LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Banking and Insurance

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1. Financial Sector Framework

1.1. Financial Intermediation

Reasons for Intermediation

- Asymmetric information on investment projects:
  - Information intermediation

- Incomplete markets and contracts;
  - external incompleteness – when it is too costly to use the legal system to ensure the outcome of the contracts.
  - intrinsic incompleteness – as it is also very hard to anticipate all the factors that will affect a borrower's credit worthiness, it may be very hard for a lender and borrower to contract on eventualities because they are too hard to anticipate in detail => contracts may not anticipate all the states of the nature (e.g. consequences of loan defaults);
  - deliberate incompleteness – contracts are not written in all the detail possible simply because doing so would lead to worse outcomes than leaving contracts incomplete.

Reasons for Intermediation

- "incomplete-contract" approach to banking: Boot, Greenbaum, and Thakor (1993); Diamond and Rajan (1997); Kiyotaki and Moore (1996); and Myers and Rajan (1997) - commercial banks emerged at a time when contracts were very incomplete and property rights insecure.

- the distinguishing feature of the bank may not simply be the contracts it writes with depositors and borrowers, but instead its investment in:
  - reputation – Book, Greenbaum, and Thakor (1993)
  - relationships with clients - Diamond and Rajan (1997)
  - the engagement between employees and the business.

- these institutional abilities cannot be replicated instantaneously in the market

Relevance of the financial sector

- According to Levine (2005), "Economists disagree sharply about the role of the financial sector in economic growth":

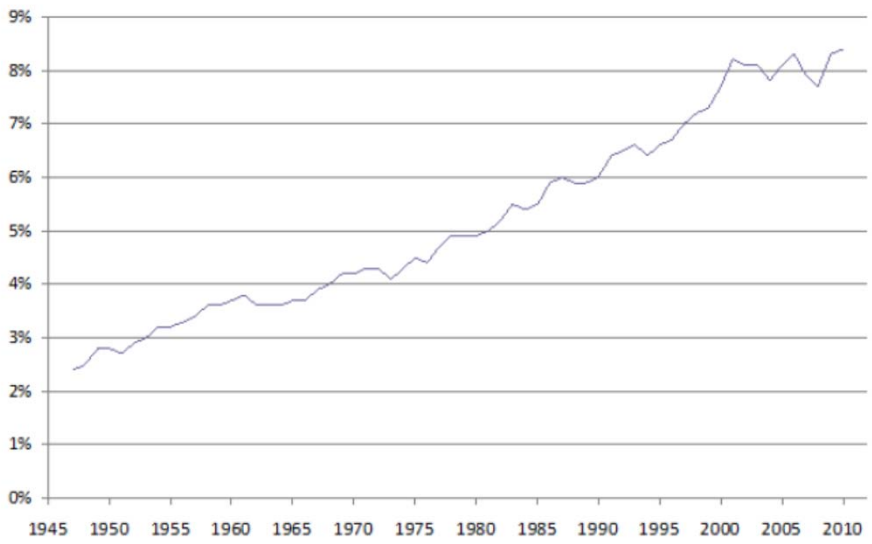
(i) "Finance is not even discussed in a collection of essays by the "pioneers of development economics" [Meier and Seers (1984)], including three Nobel Prize winners, and Nobel Laureate Robert Lucas (1988, p. 6) dismisses finance as an "over-stressed" determinant of economic growth. Joan Robinson (1952, p. 86) famously argued that "where enterprise leads finance follows". From this perspective, finance does not cause growth; finance responds to changing demands from the "real sector"."

(ii) "At the other extreme, Nobel Laureate Merton Miller (1998, p. 14) argues that, "[the idea] that financial markets contribute to economic growth is a proposition too obvious for serious discussion". (…) Drawing a more restrained conclusion, Bagehot (1873), Schumpeter (1912), Gurley and Shaw (1955), Goldsmith (1969), and McKinnon (1973) reject the idea that the finance growth nexus can be safely ignored without substantially limiting our understanding of economic growth.

Relevance of the financial sector

- Since WWII, the fraction of US GDP produced by the financial and insurance sector increased from 2% to 8%, mostly due to credit intermediation and securities activity.

Figure1. Value added of the finance and insurance sectors in the US (% of GDP)

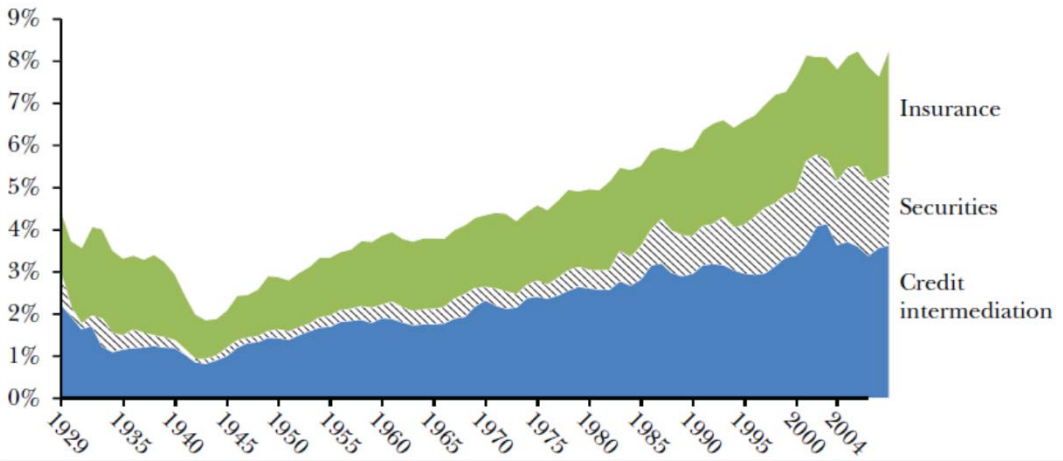


Source: Den Haan, Wouter (2011), "Why do we need a financial sector?", VOX CEPR's Policy Portal, 24 October.

Figure 1

The Growth of Financial Services

(value added share of GDP)

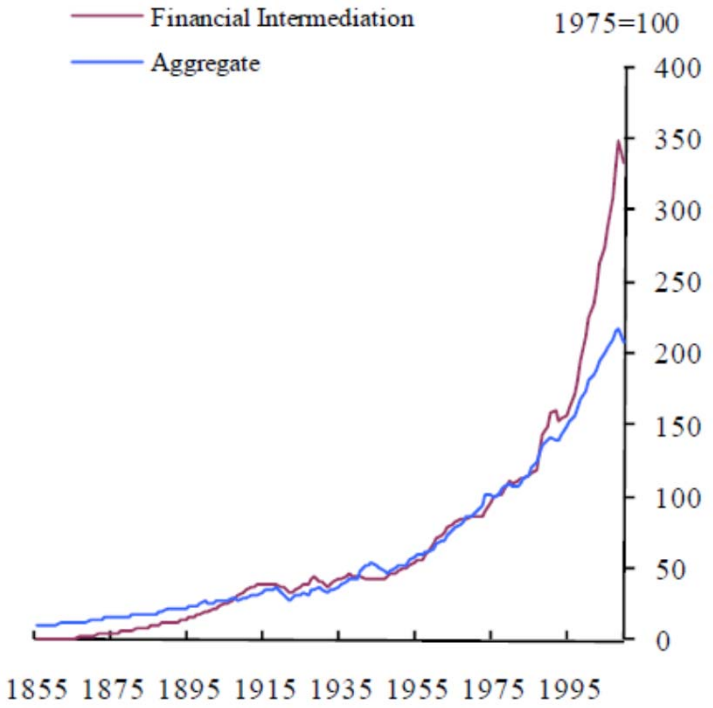


Source: Greenwood, Robin and David Scharfstein (2013), "The Growth of Finance, Journal of Economic Perspectives, Volume 27, Number 2, Spring, Pages 3–28.

Relevance of the financial sector

- In UK, the weight in GDP of the value added generated by the financial sector increased from 5% to 9% between 1970 and 2008.
- In the past 160 years, growth in financial intermediation has outstripped overall economic growth by over 2 p.p./year. =>
- Growth in financial sector value added has roughly doubled that of the economy as a whole since 1850, mostly since the 80's.

Chart 1 UK financial intermediation and aggregate real GVA



Sources: Feinstein (1972), Mitchell (1988), ONS and Bank calculations.

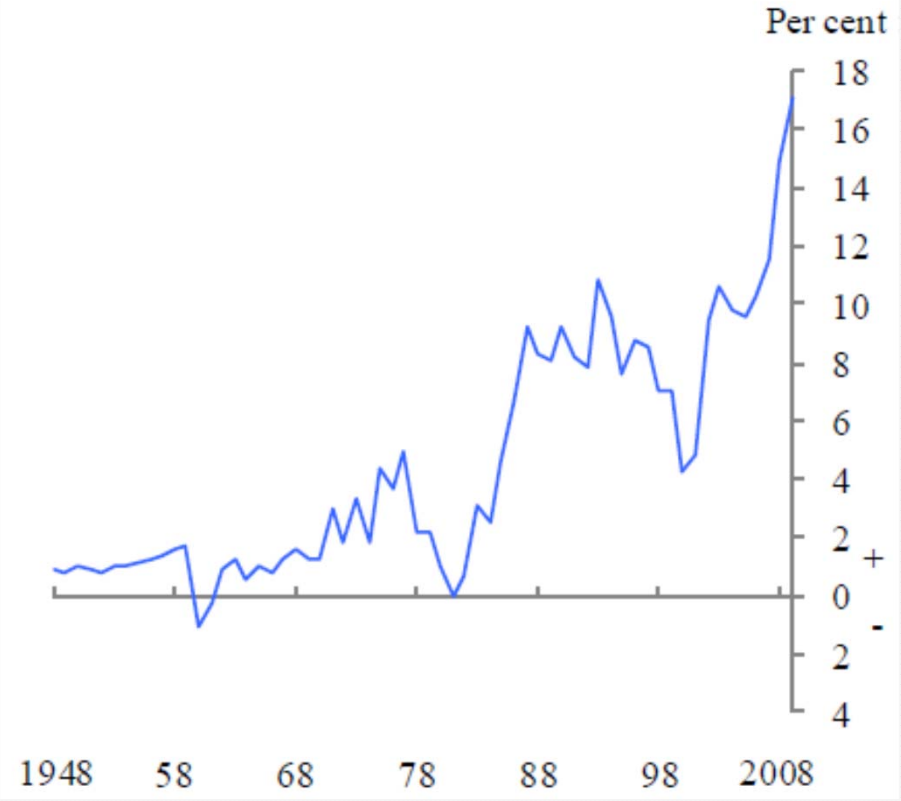
Source: Source: Haldane, Andrew (2010), "What is the contribution of the financial sector: Miracle or mirage?", in The Future of finance and the theory that underpins it, LSE.

