

Speech by

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1. Introduction

Walter Bagehot was a brilliant observer and writer on contemporary economic and financial matters. In his remarkable book *Lombard Street*, Bagehot brought together his own observations with the analysis of earlier thinkers such as Henry Thornton to provide a critique of central banking as practised by the Bank of England and a manifesto for how central banks could handle financial crises in future by acting as a lender of last resort. The present financial crisis dwarfs any of those witnessed by Bagehot. What lessons can we draw from recent and current experience to update Bagehot's vision of finance and central banking?

Surely the most important lesson from the financial crisis is the importance of a resilient and robust banking system. The countries most affected by the banking crisis have experienced the worst economic crisis since the 1930s. Output is somewhere between 5% and 10% below where it would have been had there not been a crisis. Unemployment is up, businesses have closed, and the direct and indirect costs to the taxpayer have resulted in fiscal deficits in several countries of over 10% of GDP – the largest peacetime deficits ever.

At the heart of this crisis was the expansion and subsequent contraction of the balance sheet of the banking system. Other parts of the financial system in general functioned normally. And we saw in 1987 and again in the early 2000s, that a sharp fall in equity values did not cause the same damage as did the banking crisis. Equity markets provide a natural safety valve, and when they suffer sharp falls, economic policy can respond. But when the banking system failed in September 2008, not even massive injections of both liquidity and capital by the state could prevent a devastating collapse of confidence and output around the world. So it is imperative that we find an answer to the question of how to make our banking system more stable.

As Bagehot knew only too well, banking crises are endemic to the market economy that has evolved since the Industrial Revolution. The words “banking” and “crises” are natural bedfellows. If love and marriage go together like a horse and carriage, then banking and crisis go together like Oxford and the Isis, intertwined for as long as anyone can remember. Unfortunately, such crises are occurring more frequently and on an ever larger scale. Why?

2. **The practice of banking:**

For almost a century after Bagehot wrote *Lombard Street*, the size of the banking sector in the UK, relative to GDP, was broadly stable at around 50%. But, over the past fifty years, bank balance sheets have grown so fast that today they are over five times annual GDP. The size of the US banking industry has grown from around 20% in Bagehot’s time to around 100% of GDP today. And, until recently, the true scale of balance sheets was understated by these figures because banks were allowed to put exposures to entities such as special purpose vehicles off balance sheet.

Surprisingly, such an extraordinary rate of expansion has been accompanied by increasing concentration: the largest institutions have expanded the most. Table 1 shows that the asset holdings of the top ten banks in the UK amount to over 450% of GDP, with RBS, Barclays and HSBC each individually having assets in excess of UK GDP. Table 2 shows that in the US, the top ten banks amount to over 60% of GDP, six times larger than the top ten fifty years ago. Bank of America today accounts for the same proportion of the US banking system as all of the top 10 banks put together in 1960.

While banks’ balance sheets have exploded, so have the risks associated with those balance sheets. Bagehot would have been used to banks with leverage ratios (total assets, or liabilities, to capital) of around six to one. But capital ratios have declined and leverage has risen. Immediately prior to the crisis, leverage in the banking system of the industrialised world had increased to astronomical levels. Simple leverage ratios of close

to 50 or more could be found in the US, UK, and the continent of Europe, driven in part by the expansion of trading books (Brennan, Haldane and Madouros, 2010).

And banks resorted to using more short-term, wholesale funding. The average maturity of wholesale funding issued by banks has declined by two thirds in the UK and by around three quarters in the US over the past thirty years – at the same time as reliance on wholesale funding has increased. As a result, they have run a higher degree of maturity mismatch between their long-dated assets and short-term funding. To cap it all, they held a lower proportion of liquid assets on their balance sheets, so they were more exposed if some of the short-term funding dried up. In less than fifty years, the share of highly liquid assets that UK banks hold has declined from around a third of their assets to less than 2% last year (Bank of England, 2009). Banks tested the limits of where the risk-return trade-off was located, in all parts of their operations. As John Kay wrote about his experience on the board of HBoS, the problems began “on the day it was decided that treasury should be a profit centre in its own right rather than an ancillary activity” (Kay, 2008).

Moreover, the size of the balance sheet is no longer limited by the scale of opportunities to lend to companies or individuals in the real economy. So-called ‘financial engineering’ allows banks to manufacture additional assets without limit. And in the run-up to the crisis, they were aided and abetted in this endeavour by a host of vehicles and funds in the so-called shadow banking system, which in the US grew in gross terms to be larger than the traditional banking sector. This shadow banking system, as well as holding securitised debt and a host of manufactured – or ‘synthetic’ – exposures was also a significant source of funding for the conventional banking system. Money market funds and other similar entities had call liabilities totalling over \$7 trillion. And they lent very significant amounts to banks, both directly and indirectly via chains of transactions.

