Andrew G Haldane: Control rights (and wrongs)

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Introduction

It is a great pleasure and privilege to be presenting this year's Wincott lecture.

Banks are special. That has long been recognised in the design of their ownership, governance and regulation. This special status can have strange consequences. The historical distribution of risks and returns in banking is one. For a century, both risks and returns have been high. But while the risks have typically been borne by wider society, the returns have been harvested by bank shareholders and managers.

The experience of the past two decades illustrates well this imbalance. In 1989, the CEOs of the seven largest banks in the United States earned on average $2.8 million. That was almost 100 times the median US household income. By 2007, at the height of the boom, CEO compensation among the largest US banks had risen almost tenfold to $26 million. That was over 500 times the median US household income.[1] Those are high returns by any measure.

But so, subsequently, have been the risks. The fall in the share prices of global banks means they are scarcely different in real terms today than in the early 1990s. And it is not just investors licking their wounds. So too is the global economy. Temporary support for the global banking system during the crisis peaked at around a quarter of global GDP. The permanent damage to world GDP from the crisis is still being counted, but is likely to be several multiples of that.

These oddities in the distribution of risk and return are deep-rooted and long-lived. They have grown in waves over a 150-year period, originating in a set of reforms in the mid-19th century aimed at lowering the cost of capital. They were swelled during the 20th century by the emergence of institutions too big to fail. And during the 21st century investor and managerial short-termism resulted in these waves reaching tsunami proportions. In 2007, this wave broke with devastating consequences still being felt today.

This century-long evolution in banking occurred for understandable reasons; it was no-one's "fault". But it has also unearthed a governance fault-line. Ownership and control rights are exercised by shareholders. But for banks, equity is a vanishingly small fraction of their balance sheet. Worse still, equity-holders often have risk-taking incentives out of line with the interests of other bank stakeholders, much less society. This fault-line lies at the heart of the imbalance between privatised returns and socialised risks. Only in banking do control rights and incentive wrongs combine so uncomfortably.

That calls for fundamental reform. Post-crisis that has been recognised, as regulatory reform has come thick and fast. These reforms are unquestionably a step in the right direction. But if they are not to reappear, deep-rooted incentive problems in banking need to be tackled at

[1] US Treasury (2011).

source. I wish to argue there is unfinished business before these incentives are properly aligned with the public good.

Limited liability

In the first half of the 19th century, the business and governance of banking was relatively simple. By the mid-19th century, the United Kingdom had around 500 banks and 700 building societies. Most of the former operated as unlimited liability partnerships, the latter as mutually-owned co-operatives.[2] Financial sector assets represented less than 50% of annual GDP and the largest banks had assets of less than 5% of GDP.

Bank balance sheets were heavily cushioned. Equity capital often accounted for as much as a half of all liabilities, while cash and liquid securities frequently accounted for as much as 30% of banks' assets. Banking was a low-concentration, low-leverage, high-liquidity business. A broadly-similar pattern was evident across banking systems in the United States and in Europe.

This governance and balance sheet structure was mutually compatible. Due to unlimited liability, control rights were exercised by investors whose personal wealth was literally on the line. That generated potent incentives to be prudent with depositors' money. Nowhere was this better illustrated than in the asset and liability make-up of the balance sheet. The market, amorphously but effectively, exercised discipline.

It was given a helping hand by market-based prudential safeguards. Directors of a bank had the capacity to vet share transfers, excluding owners without sufficiently deep pockets to bear the risk. Shareholders also maintained their liability after the transfer of their shares. This put shareholders firmly on the hook, a hook they then used to hold in check managers. Managers monitored shareholders and shareholders managers. In this way, the 19th century banking model aligned risk-taking incentives.

But the global environment was changing. During the first half of the 19th century, rich countries were becoming hungry for capital to finance investment in infrastructure, including railways. As long as capital in banks was restricted to a small number of unlimited liability partners, credit was constricted. In 1826, the 6-partner restriction on UK banks was lifted, allowing banks to operate as joint-stock companies. No longer was ownership and control vested in a single agent.

But pressures were building to liberalise further. Unlimited liability became the next target. In the words of British parliamentarian William Clay, "unlimited liability has a tendency to deter persons of fortune, intelligence and respectability from becoming partners or managers".[3] Shareholder discipline was proving rather *too* effective as a brake on risk-taking. One obvious solution was to limit shareholder liability. This, it was felt, could broaden and deepen the pockets of the investor base, freeing up bank capital and credit.

The United States had been an early-adopter, with Connecticut and Massachusetts permitting limited liability from 1817. Neighbouring states had quickly followed suit. Although limited liability had existed in parts of Europe from the 17th century, it was only during the second half of the 19th century that its tentacles spread widely.[4] In the UK, wholesale change came with the Limited Liability Act and Joint Stock Companies Acts of 1855 and 1856.

Interestingly, banking was slow off the mark. Limited liability status was at first not taken up enthusiastically. Bankers appeared to prize unlimited liability. It served as a safety certificate

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[2] Cleary (1965), Collins (1988).

[3] Turner (2009).

[4] Hickson and Turner (2005).

for depositors, a badge of prudence. “A depositor would be much more likely to trust his money with a bank whose shareholders he knew must yield up to him the uttermost farthing”. This from the lips of a banking expert of the day.[5]

But unlimited liability in banking remained under attack. Walter Bagehot believed its risk benefits were illusory as many shareholders did not possess so much as the “uttermost farthing”. Bagehot believed unlimited liability generated its own incentive problem: the wealthy assumed too much risk for the control they could exercise, dissuading them from investing (Bagehot (1873)).

The collapse of the City of Glasgow bank in 1878 shifted the debate decisively Bagehot’s way. In one sense, this failure was evidence of the power of unlimited liability: no depositor lost a penny. But 80% of the bank’s shareholders were bankrupted and many made destitute. As the *Economist* observed at the time, “the share lists of most of our banks exhibit a very large – almost an incredible – number of spinsters and widows”.[6] Bagehot’s incentive problem was real. Public and parliamentary opinion quickly shifted.

The Companies Act 1879 facilitated conversion to limited liability. Between 1849 and 1889, the number of unlimited liability British banks fell to just 2.[7] Even then, some of the incentive benefits of unlimited liability were preserved. Shareholder vetting remained in bank deeds. And in place of unlimited liability, UK banks moved to a regime of extended liability. This was the contingent capital regime of its day.

Extended liability typically had two elements – reserve liability and uncalled capital. Under reserve liability, existing shareholders were liable for additional capital in the event of bankruptcy. By 1884, British banks had reserve liability of around three times their paid-up capital.[8] This placed them on a similar footing to US banks, which had adopted a system of double liability in 1863.[9]

Reserve capital was augmented by a pool of uncalled capital. This could be tapped pre-insolvency at the discretion of bank management. On average between 1878 and 1913, UK banks had uncalled capital larger than their called capital (Grossman and Imai (2011)). Together, reserve and uncalled capital made for a deep contingent capital pool for even limited liability banks, amounting to as much as 50% of banks’ liabilities.

With big money on the line, extended liability kept bank shareholders and managers on their toes. Risk monitoring incentives remained sharp and risk appetites blunt. In the US, banks in states with higher-multiple extended liability regimes typically assumed less balance sheet risk (Grossman (2001)). The same was true of UK banks with high proportions of uncalled capital (Grossman and Imai (2011)).

For a time, extended liability seemed to strike a reasonable risk-taking balance. But entering the 20th century, that balance was again about to tilt. Consolidation was underway in banking. Between 1825 and 1913, the number of English and Welsh banks fell from over 600 to around 70.[10] As the industrial structure of banking adapted, vetting of shareholders became impractical. In an echo of today, it was argued that these larger institutions were better able to diversify away their risk.