Relevance of the financial sector

- Still in UK, the weight of the financial sector in total profits increased from 1.5% to 15%, between the 60's and the subprime crisis.

Source: Haldane, Andrew (2010), "What is the contribution of the financial sector: Miracle or mirage?", in The Future of finance and the theory that underpins it, LSE.

Chart 2 Gross operating surplus of UK private financial corporations (% of total)



Relevance of the financial sector

- In the 1950s, the gross profitability of the financial sector relative to capital employed was roughly in line with the economy.
- But since then, returns to capital have far overcome those at an overall level.

Chart 16 Net operating surplus over net capital stock in UK financial intermediation and the whole economy[(a)]

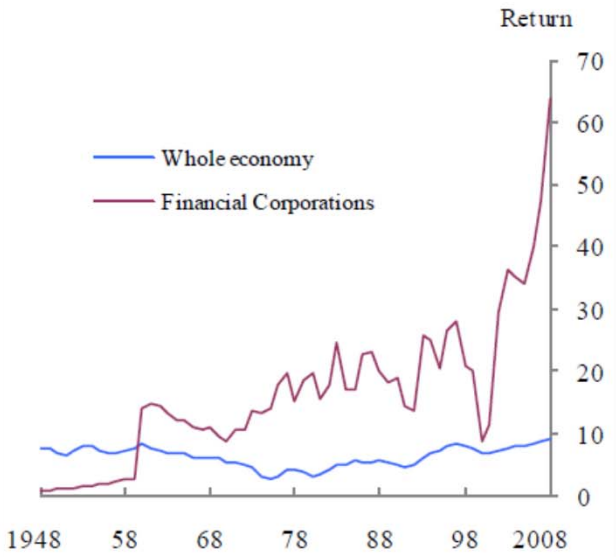
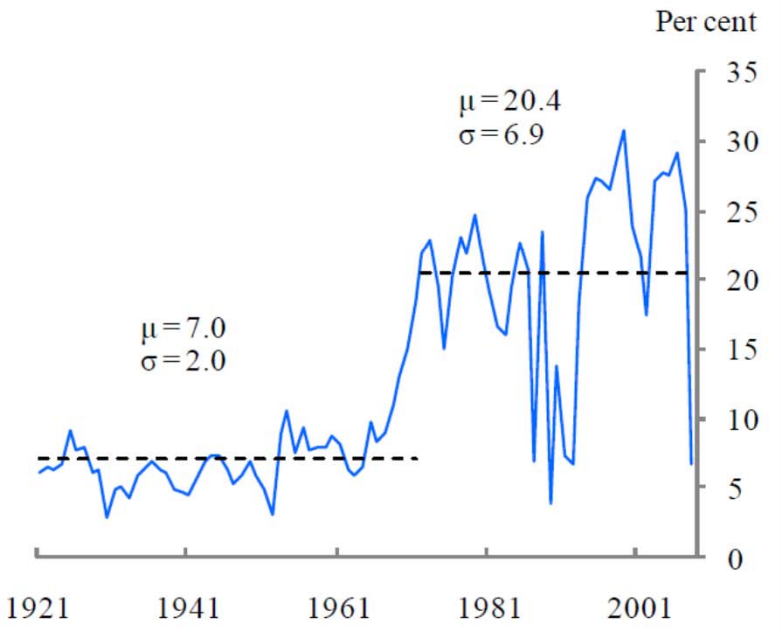


Chart 17 Return on equity in UK finance[(a)]



Source: Haldane, Andrew (2010), "What is the contribution of the financial sector: Miracle or mirage?", in The Future of finance and the theory that underpins it, LSE.

Relevance of the financial sector

- According to Haldane (2010), high returns in the financial sector may have been driven by banks assuming higher risk, through 3 often related balance sheet strategies:

(i) increased leverage, on and off-balance sheet;

(ii) increased share of assets held at fair value; and

(iii) writing deep out-of-the-money options.

- This increase in risk was facilitated by the opacity of accounting disclosures or the complexity of the products involved => while reported ROEs rose, *risk-adjusted* ROEs did not.

Relevance of the financial sector

(i) **increased leverage**

- In US, banks‘ assets increased from around 20% to over 100% of GDP since the end of the 19th century, while in UK, after a century around 50% of GDP, since the early 1970s, banks‘ assets have risen tenfold to over 500% of GDP.

Chart 19 Size of the UK banking system(a)

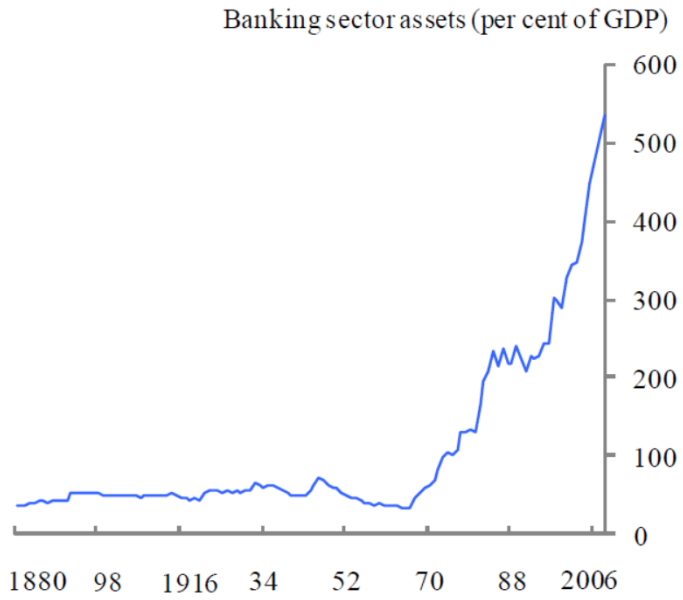
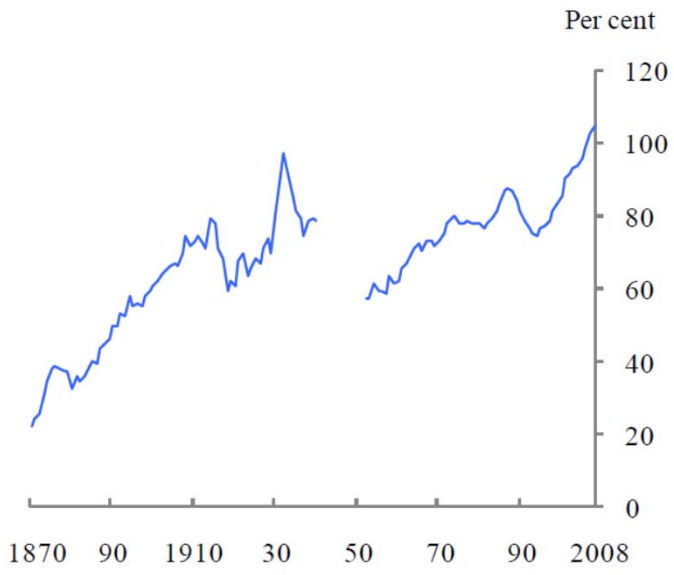


Chart 20 Size of the US banking system relative to GDP, 1870-2008



Source: Haldane, Andrew (2010), “What is the contribution of the financial sector: Miracle or mirage?”, in The Future of finance and the theory that underpins it, LSE.

Relevance of the financial sector

(i) **increased leverage**

- 21st century has seen an intensification of this growth - the balance sheets of the world's largest 1000 banks increased by around 150% between 2001 and 2009 => the scale of assets in the banking system now dwarfs other sectors.

Chart 21 Total assets of the world's 1000 largest banks

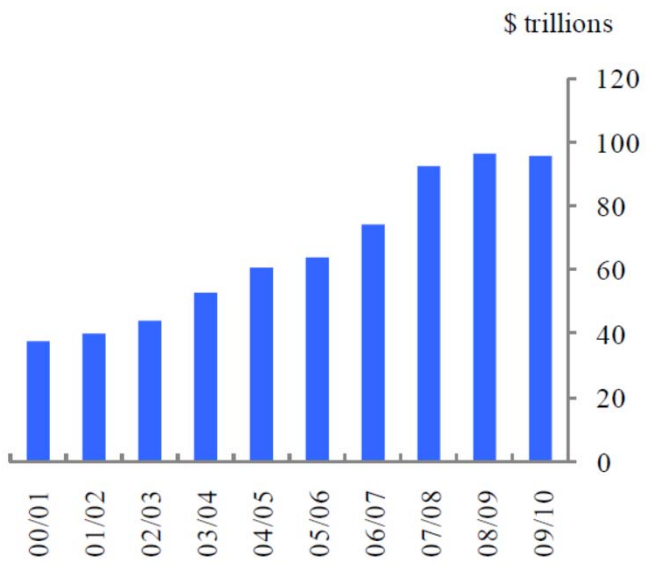
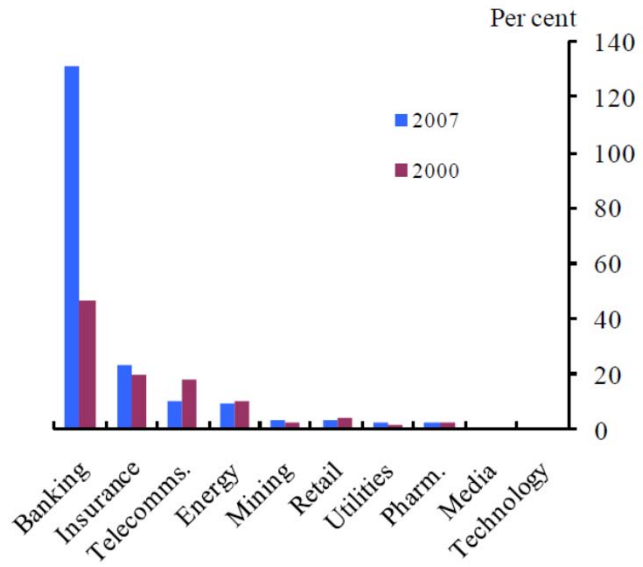


Chart 22 Largest companies' assets in each sector relative to annual GDP in the UK



Source: Haldane, Andrew (2010), "What is the contribution of the financial sector: Miracle or mirage?", in The Future of finance and the theory that underpins it, LSE.

