taken from a prior distribution of risks.
- Typically the expected return and the risk of investment projects are positively correlated. Firms with *profitable low risk projects* with

$$r < i_S + \frac{E[p]}{(1 - E[p])}(1 + i_S)$$

  will not get a loan contract!
- The remaining projects are hence more risky which leads to an increase of $E[p] \Rightarrow$ a similar mechanism as in the "market for lemons" example applies.

Adverse Selection Problems

Credit Rationing:

Adverse Selection Effect: With an increasing interest rate more and more good (= low risk) projects leave the market and the expected risk increases:

$$E[p] = E[p(i_L)], \qquad \frac{dE[p(i_L)]}{di_L} > 0$$

Profit maximizing bank:

$$\max_{i_L} \pi = (1 - E[p(i_L)])(1 + i_L)L \tag{3}$$

$$\Rightarrow \quad \frac{d\pi}{di_L} = -\frac{dE[p(i_L)]}{di_L}(1 + i_L)L + (1 - E[p(i_L)])L = 0 \tag{4}$$

$$\Rightarrow \quad i_L^* = \frac{(1 - E[p(i_L)]) - \frac{dE[p(i_L)]}{di_L}}{\frac{dE[p(i_L)]}{di_L}} \tag{5}$$

Adverse Selection Problems

What are the consequences?

- The profits do not monotonously increase with market interest rate i_L.
- If loans demand increases *there is not neccessarily a Walrasian adjustment of the equilibrium interest rate!*
- The demand side of the loans market will be rationed.
- Existence of *rationing equilibria*.
- The notional plans of the firms cannot be fulfilled
  $\Rightarrow$ spillover to other markets
  - e.g. markets for bonds or equities to finance the project
  - e.g. markets for investment goods

Adverse Selection Problems

There are different ways how to solve or to alleviate the problem:

- Providing better information = decreasing information asymmetry
  - *Screening:* The less informed agent has an incentive
    - to collect information by himself
    - to buy additional information supplied by other agents
    - to provide different contracts with self-selection effects
  - *Signalling:* The privately informed agent has an incentive to provide a trustworthy (costly) signal about his characteristics.
  - *Governmental Regulation*
- Collateral and Net Worth

  The information asymmetry is not resolved but has minor consequences since in case of a failed project the return of the loan do not fail.

Adverse Selection Problems

Screening by collecting information

- High information costs, especially for lenders with low expertise.
- Bank as a financial intermediate with expertise and specialized human capital reduces such information costs:
  - Multiple lender of funds $\Rightarrow$ bank deposits
  - Bank is pooling the risks and guarantees the depositor an interest rate
  - Screening costs of multiple non-specialized lenders are reduced and transferred to the bank
  - The bank as the intermediate lender faces a lower information asymmetry
- The existence of a professional banking system is a prerequisite for a working credit market (crucial for developing countries).

Adverse Selection Problems

Screening by buying information provided by others

- Rating agencies (e.g. Standard & Poors, Moody): (Large) Borrowers are rated according to a standardized scale (see Mishkin (2006), chapter 6, p.123)

Problems:

- *Free-rider problem* since information is a non-rival good. Once, when information is made public, there is no incentive anymore to pay for it.
- How *trustworthy* is that information? Moral Hazard problem of information providing institutions since the customer (e.g. bank) is not able to asses the reliability of the information.

Adverse Selection Problems

Governmental Regulation:

If investors need financial funds, e.g. by demanding credits or selling bonds or stocks, they can be forced by law to provide some information to reduce the information asymmetry. E.g.

- adhere standard accounting principles
- providing information about the balance sheet and other (financial) indicators like sales, earnings, assets
- in case of stock markets: publish relevant informations regularly, annual meeting of shareholders etc.

Adverse Selection Problems

Signalling:

- A firm with a low risk project has an incentive to provide a signal so that the lender is informed about the low risk (and charging a low risk premium).
- If signalling should make sense...
  (a) the signal must be costly
  (b) there must exist signals that are too expensive for a high risk firm but not too expensive for low risk firms $\Rightarrow$ discrimination is possible.
- Otherwise high risk firms have an incentive to *imitate* the signal so that signalling provides no information (pooling equilibrium).

Adverse Selection Problems

Signalling means "building reputation". Reputation signals (e.g.):

- Loans have been successfully returned in the past.
- Projects are financed also with equity capital.
- Firm provides voluntarily more sensitive information than required by law.
- Firm has valuable assets ($\rightarrow$ similar to collaterals).

This may be a problem for new and small firms.

Adverse Selection Problems

Collaterals:

- In case of failure of the investment project the investor has other assets which can be sold to meet the debt obligations.
- The borrower must prove that he has such collaterals before signing the credit contract.
- The credit contract may include the obligation that a certain asset must not sold before the credit is returned successfully.
- The credit contract includes that lender automatically becomes the owner of an asset in case of a credit failure.
- The credit contract includes that the lender has property rights on the asset which are returned to the borrower in case of a successfully returned credit $\Rightarrow$ mortgages (e.g. in case of housing, real estate)

Adverse Selection Problems

Collaterals C lower the risk premium:

$$L(1+i_S) = L(1+i_L)(1-p) + pC \tag{6}$$

$$\Rightarrow \quad RP = i_L - i_S = \frac{p}{1-p}(1+i_S) - \frac{p}{1-p}\frac{C}{L} \tag{7}$$

with $C = \arg\max\{0, (1+i_S)L\}$. In case of $C = L(1+i_S)$ there is no credit risk for the lender anymore.

Problems:

- Providing collaterals is costly (e.g. opportunity costs).
- The access to collaterals is limited (e.g. start-up companies).
- The value of collaterals may be uncertain (see the recent housing crisis in the U.S. – dramatic decrease of house prices = decrease of the value of collaterals)

Coordination issues in Banking

- Typical demand deposit contract: withdraw whenever you want, no questions asked.
- Problem: the bank cannot tell whether a withdrawer really had a liquidity shock or not.
- What if more than $N - 100$ mln EUR are withdrawn before the loan matures?
  - Bank does not have enough cash, liquidates the project.
  - Bank has 80 mln EUR in assets, $N > 100$ mln EUR liabilities.
- Depositors who arrived late at the bank get nothing.
- Rational bank run.

Coordination issues in Banking

Example with 2 depositors, who have 50 mln EUR each.

1|2	Withdraw	Stay
Withdraw	40; 40	50; 30
Stay	30; 50	$50 \times (1 + r)$; $50 \times (1 + r)$

Coordination issues in Banking

- Coordination failure: I run if I expect others to run, I don't run if I expect others not to run.
- Variant: information-based run.
- Perfect example: Hong Kong 1985, run on a bank next to a good bakery with a long line of customers.
- More recently: Northern Rock, Cyprus banking system.
- Eric Cantona's call for a bank run on 7 December 2010.