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5 Turner (mimeo).

6 Economist (1879).

7 Acheson et al (2010).

8 Acheson et al (2010).

9 Macey and Miller (1992).

10 Collins (1988).

Extended liability had also shown itself to be ineffective in dealing with banking failure. In crisis, exercising the capital option had heightened panic, not diminished it. As the Bank of England's Deputy Governor remarked, "today a bank could not in a crisis make a call on shareholders without aggravating the crisis" (Turner (2009)). By the end of the 1930s, there were only six British banks left with reserve liability.

In the US, a similar process was underway. Systemic bank failure during the Great Depression was taken as evidence of the inadequacy of extended liability in protecting depositors. As in the UK, making a call on shareholders was deemed likely to make a bad situation worse. It was quickly replaced with Federal deposit insurance in 1934. With reserve liability gone, so too did the rationale for shareholder vetting.

So by the 1930s the governance and balance sheet structure of banks was unrecognisable from a century earlier. Ownership and control were amicably divorced. Ownership was vested in a widely dispersed set of shareholders, unvetted and anonymous. Their upside payoffs remained unlimited, but their downside risks were now capped by limited liability. The pool of reserve capital had largely evaporated.

Later in the 20th century, these governance and balance sheet features spread across the financial system. During the 1990s, many of the larger global investment banks abandoned their private partnership status to become limited liability public companies. In the UK, a number of mutually-owned building societies followed suit and turned public. The rationale was familiar from a century earlier – the desire to break their balance sheet chains. By the end of the 20th century, joint stock banking was pre-eminent.

What impact did these governance changes have on banks' risk-taking incentives? Finance theory here is admirably clear. In particular, we can draw on a framework developed a century after the introduction of limited liability – the contingent claims model of Nobel Laureate Robert Merton (1974). This tells us that the equity of a limited liability company can be valued as a call option on its assets, with a strike price equal to the value of its liabilities.

Figure 1 demonstrates this option-like payoff profile to holding a hypothetical bank's equity. The beta of a firm is measure of how its value varies with the market as a whole. Arithmetically, the beta of a bank's equity is the product of its leverage and the beta of its assets.[11] So assuming an asset beta of 0.1 and a leverage ratio of 10, the bank's equity beta will be equal to one. The returns on bank equity and the return on the market will then lie on a 45 degree line, provided returns are positive. When market returns are negative, however, returns on bank equity will not follow them south. Instead they will be capped by limited liability.

This asymmetric payoff schedule generates interesting incentives. The value of the equity option is enhanced by rises in the volatility of the bank's assets. Why? Because volatility increases the upside return without affecting the downside risk. If banks seek to maximise shareholder value, they will seek bigger and riskier bets. Joint stock banking with limited liability puts ownership in the hands of a volatility junkie.

How has the junkie responded to these incentives? Chart 1 plots the distribution of the ratio of UK bank assets to nominal GDP since 1880, broken down into sub-samples. Over this period, this ratio has risen roughly tenfold. It has increased particularly strongly over the past 30 years, peaking at well over 500% of GDP. Other developed countries have experienced a similar, if less dramatic, pattern. This is the "bigger bet" strategy in practice, as a route to higher equity returns.

Historically, there is also evidence of the "riskier bet" strategy having been deployed to boost returns. Chart 2 plots the distribution of returns on banks' assets, again broken down by sub-

[11] Assuming the beta of its debt is zero – say, because of deposit insurance.

sample. The mean return on bank assets lies in a range of 0.5–1% per year. But the variation in returns has risen dramatically. Asset returns were two and a half times more volatile at the end of the 20th century than at the beginning.

This evidence is no more than circumstantial. But it does point clearly to banks having assumed greater risk in greater size as the disciplines of unlimited liability were progressively relaxed. In other words, the historical evolution of banking is entirely consistent with the predictions of Merton's theoretical model.

Debt and taxes

There is a second, and simpler, route to boosting equity returns. That is by gearing-up the balance sheet. Increased leverage acts directly on a bank's equity beta. For example, doubling leverage from 10 to 20 generates a new, steeper payoff profile of returns (Figure 2). These are then even more asymmetric. Leverage allows shareholders to profit more significantly when the market turns up, while still avoiding the downside when it turns down. From Merton, this strategy enhances shareholder value.

Looking over a sweep of history, there is evidence of banks pursuing just this leverage strategy. Chart 3 plots the distribution of UK banks' leverage since 1880. As unlimited liability was phased out, leverage rose from around 3–4 in the middle of the 19th century to around 5–6 at its close. As extended liability was removed, leverage continued its upward trend into the 20th century, by its close reaching over 20. Seven years into the 21st century, at its high-water mark, leverage hit 30 or more.

This leverage strategy can be seen even more vividly in the distribution of returns to bank equity over the past century. As Chart 4 illustrates, having begun the 20th century in modest single figures, equity returns were averaging close to 20% by its end. At the height of the boom, equity returns touched 30%. Arithmetically, virtually all of this increase in equity returns can be explained by increased leverage.

And it has come at an obvious cost – greater risk. That, too, is clear from the empirical distributions. Over the past century, the variability of returns on bank equity has risen between six and sevenfold. The lower tail of equity returns has also been fattening. Consistent with the predictions of Merton's model, a leverage strategy has simultaneously boosted risks and returns to holding bank equity.

Chart 5 summarises this strategic evolution in banking over the past century of so. It is based on a simple calibration of the Merton model. Leverage is shown along the x-axis and return on equity along the y-axis. The lines are iso-volatility contours, drawn for different levels of underlying asset volatility. Banking has migrated in a North-Easterly direction, as banks have assumed greater asset risk and higher leverage. In the Merton framework these strategies raise equity returns, precisely as we observe in practice.

There is a second, largely silent, factor that contributed to this century-long rise in bank leverage – tax. Debt interest costs tend to be tax-deductible from profits in most developed countries. But the cost of equity financing is not typically tax-deductible. This biases corporate financing towards debt and away from equity.

This tax non-neutrality is hardly new. In the UK, it dates back more than a century. Tax legislation for interest and dividends was first established in the UK in 1803. Throughout the 19th century, however, neither dividends nor debt interest were automatically deducted from profits when calculating company tax. Payments to debt-holders and shareholders were made net of tax and, roughly-speaking, treated equally.

This equal treatment was justified on the grounds that the profit of a business should not be affected by its method of financing. In *Anglo-Continental Guano Works v Bell (Surveyor of Taxes)*, Mr Justice Cave summed up thus: "It seems to me... that the gains of the trade are quite independent of the question of how the capital money is found… [One] cannot take into

consideration the fact that the firm or trader has to borrow some portion of the money which is employed in the business... If you did that it would land you in very extraordinary results".[12] Indeed, it might land you in the guano.

But banking was about to buck this trend. In *Farmer (Surveyor of Taxes) v Scottish North American Trust, Limited,* Lord Atkinson referring to the *Anglo-Continental* case concluded: "It does not appear to me that the reasoning on which this decision is based can apply to a bank whose business is the borrowing and lending of money".[13] From early in the 20th century, debt interest became a legitimate deductible from bank profits. Where banks led, non-financial firms followed. This debt bias has persisted in the century since.[14]

The scale of tax-induced debt bias is generally greater the higher the rate of corporation tax and the lower the rate of personal taxation of equity. The IMF (2009) has recently estimated the scale of debt bias in a selection of developed countries. For low or tax-exempt investors, such as pension funds and non-residents, debt is typically between 30–40% cheaper than (new or retained) equity.[15] For high-tax investors, the biases are smaller but still significant.