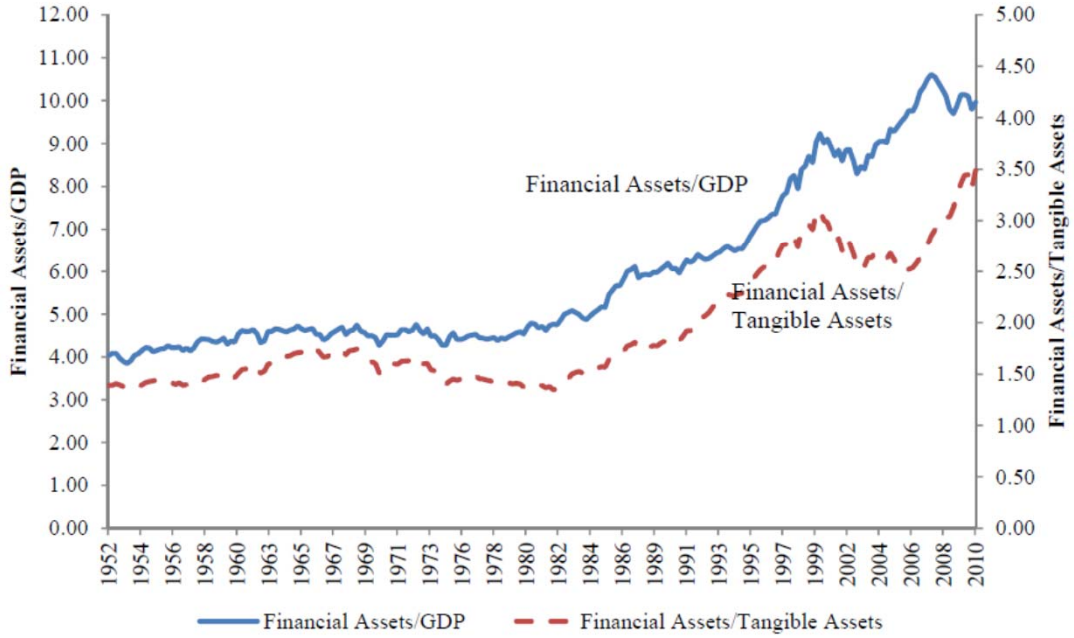
Relevance of the financial sector

(i) **increased leverage**

- In US, the value of total financial assets across all sectors was approximately 5 times the GDP in 1980 and doubled by 2007.

Figure 2. The Growth of Financial Assets

Notes: Data are from the *Flow of Funds Accounts of the United States*. Financial assets are summed across all sectors.



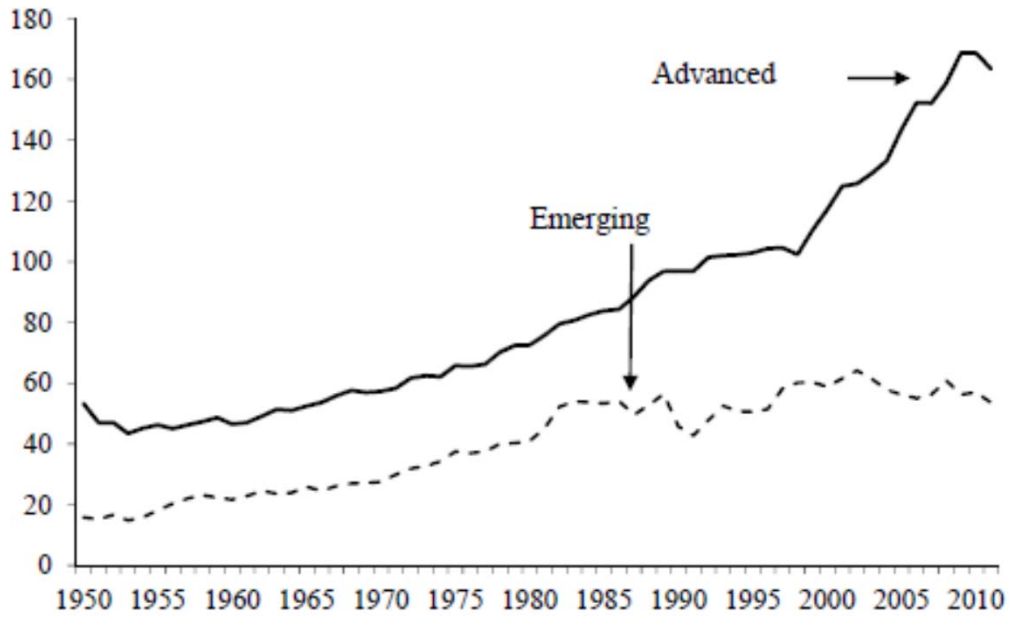
Source: Greenwood, Robin and David Scharfstein (2012), "The Growth of Modern Finance", July, Mimeo.

Relevance of the financial sector

(i) **increased leverage**

- In advanced economies, private domestic credit increased from around 50% to 160% of the GDP between 1950 and 2011.

Figure 4. Private Domestic Credit as a Percentage of GDP, 1950–2011
(22 Advanced and 28 Emerging Market Economies)



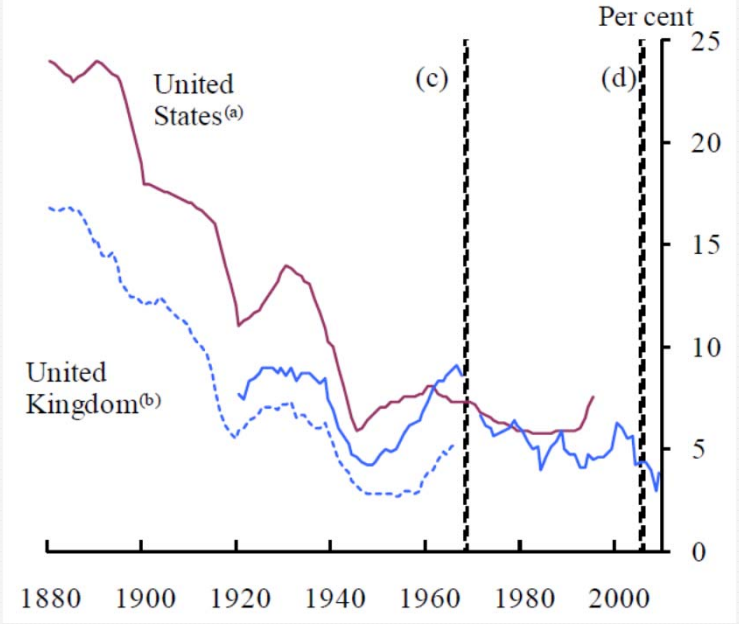
Source: *Reinhart, Carmen M. and Kenneth S. Rogoff (2013),* „*F*inancial and Sovereign Debt Crises: Some Lessons Learned and Those Forgotten", IMF WP/13/266.

Relevance of the financial sector

(i) **increased leverage**

- Assets growth was not followed by equity => capital ratios decreased significantly since the end of the 19th century:

Chart 23 Long-run capital ratios for UK and US banks



Source: Haldane, Andrew (2010), "What is the contribution of the financial sector: Miracle or mirage?", in The Future of finance and the theory that underpins it, LSE.

Relevance of the financial sector

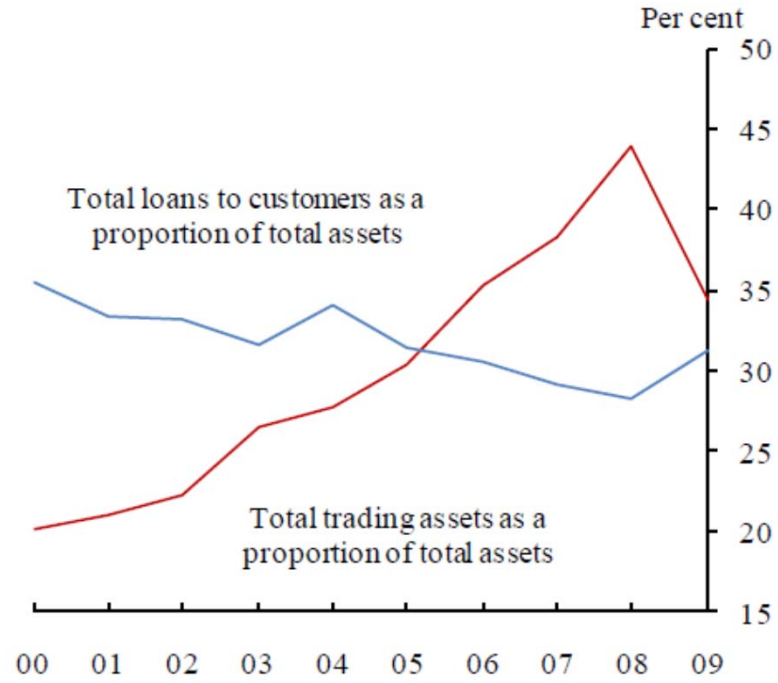
(ii) **increased share of assets held at fair value**

- Among the major global banks, the share of loans to customers in total assets fell from around 35% in 2000 to 29% by 2007, while trading book asset shares almost doubled from 20% to almost 40%.
- Regulatory arbitrage may have been a significant factor - trading book assets tended to have more favourable risk weights => it was capital-efficient for banks to bundle loans into tradable structured credit products for onward sale.