This has had two consequences. First, the financial system has become enormously more interconnected. This means that promoting stability of the system as a whole using a

regime of regulation of individual institutions is much less likely to be successful than hitherto. Maturity mismatch can grow through chains of transactions – without any significant amount being located in any one institution – a risk described many years ago by Martin Hellwig (Hellwig, 1995). Second, although many of these positions net out when the financial system is seen as a whole, gross balance sheets are not restricted by the scale of the real economy and so banks were able to expand at a remarkable pace. So when the crisis began in 2007, uncertainty about where losses would ultimately fall led confidence in banks to seep away. This was obvious through the crisis. Almost no institution was immune from suspicion, the result of the knock-on consequences so eloquently described by Bagehot when he wrote:

“At first, incipient panic amounts to a kind of vague conversation: Is A. B. as good as he used to be? Has not C. D. lost money? and a thousand such questions. A hundred people are talked about, and a thousand think, 'Am I talked about, or am I not?' 'Is my credit as good as it used to be, or is it less?' And every day, as a panic grows, this floating suspicion becomes both more intense and more diffused; it attacks more persons; and attacks them all more virulently than at first. All men of experience, therefore, try to 'strengthen themselves,' as it is called, in the early stage of a panic; they borrow money while they can; they come to their banker and offer bills for discount, which commonly they would not have offered for days or weeks to come. And if the merchant be a regular customer, a banker does not like to refuse, because if he does he will be said, or may be said, to be in want of money, and so may attract the panic to himself.”

This sentiment is described more prosaically in Tables 3 and 4. They show that the risk premia demanded by investors to lend to all large banks rose very sharply during the crisis. For most banks the spreads on their senior unsecured debt had more than trebled in October 2008 relative to their levels at the start of 2007. Similarly, credit default swap premia – the cost of insuring a bank’s debt – shot up. All banks, irrespective of the precise nature of their business and balance sheet, were tarred with the same brush. Moreover spreads and CDS premia remain elevated today – almost universally, large UK

and US banks face much higher borrowing charges compared to risk-free rates, and are seen as riskier entities, than prior to the crisis.

The size, concentration and riskiness of banks have increased in an extraordinary fashion and would be unrecognisable to Bagehot. Higher reported rates of return on equity were superficial hallmarks of success. These higher rates of return were required by, and a consequence of, the change in the pattern of banks' funding with increased leverage and more short-term funding. They did not represent a significant improvement in the overall rate of return on assets. Not merely were banks' own reported profits exaggerating the contribution of the financial sector to the economy, so were the national accounts.

In the US, the share of gross value added of the financial sector as a share of GDP rose from around 2-3% in the decade after World War II to about 8% in 2008, driven in large part by a rise in the gross operating surplus of financial intermediaries. And in the UK, in the past decade, the measured scale of the financial sector, compared to GDP, has roughly doubled to around 10%. But this exaggerates the contribution of financial services. Banks do not always charge directly for the services they provide. So the value added of the financial sector is measured by official statisticians (using the United Nations System of National Accounts) as the difference between interest receipts and payments of a "reference rate of interest" which attempts to measure the pure cost of borrowing funds. This convention overstates the true value added of the financial sector because it includes the return to risky lending represented by the difference between the hypothetical pure cost of borrowing funds and the return that is earned. But the fact that risk is channelled through an intermediation industry does not mean that the value added from risk-bearing in the economy is solely attributable to the existence of an intermediation sector. If companies financed themselves directly from households, the statisticians would regard the return on risk-bearing as value added created in that industry. Financial intermediation does add value, but not as much as the statistical convention would suggest.

Moreover, a financial sector that takes on risk with the implicit support of the tax-payer can generate measured value added that reflects not genuine risk-bearing but the upside profits from the implicit subsidy. And even without an implicit subsidy the return to risk-bearing can be mismeasured. It is widely understood that an insurance company should not count as profits the receipt of premia on an insurance policy that will pay out only when a low-frequency event occurs at some point in the future. But part of the value added of the financial sector prior to the crisis reflected temporary profits from taking risk and it was only after September 2008 that much of that so-called economic activity resulted in enormous reported losses by banks.

It is possible to make a very rough estimate of the possible size of this distortion in the reported financial sector output data. If we assume that true labour and capital productivity in the financial services industry grew in line with that in the wider economy in the 10 years prior to the crisis, then, given the inputs of capital and labour over that period, the official estimate might have overstated UK financial sector value added by almost £30 billion up to 2007 – around half of the growth in the official measure. The impact of this adjustment on overall GDP is likely to be relatively small because much of the output of the financial sector is treated as intermediate inputs to other sectors in the economy. Such an estimate is supported by the finding of my Bank of England colleagues that the increase in rates of return on equity earned by banks were accounted for almost entirely by an increase in leverage, capital gains on assets in trading books and the reported profits on contracts that produced losses only after the crisis occurred. And it is consistent with the estimates calculated by Colangelo and Inklaar (2010) for the euro area. They found that around 40% of measured financial sector value added probably captured compensation for bearing risk.