Differences on this scale provide strong tax-based incentives to increase leverage. They also generate strong incentives to simultaneously avoid tax and arbitrage regulation. One recent example was hybrid bank capital instruments. These counted as capital for regulatory purposes, but benefitted from interest deductibility for tax purposes. In short, they were win-win. The UK hybrids market grew to around $100 billion between 2000 and 2007. By then, they accounted for around 25% of UK banks' tier 1 capital.

Up until the 1990s, empirical evidence had tended to find little effect of tax on firm leverage (Graham (2008)). But a raft of recent studies has found tax effects on corporate financing behaviour which are both statistically and economically significant. Pooling the results from existing studies, de Mooij (2011) finds a marginal tax elasticity of 0.28. In other words, a fall in the tax shield by 10 percentage points would lower the debt-to-asset ratio of a typical firm by 2.8 percentage points.

This elasticity is based on a range of firms with an average debt-to-asset ratio of 0.5. Banks rely much more heavily on debt, which provides closer to 95% of their financing. That would imply a marginal tax elasticity closer to 0.5 – double that for non-financial firms. At these levels, tax biases are likely to have had a material amplifying effect on bank incentives to increase leverage.

Debt and discipline

In principle, these balance sheets risks (higher asset volatility and leverage) ought to have had a natural counterweight – the disciplining effect of debt. Although they are second in the risk-bearing queue, debt-holders as well as equity-holders would be expected to shoulder, and hence price, this balance sheet risk. This could be done either by raising its cost or by restricting its quantity. Either way, debt would then serve as a restraining device on risk-hungry, rent-seeking shareholders.

In theory, this debtor discipline mechanism ought to work like a dream. Under the assumptions of Modigliani and Miller (1963) (MM), the pricing of risk by debt-holders ought to neutralise fully any effect of increased leverage on the value of the firm. Provided

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[12] *Anglo-Continental Guano Works v Bell (Surveyor of Taxes)* (1894) 3 TC 239.

[13] *Farmer (Surveyor of Taxes) v Scottish North American Trust, Ltd* (1912), AC 118.

[14] For example, the introduction of a separate corporate tax schedule in the UK in 1965 led for a time to the double taxation of equity.

[15] These investors account for perhaps half of the US equity market and two-thirds of the UK equity market.

shareholders maximise firm value, and the world behaves according to MM, debtor discipline ought to defuse completely incentives to gear-up.

Figure 3 illustrates the point diagrammatically, showing payoffs to debt and equity. They are a mirror-image. The downside risk avoided by equity is assumed by debt and vice-versa for upside returns. In principle, then, combining debt and equity would lead to offsetting payoffs, neutralising risk-taking incentives.

During the 19th century, debt appears to have played just this role. Depositor flight and bank runs came thick and fast, operating as an effective disciplining device on shareholders and managers. That is why unlimited liability remained a prize asset until the end of the 19th century. This quasi-disciplining role of debt persisted up to the Great Depression. Calomiris and Mason (1997) find that debt and equity prices did a reasonable job of distinguishing good and bad banks during the Chicago banking panic of 1932. Indeed, they signalled distress fully six months prior to banks' failure.

As the 20th century progressed, however, evidence of debt disciplining became patchier. Studies in the 1980s typically failed to find balance sheet risk having a significant impact on banks' subordinated debt spreads (Gorton and Santomero (1990)). Evidence from the 1990s was more encouraging (Flannery and Sorescu (1996), Morgan and Stiroh (1999)). But even then the link was weaker among larger banks, with little evidence of market prices influencing banks' risk decisions (Bliss and Flannery (2002)).

Nowhere was the ineffectiveness of debtor discipline better illustrated than in the run-up to the recent financial crisis. Chart 6 plots CDS premia for a sample of 33 large international banks over the period 2002 to 2011. It partitions the sample into "crisis" and "no crisis" banks, where the former are institutions subject to government intervention during the crisis.

CDS premia for all banks fell dramatically between 2002 and 2007, on average by around three-quarters. Market perceptions of risk were falling at precisely the time risk in the system was building. There was also little market differentiation between the spreads of "crisis" and "no-crisis" banks: their average pre-crisis spread difference was a mere 8 basis points.

The extent of risk mispricing is clear from the movements in CDS premia as the crisis broke. Average spreads rose by a factor of over 50 for "no crisis" banks. For crisis banks, they rose by a factor closer to 70. Adjustments on that scale are a decisive rejection of the debt disciplining hypothesis. Debtors were meant to act as a brake on risk-taking incentives. Instead they had served as an accelerator.

Why? The answer again lies in incentives – the incentives of bank managers and policy authorities. These incentives matter most at crisis time. Then, it may no longer be in the interests of either bank management or the authorities to have debtors bear risk. Doing so may run the risk of making a bad crisis situation worse. As much as bank management and the authorities may pre-commit to debtor's bearing risk ex-ante, they may be tempted to capitulate ex-post.

Economists call this a time-consistency problem. Agents cannot credibly commit to stick to their guns in the midst of war. Private contracts for bank debt and public policies towards bank debt suffer from a severe case of this time-inconsistency problem. Having debtors assume pain is fine on paper. But crisis wars are not waged on paper. And if debtors recognise that risks in contracts will not be enforced, they will no longer have incentives to price risk and exercise discipline themselves. So it has been for well over a century.

There are many examples of time-inconsistencies in the private debt contracts issued by banks. Uncalled capital and reserve liability were banks' loss-absorbing contract of choice in the late 19th and early 20th centuries. They ultimately proved ineffective and were abolished. Why? Because managers feared that invoking these instruments, at precisely the time they were most needed, might make a bad situation worse. This is time-inconsistency writ large.

A century on, hybrid bank debt instruments fell into the same trap. They gave bank management the option to rollover debt automatically in the event of stress. In principle, this option had insurance value in a situation of liquidity stress. In practice, facing the liquidity crunch of 2008, banks failed to exercise this option at just the point it was most valuable. Why? Because they too feared scaring creditors and making a bad liquidity situation worse. Hybrid debt, too, was time-inconsistent.

Time-inconsistencies in public policies regarding bank debt have been every bit as acute. Both liquidity and deposit insurance have a long and revealing history. Liquidity insurance by the central bank was firmly established in the UK by the end of the 19th century and spread to all major central banks during the course of the 20th century. Deposit insurance started life later in the US in 1934, but has since spread to most major developed countries.

The recent financial crisis illustrates perfectly the time-consistency problems both policies face. Pre-crisis, deposit and liquidity insurance were enshrined in a well-defined regime. But in the teeth of crisis, these regimes were abandoned. Liquidity and deposit insurance was offered in close to unlimited amounts in most countries to protect confidence among bank creditors, whether retail or wholesale. Prior policy commitments proved time-inconsistent. This is a pattern familiar for well over a century (Alessandri and Haldane (2009)).

These time-inconsistency problems, private and public, have been made more acute by a dramatic structural shift in the industrial organisation of banking over that period. This has seen the emergence of leviathan institutions too-big-to-fail. At the start of the 20th century, the UK's largest 3 banks' assets accounted for 7% of GDP (Chart 7). By the middle of the century they had reached 27%. By its end, they had reached 75%. By 2007, assets of the big 3 banks had risen to 200% of GDP. Other countries tell a similar tale. Size and concentration in banking has hit the roof.