(iii) **writing deep out-of-the-money options.**

- Investing in senior tranches of sub-prime loan securitisations or selling CDSD is equivalent to selling deep-out-of-the-money options: high returns except in those tail states of the world when borrowers default massively.

Chart 29 LCFIs' trading assets and loans to customers as a proportion of total assets[a]



Source: Haldane, Andrew (2010), "What is the contribution of the financial sector: Miracle or mirage?", in The Future of finance and the theory that underpins it, LSE.
Note: LCFI – Large Complex Financial Institutions.

Relevance of the financial sector

- One may argue that there is a gap between the sector revenues and its contribution to society:

(i) if the sector is imperfectly competitive, the price will exceed the social marginal cost;

(ii) the implicit insurance that the financial sector gets - as financial service providers do not pay for the "moral hazard" they create, the true value of financial services is systematically less than the payment to factors.

- fiscal cost (net of recoveries) of the 1980s US Savings and Loan Crisis = 124 B$ (3% of GDP, ignoring other costs like output losses, according to Curry and Shibut (2000).
- Laeven and Valencia (2008) - 42 crisis episodes, with an average net fiscal cost of 13%.
- Haldane (2010) - costs of past financial crises often in excess of 10% of pre-crisis GDP.

(iii) negative spillovers - services provided by FIs that are useful to a client, but not to society as a whole, e.g. structure a firm's financing in a way that the firm pays less taxes.

Relevance of the financial sector

- **Questions to be answered**:
  - What are the reasons for the observed substantial increase in the share of the financial sector in the GDP?
  - What is the value of the services provided? - measured by investigating how differences in financial sectors across countries are related to valuable characteristics such as smaller business cycles, better life-time consumption patterns, and innovative firms not facing financing constraints.
  - Why was the growth in financial intermediation irrelevant in economic models and central banks?
  - Is financial deepening always beneficial?

Relevance of the financial sector

- "Most financial experts and policy makers thus treated more finance as positively beneficial. But in one area of policymaking – in central banks – financial system developments were primarily viewed as neither positive nor negative, but simply neutral".
- "Earlier economists who experienced the financial and economic upheavals of the 1920s and 1930s – such as Friedrich Hayed, Irving Fisher or John Maynard Keynes – believed that the operation of the financial system, and in particular of the banking system, carried vital implications for overall macroeconomic stability. But increasingly from the 1970s on, their insights were rejected or ignored".
- "Instead modern macroeconomics and central bank practice gravitated to the assumption that the monetary workings of the economy could be captured by models from which the banking system was entirely absent, and that provided central banks manipulated interest rates successfully to achieve low and stable inflation, stable macroeconomic performance would follow. Finance was described as a mere "veil".

in Turner, Adair (2015), Between Debt and the Devil: Money, Credit, and Fixing Global Finance, October, Princeton University Press.

Financial Roles

- Liquidity Intermediation – channeling savings to investment projects, by maturity transformation.
- Risk Intermediation – risk taking (e.g. credit, interest rate, currency) and reselling to final investors/savers.
- Information Intermediation – FIs are delegated monitors (Diamond (1984)) of economic agents, optimally processing the information available. FI average size allows the collection of information at a lower average cost (economies of scale).
- Transmission of monetary policy effects – monetary aggregates are linked to macroeconomic variables (namely prices) and correspond to banks' liabilities.
- Intergenerational wealth transfer
- Payment system

Liquidity Intermediation

- Banking activity conciliates opponent goals of consumers and investors:
  - Consumers – maximize their utility in a short term horizon. They are averse to volatility, preferring stable consumption patterns along time. Consequently, they opt for short term banking investments. The liquidity insurance is reflected on the lower interest rates paid.
  - Entrepreneurs – evidence a higher risk appetite, looking for long term investments.
- According to Diamond and Dybvig (1983), a bank is essentially an ex-ante insurance contract assuring liquidity to the signers.
- The consensus among economic historians is that deposit banking in continental Europe evolved from the activity of money changing and the first loans were overdraft facilities provided to depositors.

Liquidity Intermediation

- Depositors were natural candidates for loans, as public information about the merchants was scarce at that time and money changers could obtain very relevant information from the merchant's current account.
- According to Rajan, Raghuram G. (1998), "The Past and Future of Commercial Banking Viewed through an Incomplete Contract Lens", Lamoreaux (1994, p. 101) quotes an early New England banker arguing that:

  "the best paper to accept is that offered by firms or individuals who are in the habit of carrying balances with their bank from whom the accommodation should be obtained. There appears to me no better means to determine the amount of risk a bank incurs than by regulating its loans according to the average balance carried. Also, the promise of loans when in need would make the depositor more eager to establish a good credit history with the money changer. This would assure the money changer of deposit inflows whenever the depositor was flush with cash. Thus a valuable quid pro quo relationship could be established with depositors through the overdraft facility."

Liquidity Intermediation

- However, early banks were not models of sound banking practice and failed often, mostly due to sovereign risk.

Question: Why didn't the money changer let the money lie idle in his strong box, and charge the depositor an additional fee for providing riskless payment services? Why wasn't 100% reserve banking a viable institutional form instead of fractional banks?

One answer may simply be that it was too costly to let reserves lie idle.

Liquidity Intermediation

- Banks in the Middle Ages that
  - were restricted to lending to public entities, lost depositors' money to private banks, as in the latter depositors could rely on in satisfying their potential future needs.
  - faced 100% reserve requirements were not deemed as safe (as they had to keep the deposits, instead of investing them) and faced the risk of being forced by the Government to grant loans.

- By fully utilizing reserves through overdrafts, the money changer could protect depositors better against misappropriation.
- Moreover, he created a larger number of stakeholders who would help him against the sovereign => the money changer aggregated both the financial and political power of the depositors.

Risk Intermediation

- Interest rate and currency risks have been developed through the derivatives market, with banks offering these services to their customers.
- More recently, credit derivatives market increased substantially, allowing for the credit risk trading between banks and their final investors.
- Consequently, in the years before the bursting of the subprime crisis, banks increasingly positioned themselves as simple intermediaries, buying and selling risks, instead of retaining those risks.

Information Intermediation

- Banks are generally in a better position to assess the credit risk of economic agents, namely those with lower size, for whom the information available is more limited and less robust.
- There is a minimum optimal size to perform this role, in order to minimize the costs of information management.
- For larger size companies, capital markets and rating agencies replace banks in this role.
- According to Diamond (1984), a financial intermediary improves corporate governance of debtors, channelling savings to firms.

- By being a "delegated monitor", FI reduce the costs of aggregate monitoring costs and eliminates the free-rider problem among the several shareholders, since it does the monitoring for all the investors.
- As financial intermediaries and firms develop long-run relationships, this can further lower information acquisition costs.

Information Intermediation

- Some literature concludes that debt contracts may improve corporate governance and economic growth, reducing the costs of monitoring firm insiders, in line with Diamond (1984) [e.g., Townsend (1979), Gale and Hellwig (1985), Boyd and Smith (1994), quoted in Levine (2005)].
- According to Aghion, Dewatripont and Rey (1999), debt instruments reduce the amount of free cash available to firms, shortening the managerial slack and accelerating the rate at which managers adopt new technologies.
- Several models also show that well-functioning financial intermediaries influence growth by improving corporate governance (e.g. Bencivenga and Smith (1993), Sussman (1993), Harrison, Sussman and Zeira (1999) and De la Fuente and Marin (1996), quoted in Levine (2005).

Information Intermediation

- With low information costs, diffuse shareholders may exert effective corporate governance directly by voting on crucial issues, e.g. M&A and other strategic issues.
- However, many researchers emphasize that diffuse equity face several barriers to exerting sound control over corporations (e.g. Berle and Means (1932), quoted in Levine (2005)", namely with large information and contracting costs, with adverse effects on resource allocation and economic growth.

- Managers may pursue projects that benefit themselves rather than the firm and society at large, as there are large information asymmetries between managers and small shareholders.

Information Intermediation

- Small shareholders frequently lack the knowledge and incentives to monitor managers due to the large costs and complexity associated with overseeing managers and exerting corporate control.
- Investor become "free-riders" – as each stockowner's stake is so small, each investor relies on others to undertake the costly process of monitoring managers.

Insufficient monitoring

- The voting rights mechanism will not work effectively.

Information Intermediation

- Additionally, the board of directors may not represent the interests of minority shareholders, as management may capture the board into acting in the best interests of the managers, not the shareholders.
- Furthermore, in many countries legal codes do not adequately protect the rights of small shareholders and legal systems frequently do not enforce the legal codes concerning diffuse shareholder rights.
- A large and concentrated owner structure also has its problems.

- Large owners have greater incentives to acquire information and monitor managers and greater power to limit managerial discretion [see e.g. Grossman and Hart (1980, 1986); Shleifer and Vishny (1996); and Stulz (1988), quoted in Levine (2005)].

Information Intermediation

- However, large shareholders create a different agency problem: Conflicts between the controlling shareholder and other shareholders [Jensen and Meckling (1976)].
- The controlling owner may expropriate resources from the firm, or deal with related parties in a manner that hurts the firm and society.
- Morck, Wolfenzon and Yeung (2005):
  - controlling owners are frequently powerful families that use pyramidal structures, cross-holdings, and super voting rights to magnify their control over many corporations and banks
  - evidence that these controlling families frequently translate their corporate power into political influence to shape public policies protecting them from competition and subsidizing their ventures.
- Highly concentrated ownership can distort corporate decisions and national policies in ways that encourage rent-seeking, limiting innovation and economic growth.

Information Intermediation

- FI intermediaries may reduce the costs of acquiring and processing information, consequently improving resource allocation [Boyd and Prescott (1986)].
- Therefore, FIs may identify the best production technologies, increasing the rate of technological innovation [e.g. King and Levine (1993), and Acemoglu, Aghion and Zilibotti (2003), quoted in Levine (2005)].

- Schumpeter (1912) view of finance in the process of economic development: "The banker, therefore, is not so much primarily a middleman . . . He authorizes people in the name of society . . . (to innovate)".