A short history of banking and banking crises

US banks

- No American banks as late as 1781
- Alexander Hamilton writes to Congress's superintendent of finance, Robert Morris, that *"Most commercial nations have found it necessary to institute banks and they have proved to be the happiest engines that ever were invented for advancing trade."* . Hamilton recommended that a bank be founded.
- Morris persuaded Congress to charter the new nation's first bank, *the Bank of North America* located in Philadelphia in 1782.
- Three years later, Boston merchants founded the Massachusetts Bank and Hamilton became a founder of the Bank of New York.
- The irony: establishment of the *First Bank of the United States* in 1791

US banks ... continued

- First Bank of the United States was opposed for being unconstitutional
- many fearing that it relegated undue powers to the federal government $\Rightarrow$ its charter was not renewed in 1811
- War of 1812 $\Rightarrow$ government turning to state banks for finance... followed by over-expansion of credit
- financial order needed to be reinstated
- obtaining an official legislative charter was highly political

Era of free banking

- A new era of "free banking" emerged with a number of states passing laws in 1837 that abolished the requirement to obtain an officially legislated charter to operate a bank, and by 1860, a majority of states had issued such laws.
- Anyone could operate a bank, one of the conditions was that all notes issued were back by proper security
- still it did not guarantee immediate redemption in specie (gold or silver)
- era of free banking suffered from financial instability with several banking crises occurring
- a disorderly currency characterized by thousands of different bank notes circulating at varying discount rates

$\Rightarrow$ The free banking era - characterized as it was by a complete lack of federal control and regulation - came to an end with the National Banking Act of 1863

- National Banking Act of 1863 aimed to replace the old state banks with nationally chartered ones.
- Office of the Comptroller of the Currency (OCC) was created to issue these new bank charters as well oversee that national banks maintained the requirement to back all note issuance with holdings of US government securities
- new national banking system helped return the country to a more uniform and secure currency
- growing complexity of the U.S. economy highlighted the inadequacy of an inelastic currency
- frequent financial panics occurring throughout the rest of the nineteenth century
- occurrence of the bank panic of 1907, it had become apparent that America's banking system was out of date

Establishing the US Fed

- Congress created a new central bank, the Federal Reserve System (Fed) in 1913, after three-quarters of a century without a central bank - a period punctuated by a number of banking crises.
- by end 1914 the twelve regional Reserve Banks, coordinated by the Federal Reserve Board in Washington, DC, were open for business.

Background to US regulatory changes - Leading up to 1929

- Separation of activities in banking came only after crash of 1929
- Roaring Twenties
  - Unprecedented economic boom in the US
  - Mass production in manufacturing, telecommunication, movie and chemical sectors
  - Population moved into cities to acquire jobs in these industries
  - Americans - cash flush - invest in the stock market and deposit into banks
  - Banks were opening at a rate of 4-5 per day (!)


Stock market crash of 1929:
DJT© Stock Index
200
180
160
140
120
100
80
60
40
20
0
02.01.1920
01.11.1920
01.09.1921
03.07.1922
03.05.1923
04.03.1924
31.12.1924
28.10.1925
30.08.1926
01.07.1927
02.05.1928
09.03.1929
16.01.1930
18.11.1930
17.09.1931
19.07.1932
SNIPER Market Timing - 2007 - http://www.sniper.at

Background to US regulatory changes - The Great Depression (1929 - 1941)

- 1929 stock market crash
  - Stock market peaked on 3 Sept 1929
  - 29 October 1929 - 40 per cent down. $\rightarrow$ Black Tuesday. Investors lost 14 billion dollars in a single day.
- Banks
  - Banks lent money to investors to buy stock
  - Margin requirements were low
  - Banks were allowed to speculate and buy stocks for themselves
  - $\rightarrow$ The crash put a lot of pressure on banks

Background to US regulatory changes - The Great Depression (1929 - 1941)

Once the selling began, more selling was needed to satisfy margin calls and liquidity requirements for banks....

- Bank runs
  - No guarantees on cash at the bank
  - People feared that their bank would collapse
  - Some banks were not able to fulfill the requests for withdrawal and closed their doors to people
  - $\downarrow$ lending to businesses and consumers
  - $\rightarrow$ more people need to withdraw money
  - paper money was backed by gold
  - people kept money under their mattresses


SAFE DEPOSIT
VAULTS
AMERICAN
UNION
BANK
4 % PAID ON
THRIFT ACCOUNTS
AMERICAN
UNION
BANK
W 37 ST

The US Federal Reserve and the Great Depression

- The government began to increase interest rates, in 1929, from 3.5% to 5%.
- Money supply not stabilised - supply fell by 30% between 1929 and 1933
- prices dropped
- banks failed
- $\Rightarrow$ deflation
- $\Rightarrow$ No confidence in banking sector
- Focus was on maintaining the gold standard - sufficient gold reserves to meet the demands of the depositor, and adequate demand for currency

Great Depression Effects on the Economy

- **Higher unemployment** By 1933, the unemployment rate had climbed from 3% to 25%
- **Lower income** On average incomes were reduced by 40 %
- **Deflation**
- **Increased foreclosures** By 1934, nearly one-half of all residential loans were delinquent and over 1 million families lost their farms
- **Banks close** In 1933 alone, more than 4 000 banks closed
- **Hollywood** actually did very well during this period of time - the Hollywood film industry. It is thought that people went to the movies because, for a brief time while at the movie, they could forget their many hardships :)

Bank Holiday of 1933

An effort to stem bank failures and ultimately restore confidence in the financial system

- 36 hours after taking office in March 1933, President Roosevelt ordered the suspension of all banking transactions, effective immediately
- For an entire week, Americans would have no access to banks or banking services.
- Before banks could reopen, there needed to be agreement on whether or not to "weaken the link between gold and note issue" (Meltzer 2003, 423)
- The crisis began to subside on 9 March, when Congress passed the Emergency Banking Act.
- On March 13, member banks in Federal Reserve cities received permission to reopen.
- By March 15, banks controlling 90% percent of the country's banking resources had resumed operations and deposits far exceeded withdrawals.... the worst of the banking crisis seemed to be over.

Policy changes during the great depression

Role of the US Government changed dramatically

- Banking Act of 1933
  - Glass-Stegall Act - breaks connection between commercial and investment banks
  - Federal Deposit Insurance Corporation (FDIC) - insure bank deposits
  - Regulation Q - outlawed the payment of interest on checking accounts and also placed ceilings on the amount of interest that could be paid on other deposits
- 1933: The US goes off the gold standard
- 1934: Securities and Exchange Act - helped to police activities related to the selling of securities
- 1935: Social Security Act - assistance to the unemployed, handicapped and elderly
- Banking Act of 1935 - fully insured balances up to $5,000 and provided no insurance for balances above that amount

Glass-Steagall recap

Over time, the term Glass–Steagall Act came to be used most often to refer to four provisions of the 1933 Banking Act that separated commercial banking from investment banking.

- Glass-Steagall Act is a law that prevented banks from using depositors' funds for risky investments (stock market)
  $\Rightarrow$ Separated investment banking from retail banking
- Institutions were given one year to decide whether they wanted to specialize in commercial or investment banking.

Justification of the rate ceilings - Regulation Q

- Shield bank profits by limiting the competition for deposits: competition for deposits not only reduced bank profits by raising interest expenses, but also could cause banks to seek riskier investments and make high risk loans in order to cover the costs.
- Encourage country banks to lend more in their local communities rather than hold balances with larger banks in financial centers.
- Deposit interest rate ceiling would compensate banks for the costs incurred by the newly introduced deposit insurance premiums
- Ceilings were extended to thrift institutions such as mutual savings banks, savings and loan associations in 1966 - policymakers believed that competition for deposits between commercial banks and thrifts as one of the reasons of the rise in residential mortgage interest rates and the subsequent slowdown in lending growth