Too-big-to-fail heightens the time-consistency dilemma for managers and policymakers. Big, connected firms increase the chances of a bad situation turning not just worse but catastrophic. Knowing the authorities will shoulder that tail risk, debt-holders will not price it for themselves. That is doubly unfortunate, as it means debtor discipline will be weakest among institutions for whom society would wish it to be strongest. Worse than that, bigger banks will then benefit from an implicit state subsidy, for cheaper debt means fatter profits. That might itself encourage further risk-taking.

There has been considerable recent interest in the scale of this too-big-to-fail subsidy. Indeed, eliminating this subsidy has been taken as a bellwether of the authorities' success in tackling the too-big-to-fail problem (Treasury Committee (2010)). Various attempts have been made to quantify this subsidy (Oxera (2011), New Economics Foundation (2011), Haldane (2010)). The two most popular approaches use credit ratings or option-implied distributions.

The ratings-based approach looks at the difference between the standalone ("no support") and "support" ratings of a set of banks. It uses this difference to determine how much higher funding costs would have been in the absence of support (Haldane (2010), New Economics Foundation (2011)). The options-based approach builds on Merton's framework (Kou (2004)). A distribution is fitted to banks' assets. Whenever assets fall below a certain threshold, the probability of government support can be estimated.

Table 1 looks at some empirical estimates of the implicit subsidy using the two methods, for a sample of the four largest UK banks and 22 large international banks. The estimates are shown over the period 2007–2010. For UK banks, under either measure, the implicit subsidy amounts to at least tens of billions of pounds per year, often stretching to three figures. For the global banks, the subsidy is worth at least hundreds of billions of dollars per year, on occasions four figures.

These numbers are eye-popping. To give some context, they are a large chunk, and sometimes exceed, the measured valued-added of the financial sector to annual GDP.

Recent revisions to support ratings do little to make a dent in them. Because they measure risk mispricing by bank debtors, they capture the extent of dilution in debtor discipline arising from time-inconsistency. The scale of subsidy suggests there is a considerable distance to travel before debtor discipline could be fully effective in checking risk-taking.

Short-termism and performance targets

The story so far. Ownership and control rights for banks are vested in agents comprising less than 5% of the balance sheet. To boost equity returns, there are strong incentives for owners to increase volatility. Those risk-taking flames have been fanned by tax and state aid. As stories go, this one sounds grim.

But this story also contains a puzzle. Long-term shareholders in banks have not obviously reaped the benefits of these distortions. The purchaser of a portfolio of global banking stocks in the early 1990s is today sitting on a real loss. So who exactly is it extracting value from these incentive distortions? The answer is twofold: shorter-term investors and bank management.

It is not difficult to see why shorter-term investors in bank equities stand to gain from volatility. Institutional investors in equities are typically structurally long. They gain and lose symmetrically as returns rise and fall. Many shorter-term investors face no such restrictions. If their timing is right, they can win on both the upswings (when long) and the downswings (when short). For them, the road to riches is a bumpy one – and the bigger the bumps the better. As in Merton's model, all volatility is good volatility.

Perhaps reflecting that, there is evidence of the balance of shareholding having become increasingly short-term over recent years. Chart 8 shows the average duration of holdings of US, UK and European bank shares. Average holding periods for US and UK banks fell from around 3 years in 1998 to around 3 months by 2008. Banking became, quite literally, quarterly capitalism. Today, the average bank is owned by an investor with a time-horizon considerably less than a year.

A second piece of evidence on equity short-termism, which is specific to banks, comes from trends in banks' capital planning. Since the late 1990s, there has been increasing focus on return on equity (ROE) as a performance target. Indeed, major banks have recently set explicit numerical targets for ROE as a guidepost for shareholders and managers. These targets are revealing about investor and managerial incentives.

ROE is an entirely equity-focussed concept. As such, ROE targets provide strong incentives for banks to increase equity returns, either by boosting asset volatility or gearing up their balance sheet. ROE targets hard-wire in the North-Easterly drift evident in Chart 5. Instead of adjusting for risk, ROE is flattered by it. This is fine for short-term investors who thrive on the bumps. But for longer-term investors they are a road to nowhere, as recent experience has shown.

What we have, then, is a set of mutually-reinforcing risk incentives. Investors shorten their horizons. They set ROE targets for management to boost their short-term stake. These targets in turn encourage short-term risk-taking behaviour. That benefits the short-term investor at the expense of the long-term, generating incentives to shorten further horizons. And so the myopia loop continues.

These incentive problems do not stop with owners. Under joint stock banking, ownership and control are divorced. This generates what economists call a principal-agent problem: managers (agents) may not do what owners (principals) wish. In an attempt to solve it, shareholders have sought over recent years to align managerial incentives with their own. That has meant remunerating managers in equity or using equity-based metrics such as ROE.

These trends were all too apparent in the pre-crisis data. The wealth of the average US bank CEO increased by $24 for every $1000 created for shareholders in 2006 (Fahlenbrach and Stulz (2011)). The typical bank CEO pocketed over $1 million for every 1% increase the value of their firm. These are rather potent pecuniary incentives on bank managers to keep shareholders sweet.

These facts also help explain the evolution of large US banks' CEO pay between 1990 and 2007. Imagine that in 1990 bank CEO pay had been indexed to bank ROE. By 2007, CEO compensation would have reached $26 million. That is precisely in line with their actual payouts.

If you believed ROE were a reliable performance metric, US bank CEOs would have had a watertight defence back in 2007. Indeed, it was the L'Oreal defence: because we're worth it. But experience since suggests this performance was cosmetic. ROE flattered returns, and hence compensation, in the upswing. That is hardly surprising since it puts risk ahead of return and short-term ahead of long-term performance.

When the downswing came, the volatility of equity returns sent many banks to the wall. Equity-based incentive contracts helped propel them there. Firm-level evidence could not be clearer. In 2006, the top 5 equity stakes of US bank CEOs ran as follows: Dick Fuld (Lehman Brothers), James Cayne (Bear Stearns), Stan O'Neal (Merrill Lynch), John Mack (Morgan Stanley) and Angelo Mozilo (Countrywide) (Fahlenbrach and Stulz (2011)). We know how these disaster movies ended.

So having been divorced for almost two hundred years, ownership and control have been reunited. But they are an odd couple. Their marriage contract encourages both partners to behave in a volatile, short-term fashion. The marriage itself is destined to last less than a year. In the mid-19th century, unlimited liability was said to be deterring investors of "fortune, intelligence and respectability". For very different reasons, today's governance arrangements might be suffering the same fate.

Banking and public policy

The previous sections identified four forces which have shaped risk-taking incentives for over a century. Each will have tended to boost bank risk appetite above its socially optimal level. While satisfying the short-term demands of shareholders and managers, this structure has left many others short-changed. These distortions make a case for policy intervention. These interventions are best directed at incentives themselves. Otherwise risk-taking is likely to be simply displaced, rather than curbed, by reform efforts.

(a) Higher equity capital

Perhaps the most obvious means of tackling equity-led incentive problems would be simply to augment banks' equity base. This would act on at least three of the underlying incentive frictions (Hellwig (2010), Admati et al (2010)). It would put more skin in the game for equity-holders, thereby reducing their incentives to extract option value. It would reduce leverage directly, thereby reducing banks' capacity to risk-up. And it would increase banks' capacity to absorb loss, thereby reducing the probability of official intervention.

Over the past few years, regulatory reform internationally has responded to those messages. Under so-called Basel III, the minimum equity capital ratio will quintuple over the next decade, rising from 2% to close to 10% of banks' risk-weighted assets for the largest global banks. That is a material shift. The policy question is whether, while necessary, it is likely to prove sufficient.