Information Intermediation

- Monitoring firms and exerting corporate governance can also be performed through financial markets.
- According to a large set of literature (see e.g. Jensen and Meckling (1976), quoted in Levine (2005), well functioning stock markets improve corporate governance.
- For example, public trading of shares in stock markets allows owners to link managerial compensation to stock prices, helping to align the interests of managers with those of owners [Diamond and Verrecchia (1982) and Jensen and Murphy (1990), quoted in Levine (2005)].
- Better stock markets can improve corporate control by easing takeovers of poorly managed firms => the threat of a takeover will help align managerial incentives with those of the owners [Scharfstein (1988) and Stein (1988), quoted in Levine (2005)].

Information Intermediation

- The manager or entrepreneur has privileged information on the project to finance and its management vis-à-vis the FI or the shareholders.
- 2 risks of asymmetric information:
  - Adverse selection – due to the lack of information, investors may be unable to select the best projects. Fixing the same interest rate for all projects, banks may crowd-out the best projects, attracting only those whose entrepreneurs know in advance they will not redeem the loans (consequently being available to accept higher interest rates);
  - Moral hazard – if an investor cannot monitor the entrepreneur, the latter may manage the project sub-optimally, hampering the company growth and its ability to redeem the investor.

Moral Hazard Behaviors

- Actions motivated by private benefits
- Utilization of company resources for private goals
- Limited effort
- Drop-out pressure
- Overinvestment to maximize the entrepreneur's utility
- Opposition to the project's abandonment, when such decision is optimal
- Postponement of the disposal of NPLs
- Too big to fail (in some cases, too big to bail)

Moral Hazard Behaviors

- Too big to fail (TBTF) is visible in the differences between the standalone and the support ratings (ratings considering the implicit Government support), which are higher for larger banks (Haldane (2010)).
- Reducing moral hazard is even an intermediate objective of macro prudential policies in EU, as set out in ESRB Recommendation 2013/1.
- Consequences of TBTF policies (according to the Squam Lake Report (2010)):

(i) stakeholders claim all the profits but only some of the losses => TBTF FI have an incentive to take extra risk, shared by shareholders, creditors, employees and management => increase in the risks borne by society as a whole.

(ii) encourage smaller FI to expand or to become more closely interconnected with other firms, so they move under the TBTF umbrella => FI have an incentive to do whatever it takes to make policymakers fear their failure, creating the very fragility the government wishes to avoid => TBTF FI also benefit from lower cost of funding, allowing it to offer better prices to its customers.

Transmission of Monetary Policy Effects

- Ensured by the involvement of banks in the money market.
- Therefore, central banks, by setting the level of interest rates in liquidity providing and absorption facilities through the money market, exert influence on the general level of interest rates (though at a lesser degree on long term interest rates).
- Banks' liabilities are considered in the definition of monetary aggregates.

Intergenerational Wealth Transfer

- Ensured by long term saving instruments offered by banks.
- These instruments may be originated by insurance or pension fund management companies, frequently with a tight connection to banks.

Payment System

- Ensured by the payment mechanisms implemented and managed by banks, namely:

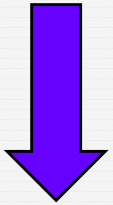
  - banking transfers;
  - ATM;
  - correspondent banks;
  - credit cards.

Relevance of Debt

- The relevance of FIs is in a large extent related to the importance of debt in the economy.
- In a "perfect" economy, **economic agents should be indifferent in the choice between capital and debt** (Modigliani and Miller theorem (1958)).
- Debt stems from markets' and contracts' imperfections, as well as from taxation.
- Debt issuance can be considered as transferring the company's control from the shareholders to the debtholders, with the former keeping a call-option on the market value of the company's assets, being the nominal value of the debt the strike price (Merton(1974)).

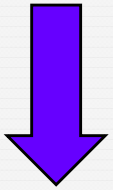
Relevance of Debt

- Debt is socially useful => excessive debt is economic pollution



- More financial activity is not always beneficial

- Debt pollution must be constrained by public policy



- Build a less credit-intensive economy, to reduce systemic risk

Sudden stops

- One of the major reasons for systemic risk are the sudden stops in credit supply.
- Debt markets may suddenly move from risk appetite to risk-aversion.

- New credit supply may suddenly stop, hampering the debt rollover and the funding of new projects.
- Depressed confidence leads to asset price falls, due to the pressure to sell assets in order to reduce leverage.

Drivers of Increasing Debt

(i) Increasing importance of real estate in modern economies

- real estate accounts for more than 50% of all wealth and the vast majority of lending in advanced economies.

(ii) Increasing inequality

- poorer people tend to spend a higher proportion of their income and to borrow relatively more (e.g. subprime crisis).

(iii) Current-account imbalances

- have to be matched by the accumulation of unsustainable debt.

Building a less credit-intensive economy

- Interest rate increases by central banks to tackle excessive credit growth, even before inflation is increasing.
- Develop more holistic policies, to tackle issues like urban development, inequality, taxation (to reduce the bias in favor of debt and against equity).
- Higher capital requirements for banks.
- Use reserve requirements to limit banks' money creation ability.
- Revise the role of monetary policy and credit in money creation
  - Better balance between public and private money creation – **printing money, under strict rules, may be a better alternative than allowing for excessive credit growth**.
  - Improve the relationship between monetary policy and credit directions, reinforcing mechanisms to channel liquidity to targeted economic activities (e.g. targeted liquidity injections as in UK during the current decade).

Building a less credit-intensive economy

- Consolidate macroprudential policies:
  - limits on LTV or DTI;
  - more comprehensive and harmonized definitions of income, considering the expected permanent income (also after retirement, if the maturity exceeds the expected retirement date) and all debt obligations, living expenses, taxes and any anticipated expenditures (e.g. tuition for education);
  - stressed and steady-state debt service definitions;
  - regular and independent appraisals of real estate collaterals, with individual reviews for higher LTVs and amounts;
  - publication of financial stability reports.

Building a less credit-intensive economy

- 2 sources of liquidity generation:

(i) Central banks – money printing

(ii) Banks – credit offer

- Each has pros and cons, being potentially beneficial up to a point and dangerous in excess.
- Successes in stimulating economic growth through money printing:

(i) US Union Government in the American Civil War

(ii) Japan in the 30's

- Failures in stimulating economic growth through money printing:

(i) US Confederate States in the American Civil War

(ii) Weimar Germany

(iii) Zimbabwe

Pollution control

- Optimal amount of pollution: marginal social benefits of pollution-control = marginal private costs of this control.
- No uncertainty about costs or benefits => policymakers indifferent between taxation and restrictions/prohibitions.
- Real world: considerable uncertainty about both costs and benefits.
- Weitzman, Martin L. (1974), "Prices vs. Quantities", *Review of Economic Studies, vol. 41, p.477-91*

Public goods framework:

How to choose between pollution-control instruments under uncertainty

- Marginal social benefit curve steeper than the marginal private cost curve => restrictions dominate (as fixing quantities to achieve pollution control, while letting prices vary).

Benefits of Prohibition

- Potential benefits of restricting activity in any complex adaptive system (financial or not):

(1) Modularity

(2) Robustness

(3) Incentives.

- Each has a potentially important impact on systemic resilience and hence on the social benefits of restrictions.

Benefits of Prohibition

(1) Modularity

- Modularity in organisational structures - highly decentralised and loose networks, less prone to the "too-big-to-fail" problem.

strengthens systemic resilience - if any one cell is incapacitated, the likelihood of this undermining the operations of other cells is severely reduced.

Benefits of Prohibition

- Examples where modularity in organisational structure has been deployed to enhance systemic resilience:

(i) Terrorism - Al'Qaeda

(ii) Computer manufacturing - computers were highly integrated systems in the 1960s, having evolved into the modular system of today, with distinct modules (CPU, hard disk, keyboard) which were replaceable if they failed without endangering the functioning of the system as a whole.

(iii) Computer industry structure - in 1969, IBM had a market share of over 70%. In 2000, the market share of the largest hardware firm was below 25%;

(iv) Management of forest fires - introduction of firebreaks to control the spread of fire;

Benefits of Prohibition

(v) Management of utility services (e.g. water, gas and electricity) - latencies and restrictions built in the network to avoid overload and contagion

(vi) Management of infectious diseases - restrictions on travel

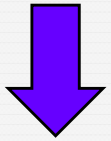
(vii) Control of computer viruses across the internet - firewalls restricting access to domains;

(viii) Attempts on the world domino toppling record, which involve arranging the dominos in discrete blocks to minimise the risk of premature cascades.

Benefits of Prohibition

- Banking - size and scope also tend to increase the diversification benefits.

- Idiosyncratic risk can be eradicated by holding the market portfolio, holding only the systematic risk.
- But if all banks are fully diversified and hold the market portfolio => they are all holding the same portfolio => All are subject to the same systematic risk factors => the system as a whole lacks diversity => Homogeneity breeds fragility.



- **Building larger or more diversified banks do not necessarily smooth income volatility.**

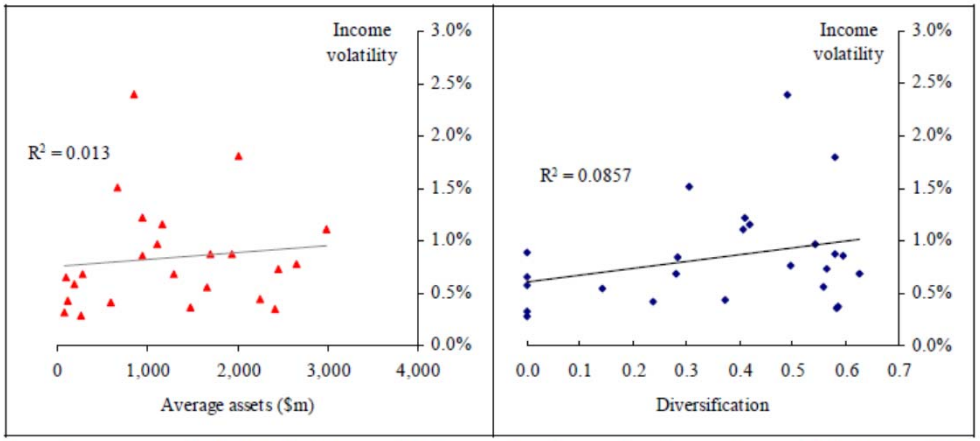
Benefits of Prohibition

- **There is no strong relationship between either size or diversity and income volatility.**
- There is even evidence from econometric studies of banking conglomerates that larger banks exhibit greater risk due to higher volatility assets and activities.
- The relationship between size and diversity, on one hand, and income variability, on the other, is positively sloped.