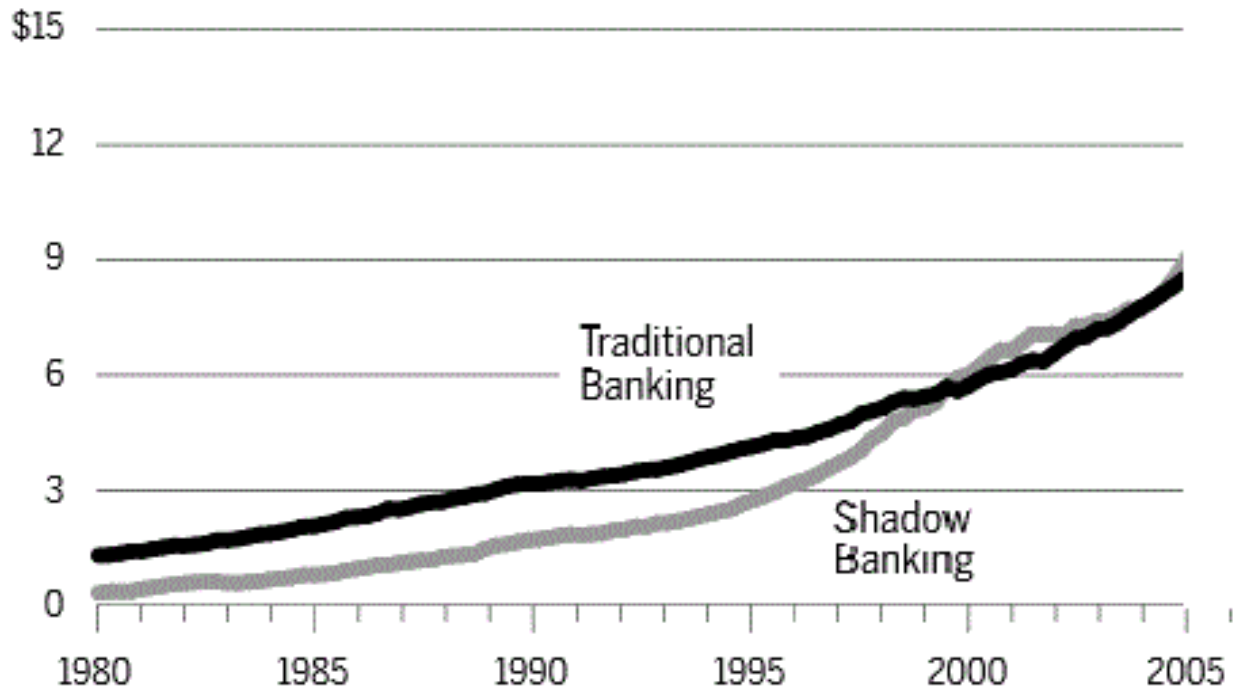
Issues with Glass-Steagall

- Limiting deposit interest rate competition through rate limitations
- Restricting competition for deposits based on financial strength by insuring depositors
- Critics argued that Regulation Q's limits on interest rates created the "disintermediation" that began in the 1960s
- Allowed commercial banks to earn high profits until nonbanking companies found ways to offer substitutes for bank loans and deposits...
- ... Over time, Regulation Q made bank deposits less attractive relative to other savings products and helped boost fund industry growth, particularly, money market mutual funds.
- $\Rightarrow$ the development of substitutes to bank deposits

Traditional and Shadow Banking Systems

The funding available through the shadow banking system grew sharply in the 2000s, exceeding the traditional banking system in the years before the crisis.

IN TRILLIONS OF DOLLARS



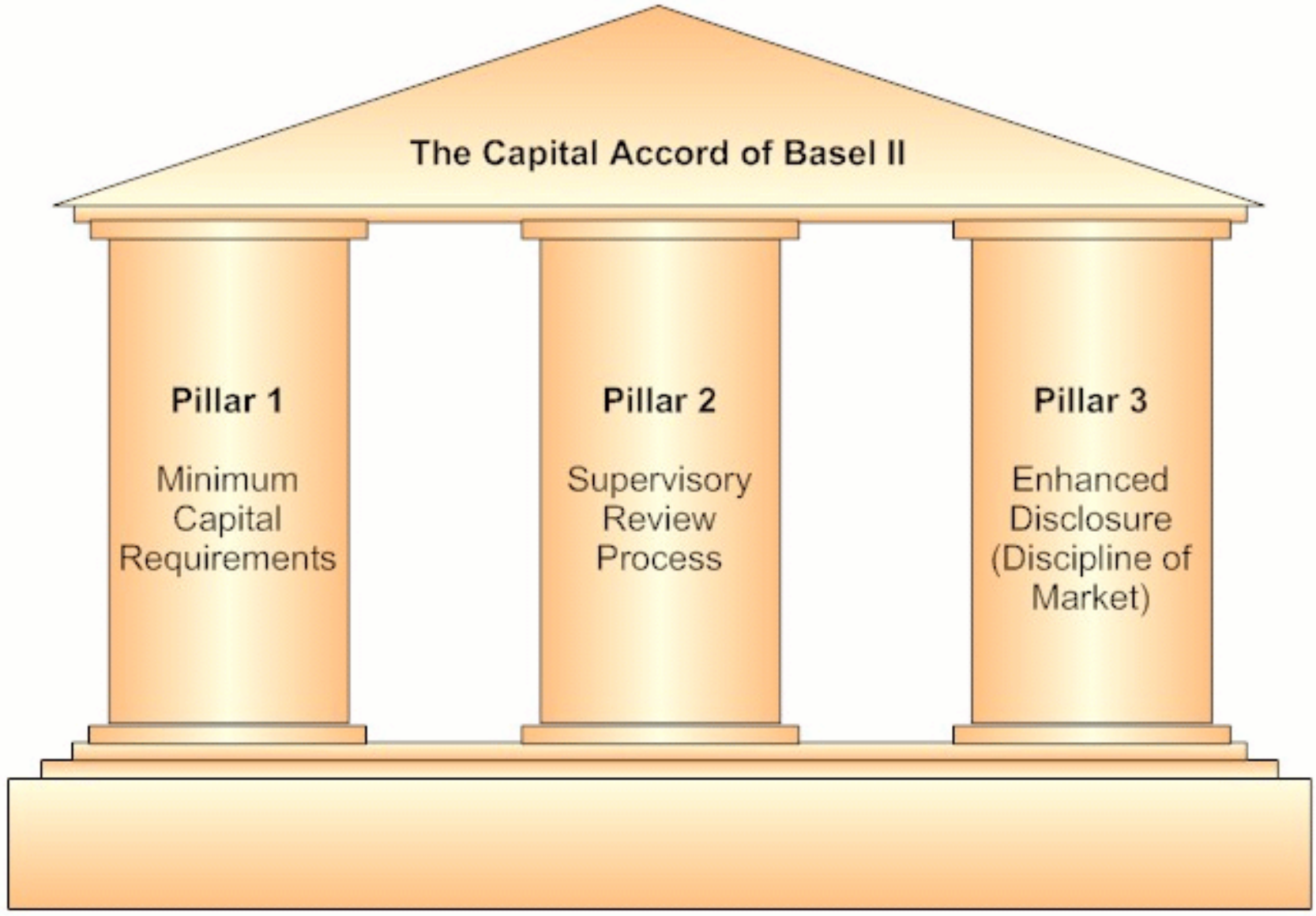
NOTE: Shadow banking funding includes commercial paper and other short-term borrowing (bankers acceptances), repo, net securities loaned, liabilities of asset-backed securities issuers, and money market mutual fund assets.