There is a genuine debate underway here. It is long overdue. For the better part of thirty years, the international regulatory community stuck, limpet-like, to a target bank capital ratio

of 8%. That had no scientific basis whatsoever (Goodhart (2011)). It just happened to be the prevailing capital ratio among US banks at the time the first Basel capital accord was struck.

More recently, the Basel Committee has explored the costs and benefits of higher capital ratios (Basel Committee (2010a)). Using conservative estimates of the benefits, that study suggests an optimal capital ratio in the region of 13–14%. One area of conspicuous conservatism is the study's assumption that higher capital will not lower banks' equity and debt-servicing costs. Reworking the arithmetic to include these and other effects, Miles et al (2011) calculate an optimal capital ratio closer to 20%.

These studies are technically complex. A simpler way of posing the question is to ask what it might take to avoid a repeat crisis performance under the new rules. The average risk weight for a global bank is 40%. This means that a 10% capital ratio in risk-weighted terms translates into bank leverage of 25 times equity. So even once Basel III is in place, an unexpected loss in the value of a bank's assets of 4% will be sufficient to render it insolvent; much less than that to render it illiquid.

For me, that argues for bolstering further banks' capital defences over the medium term. Basel III is a good starting point, but may not be the right finishing line. Leaning against that are those arguing "equity is expensive". They seem to me to have two unassailable arguments on their side. One is tax. The other is state subsidies. But these are good arguments only for those in receipt of the tax rebates or the state subsidies. As a policy matter, they are distortions to risk-taking. Using them to support lower capital ratios is to argue that three wrongs make a right.

Even without further regulatory reform, a case could be made for reconsidering risk-taking distortions directly, such as the tax advantage of debt. The effects of removing that tax subsidy could be potent. Basel III will lower banks' required debt-to-asset ratio by around 3 percentage points. Given estimated tax elasticities, a similar change could be achieved by lowering the tax shield on debt by as little as 5 percentage points.

There are two ways in which the playing field between debt and equity could be levelled: removing the tax deductibility of debt interest – for example, through a system of comprehensive business taxation; or allowing firms to deduct from profits an allowance for corporate equity – for example, as recently proposed in the Mirrlees Report (2011). The latter approach already operates in Belgium, Brazil and Latvia.

There is of course a third way – do both. That would tilt the financing playing field through its axis, favouring equity over debt. In public finance theory, a non-neutral tax system can be justified when externalities are at play. Bank leverage has negative externality-like properties because of the deadweight costs of default and the growth-sapping effects of debt overhang. Both these externalities have been evident recently. If these externalities are large, and if equity avoids them, there is an economic case for tax non-neutrality.

In the 19th century, subsidising debt to finance investment, including through tax, was a sensible growth strategy. A century on, the opposite is true. Today's debt ratios, both private and public, are at levels which are likely to damage medium-term growth (Reinhart and Rogoff (2009), Cecchetti et al (2011)). There may have never been a better time in history to consider re-tilting the fiscal scales.

(b) Equity-like liabilities

No amount of additional equity removes the asymmetry of payoffs under limited liability. Indeed, some have argued that materially higher levels of equity capital could even encourage tail risk-taking (Perotti, Ratnovski and Vlahu (2011)). Nor, by itself, would higher equity guarantee discipline by debt-holders. So are there non-equity means of reshaping risk incentives on the part of debt-holders and shareholders?

One possibility would be to use financial instruments which explicitly combine the incentive features of debt and equity – so-called contingent convertible securities or CoCos (Flannery (2010), Calomiris (2011)). These instruments are debt in good times, but convert to equity in bad. As Figure 3 illustrates, they would result in a combined payoff schedule which mirrors unlimited liability, without its obvious practical drawbacks. In other words, CoCos could generate better risk incentives than either debt or equity in isolation.

To play this role, however, these instruments would need to be time-consistent. In this respect, earlier experience with contingent instruments suggests two contractual features are likely to be key. First, no discretion on the part of bank management or the authorities about when and how conversion takes place. Such discretion undermined the effectiveness of uncalled capital in the 20th century and hybrids in the 21st.

Second, conversion needs to take place well ahead of bankruptcy. Doing so avoids the deadweight costs of default which, for too-big-to-fail institutions, are likely to be too large to be tolerable by the authorities. That is what undermined reserve liability in the 20th century. It is also what risks jeopardising the effectiveness of so-called bail-in debt in the 21st.

To satisfy these two conditions, contingent securities would need a trigger which was both early and non-discretionary. That rules out triggers activated on a discretionary basis by the regulator. It should also make us sceptical of triggers based on regulatory ratios, as these embody a great deal of management discretion. The trigger would need also to be set well ahead of default to avoid its deadweight costs. Pulling the trigger needs to be an early health scare for a bank, not the last rites.

One trigger satisfying those criteria would be market-based measures of capital adequacy (Haldane (2011), Calomiris and Herring (2011)). Unlike subordinated debt, equity prices did a good job of signalling distress among institutions during the recent crisis, fully six months or more ahead of failure. Chart 9 illustrates this for the set of "crisis" and "no-crisis" banks. Equity prices called the crisis early and differentiated the sick from the sound. Market discipline worked.

Had CoCos with market-based triggers been in place, the crisis may just have played out differently. Pre-emptive recapitalisation of failing institutions would have occurred, either due to automatic CoCo conversion or remedial action by managers under pressure from (potentially converting) debt- and (potentially diluting) shareholders. CoCos could have operated as a contractual prompt corrective action mechanism.

This market-based contractual approach has the advantage of turning poacher into gamekeeper. It uses the risk-taking incentives embedded in equities to sharpen market discipline. A market problem is turned into a market solution. With less discretion and bankruptcy, these contracts would stand a greater chance of proving time-consistent in a crisis. Historically, that has been the hardest nut to crack.

(c) Control rights

A third set of potential structural solutions would be to address governance and control problems at source. Post-crisis, a number of proposals have already been put forward to strengthen bank governance. These include increasing board expertise and performance and upping the power of bank risk committees (Walker (2009), Basel (2010b), OECD (2010)). These are steps in the right direction. But looking down the star-studded cast of non-executive directors on the boards of failed financial institutions during the crisis, to wish for better is to wish upon a star.

So what else might be done? In banking, the two prevailing ownership and control models are the public limited company and the mutually-owned co-operative. Under the first, ownership and control are vested in a small minority of the liability-holders, with voting rights assigned according to portfolio weights – an equity dictatorship. Under the second,

ownership and control are vested in a much wider set of liability-holders, with voting rights unrelated to portfolio weights – a liability democracy.

These are very different governance models. Both face their own principal-agent problem. For the first, this manifests itself as risk and rent-seeking by the equity minority at the potential expense of the majority. For the second, it manifests itself as inertia due to the misalignment between voting rights and financial stakes – the same governance problem Bagehot identified in the 19th century.

It is possible to conceive of voting models which guard against these downsides. To give one example, voting rights could be extended across a wider set of liability stake-holders in a bank. These rights need not be allocated on an equivalent basis to equity-holders, given that equity has a junior claim. For example, holders of CoCos might have voting rights which were some fraction of their equity equivalents and depositors likewise.

