THE FUTURE OF FINANCE

And the theory that underpins it

5 How should we regulate the financial sector?

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Chapter 5
How should we regulate bank capital and financial products? What role for 'living wills'?

Charles Goodhart

Financial regulation is normally imposed in reaction to some prior crisis, rather than founded on theoretical principle. In the past regulation has been deployed to improve risk management practices in individual banks. This was misguided. Instead, regulation should focus first on systemic externalities (contagion) and second on consumer protection (asymmetric information). The quantification of systemic externalities is difficult. Since the costs of financial breakdown is high, a natural response is to pile extra regulation onto a set of regulated intermediaries, but this can impair their capacity to intermediate and leads onto border problems, between regulated and unregulated and between different national regulatory systems.

A. Introduction

Financial regulation has always been a-theoretical, a pragmatic response by practical officials, and concerned politicians, to immediate problems, following the dictum that "We must not let that happen again". When the Basel Committee on Banking Supervision (BCBS) was established in 1974/75, to handle some of the emerging problems of global finance and cross-border banking, the modus operandi then developed was to hold a round-table discussion of current practice in each member state with the objective of trying to reach an agreement on which practice was 'best', and then to harmonise on that. Little, or no, attempt was made to go back to first principles, and to start by asking why there should be a call for regulation on banking, whether purely domestic or cross-border, in the first place.

Thus Basel I, the Accord on Capital Regulation in 1988, was propelled by concern that many of the major international banks, especially in the USA, would have been made insolvent, under a mark-to-market accounting procedure, by the MAB (Mexican, Argentina, Brazil) default crisis of 1982. Congress wanted to impose higher capital regulations on US banks, but was deterred by the 'Level Playing Field' argument that any unilateral move would just shift business to foreign, especially to Japanese, banks. Hence the appeal to the BCBS. Again little, or no, attempt was made to explore what was the fundamental need for holding capital, or what might be its optimal level (see Hellwig, 1996 and 2008). The target of 8% was the outcome of a balance between a desire to prevent, and if possible to reverse, the prior long decline in that ratio counteracted by a concern that any sharp rise in the required ratio above pre-existing levels could force

banks into de-leveraging and a slow-down on bank lending, which would be bad for the economy. It was a thoroughly practical compromise.

Basel I was hammered out by Central Bank officials behind closed doors, with little input from the commercial banks, the regulated. When, however, those same Central Bank practitioners sought to move on from attention to credit risk, the sole focus of Basel I, to a wider range of risks, notably market risk, in the mid-1990s their initial, *de haut en bas*, 'building block' approach to such risks was rejected by the commercial banks on the grounds that it was technically antediluvian, and that the banks had a much more up-to-date methodology of risk assessment, notably Value at Risk (VaR), (n.b. VaR was itself derived from earlier developments in finance theory by economists such as Markowitz and Sharpe). The officials seized on this eagerly. It enabled regulation to be based on the precept that each individual bank's own risk management should be brought up to the level of, and harmonised with, those of the 'best' banks, and had the added bonus that the methodology of regulation could be rooted in the (best) practices of the most technically advanced individual banks. The implicit idea was that if you made all banks copy the principles of the best, then the system as a whole would be safe. Hardly anyone critically examined this proposition, and it turned out to be wrong.

It was wrong for two main associated reasons. First, the risk management concerns of individual banks are, and indeed should be, quite different from those of regulators. A banker wants to know what his/her individual risk is under normal circumstances, 99% of the time. If an extreme shock occurs, it will anyhow be for the authorities to respond. For such normal conditions, the VaR measure is well designed. But it does not handle tail-risk adequately, (see Danielsson 2002). It is the tail risk of such extreme shocks that should worry the regulator.

Next, the whole process focussed on the individual bank, but what should matter to the regulator is systemic risk, not individual risk. Under most measures of individual risks, each individual bank had never seemed stronger, as measured by Basel II and mark-to-market accounting, than in July 2007, on the eve of the crisis; Adair Turner emphasizes that CDS spreads on banks generally reached their all-time minimum then.

B. The Rationale for Regulation

Bankers are professionals. It should not be for the government, or for delegated regulators, to try to determine how much risk they take on board, nor to set out the particular way that they assess such risks, so long as any adverse fall-out from adverse outcomes is internalised amongst themselves and their professional investors, debt or

equity holders. Under these circumstances the authorities have no locus for any intervention, however risky the bank's business plan may seem.

This immediately indicates two of the three theoretical reasons for regulation/supervision, which are externalities and the protection of non-professional consumers of banking services (asymmetric information). There is a third reason for regulation, i.e. the control of monopoly power, but, with a few minor exceptions, e.g. access to Clearing Houses, this is not a relevant concern in the financial system. All this is set out at greater length in the Geneva Report (2009) on 'The Fundamental Principles of Financial Regulation'. Although externalities are the more important concern, in terms of the potential loss to society from lack of, or inappropriate, regulation/supervision, it is, perhaps, easiest to begin with customer protection (asymmetric information).