Benefits of Prohibition

Pre-crisis

Chart 4: Bank size and volatility



Notes: Average assets are calculated for 24 banks between 2006 and 2008. Income volatility is measured as the standard deviation of operating income (per asset) over the period 1997-2008.

Source: Bankscope, published accounts and Bank calculations.

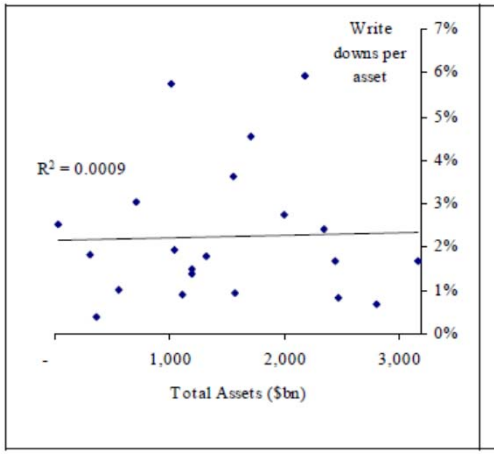
Chart 5: Bank diversification and volatility

Notes: Pre-crisis diversification and income volatility for a sample of 25 banks. Diversification index based on revenue concentration, as described in the main text.

Source: Bankscope, published accounts and Bank calculations.

During the crisis

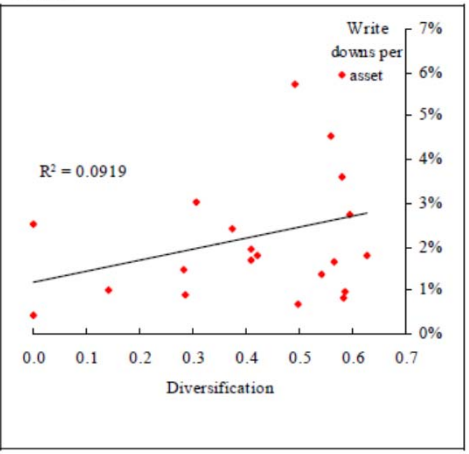
Chart 6: Bank size and write downs



Notes: Total assets for a sample of 21 banks for 2007. Cumulative write downs over the course of the crisis are shown (from 2007 Q4 to 2009 Q3).

Source: Bankscope, published accounts and Bank calculations.

Chart 7: Bank diversification and write downs



Notes: Sample of 21 banks. Cumulative write downs over the course of the crisis are shown (from 2007 Q4 to 2009 Q3).

Source: Bankscope, published accounts and Bank calculations.

in Haldane (2010)

Note: Diversification is measured by the Herfindahl-Hirschman (HH) index of revenue concentration (HH = 1 ⇔ revenue concentrated solely on one activity). Revenue concentration is calculated across 3 buckets for the last pre crisis year (2006) - Retail and commercial banking; Corporate and investment banking; Asset and wealth management.

Benefits of Prohibition

(2) Robustness

- In complex dynamic systems, such as the banking system, the distribution of risk may be irregular and subject to discontinuities => the distribution of outcomes for the financial system as a whole may be incalculable.
- Frank Knight (1921) – differences between risk (where frequencies could be used to calculate probabilities) and uncertainty (where there was no objective basis on which to derive probabilities).
- The financial system may operate in an environment of uncertainty, in the Knightian sense.

Benefits of Prohibition

(2) Robustness

- Literature on how best to regulate systems in the face of such Knightian uncertainty suggests some references for regulation of financial systems:

(i) keep it simple - Complex control of a complex system is a recipe for confusion at best, catastrophe at worst.

- The US constitution is 4 pages long.
- Dodd-Frank Act on US financial sector reform is 1,336 pages long.

Benefits of Prohibition

(2) Robustness

(ii) **choose the "minimax" strategy** - a strategy which avoids the extreme tails of the distribution, minimising the likelihood of the worst outcome. Paranoia can sometimes be an optimal strategy.

(iii) simple loss-minimising strategies are often best achieved through what economists call "mechanism design"

- acting on the underlying organisational form of the system, rather than through the participants => it is about regulating structure not the behaviour of market participants => **macroprudential above microprudential supervision**

Benefits of Prohibition

(2) Robustness

- Glass-Steagall vs Basel II:

(i) GS was simple in its objectives and execution:

- only 17 pages long
- goals shaped by an extreme tail event (the Great Depression) and explicitly minimax (to avoid a repetition).
- acted directly on the structure of the financial system, separating commercial bank and brokering activities through red-line regulation.
- Conclusion: GS satisfied all three robustness criteria => lasted more than half a century without a significant systemic event in the US.

Benefits of Prohibition

(2) Robustness

- Glass-Steagall vs Basel II:

(ii) The contrast with Basel II is striking:

- thousands of pages, taking 15 years to deliver.
- calibrated largely to data drawn from the Great Moderation, a period characterised by an absence of tail events - more minimin (minimizing the probability of not such a bad event) than minimax;
- complex menu of capital risk weights.
- Conclusion: Basel II satisfied few of the robustness criteria => it was overwhelmed by the recent crisis scarcely after it had been introduced.

Benefits of Prohibition

(3) Incentives

- There is no magic number for regulatory ratios sufficient to insure against tail risk in all states of the world.
- Calibrating a capital ratio for all seasons may be pointless – whatever today's optimal regulatory point, risk incentives mean that tomorrow's is sure to be different.
- Higher bank capital ratios can lower banks' cost of capital, as the size of the premium demanded by holders of equity can be explained by fears of extreme tail events, e.g. banking crises.

Costs of Prohibition

(1) Economies of scale

- Economies of scale appear to operate among banks with assets less (or much less) than 100 B$. Above that there is evidence of diseconomies of scale.
- According to 2 comprehensive studies in the mid-1990s, economies of scale in banking are exhausted at relatively modest levels of assets, between 5-10 B$.*
- A more recent 2004 survey of studies in both the US and Europe finds evidence of a similar asset threshold.**
- Evidence from banking mergers offers no strong evidence of increased bank efficiency after a merger or acquisition.

* Saunders, A (1996), *Financial Institutions Management: A Modern Perspective*, Irwin Professional Publishing and Berger, A N and L J Mester (1997), "Inside the Black Box: What Explains Differences in the Efficiencies of Financial Institutions?", *Journal of Banking & Finance, vol. 21(7), p.895-947.*)

** Amel, D, Barnes, C, Panetta, F and C Salleo (2004), "Consolidation and Efficiency in the Financial Sector: A Review of the International Evidence", *Journal of Banking & Finance, vol. 28(10).*

Costs of Prohibition

(2) Economies of scope

- Evidence from US bank holding companies suggests that diversification gains from multiple business lines may be more than counter-balanced by heightened exposures to volatile income generating activities, such as trading.*

* **Stiroh, K and A Rumble (2006),** "The Dark Side of Diversification: the Case of US Financial Holding Companies", *Journal of Banking and Finance, Vol.80, p.2131-2161.*

Bank size and scope control

- After the great recession in the 20's and 30's, even very strong free-market supporter economists like Irving Fisher, Henry Simons and Milton Friedman concluded that fractional reserve banks (banks that keep only a small fraction of their liabilities in central bank reserves) were so dangerous that they should be abolished.

- Banks should hold reserves equal to 100% of their deposits and should play no role in the extension of credit, being simply custodians of savings and providers of payment services.
  - See e.g. Friedman, M. (1948), "A Monetary and Fiscal Framework for Economic Stability", American Economic Review, 38 (3), pp. 245-264.
- More recently, John Kay in UK and Laurence Kotlikoff in the US have produced narrow bank' or limited purpose bank' proposals: Kotlikoff, L (2010), "*Jimmy Stewart is Dead: Ending the World's Ongoing Financial Plague with Limited Purpose Banking*", Wiley; Kay, J. (2009), "*Narrow Banking, The Reform of Banking Regulation*", Centre for the Study of Financial Innovation.

Bank size and scope control

- Restrictions imposed in US after the great recession in the 20's and 30's:

(i) Bank size - McFadden (1927)

- covered a wide range of banking functions, including deposit taking and brokerage.
- gave nationally-chartered banks broadly the same branching rights as state banks within the state, but confirming the prohibition on national banks opening new branches across state lines that had previously been implicit in the US National Banking Act (1864).
- motivated by the lobbying of small banks under threat from larger competitors, but also by an economic goal of avoiding excessive concentration (TBTF).
- the same too-big-to-fail arguments exist today, though crisis-related, as the increase in capital requirements and the behaviour of competition and resolution authorities as been leading to larger banks and higher levels of concentration.

(ii) Bank scope - Glass-Steagall (1933) Act.