3. The theory of banking

Why are banks so risky? The starting point is that banks make heavy use of short-term debt. Short-term debt holders can always run if they start to have doubts about an institution. Equity holders and long-term debt holders cannot cut and run so easily.

Douglas Diamond and Philip Dybvig showed nearly thirty years ago that this can create fragile institutions even in the absence of risk associated with the assets that a bank holds. All that is required is a cost to the liquidation of long-term assets and that banks serve customers on a first-come, first-served basis (Diamond and Dybvig, 1983). Nevertheless, there are benefits to this maturity transformation – funds can be pooled allowing a greater proportion to be directed to long-term illiquid investments, and less held back to meet individual needs for liquidity. And from Diamond's and Dybvig's insights, flows an intellectual foundation for many of the policy structures that we have today – especially deposit insurance and Bagehot's time-honoured key principle of central banks acting as lender of last resort in a crisis. If the only problem is one of illiquidity leading to fragility, then central banks can easily act to ward off problems. By demonstrating a willingness to step in to provide temporary liquidity support, then the likelihood of problems arising in the first place is dramatically diminished. It was wholly appropriate that this was the focus of Bagehot's writings – at the time, the structure of the banking system meant that illiquidity was often the key problem. And central banks did not appreciate the importance of the role that they could play. Bagehot's whole purpose was to convince the Bank of England to fulfil this role. But the changes in the banking system over the past fifty years mean that a much more diverse range of problems can strike today. In September 2007, everyone thought that the crisis was one of liquidity and as a result there was an expectation central banks could provide the solution. But it quickly became clear that it was in fact a crisis of solvency.

Diamond and Dybvig's analysis consciously omitted the fact that, in reality, banks' assets are risky. And not only are banks' assets risky, but banks are highly leveraged institutions. This leaves them heavily exposed – with very high debt-equity ratios, small movements in asset valuations are enough to wipe out their equity and leave banks insolvent. That means the distinction between illiquidity and solvency can be difficult in practice – the difference in timing might be just a few days. If a crisis is in fact one of insolvency, brought on by excessive leverage and risk, then central bank liquidity

provision cannot provide the answer. Central banks can offer liquidity insurance only to solvent institutions or as a bridge to a more permanent solution.

It is this structure, in which risky long-term assets are funded by short-term deposits, that makes banks so hazardous. Yet many treat loans to banks as if they were riskless. In isolation, this would be akin to a belief in alchemy – risk-free deposits can never be supported by long-term risky investments in isolation. To work, financial alchemy requires the implicit support of the tax payer.

When all the functions of the financial system are heavily interconnected, any problems that arise can end up playing havoc with services vital to the functioning of the economy – the payments system, the services of money and the provision of working capital to industry. If such services are materially threatened, governments will never be able to sit idly by. Institutions supplying such services are quite simply too important to fail. Everyone knows it. So, highly risky banking institutions enjoy implicit public sector support. In turn, public support incentivises banks to take on yet more risk, knowing that, if things go well, they will reap the rewards while the public sector will foot the bill if things go wrong. Greater risk begets greater size, most probably greater importance to the functioning of the economy, higher implicit public subsidies, and hence yet larger incentives to take risk – described by Martin Wolf as the “financial doomsday machine”.

The failure in the crisis was not one of intellectual imagination or economic science to understand these issues. Economists recognised that distorted incentives, whether arising from implicit public subsidies, asymmetric information or a host of other imperfections, will cause a market-based outcome to be sub-optimal from the perspective of society. This idea has been at the centre of modern economics since the extraordinary series of papers written by Arrow and Debreu in the 1950s (Arrow, 1951; Debreu, 1951; Arrow and Debreu, 1954).

The real failure was a lapse into hubris – we came to believe that crises created by massive maturity transformation were problems that no longer applied to modern

banking, that they belonged to an era in which people wore whiskers and top hats. There was an inability to see through the veil of modern finance to the fact that the balance sheets of too many banks were an accident waiting to happen, with levels of leverage on a scale that could not resist even the slightest tremor to confidence about the uncertain value of bank assets. For all the clever innovation in the financial system, its Achilles heel was, and remains, simply the extraordinary – indeed absurd – levels of leverage represented by a heavy reliance on short-term debt.

Modern financiers are now invoking other dubious claims to resist reforms that might limit the public subsidies they have enjoyed in the past. No one should blame them for that – indeed, we should not expect anything else. They are responding to incentives. Some claim that reducing leverage and holding more equity capital would be expensive. But, as economists, such as my colleague David Miles (2010) and Anat Admati and her colleagues (Admati et. al., 2010), have argued, the cost of capital overall is much less sensitive to changes in the amount of debt in a bank's balance sheet than many bankers claim – a proposition demonstrated forcefully by Professors Modigliani and Miller over fifty years ago (Modigliani and Miller, 1958). And the benefits to society, most obviously through greater financial stability, but also through factors such as higher tax revenue, are likely to swamp any change in the private costs faced by banks. What does reduce the cost of capital is the ability to borrow short to lend long. But the scale of maturity transformation undertaken today produces private benefits and social costs. We have seen from the experience of first Iceland, and now Ireland, the results that can follow from allowing a banking system to become too large relative to national output without having first solved the "too important to fail" problem.