The advantage is that governance and control would then be distributed across the whole balance sheet. Some of the rent-seeking incentives of the equity-dictatorship model would be curbed. At the same time, voting rights would still be weighted in line with portfolio stakes to avoid the inertia of mutuality. Bank governance would be a wealth-weighted democracy, a hybrid of the mutual and joint-stock models. This would help put risk incentives in the right place, while enhancing diversity within the financial system.[16]

(d) Performance and remuneration

The behaviour of the financial system would be improved by an alternative set of performance metrics. The ideal metric would be less focussed on a narrow subset of the balance sheet (such as equity) and do a better job of adjusting for risk (than ROE). One metric satisfying those criteria would be return on assets (ROA). This covers the whole balance sheet and, because it is not flattered by leverage, does a better job of adjusting for risk.

It would be a relatively small step for banks to switch from ROE to ROA targets in their capital planning and compensation. Yet the effects on risk-taking and remuneration could be large. Imagine if the CEOs of the seven largest US banks had in 1989 agreed to index their salaries not to ROE, but to ROA. By 2007, their compensation would not have grown tenfold. Instead it would have risen from $2.8 million to $3.4 million. Rather than rising to 500 times median US household income, it would have fallen to around 68 times.[17]

Conclusion

The words “bank” and “bankrupt” have common etymological roots, dating from the 13th century. In the 13th century, it was bankers bankrupting banks. In the 21st century, bankers are still bankrupting banks. But it is no longer just banks. In England and Wales alone, over half a million individuals and nearly 100,000 businesses have found themselves in insolvency since 2007. Internationally, a growing number of sovereign states face a similar fate.

This tells us that the risks from banking have been widely spread socially. But the returns to bankers have been narrowly kept privately. That risk/return imbalance has grown over the

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[16] Further refinement of voting rights might be possible. For example, some have argued that voting rights could be made conditional on the holding period of an investor (Aspen Institute (2009)). This would lean against short-termist tendencies which encourage rent-seeking.

[17] An alternative way of aligning managerial and system-wide incentives is to remunerate managers not in shares or cash, but in CoCos (Haldane (2011)). This would sharpen managerial incentives to keep equity away from conversion and the “wolf away from the door”.

past century. Shareholder incentives lie at its heart. It is the ultimate irony that an asset calling itself equity could have contributed to such inequity. Righting that wrong needs investors, bankers and regulators to act on wonky risk-taking incentives at source.

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Figure 1:

Payoff profile for bank equity

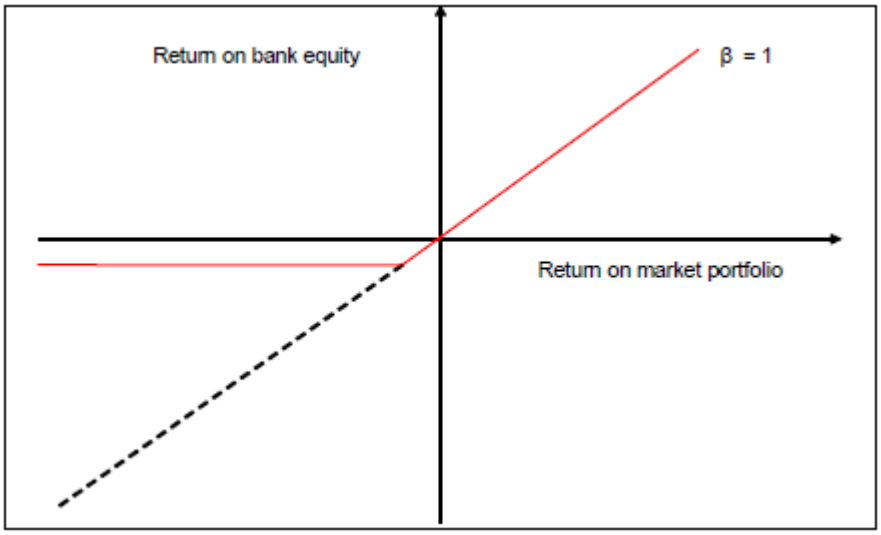


Figure 2:

Payoff profile for bank equity with higher leverage

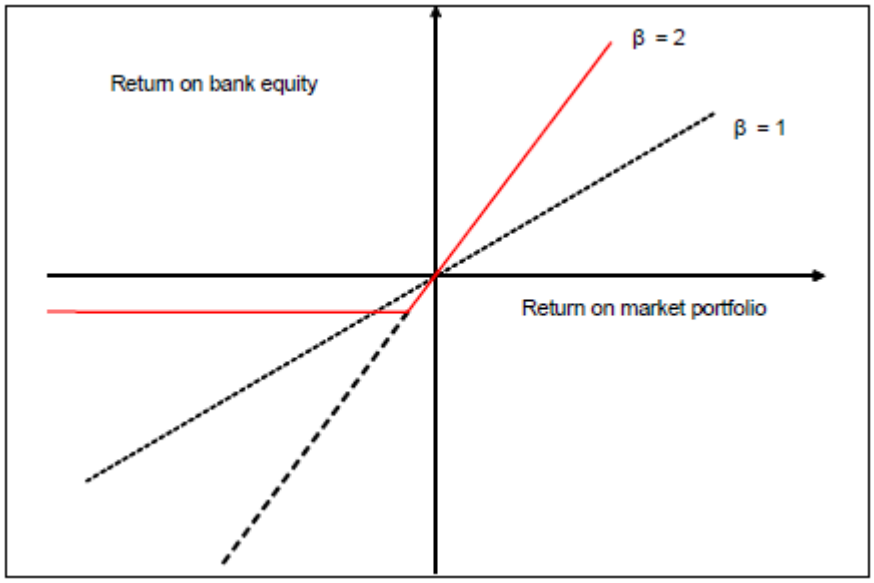


Figure 3:

Payout profiles for bank equity and debt

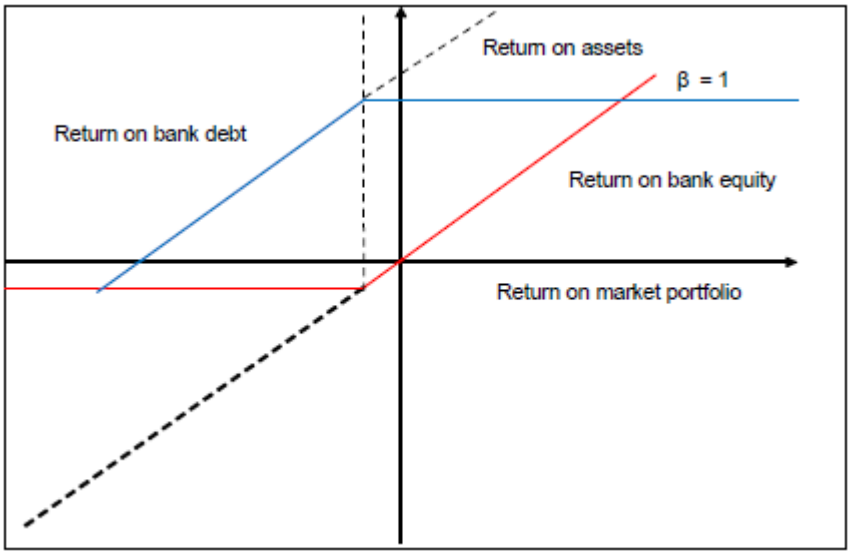
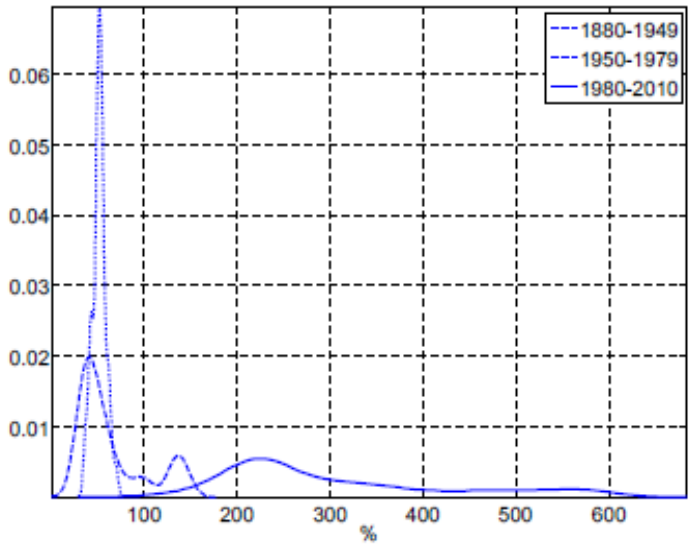


Chart 1:

Estimated distribution of UK banks' assets to GDP



Source: Sheppard, D.K (1971) and Bank of England.