SOURCE: Federal Reserve Flow of Funds Report

Federal guarantees in the mortgage market

The rise of securitization, in the 1980s, was strongly supported by the introduction of federal guarantees in the mortgage market

- The US housing policy and particularly the introduction of federal guarantees in mortgages markets helped transform the funding structure of the US economy
- The creation of GSEs planted the seeds for linking mortgage markets with broader capital markets...
- by creating a strong secondary mortgage market for housing loans in order to provide a stable source of funding for residential mortgages across the country (particularly for low- and moderate-income households)
- 'originate to distribute' model


The Capital Accord of Basel II
Pillar 1
Minimum Capital Requirements
Pillar 2
Supervisory Review Process
Pillar 3
Enhanced Disclosure (Discipline of Market)

Source: IBM

The Global Financial Crisis


CHRISTIE'S
LEHMAN BROTHERS

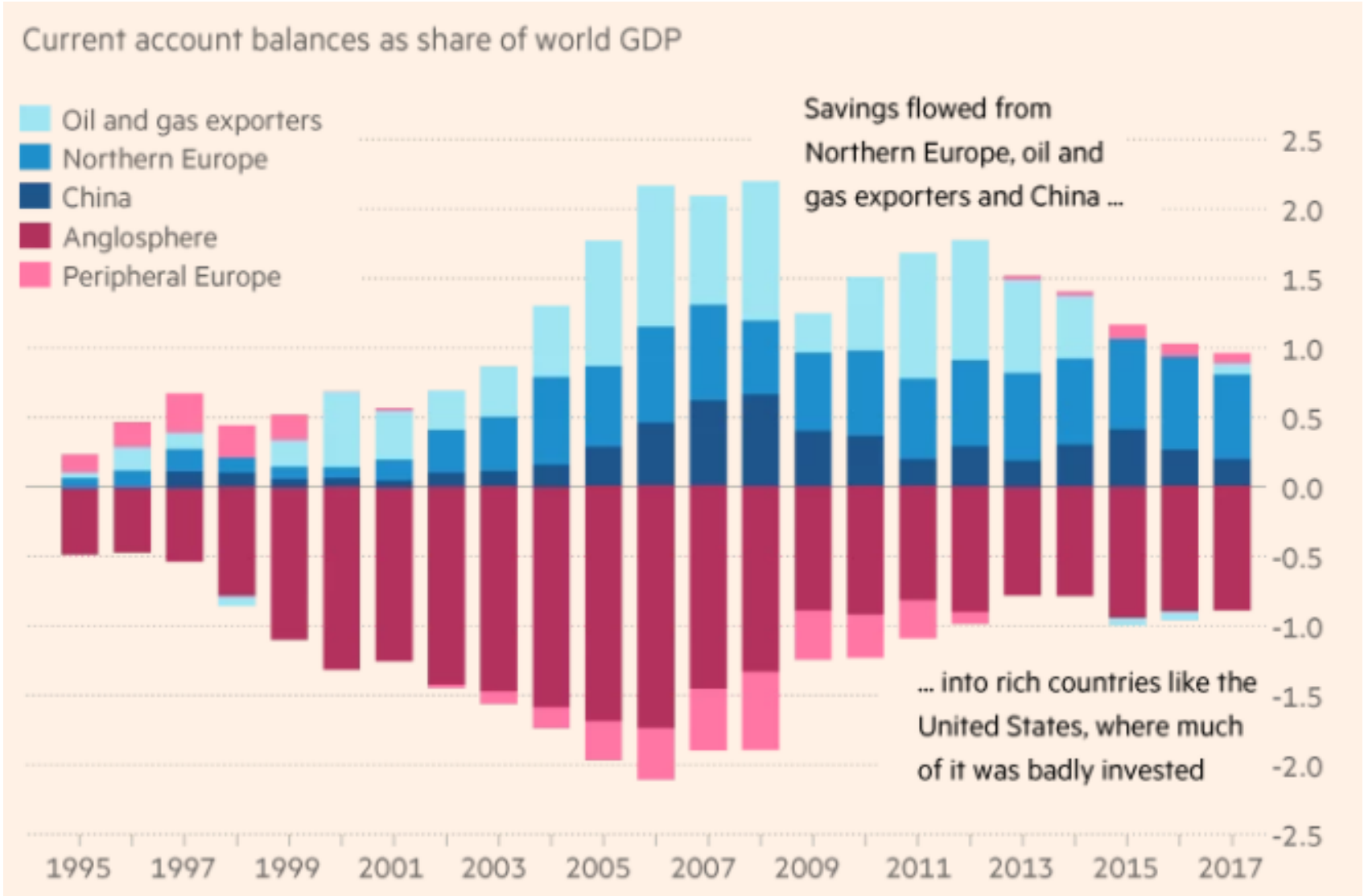
Leading up to the crisis

- Massive new inflows of capital into the US, mostly from oil-producing and Asian countries since the early 2000s
- Increase in house prices in the US (also Spain, Ireland, . . .)
- Mid-2006: house prices begin to stagnate
- February 2007: Prices of Credit Default Swaps for sub-prime mortgages in the US collapse by 30 %.
- Mid-June 2007: Bear Stearns injects $3.2 billion in two hedge funds in order to avoid their liquidation.
- End July 2007: American Home Mortgage Investment Corp. ceases interest payments, bankruptcy on 6 August.
- 9 August: BNP Paribas suspends payouts for 3 investment funds because of the impossibility to value underlying assets.