4. Finding a Solution

Many remedies for reducing the riskiness of our financial system have been proposed, ranging from higher capital requirements on banks to functional separation and other more radical ideas. The guiding principle of any change should be to ensure that the costs of maturity transformation – the costs of periodic financial crises – fall on those

who enjoy the benefits of maturity transformation – the reduced cost of financial intermediation. All proposals should be evaluated by this simple criterion.

The first, and most obvious, response to the divergence between private benefits and social costs is the imposition of a permanent tax on the activity of maturity transformation to “internalise the externalities”. Such a tax, or levy, has been discussed by the G7, and introduced in the UK. The principle that the “polluter pays” for the costs they impose on others is an old one, going back at least to Pigou in the 1920s. The main practical problem is to calibrate the costs to maturity transformation. The loss of world output from the financial crisis is enormous, even though such a crisis might be considered a once in a generation, or even once in a century, event. It is not difficult to see that a crisis that reduces output by between 5% and 10% for a number of years, and occurs once every fifty years, amounts to an annual cost several multiples of the revenue that will be generated by the UK bank levy (Haldane, 2010). But how can we be certain of correctly establishing what the tax should be when we are trying to internalise costs that occur so infrequently? So although there is a sound case for a levy directed at the size of short-term borrowing, it would be foolish to regard that as the main tool to align costs and benefits of risky balance sheet activity.

If setting the appropriate price is hard, then some form of controls on quantities might be a better answer (Weitzman, 1974). For example, limits on leverage have much to commend them. And for a generation, the quantitative control of this type that regulators have embraced was embodied in the capital standards set within the Basel framework. Last month a new concordat on such standards was reached in Basel – the so-called Basel III requirements. The challenge here is to set the requirements in a way that will materially affect the probability of a crisis.

Other forms of quantitative intervention include functional separation to reduce the costs of maturity transformation by ring-fencing those activities that we are most concerned to safeguard from disruption. If successful, the costs of any failure of financial institutions would be reduced. The challenge with this approach is to prevent the costs associated

with the activity of maturity transformation from gravitating to another set of institutions – the “shadow” banking system.

Whatever solution is adopted, the aim must be to align private and social costs.

5. Why Basel III is not a complete answer

Lauded as a new standard, Basel III is seen by some as the answer to the failure of regulation to prevent the financial crisis. It is certainly a step in the right direction, an improvement on both Basel I and the ill-fated Basel II, and we should all welcome it. But if it is a giant leap for the regulators of the world, it is only a small step for mankind. Basel III on its own will not prevent another crisis for a number of reasons.

First, even the new levels of capital are insufficient to prevent another crisis. Calibrating required capital by reference to the losses incurred during the recent crisis takes inadequate account of the benefits to banks of massive government intervention and the implicit guarantee. More fundamentally, it fails to recognise that when sentiment changes only very high levels of capital would be sufficient to enable banks to obtain funding on anything like normal spreads to policy rates, as we can see at present. When investors change their view about the unknowable future – as they will occasionally in sudden and discontinuous ways – banks that were perceived as well-capitalised can seem under-capitalised with concerns over their solvency. That is what happened in 2007-08. As the IMF have pointed out differences in capital ratios failed to predict which financial institutions would be vulnerable in the crisis (IMF, 2009). Only very much higher levels of capital – levels that would be seen by the industry as wildly excessive most of the time – would prevent such a crisis.

Second, the Basel approach calculates the amount of capital required by using a measure of “risk-weighted” assets. Those risk weights are computed from past experience. Yet the circumstances in which capital needs to be available to absorb potential losses are precisely those when earlier judgements about the risk of different assets and their

correlation are shown to be wrong. One might well say that a financial crisis occurs when the Basel risk weights turn out to be poor estimates of underlying risk. And that is not because investors, banks or regulators are incompetent. It is because the relevant risks are often impossible to assess in terms of fixed probabilities. Events can take place that we could not have envisaged, let alone to which we could attach probabilities. If only banks were playing in a casino then we probably could calculate appropriate risk weights. Unfortunately, the world is more complicated. So the regulatory framework needs to contain elements that are robust with respect to changes in the appropriate risk weights, and that is why the Bank of England advocated a simple leverage ratio as a key backstop to capital requirements.

Third, the Basel framework still focuses largely on the assets side of a bank's balance sheet. Basel II excluded consideration of the liquidity and liability structure of the balance sheet, so much so that when the UK adopted Basel II in 2007, of all the major banks the one with the highest capital ratio was, believe it or not, Northern Rock. Within weeks of announcing that it intended to return excess capital to its shareholders, Northern Rock ran out of money. Basel II was based on a judgement that mortgages were the safest form of lending irrespective of how they were financed. If a business model is based around a particular funding model that suddenly becomes unviable, then the business model becomes unviable too, as events in 2007 showed. Whether the measures included in Basel III will be able to deal properly with the risks that result from inadequate levels of liquid assets and a risky structure of liabilities remains to be seen.