(1) Asymmetric Information

The expertise of professionals, whether doctors, lawyers, independent financial advisors or bankers lies in their presumed greater knowledge. Since obtaining such knowledge is time-consuming and costly, the client is by definition at a disadvantage. In many cases we only need professional help rarely, but when we do it is vital, so repetition is not a safeguard. Schleifer (2010), 'Efficient Regulation' asks why a Coaseian appeal to the courts could not replace regulation in such circumstances and answers that the legal process is too time-consuming, costly and uncertain. Again while disclosure, and enforced dual capacity (i.e. the separation of advice from execution) can be partial safeguards, the former depends on the customer having the time/intelligence to interpret what is disclosed, and the latter adds greatly to the expense.

Moreover, when some shock makes depositors realise (eventually) that their bank may be in trouble, a run ensues, and once a run is perceived it is always rational to join it. With a fractional reserve banking system, any such run is likely to cause the bank involved to fail, unless supported by the Central Bank. If the losses from such a failure was entirely internalised that would only matter to that one bank's clients, and, apart from customer protection, would not matter (much) to the wider economy; but in many (but not all) cases there are serious externalities arising from such a bank failure.

So, there are two reasons to adopt deposit insurance, at least for non-professional retail depositors, both to protect customers and to prevent bank runs. Insurance is both costly and provokes moral hazard. So the regulator/supervisor, who should themselves also be professionals, should, in principle, like any other professional investor, be in a position to assess the relative risk of the provision of such insurance and charge an appropriate levy or premium for so doing. In practice this has not happened in the past. No one can measure risk accurately in an uncertain (non-ergodic) world, so any attempt to do so has been put in the 'too difficult' category. Instead, insurance premia have usually been related, on a flat rate basis, to total insured deposits at a low, historically

related, level. Following the recent crisis and the Obama (January 2010) initiative in proposing a tax on banks, that may now change with a possibly wide-spread introduction of bank taxes in many countries, one would hope ex ante rather than ex post, and risk-related rather than flat rate, or related to transactions (Tobin tax). We will see.

Some commentators have argued that the introduction of a risk-related bank levy is all that is needed to provide incentives for bankers to be appropriately prudent, and to provide a fund to support financial intermediaries that are too big to fail (TBTF), so that otherwise, and apart from other consumer protection measures, all other regulation/supervision could be removed. This is not so, since it ignores the role and importance of externalities, to which we now turn.

(2) Externalities

Any market action taken by one player in a market is always likely to affect the economic position of all the other players in that market. If I buy (sell) an asset, its price will tend to rise (fall) and the current wealth of all players, as measured by current market prices tends to increase (fall). If I am more defensive (aggressive) in my lending practices by seeking more (less) collateral from my prospective borrowers, they in turn can purchase and hold fewer (more) assets, thereby lowering (raising) asset prices more generally. If I want to hold safer (riskier) assets, the risk spreads, and often the volatility, of riskier assets rises (falls), making such assets appear even riskier (less risky) in the market. Such pecuniary effects of market adjustments do not in themselves represent social externalities, nor are causes of systemic contagion, but can become so, in particular when extreme losses result in bankruptcies and liquidation, as described subsequently.

There are many such self-amplifying spirals in our financial system (See, for example, Adrian and Shin, 2008, Brunnermeier and Pedersen, 2005, and Geneva Report, 2009). Such inherent pro-cyclicality becomes more immediately apparent when accounting is done on a fair value, mark-to-market basis. This is not, however, a knock-down argument against the adoption of such a measuring rod, since many partially informed (wholesale) counterparties, who are the most likely to run, can imagine the effect of current market price changes on underlying wealth, and, given the uncertainty, their imagination may lead to a picture worse than the reality. Anyhow if accounting is not to be at a ‘fair’ value, what ‘unfair’ value would be preferable? The conclusion from such considerations must surely be that a better way to handle pro-cyclicality is to introduce contra-cyclicality into our macro-prudential regulations, a theme taken further in the accompanying Chapter by Large and Smithers (2010).

Such self-amplifying market spirals would not matter in themselves, except to those directly involved, if all such losses/gains were internalised. There would then be no social externalities. This would be the case if all such losses/gains fell on shareholders, which would be so if all assets were backed by equity capital, or if the equity holders had

unlimited liability (and the wealth to meet all debts). Indeed, in the early days of banking, until about 1850 in many countries, this was the intention of policy towards banks. As the scale of industry increased, however, relative to the size and the willingness and ability of the small, unlimited liability, private partnership banks to extend sufficient medium-term credit to such enterprises, a conscious choice was made to move towards limited liability joint stock banks, whose resulting greater riskiness was to be held in check by more transparency in their accounts and by external regulation.