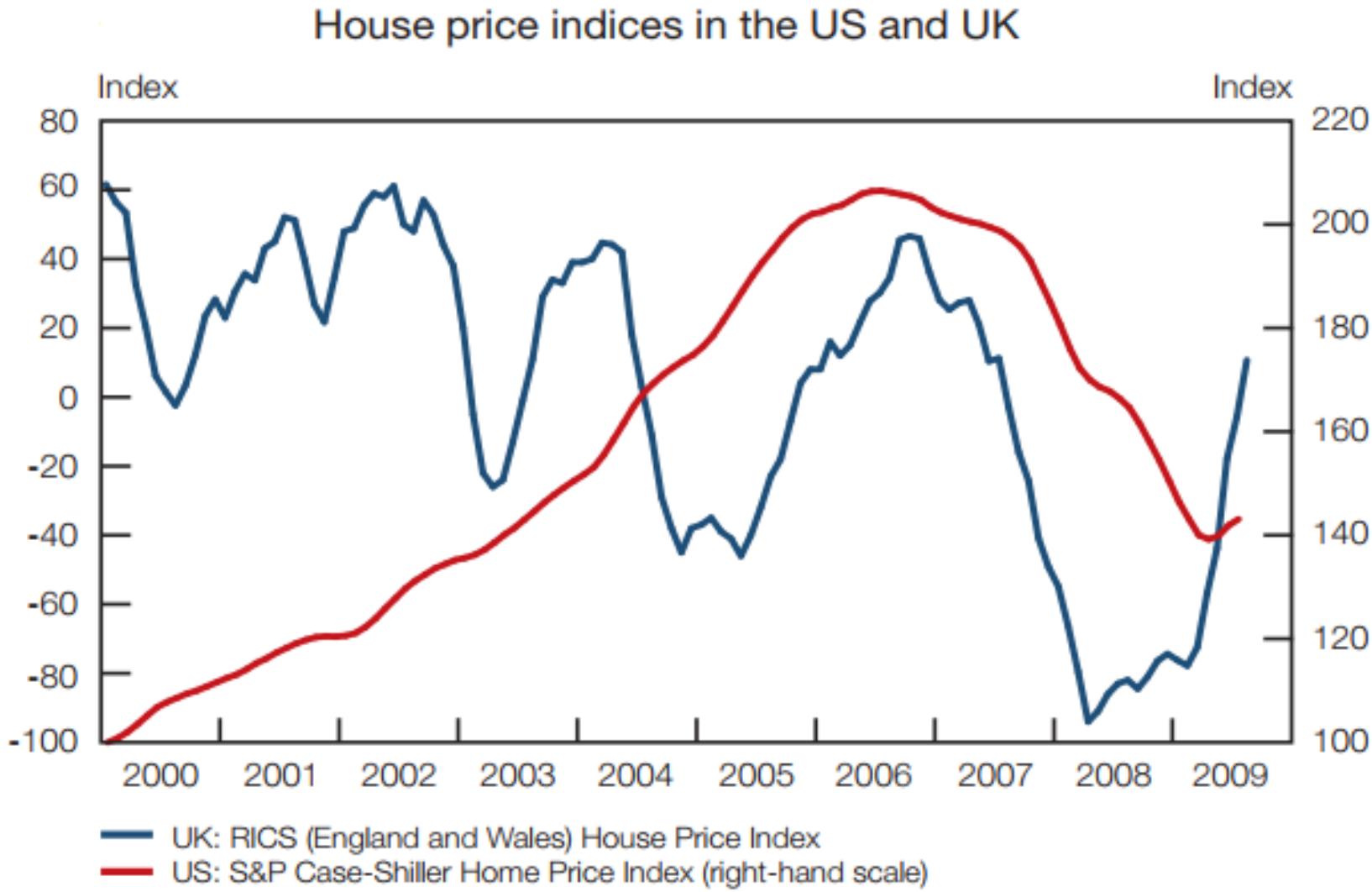
Source: E von Thadden 2012

- September – December: increasing write-downs on mortgage backed securities
- January 2008: Hypo Real Estate (Germany) acknowledges temporary funding problems
- March 5: Carlyle Capital (NY) bankrupt. Bear Stearns suffers major losses.
- March 13: Bear Stearns obtains no more funding on the repo market
- March 14-16: Federal Reserve Bank of New York brokers the acquisition of Bear Stearns by JP Morgan Chase for $236 million, loan of $30 billion to JP Morgan Chase.
- September 15: Lehmann Brothers bankrupt with $613 billion of debt, Merrill Lynch taken over by Bank of America.

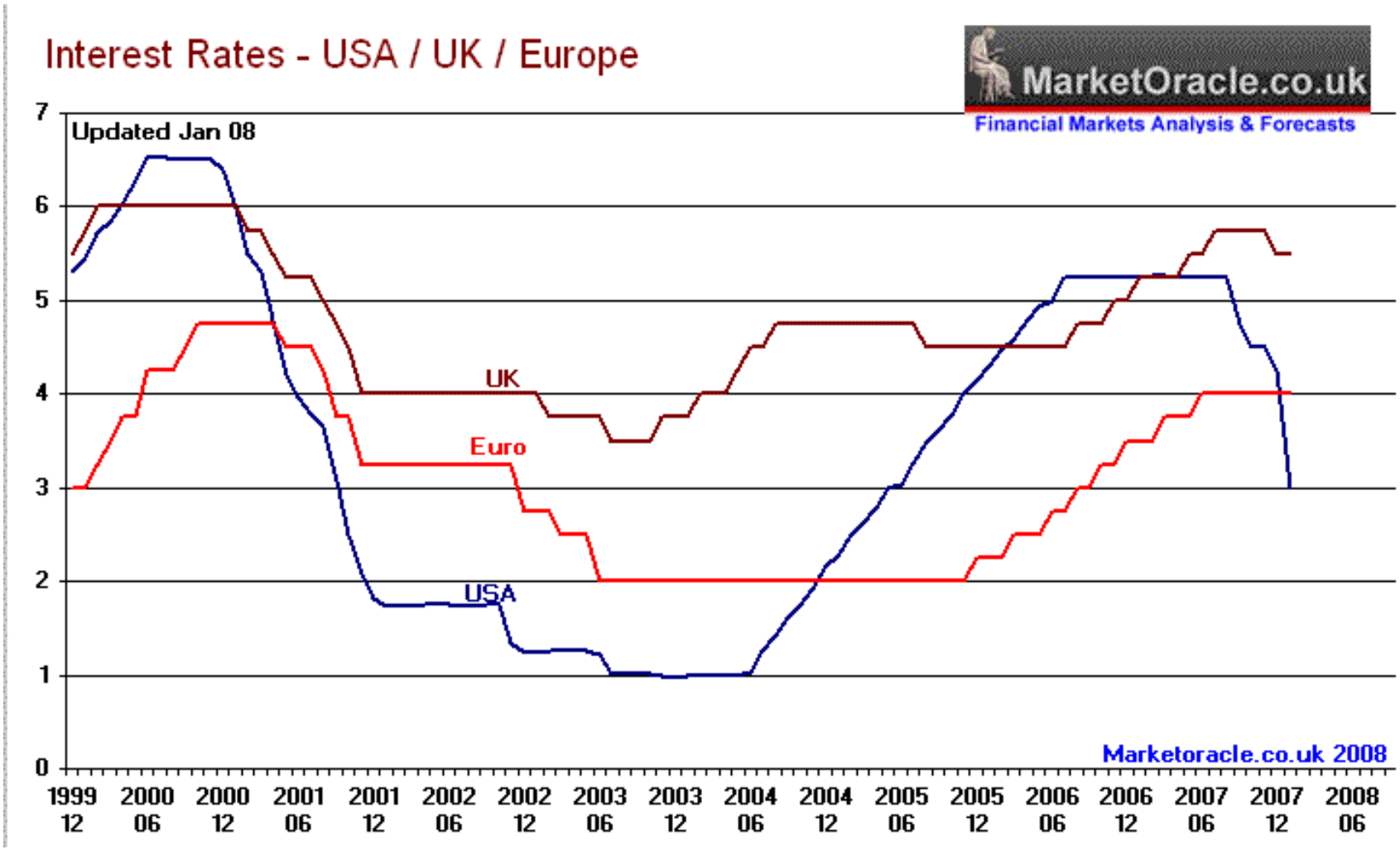
Source: E von Thadden 2012



Source: Financial Times. https://www.ft.com/content/56d25a52-7df5-11e7-9108-edda0bcbc928



Source: Financial Stability Review, Sept 2009, SARB



Source: Market Oracle.co.uk

NINJA loans

NINJA = No Income, No Job or Assets

- Sub-prime mortgages were mis-sold in their millions by lenders desperate to feed the pipeline for securitising, or packaging up, these loans by investment banks
- Research by the industry's regulator, the Financial Services Authority:
  - Poor practices by mortgage brokers (account for more than 60 per cent of all mortgages sold) and lenders
  - In half the cases it investigated customers had self-certified their income
  - Significant numbers of consumers' had been advised to remortgage - thus incur additional charges, without the adviser being able to demonstrate that this was beneficial to the customer
  - In a third of cases the intermediaries failed to assess properly the borrower's ability to afford the mortgages
  - Lenders had inadequate lending standards which they often failed to apply properly

More on the Causes of the Crisis

- Excessive US mortgage lending
- Excessive securitization
- Failure of bank risk models
- Inadequate corporate governance of banks
- Faulty financial regulation: - systemic risk, shadow banking?
- Systemically Important Financial Intermediaries
- Break-down of interbank market
- Biased rating agencies
- Savings glut (China, Middle East, Germany, . . .)
- Real-estate price bubble (US, UK, Spain, . . .)
- US Federal Reserve interest rate policy