One criticism of Basel III with which I have no truck is the length of the transition period. Banks have up to 2019 to adjust fully to the new requirements. Although some of the calculations of the alleged economic cost of higher capital requirements presented by the industry seem to me exaggerated (Institute of International Finance, 2010), I do believe that it is important in the present phase of de-leveraging not to exacerbate the challenge banks face in raising capital today. Banks should take advantage of opportunities to raise loss-absorbing capital, and should recognise the importance of using profits to rebuild capital rather than pay out higher dividends and compensation. But we must not forget

the principle underlying the Basel approach: asking banks to maintain a buffer of capital above the minimum requirement allows them to run the buffer down in circumstances like the present. Rebuilding the buffer is a task for the future. So even though the Bank of England would have preferred an agreement to set capital ratios at higher levels in the long run, we have no intention of asking UK banks to adopt a faster timetable for implementation of Basel III. That logic should apply to any reforms we choose to implement. We should not expect to change the financial system for the better overnight. Rather we need radical reforms that will give us a much more robust system in the long run, accepting that it may take a period of many years to get there.

As with a bank levy, it is no criticism of Basel III to say that it is not a “silver bullet”. The difficulty of identifying and calibrating the difference between the private and social costs of maturity transformation means that there is merit in having a basket of different measures to rein in excessive risk-taking. In the area of financial stability, it makes sense to have both belt and braces.

6. Large Institutions

The implicit subsidy to banks that are perceived as “too important to fail” can be important to banks of any size but is usually seen as bigger for large institutions for which existing bank resolution procedures either do or could not apply. Moreover, most large complex financial institutions are global – at least in life if not in death. So a major international effort is underway to try to work out how best to deal with such institutions, initiated by heads of government at the G-20 Summit in Pittsburgh in 2009. Much of this work is being led by the Financial Stability Board. Ideas agreed in principle or under consideration include an addition to the Basel III capital requirement of an extra layer of either equity or other loss-absorbing capital, a special resolution regime for large institutions that would allow losses to be shared among creditors as well as equity-holders, and tentative steps towards international harmonisation of resolution procedures on which my colleague Paul Tucker and others are engaged.

Some countries have already started down the road of augmenting the Basel calibration with additional requirements of their own for large banks. Earlier this month the Swiss authorities announced just such a requirement for their two current systemically important banks – UBS and Credit Suisse. In future, they will have to hold additional amounts of both equity capital and loss-bearing contingent capital which takes their total holding of equity-like capital to 19%, compared with the Basel standard of 7%.

But in most other countries, identifying in advance a group of financial institutions whose failure would be intolerable, and so are “too important to fail”, is a hazardous undertaking. In itself it would simply increase the subsidy by making it explicit. And it is hard to see why institutions whose failure cannot be contemplated should be in the private sector in the first place. But if international regulators failed to agree on higher capital requirements in general, adding to the loss-absorbing capacity of large institutions could be a second-best outcome.

Solving the “too important to fail” problem will require ultimately that every financial sector entity can be left to fail without risk of threatening the functioning of the economy. So it is natural that improved resolution procedures is part of the overall strategy – and within many countries big steps forward have already been taken. But the successful resolution of a large institution would, in the absence of an implausibly large deposit insurance fund, require the ability to bail-in creditors. Yet that possibility would give an incentive to the bank to increase its dependence on short-term funding so that more creditors might get out in time. That might increase rather than decrease the fragility of the institution. So there would need to be restrictions on the maturity structure of its liabilities. Resolution would naturally go hand-in-hand with a greater reliance on instruments such as contingent capital. And there would be enormous challenges in resolving global banks that span countries with different legal jurisdictions. Extending resolution procedures to large institutions is a necessary but not sufficient condition for stability of the banking system.

7. More radical reforms

All of these potential reforms would be steps in the right direction. They would all help to put more of the costs of maturity mismatch on the shoulders of those who reap the benefits. But taxes, the Basel capital requirements, special arrangements for systemically important financial institutions and enhanced resolution procedures all have drawbacks and are unlikely to do the job perfectly. So, if we cannot rely solely on these types of measures, are there more fundamental directions in which we could move that would align costs and benefits more effectively?

One simple solution, advocated by my colleague David Miles, would be to move to very much higher levels of capital requirements – several orders of magnitude higher. A related proposal is to ensure there are large amounts of contingent capital in a bank's liability structure. Much more loss-absorbing capital – actual or contingent – can substantially reduce the size of costs that might be borne outside of a financial firm. But unless complete, capital requirements will never be able to guarantee that costs will not spill over elsewhere. This leads to the limiting case of proposals such as Professor Kotlikoff's idea to introduce what he calls "limited purpose banking" (Kotlikoff, 2010). That would ensure that each pool of investments made by a bank is turned into a mutual fund with no maturity mismatch. There is no possibility of alchemy. It is an idea worthy of further study.