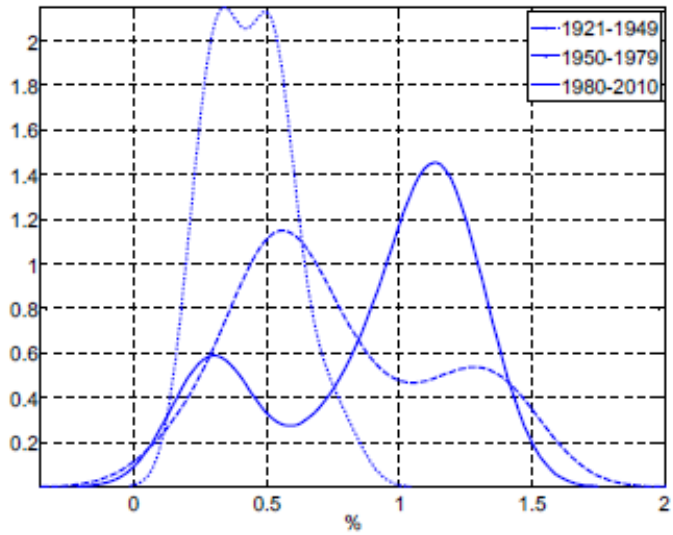
(a) Data before 1974 are from Sheppard, D.K (1971). The definition of UK banking sector assets is broader after 1966, but using a narrower definition throughout gives the same growth profile.

(b) Data after 1974 include total assets of UK resident banks from Bank of England data. Assets of the Bank of England's Issue department and Asset Purchase Facility are excluded.

Notes: The density estimates are based on a normal kernel function and a number of observations in each subsample.

Chart 2:

Estimated distribution of UK banks' return on assets

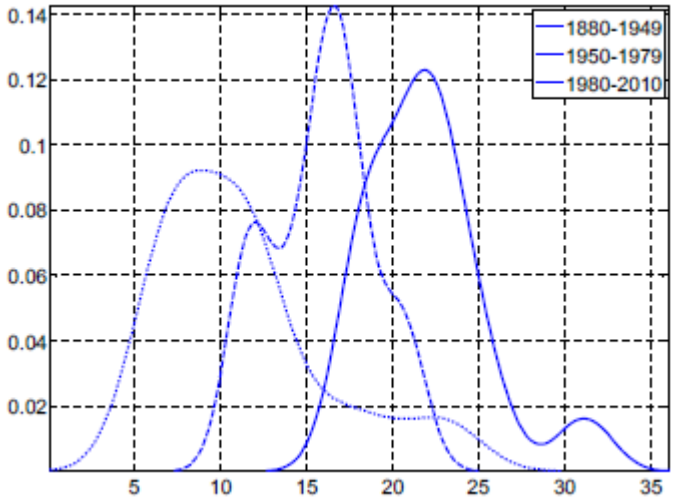


Source: Capie, F and Billing, M (2004), BBA and Bank calculations.

Notes: The density estimates are based on a normal kernel function and a number of observations in each subsample. There is a definitional change in the sample in 1967 and again in 2010.

Chart 3:

Estimated distribution of UK banks' leverage

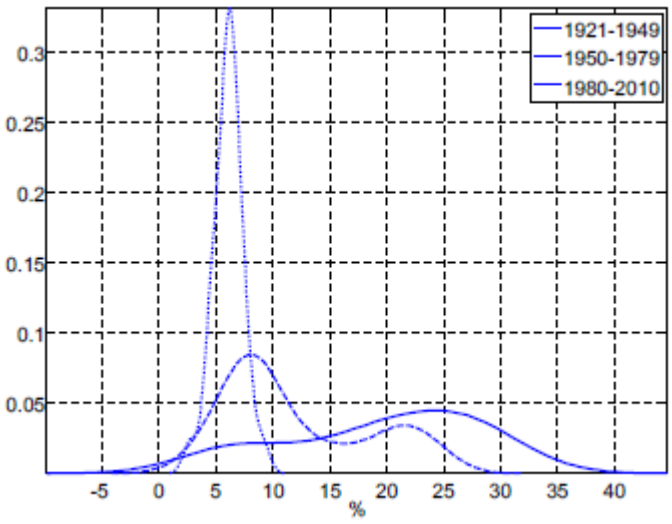


Source: Capie, F and Billing, M (2004), BBA, Bank of England and Bank calculations.

Notes: The density estimates are based on a normal kernel function and a number of observations in each subsample.

Chart 4:

Estimated distribution of UK banks' return on equity

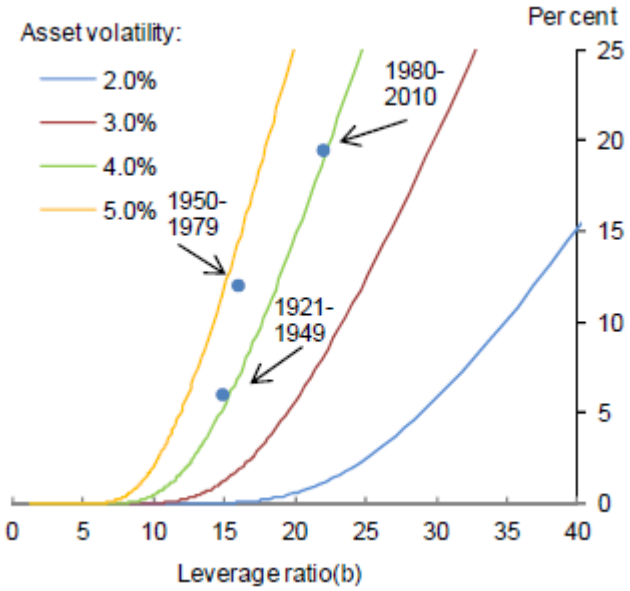


Source: Capie, F and Billing, M (2004), BBA and Bank calculations.

Notes: The density estimates are based on a normal kernel function and a number of observations in each subsample. There is a definitional change in the sample in 1967 and again in 2010.

Chart 5:

Variation in expected and actual return on equity and leverage[(a)]



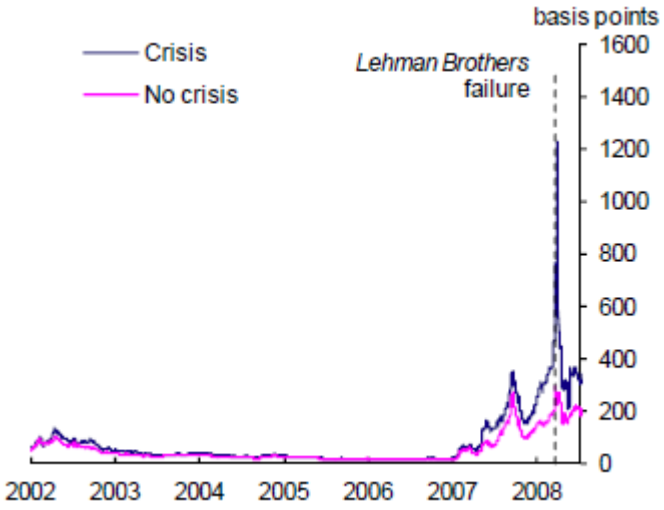
Source: Capie, F and Billing, M (2004), BBA and Bank calculations.