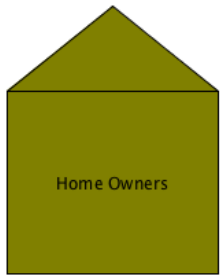
Source: E von Thadden 2012

Write-downs of Large US Institutions

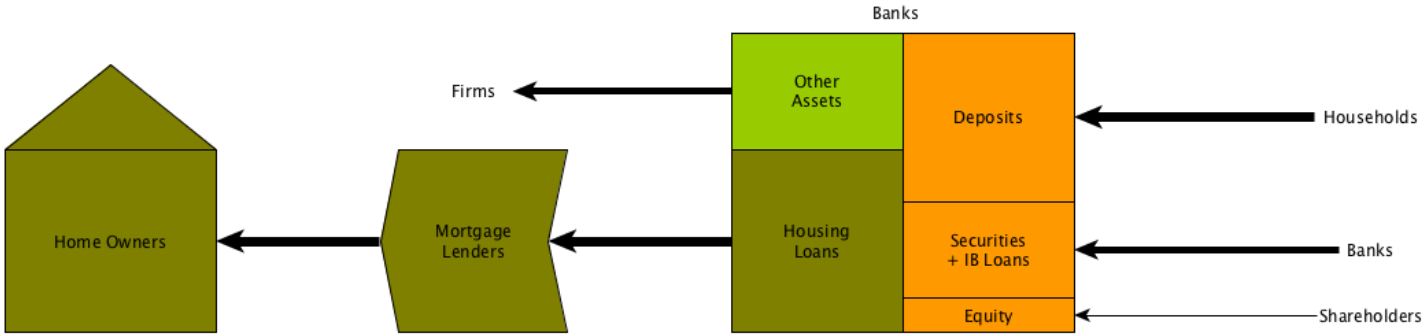
Firm	Write-Downs and Credit Losses ($ Billions)	Equity Return (June 2007–Dec. 2008)	Equity Return (June 2007–Sept. 16, 2008)
Fannie Mae	151.4	−98.14%	−99.23%
Citigroup	130.4	−82.46	−67.20
Freddie Mac	118.1	−97.98	−99.56
Wachovia	101.9	−88.34	−73.18
Bank of America	97.6	−67.79	−34.35
AIG	97.0	−97.57	−94.50
JPMorgan	69.0	−31.51	−12.13
Merrill Lynch	55.9	−85.16	−72.45
Wells Fargo	47.4	−10.77	4.47
Washington Mutual	45.3	−99.95	−90.07
National City	25.2	−94.29	−86.61
Morgan Stanley	23.4	−75.99	−57.65

Source: Bloomberg.