Another avenue of reform is some form of functional separation. The Volcker Rule is one example. Another, more fundamental, example would be to divorce the payment system from risky lending activity – that is to prevent fractional reserve banking (for example, as proposed by Fisher, 1936, Friedman, 1960, Tobin, 1987 and more recently by Kay, 2009).

In essence these proposals recognise that if banks undertake risky activities then it is highly dangerous to allow such “gambling” to take place on the same balance sheet as is used to support the payments system, and other crucial parts of the financial

infrastructure. And eliminating fractional reserve banking explicitly recognises that the pretence that risk-free deposits can be supported by risky assets is alchemy. If there is a need for genuinely safe deposits the only way they can be provided, while ensuring costs and benefits are fully aligned, is to insist such deposits do not coexist with risky assets.

The advantage of these types of more fundamental proposals is that no tax or capital requirement needs to be calibrated. And if successfully enforced then they certainly would be robust measures. But a key challenge is to ensure that maturity transformation does not simply migrate outside of the regulated perimeter, and end up benefiting from an implicit public subsidy (Tucker, 2010b). That is difficult because it is the nature of the services – not the institutions – that is the concern. Ultimately, we need a system whereby the suppliers of funds to risky activities, whether intermediated via banks or any other entity, must understand that they will not be protected from loss by taxpayer bailouts. Creditors should know that they will bear losses in the event of failure. We certainly cannot rely on being able to expand the scope of regulation without limit to prevent the migration of maturity mismatch. Regulators will never be able to keep up with the pace and scale of financial innovation. Nor should we want to restrict innovation. But it should be undertaken by investors using their own money not by intermediaries who also provide crucial services to the economy, allowing them to reap an implicit public subsidy. It will not be possible to regulate all parts of the financial system as if they were banks. As Jeffrey Lacker, President of the Federal Reserve Bank of Richmond, has argued, “merely expanding the scope of regulation to chase those firms that extract implicit guarantees by engaging in maturity transformation would be an interminable journey with yet more financial instability in its wake” (Lacker, 2010). In the end, clarity about the regulatory perimeter is both desirable and unavoidable – a task given to the Financial Policy Committee as part of the Bank of England’s new responsibilities. And the attraction of the more radical solutions is that they offer the hope of avoiding the seemingly inevitable drift to ever more complex and costly regulation.

The broad answer to the problem is likely to be remarkably simple. Banks should be financed much more heavily by equity rather than short-term debt. Much, much more equity; much, much less short-term debt. Risky investments cannot be financed in any other way. What we cannot countenance is a continuation of the system in which bank executives trade and take risks on their own account, and yet those who finance them are protected from loss by the implicit taxpayer guarantees. The difficulty is in finding the right practical way to achieve that. Some of the solutions that economists have proposed have been dismissed by some as impractical and pie in the sky. But I am reminded of Keynes' dictum that "practical men who believe themselves to be quite exempt from any intellectual influence are usually the slaves of some defunct economist" (Keynes, 1936). Of all the many ways of organising banking, the worst is the one we have today.

I have suggested a number of ways in which the system could be reformed. But making the right choice will take much careful thought and a good deal of time. So I do not want today to offer a blueprint – and indeed that is for others to do. In the UK we are fortunate. The Independent Commission on Banking was set up earlier this year. It has outstanding members. I am sure they will lead us to the right solution, and I look forward to their findings.

8. Conclusions

There is no simple answer to the too important to fail nature of banks. Maturity transformation brings economic benefits but it creates real economic costs. The problem is that the costs do not fall on those who enjoy the benefits. The damaging externalities created by excessive maturity transformation and risk-taking must be internalised.

A market economy has proved to be the most reliable means for a society to expand its standard of living. But ever since the Industrial Revolution we have not cracked the problem of how to ensure a more stable banking system. We know that there will always be sharp and unpredictable movements in expectations, sentiment and hence valuations of financial assets. They represent our best guess as to what the future holds, and views

about the future can change radically and unpredictably. It is a phenomenon that we must learn to live with. But changes in expectations can create havoc with the banking system because it relies so heavily on transforming short-term debt into long-term risky assets. For a society to base its financial system on alchemy is a poor advertisement for its rationality.

Change is, I believe, inevitable. The question is only whether we can think our way through to a better outcome before the next generation is damaged by a future and bigger crisis. This crisis has already left a legacy of debt to the next generation. We must not leave them the legacy of a fragile banking system too.

I have explained the principles on which a successful reform of the system should rest. It is a program that will take many years, if not decades. But, as Bagehot concluded in *Lombard Street*, “I have written in vain if I require to say now that the problem is delicate, that the solution is varying and difficult, and that the result is inestimable to us all.”