Bank size and scope control

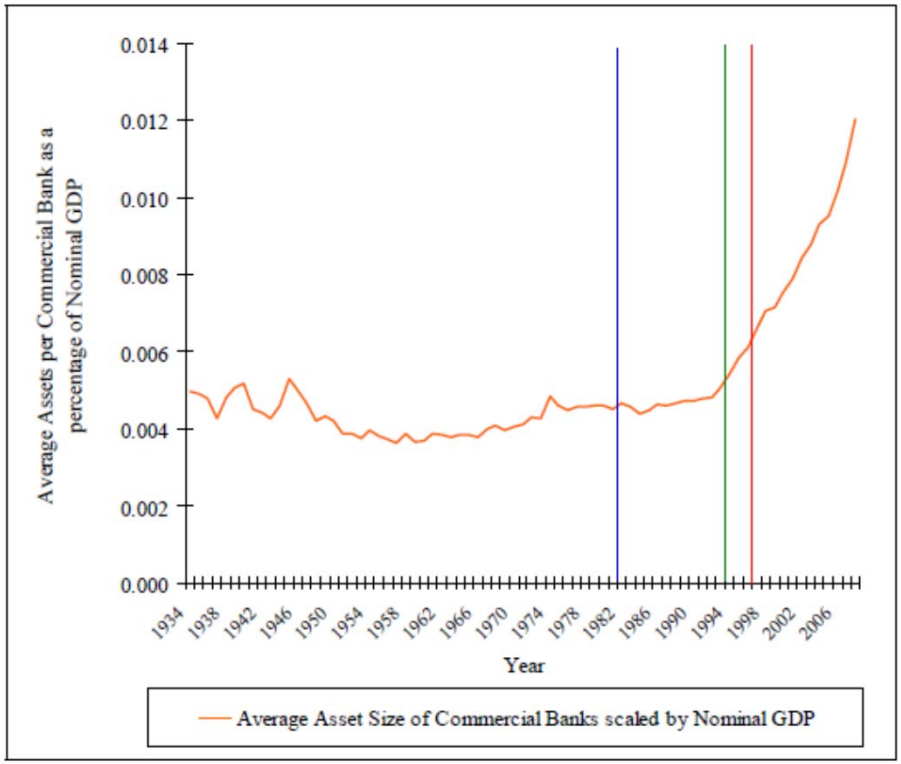
- McFadden was very effective in limiting the size of US banks between the 1930s and mid-1970s ⇔ average asset size of US banks/nominal GDP roughly flat.
- In the 1980s, interstate branching restrictions were progressively lifted:

(i) States began to open their borders to out-of-state Bank Holding Companies (BHCs).

(ii) Garn-St Germain Act (1982) - allowed any BHC to acquire failed banks and thrifts, regardless of the state law.

(iii) Riegle-Neal Act (1994), implemented in 1997, lifted most restrictions on interstate branching for domestic and foreign banks.

Chart 1: Average assets relative to GDP of US commercial banks[(a)]



(a) Blue vertical line represents the 1982 Garn-St Germain Act, green vertical line represents the 1994 Riegle-Neal Act, red vertical line represents the Riegle-Neal Act coming into effect in 1997.
Source: FDIC and www.measuringworth.org

Source: Haldane (2010)

Bank size and scope control

- The rationale for this change was a mirror-image of the 1920s:

- Large banks convinced politicians of the high private costs of restrictions, which inhibited the efficiency of their offering to the public ⇔ private costs overcome social benefits.
- Effects of the removal of interstate restrictions were dramatic => average size of US banks relative to GDP has risen roughly 3x over the past 20 years => the rebirth of too-big-to-fail banks.
- 2 groups of recent proposals and measures for banking reform:

(i) qualitative restrictions - narrow banking ⇔restrict the scope of banks' activities (e.g. US Dodd-Frank Act)

(ii) quantitative restrictions - more capital and liquidity (e.g. Basel III).

Capital requirements

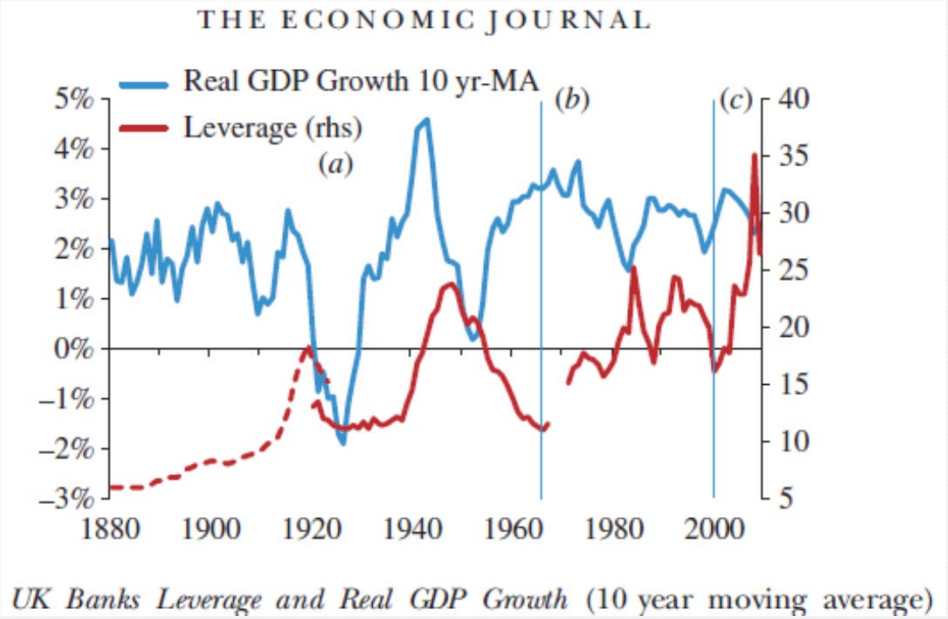
- **Higher capital requirements may be considered as beneficial, as they improve the prospects of financial stability.**
- Conversely, they can also impact adversely on the access to funding by debtors and consequently on the overall economic performance.
- According to Miles et al. (2012), even large increases in bank capital are likely to result in a small long-run impact on the borrowing costs faced by bank customers: e.g., if the amount of bank capital doubles, the average cost of bank funding will increase by only around 10–40 basis points (bps).

Capital requirements

- Concerns about the impact of higher capital requirements:

(i) In the UK and US economic performance was not worse, and spreads between reference rates of interest and the rates charged on bank loans were not significantly higher, when banks increased equity funding.

(ii) Conversely, there is little evidence that investment or the average/potential growth rate of the economy picked up as leverage moved sharply higher in recent decades.



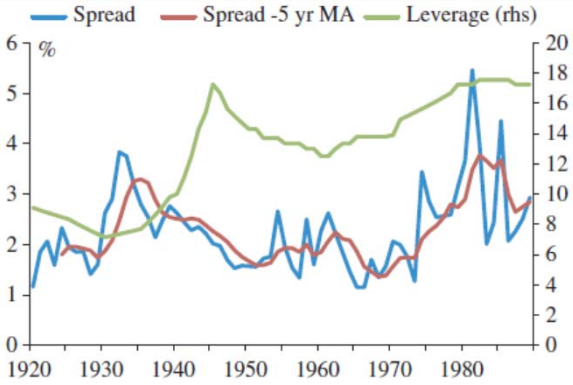
UK Banks Leverage and Real GDP Growth (10 year moving average)

Miles, David, Jing Yang and Gilberto Marcheggiano (2012), "Optimal bank capital", *The Economic Journal*.

Capital requirements

(iii) it is not obvious that spreads on bank lending were significantly higher when banks had higher capital levels (see e.g. Hanson *et al*. (2011):

- According to Modigliani–Miller (1958) theorem, as more equity capital is used, the volatility of the return on that equity falls and the safety of the debt rises => the required rate of return on both sources of funds falls => **the weighted average cost of finance is unchanged.**
- MM may not hold exactly, but one cannot assume that the reduced volatility of the returns on bank equity deriving from lower bank leverage has no effect on its cost, contrary to the common wisdom that higher capital will increase the cost of funding, because capital is more expensive.



Leverage and Spreads of Average Business Loan Rates Charged by US Commercial Banks Over 3-month Treasury Bills

Miles, David, Jing Yang and Gilberto Marcheggiano (2011), "Optimal bank capital", *The Economic Journal*.

Capital requirements

- Kashyap et al. (2010) find that the long-run steady-state impact on bank loan rates from increases in external equity finance is modest (25–45 basis points for a 10 p.p. increase in the ratio of capital to bank assets,which would roughly halve leverage).

- The key issue is in which extent there is an offset to the impact upon a bank's overall cost of funds of using more equity because the risk of that equity is reduced and so the return it needs to offer is lowered:

(i) tax treatment of debt and equity - Companies can deduct interest payments but not dividends. Econometric evidence suggests that tax distortions have a significant influence on financial structure (e.g. Auerbach (2002)), with 10 p.p increase in the corporate income tax rate estimated to increase the debt–asset ratio by 1.4–4.6 percentage points => Stricter capital requirements mean banks are less able to exploit any favourable tax treatment of debt.

(ii) Deposit insurance, implicit Government support and usefulness as means of payment– reduces the cost of deposits, increasing the appetite for deposit funding instead of equity.

Scope control

- **Glass-Steagall Act**:

(i) key functions of commercial and investment banks were effectively separated:

- commercial banks were prevented from conducting most types of securities business, including principal trading, underwriting and securities lending.
- investment banks were banned from taking deposits.

(ii) motivated by stability concerns following the Great Depression:

- stock market boom of the 1920s fuelled by cheap credit from the banks =>

⇒ 1929 crash brought massive losses on securities and also loans =>

⇒ Impact on the real economy through a collapse in lending (whose stock halved between 1929 and 1933).

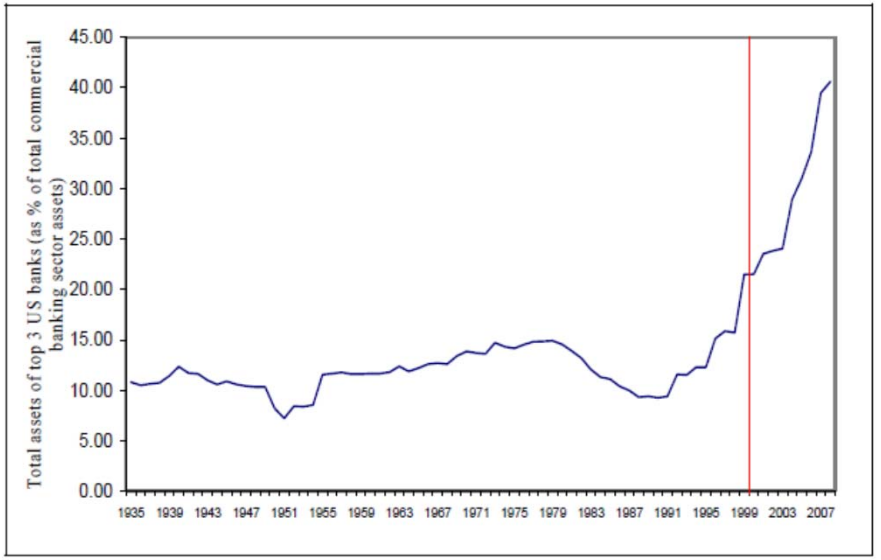
Scope control

- Glass-Steagall was effective from the 1930s until the end-1980s =>

=> Measures of concentration in the US banking system remained broadly flat between the 1930s and the late 1980s.