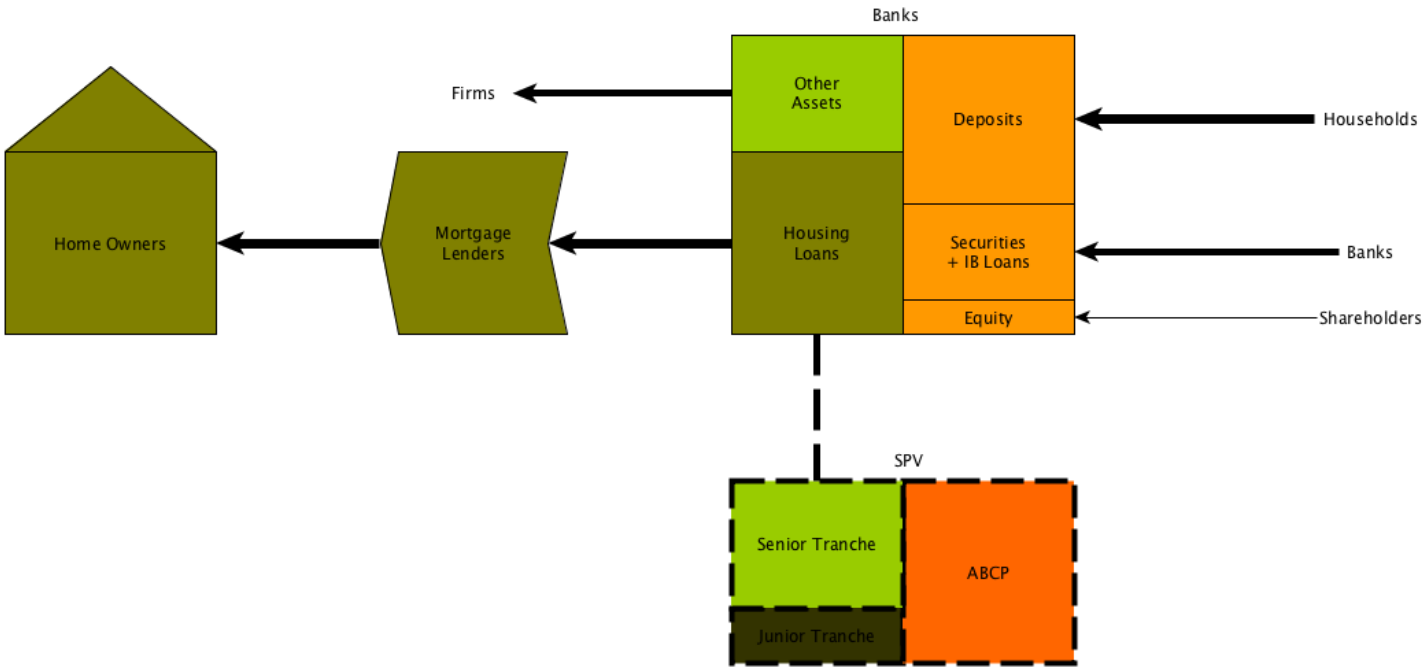
Regulatory Arbitrage - How it Works



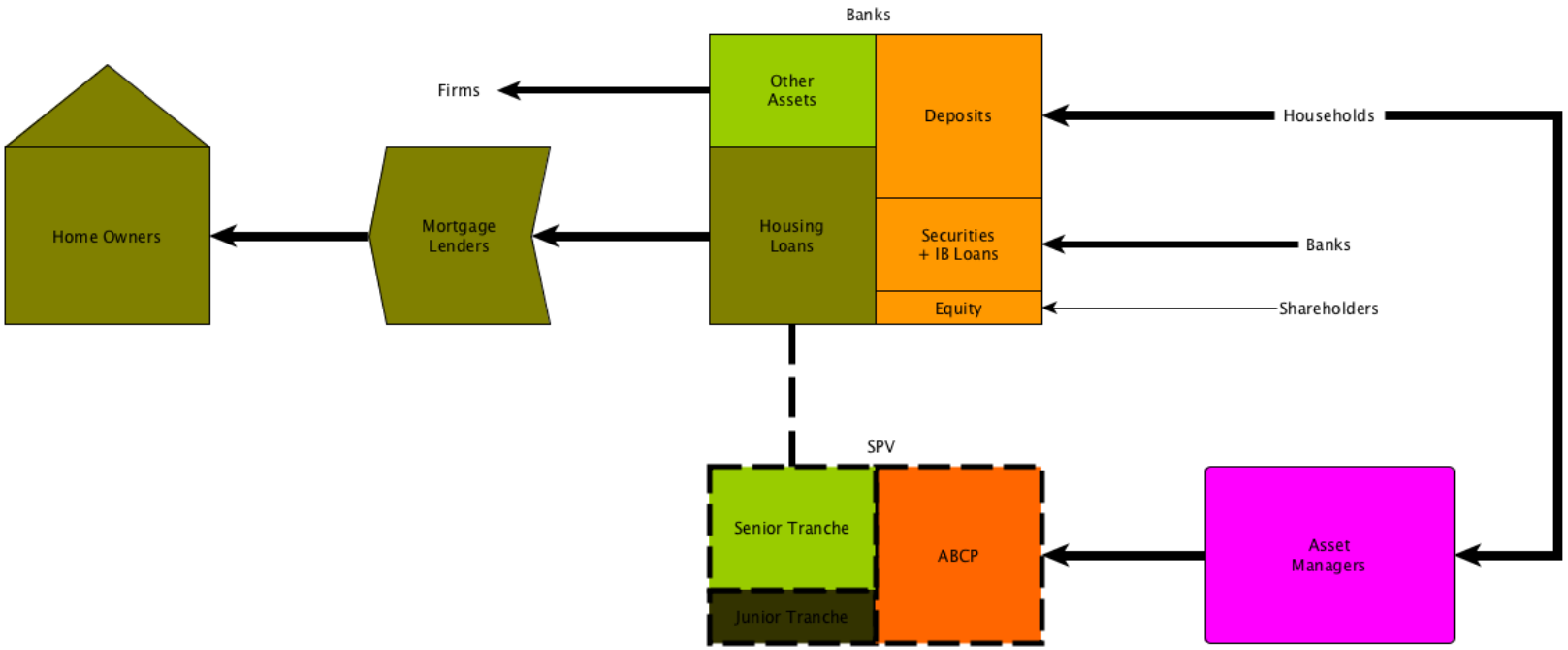
Regulatory Arbitrage - How it Works



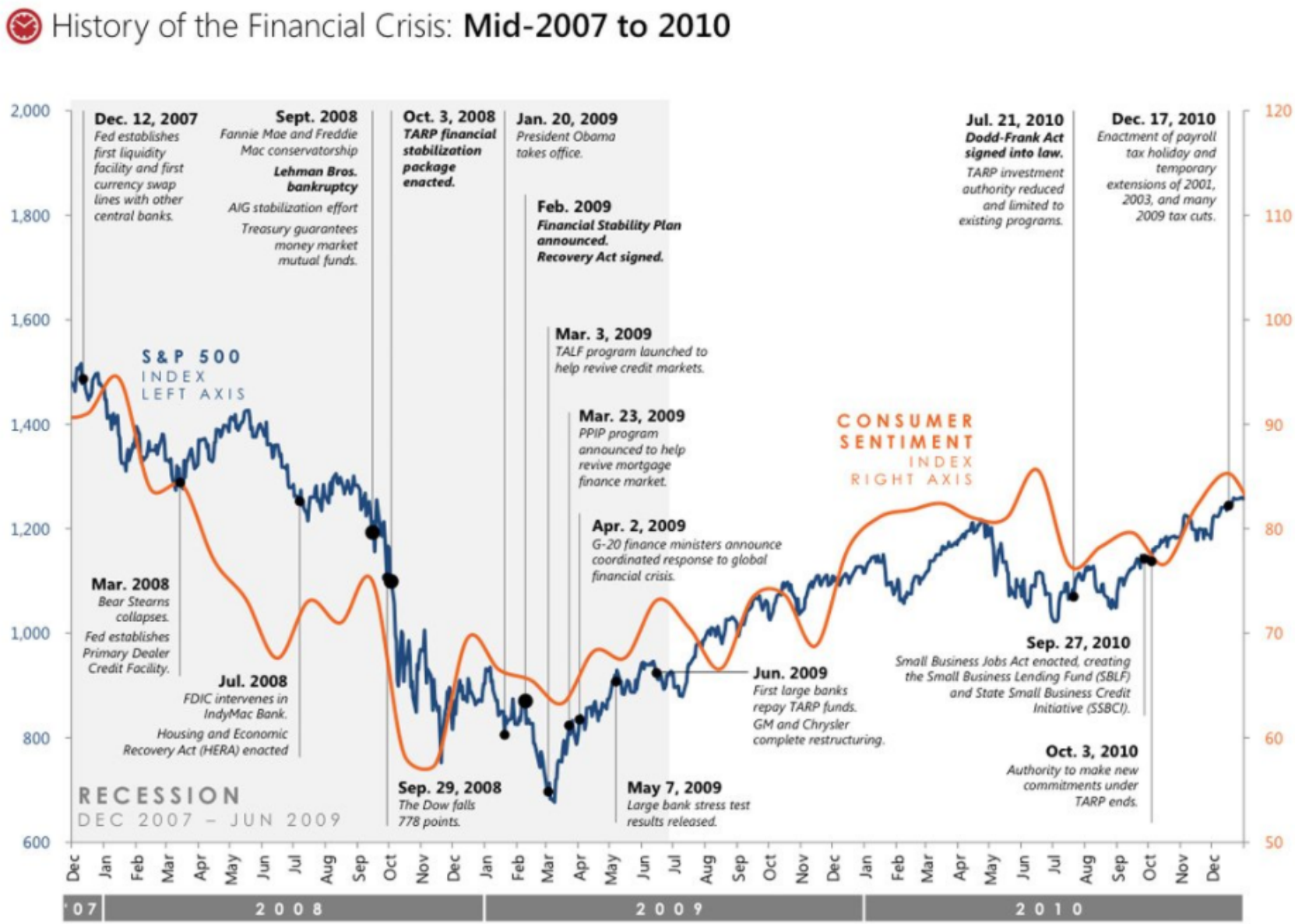
Regulatory Arbitrage - How it Works



Regulatory Arbitrage - How it Works



Financial Crisis timeline



Source:http://www.businessinsider.com/chart-financial-crisis-2013-9

Introduction to shadow banking

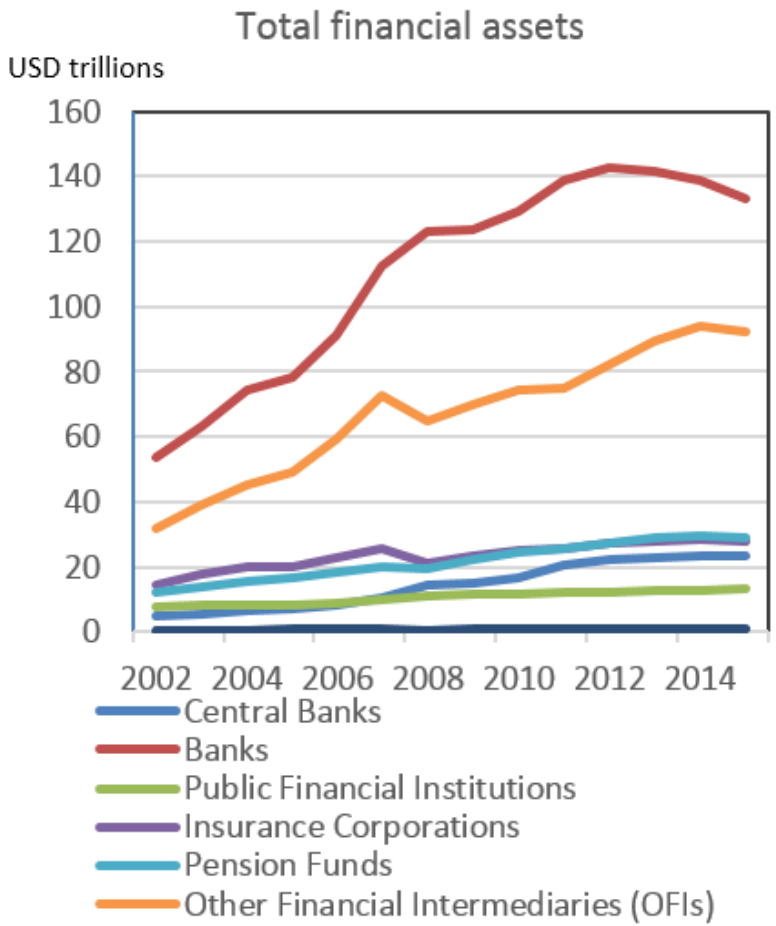
Shadow banking - history

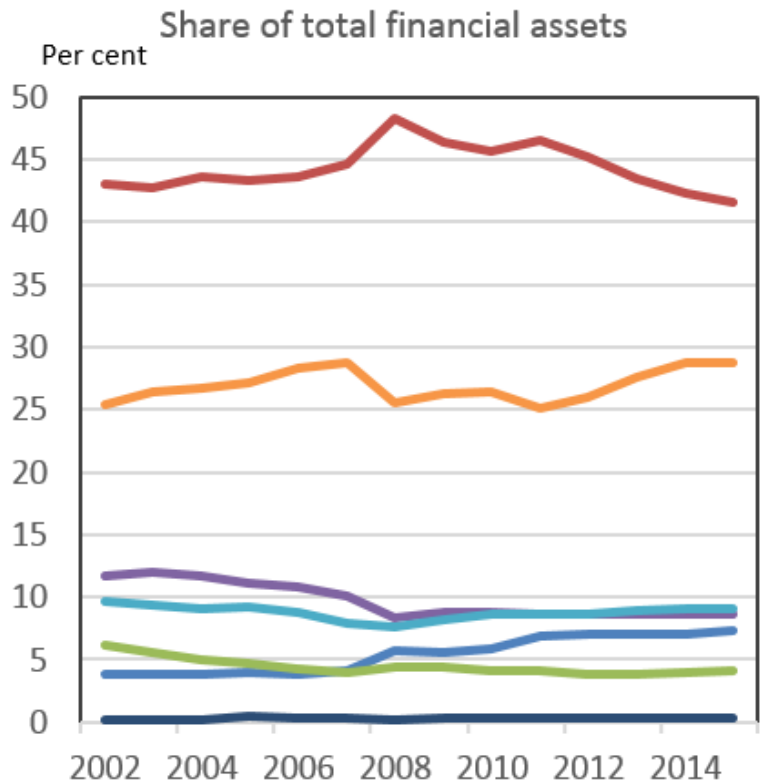
- *Shadow banking* coined in 2007
- Prior to 2007 - known as market-based finance or non-banks
- A lot of focus on developments in the US
- US Money-market mutual funds: 1970
- US Cash management accounts: 1977
- Less-regulated market for capital grew rapidly next to the traditional banking system
- Regulatory arbitrage $\rightarrow$ Deregulation

Why worry about shadow banking?

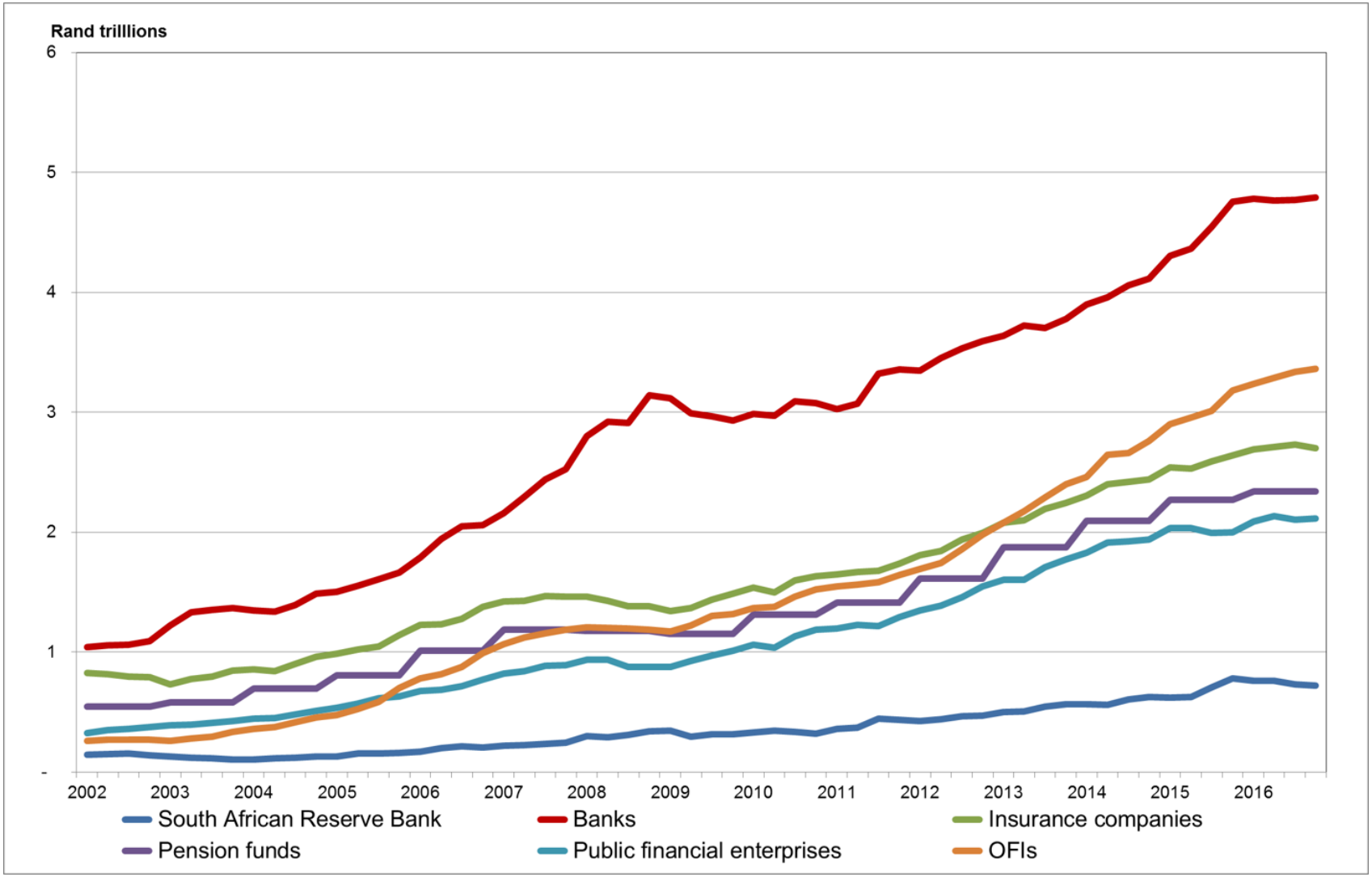
- Systemic risk
- Regulatory arbitrage
- Monetary policy transmission
- Channel for capital flows
- Financial inclusion

Distribution of financial assets globally





Distribution of financial assets among FIs in South Africa



A Quick Overview of Monetary Policy

The Balance Sheet of the Federal Reserve

Federal Reserve System	
Assets	**Liabilities**
Government securities	Currency in circulation
Discount loans	Reserves

- Currency in circulation are IOUs backed by legal promise to be repaid
- All banks have to hold required reserves (2% of deposits) and hold excess reserves at Fed
- Assets are mostly government securities obtained in open market operations

Central Bank Operations

Open Market Operations

Nonbank Public

Assets		Liabilities	
Securities	–$100		
Checkable deposits	+$100		

Banking System

Assets		Liabilities	
Reserves	+$100	Checkable deposits	+$100

Federal Reserve System

Assets		Liabilities	
Securities	+$100	Reserves	+$100

Discount Lending:

Banking System

Assets		Liabilities	
Reserves	+$100	Discount loans	+$100

Federal Reserve System

Assets		Liabilities	
Discount loans	+$100	Reserves	+$100

Some final thoughts continued

- If the ultimate purpose of regulation is to protect the consumer and serve systemic interests, then it should be subjected to the test of whether it does so effectively and cost-efficiently
- arguments against particular mechanisms may not invalidate the arguments for regulation in general
- the rationale for all regulatory arrangements and structures needs to be clearly identified rather than taken for granted
- Therefore regulation should be an evolving process, responsive to changes in the market environment
- Regulation that remains stable irrespective of market changes will be inefficient at best, and perhaps even perverse.

Thank you!