(a) Illustration using the Merton (1974) model. Chart shows how the implied expected rate of return on equity is increasing in leverage for different asset volatilities, even when the expected rate of return on assets is fixed at zero.

(b) Ratio of equity to assets.

Chart 6:

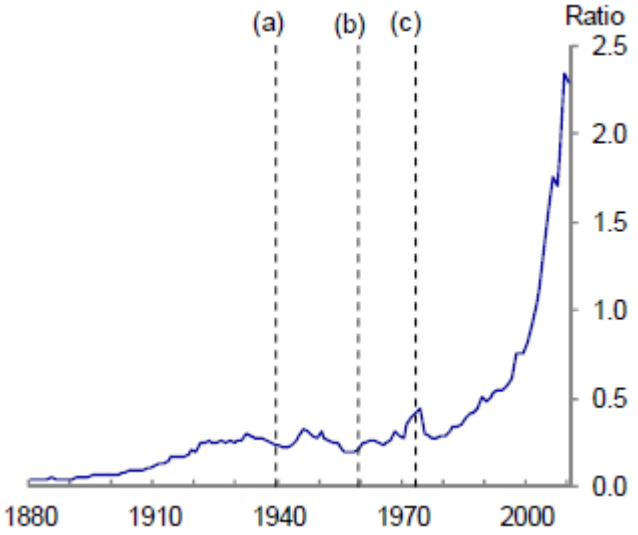
CDS premia for crisis and "no-crisis" banks



Source: Thomson Reuters Datastream and Bank calculations.

Chart 7:

Concentration of UK banking system (per cent of GDP)



Source: Bankers Magazine, Sheppard, D.K (1971) and Bank of England.

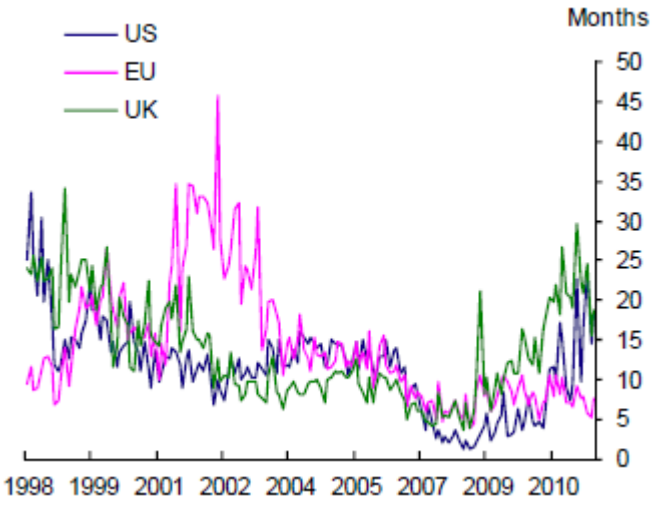
(a) Total assets of the largest 3 banks are identified from copies of the Bankers' Magazine before 1940. Observations are taken every 10 years and are linearly interpolated between.

(b) From 1940–1974 the total assets of the 3 largest clearing banks are used from the Bankers' Magazine and banks' published accounts. Bank observations are linearly interpolated between observations.

(c) Total UK assets of the three largest UK owned banks are used after 1974 from Bank of England data.

Chart 8:

Holding periods in bank equities

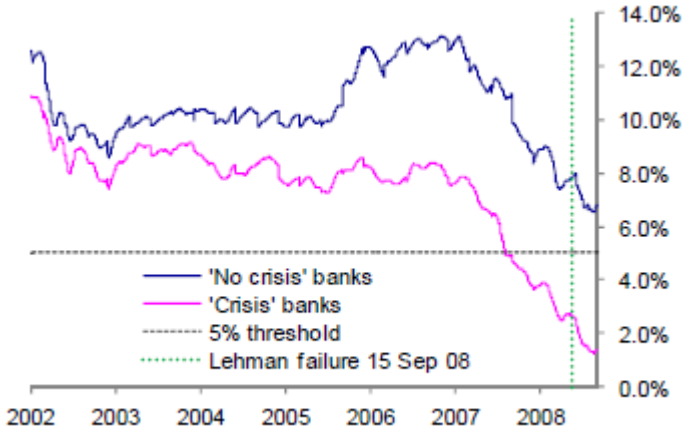


Source: Bloomberg and Bank calculations.

Notes: Average holding period of equities for a sample of 30 banks.

Chart 9:

Market-based measures of capital ratios[(a)(b)(c)(d)]



Sources: Capital IQ and Bank calculations

(a) "Crisis" banks are a set of major financial institutions which in autumn 2008 either failed, required government capital or were taken over in distressed circumstances. These are RBS, HBOS, Lloyds TSB, Bradford & Bingley, Alliance & Leicester, Citigroup, Washington Mutual, Wachovia, Merrill Lynch, Freddie Mac, Fannie Mae, Goldman Sachs, ING Group, Dexia and Commerzbank. The chart shows an unweighted average for those institutions in the sample for which data are available on the given day.

(b) The "no crisis" institutions are HSBC, Barclays, Wells Fargo, JP Morgan, Santander, BNP Paribas, Deutsche Bank, Crédit Agricole, Société Générale, BBVA, Banco Popular, Banco Sabadell, Unicredit, Banca Popolare di Milano, Royal Bank of Canada, National Australia Bank, Commonwealth Bank of Australia and ANZ Banking Group. The chart shows an unweighted average for those banks in the sample for which data are available on the given day.

(c) The dotted black line is a suggested trigger level for contingent capital calibrated by minimising a loss function which takes into account both Type I and Type II errors. Type I error is the probability that conversion occurs despite capital not being required. Type II error is the event that conversion does not occur despite capital being required. The loss function places greater weight on Type II errors. Note that the loss function takes into account the full range of banks, not just the average score for each set.

(d) 30-day moving average of market capitalisation.

Table 1:

Estimated subsidy for UK and global banks ($bn)

	Contingent claims / Kou[(a)]					**Ratings**[(b)]				
	2007	*2008*	*2009*	*2010*	*2007–2010 average*	*2007*	*2008*	*2009*	*2010*	*2007–2010 average*
UK	134	354	622	250	340	9	51	178	58	74
Global	496	1,308	2,294	924	1,256	33	211	528	197	242

a) Calculated using an extension to the Merton (1977) model developed by Kou (2002). It models changes in banks' assets as being normally distributed with upward and downward "jumps" designed to reflect the possibility of extreme movements in asset values, and "fatten the tails" of the resulting distribution. This model is fitted to the prices of options written on the four largest UK banks' equities. This is the same methodology as Oxera (2011) with a downward adjustment for the risk free rate to the nominal yield on 1-year UK gilts and considers that support can be realised at any time during the year. The figure for global banks is an estimate based on the UK figures.

(b) Calculated by comparing the difference in funding costs calculated as an annual average for individual banks, based on the difference in the average funding cost of benchmark financial institutions rated at the support rating and the average funding cost for financial institutions rated at the standalone rating. This difference is then multiplied by the rating-sensitive liabilities of the bank or building society. Data availability for non-UK banks is less granular.