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Table 1: Top 10 UK-headquartered commercial banks, 1960 and 2010

1960

Institution	Total assets (GBP billions)	Assets as a percentage of GDP (percent) ⁽⁷⁾	Assets as a percentage of total banking sector assets (percent) ⁽⁸⁾
Barclays Bank Ltd plus affiliated banks ⁽¹⁾	2.5	10	17
Midland Bank Ltd plus affiliated banks ⁽²⁾	2.0	8	13
Lloyds Bank Ltd plus affiliated banks ⁽³⁾	1.8	7	12
Westminster Bank Ltd plus affiliated banks ⁽⁴⁾	1.3	5	8
National Provincial Bank Ltd plus affiliated banks ⁽⁵⁾	1.1	4	7
Royal Bank of Scotland Ltd plus affiliated banks ⁽⁶⁾	0.4	2	3
Martins Bank Ltd	0.4	1	3
Standard Bank of South Africa Ltd	0.4	1	2
Chartered Bank Ltd	0.3	1	2
Union Discount Company of London	0.3	1	2
Total	10.5	40.0	69.0

2010⁽⁹⁾⁽¹⁰⁾

Institution	Total assets (GBP billions)	Assets as a percentage of GDP (percent) ⁽¹⁴⁾	Assets as a percentage of total banking sector assets (percent) ⁽¹⁵⁾
Royal Bank of Scotland Group	1,696	122	26
Barclays Group ⁽¹¹⁾	1,526	110	23
HSBC Holdings Group ⁽¹²⁾	1,463	105	22
Lloyds Banking Group	1,027	74	16
Standard Chartered Group ⁽¹²⁾	270	19	4
Nationwide Building Society	191	14	3
Northern Rock PLC	87	6	1
Bradford and Bingley PLC ⁽¹³⁾	49	4	1
The Co-Operative Bank	46	3	1
Yorkshire Building Society	23	2	0
Total	6,378	459.0	97.3

Sources: 'The Bankers' Almanac and Year Book 1961-62', and Bank of England calculations.

(1) Includes Barclays Bank (Dominion, Colonial and Overseas) and British Linen Bank in addition to Barclays Bank Ltd.

(2) Includes Belfast Banking Company Ltd, Clydesdale & North of Scotland Bank Ltd and Forward Trust Ltd in addition to Midland Bank Ltd.

(3) Includes Olds Discount Company Ltd in addition to Lloyds Bank Ltd.

(4) Includes Ulster Bank in addition to Westminster Bank Ltd.

(5) Includes Coutts & Co, Isle of Man Bank Ltd, North Central Wagon & Finance Company Ltd in addition to National Provincial Bank Ltd.

(6) Includes Glynn, Mills & Co, Williams Deacon's Bank Ltd in addition to Royal Bank of Scotland Ltd.

(7) Nominal GDP at market prices (£26bn). Source: ONS.

(8) Total is calculated for all UK headquartered banks reporting total assets in sterling in 1961-62 Bankers' Almanac (excluding BoE). The total number (after accounting for affiliates) is 71; the total size is £15.15bn. Total does not account for private banks / partnerships which did not report total assets in Bankers' almanac.

(9) Year end 2009 data is used. UK banks are considered to be banks where the ultimate parent company is headquartered in the UK, irrespective of where its main activities are. This approach results in Santander UK not appearing on the list (Santander UK's total assets were £288bn at year end 2009).

(10) Group / consolidated statements are used for all institutions.

(11) This figure includes total assets of Standard Life Bank, which was acquired in January 2010.

(12) Originally reported figures converted at period end exchange rates.

(13) Does not include the parts of Bradford and Bingley transferred to Santander UK.

(14) Nominal GDP at market prices (£1,393bn). Source: ONS.

(15) The total assets figure includes 26 banks headquartered in the UK plus 50 building societies. The 26 banks are chosen by eliminating foreign owned banks from 2008 Banker's Almanac list. The total asset number is £6,520bn. Assets of all foreign owned subsidiaries' assets are not included in the total asset figure, and hence the total size of the banking system here is slightly different to the size of the banking system referred to in the first paragraph of "The practice of banking" section.

Table 2: Top 10 US-headquartered commercial banks, 1960 and 2010^(a)

1960			
Institution	Total assets (USD billions)	Assets as a percentage of GDP (percent)	Assets as a percentage of total banking sector assets ^{(b)(c)} (percent)
Bank of America	11.2	2.1	4.4
Chase Manhattan Bank	8.4	1.6	3.3
First National City Bank of New York	8.2	1.6	3.2
Manufacturer's Hanover Trust Company ^(e)	5.9	1.1	2.3
Morgan Guaranty Trust Company	4.1	0.8	1.6
Chemical Bank New York Trust Company	4.1	0.8	1.6
Security First National Bank	3.4	0.7	1.3
Bankers Trust Company	3.1	0.6	1.2
First National Bank of Chicago	3.0	0.6	1.2
Bank of California	0.7	0.1	0.3
Total	52.1	9.9	20.3

2010			
Institution	Total assets (USD billions)	Assets as a percentage of GDP ^(d)	Assets as a percentage of total banking sector assets ^{(b)(c)} (percent)
Bank of America	2,363.9	16.7	19.7
JP Morgan	2,014.0	14.3	16.8
Citigroup	1,937.7	13.7	16.2
Wells Fargo	1,225.9	8.7	10.2
US Bancorp	283.2	2.0	2.4
PNC Financial Services.	261.8	1.9	2.2
Bank of New York Mellon	235.9	1.7	2.0
Suntrust banks	170.7	1.2	1.4
BB&T corporation	155.1	1.1	1.3
State Street	160.7	1.1	1.3
Total	8,809	62.4	73.6

Sources: 'The Bankers' Almanac and Year Book 1961-62', Federal Reserve System and US Bureau of Economic Analysis and Janicki H P and Prescott E S (2006).