- But competitive pressures were building since the late 1970s from alternative lending vehicles (e.g. mutual funds and commercial paper markets) and overseas banks => the private costs of restrictions were rising. =>

Chart 2: Concentration of the US banking system[(b)]



(a) Red line represents the Gramm-Leach-Bliley Act (1999) which revoked restrictions of Glass-Steagall
(b) Top 3 banks by total assets as a % of total banking sector assets
(c) Data includes only the insured depository subsidiaries of banks to ensure consistency over time - for example, non-deposit subsidiaries are not included.
Source: FDIC

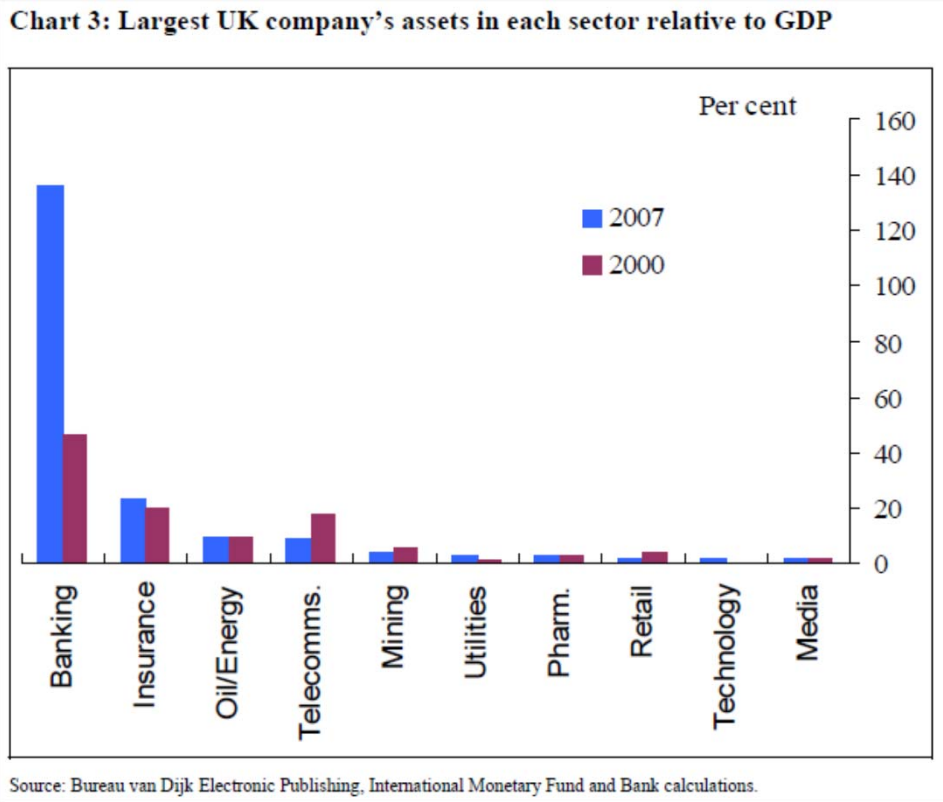
in Haldane (2010)

=> in 1999, the Gramm-Leach-Bliley Act revoked Glass-Steagall.

- As with size, the effects of liberalisation on banking concentration were immediate and dramatic => share of the top 3 largest US banks in total assets rose 4x, from 10% to 40%.

Scope control

- Similar trend internationally => share of top 5 largest global banks in assets among the largest 1000 banks doubled between 1998 and 2009 to 16%.
- Concentration level in banking much above other industries:



in Haldane (2010)

Entry Barriers

- The key role performed by banking activity in the economy has motivated special concerns from the authorities.
- Therefore, legal entry barriers have been imposed, e.g. by higher minimum capital levels or by a more acting and costly supervision.
- The legal barriers add to economic barriers, e.g. minimum optimal size.

Supervision

- Banks differ from other companies due to the dependence between their activity and the sector's credibility and reputation.
- This fact is illustrated by the several bank runs in several countries along time.
- Therefore, **banks are significantly exposed to systemic and contagion risks**.
- While a bank failure weakens the other banks and financial markets with which they were involved, the failure of a non-financial company tends to strengthen the remaining companies in the same sector, by removing a competitor.
- Systemic risks are usually increased in more fragmented financial systems with limited ability to provide a lender of last resort function (e.g. the US until the beginning of the 20th century).
- Conversely, their crucial role in the economy also increases this contagion effects to the economic agents (**negative externalities**).
- Therefore, banks are specially regulated and have access to a public lender of last resort.

Supervision

- There are, at least, 5 reasons for negative externalities:

(i) informational contagion, particularly with FI with maturity mismatches between assets and liabilities

- Bank A fails => more doubts on the solvency of bank B, if B is perceived as being of the same type as A => loss of confidence of bank B's depositors and lenders => liquidity withdraw => sudden liquidity problem for B => higher interest rates for B => higher solvency difficulties
- If a problem is perceived as being a unique outlier (e.g. BCCI in UK) or if the cause of loss is particular to that bank and not applicable to its close competitors (e.g. frauds in Barings and Soc Gen, involving Nick Leeson and Jerome Kerviel, respectively), the risk of direct contagion is much lower

Supervision

- Examples:

(a) with the failure of Lehman Bros, Merrill Lynch was forced into a merger with Bank of America

(b) Failure of Glitnir in Iceland rapidly translated into the collapse of Landsbanki and Kaupthing.

(ii) loss of access to future funding for the failed bank's customers:

- a client of failed bank A can try to transfer its funding to surviving bank B, but bank B will have less direct information on this client, and is likely, especially under fear and panic, to provide replacement credit facilities only on much tougher terms.

- a bank failure causes an externality due to the loss of specific information.

Supervision

(iii) FIs trade much more amongst themselves than non-financial corporates.

(iv) Solvency is not exogenous to liquidity - generalised liquidity problems => attempts to deal with them lead to declines in asset values, creating a solvency problem, even when none existed before => liquidity spirals.

- financial crises are predominantly caused by market dynamics, not just by external shocks, though such shocks may have been the trigger (e.g. the downturn in the US housing market in 2006, the quadrupling of oil prices in 1973-4 or the Stock Market collapse in 1929)

- the standard format of banking stress tests is insufficient, as these stress tests review the effect on each bank's profits and capital of historically-based exogenous shocks, while financial crises are primarily caused by second round effects (endogenous risks), whereby the banks' reactions to such a trigger sets off an amplifying spiral, via declines in asset prices and reductions in credit expansion.

Supervision

(v) Instead of, or minimizing, selling financial assets to regain liquidity and improve capital ratios, a FI may seek to restrict new credit extension, e.g. by rationing via higher margins/haircuts or by raising interest rates => deceleration of the economy => increase PD of other borrowers.

- According to economic theory, supervision has three main purposes (see Brunnermeier *et al.* (2009)):

1. to constrain the use of monopoly power and the prevention of serious distortions to competition and the maintenance of market integrity;

2. to protect the essential needs of ordinary people in cases where information is hard or costly to obtain, and mistakes could devastate welfare;

3. where there are sufficient externalities that the social costs of market failure exceed both the private costs of failure and the extra costs of regulation.

Supervision

- 1) above has been a main rationale for the regulation of private utilities, but the effect of the recent crisis has been to reduce competition in the banking industry.

- Concerns about reductions in competition are marginalized, in the rush to shore up the system.

- The result is an oligopolistic system, dominated by TBTF (and, in smaller countries, too large to save) banks, wielding great influence and power.

- Competition authorities must reinforce they surveillance on potential anti-competitive practices by the larger banks.

Supervision

- Supervision domains:

(i) Behavioral – focus on eliminating information asymmetries between banks and its customers, in order to protect the customers;

(ii) Microprudential – aims at ensuring the solvency of FIs by rules on the main activity risks (e.g. large exposures, liquidity and market risks) and on capital adequacy, considering the set of main risks faces (namely, credit, market and operational risks).

(iii) Macroprudential – focus on the stability of the whole financial system, avoiding generalized asset shrinkage: credit-crunch and fire-sale.

- In Portugal, behavioral and micro/macroprudential supervision is performed on a sector basis, by the Bank of Portugal, the Pension Funds and Insurance Authority (ASF) and the Securities and Exchange Commission (CMVM).

Supervision

- We try to prevent banking crises as the costs to society are invariably enormous and exceed the private cost to individual FI

- Regulation to internalize these externalities (see e.g. Brunnermeier, Markus, Andrew Crocket, Charles Goodhart, Avinash D. Persaud and Hyun Shin (2009), "The Fundamental Principles of Financial Regulation").

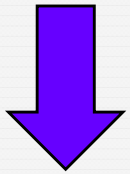
- The main tool used by regulators is capital adequacy requirements, assuming implicitly that the system as a whole can be turned safe by simply trying to make sure that individual banks are safe.

Supervision

- However, in trying to make themselves safer, banks can behave in a way that collectively undermines the system.
- E.g., selling an asset when perceived risk increases, is a prudent response from the perspective of an individual bank. But if many banks act in this way, the asset price will collapse, forcing institutions to take yet further steps to rectify the situation. Such responses by banks lead to generalised declines in asset prices.
- Constrains on mortgage loans e.g. maximum limits to loan-to-value (LTV) and Debt-to-Income (DTI) ratios play an important role => **again, macroprudential above microprudential concerns**

The end of banks?

- Competition on both sides of banks' balance sheets has increased:
  - large firms have a better access to bond markets
  - the role of crowdfunding and fintechs is increasing, namely in payment systems



- Are the historical bank functions obsolete?
- Is the institutional form that carried out these functions no longer useful?