(a) Data as at end-Q2 2010.

(b) Total assets of firm as a percentage of total domestically-owned banks' assets, on a consolidated basis.

(c) Banking sector data based on FDIC data for insured commercial banks.

(d) GDP data as at end-2009.

(e) Data for 1961.

Table 3: Spreads on 5-year senior unsecured debt for large US and UK commercial banks^{(a)(b)}

Institution	Currency ^(c)	Spread (basis points) ^(d)			Change to August 2010 since (basis points):		Memo	
		Jan-07	Oct-08	Aug-10	Jan-07	Oct-08	Max	Date
<i>UK banks</i>								
RBS	GBP	51	343	228	177	-115	404	08/04/09
Barclays	EUR	-	220	144	-	-76	445	05/12/08
LBG	GBP	74	270	219	145	-51	510	18/03/08
Santander ^(e)	EUR	22	196	169	148	-27	266	08/06/10
Nationwide	USD	59	395	158	99	-238	519	22/05/09
Northern Rock	GBP	45	420	316	271	-104	742	02/09/09
The Co-operative bank	GBP	104	432	260	156	-171	614	29/12/08
<i>US banks</i>								
Bank of America	USD	42	382	244	201	-138	715	10/04/09
JP Morgan	USD	55	334	162	107	-172	371	13/10/08
Citigroup	USD	51	523	231	180	-292	659	12/03/09
Wells Fargo	USD	56	355	149	93	-207	488	01/04/09
US Bancorp	USD	62	222	86	24	-136	394	09/03/09
Bank of New York Mellon	USD	76	330	81	6	-249	382	14/04/09
Suntrust banks	USD	64	551	263	199	-288	588	03/11/08

Source: UBS Delta.

(a) Spreads to government bonds. Spread at five-year maturity estimated based on spreads on senior unsecured debt securities in issue for firm. Spread may not in all cases reflect the cost of funding actually faced by a firm, in particular where the number and liquidity of securities outstanding is small. Blank indicates data not available.

(b) Data have been revised since this speech was originally given to reflect refinements to the data originally supplied by UBS Delta.

(c) Where a firm issues senior unsecured debt in more than one currency the currency quoted here is chosen based on the depth of outstanding issuance between January 2007 and August 2010.

(d) Monthly average.

(e) Although it is not headquartered in the UK, Santander is included in the UK banks peer group because of the significance of its operations in the UK.

Table 4: 5-year senior CDS premia for large US and UK commercial banks

Selected UK banks (basis points)	Jan 07 average	Oct 08 average	Aug 10 average	Change 10 - 07	Change 10 - 08	Max value	Max date
RBS	4	157	175	170	17	325	29/09/08
Barclays	6	109	114	108	6	240	24/02/09
HSBC	5	85	91	85	6	202	16/03/09
Lloyds Banking Group	4	100	179	175	80	250	08/06/10
Standard Chartered	7	141	83	76	-58	354	16/03/09
Nationwide	9	157	135	127	-22	289	03/10/08
Northern Rock	N/A	N/A	192	N/A	N/A	221	08/02/10
Co-operative Financial Services	13	470	265	252	-205	333	25/09/09
Santander	N/A	97	150	N/A	53	260	08/06/10
Clydesdale (National Australia Bank)	6	129	105	98	-25	225	10/03/09

Selected US banks (basis points)	Jan 07 average	Oct 08 average	Aug 10 average	Change 10 - 07	Change 10 - 08	Max value	Max date
Bank of America	9	136	149	140	13	321	08/04/09
JPMorgan Chase & co	15	121	96	80	-25	183	08/04/09
Citigroup	8	243	165	158	-78	621	08/04/09
Wells Fargo & Company	7	123	97	90	-26	288	08/04/09
US Bancorp	8	144	71	63	-74	249	19/05/09
PNC Financial Services Group Inc	20	N/A	78	58	N/A	296	13/04/09
Bank of New York Mellon Corp	N/A	N/A	73	N/A	N/A	100	12/05/09
Suntrust Banks	11	250	168	157	-82	323	24/07/09
BB&T corp	14	224	71	58	-153	200	02/07/09
State Street	20	147	149	129	2	197	15/10/09

Source: Markit

Note: Max value is drawn from the period 1 Jan 07 to current