The insiders, the executives, of any business know far more about it than everyone else, and are liable to use that information to extract rents from outsiders. That fact of life is the ultimate reason both for banks, who (should) have a comparative advantage in obtaining information about borrowers, and for the existence of certain contracts, e.g. fixed interest debt (and fixed nominal wage), whose purpose is to economise on information by imposing legal penalties on the borrower (employer) when she fails to meet the terms of the contract, in the guise of bankruptcy (and/or renegotiation under duress).[1] Unfortunately the societal costs of such bankruptcies are generally enormous in the case of large, inter-connected financial intermediaries, so much so that, following the bankruptcy of Lehman Bros in September 2008, it has been accepted by most governments that such intermediaries are indeed too big to close in bankruptcy (Too Big to Fail; TBTF). What are these costs? There are, perhaps, five such sets of costs:-

(i) The direct costs of using legal/accounting resources to wind down the enterprise. These can be sizeable.

(ii) The potential dislocation to financial markets and settlement/payment systems.

(iii) The loss of the specialised skills/information of those working in the bankrupt institution. Many will be deployed in similar jobs elsewhere after a time, but even so the loss could be considerable.

(iv) The immediate uncertainty, and ultimate potential loss, for all counterparty creditors of the financial intermediary. This will not only include bank depositors and those with insurance claims, but also those with uncompleted transactions, pledged or custodian assets, other forms of secured or unsecured debt, etc., etc. Even when the ultimate loss may be quite small (as for example in the case of Continental Illinois), the interim inability to use the frozen assets and the uncertainty both about the ultimate timing of, and the valuation at, their release can be severe.

(v) Besides creditors of the failing financial intermediary, potential debtors generally have an explicit or implicit agreement with the intermediary to borrow more, i.e. unused credit facilities. These disappear instantaneously on bankruptcy. While these may, or may not, be capable of replication elsewhere, this would take time, effort and perhaps extra cost. In the meantime potential access to money is lost.

[1] This essentially is the reason why the proposals by L. Kotlikoff with various colleagues, Chamley, Ferguson, Goodman and Leamer, (2009) to transform all banking into mutual-fund, equity-based banking is a non-starter.

Some of our colleagues, notably John Kay in his accompanying Chapter, (also see Kay, 2010, and the Treasury Select Committee, 2010), focus on the bankruptcy costs falling on bank depositors and payments systems, and argue that, once these are protected, no other financial intermediary need be regulated, or protected from bankruptcy. In my view that is to take far too narrow a view of the costs of bankruptcy. Lehman Bros was a 'casino' bank with few, if any, retail deposits and few links with the payment system. In the crisis of 2007-9, hardly any bank depositor lost a cent, and, following government guarantees, none need now expect to do so. In contrast, the crisis both generated, and was in turn deepened by, a sharp reduction in access to credit and a tightening in the terms on which credit might be obtained. A capitalist economy is a credit-based economy, and anything which severely restricts the continuing flow of such credit damages that economy. A sole focus on (retail) depositor protection is not enough.

One of the purposes of this section of this Chapter is to demonstrate that the social externalities that provide a rationale, (beyond consumer protection), for financial regulation are intimately related to the governance structure of financial intermediaries, to which we now turn, and to the form, structure and costs of bankruptcy, to which we shall turn later.

C. The Governance Structure of Banks

There is no call for a generalised reversion to unlimited liability for the shareholders of banks, though there is a degree of regret about the earlier switch of the large investment houses (broker/dealers) in the USA from a partnership status to incorporation as a public company. Especially in view of the recent crisis, it would be impossible to raise sufficient equity funding to finance our financial intermediaries on an unlimited liability basis. In view, moreover, of the nature of a limited liability shareholding, equivalent to a call option on the assets of the bank, shareholders will tend to encourage bank executives to take on riskier activities, particularly in boom times. Northern Rock was a favourite of the London Stock Exchange until just a few months before it collapsed. It is, therefore, a mistake to try to align the interests of bank executives, who take the decisions, with those of shareholders, (Bebchuk and Fried, 2009, and Bebchuk and Spamann, 2010). Indeed as Beltratti and Stulz (2009) have shown, it was banks with the most shareholder friendly governance structures who tended to do worst in the recent crisis.

The payment structures for those in Wall Street and the City have been, arguably, more appropriate for a partnership structure than for limited liability. The wrath of the public was related more to the continuation of high remuneration following widespread disaster, than to the massive bonus rewards in good times. This raises the question

whether more could be done to make (at least part of) the remuneration of bank executives once again more akin to unlimited liability, for example by some extended claw-back system (Squam Lake, 2010), by making bonus payments subject to unlimited liability (Record, FT, 2010), or by requiring such executives' pensions to be invested wholly in the equity of their own bank, (a suggestion once made by G. Wood). The case for doing so, however, rests, as yet, in some large part on public perception of what would be ethically appropriate, rather than on much empirical evidence that existing payment structures for bank executives led them consciously to take risks in the expectation that their bank would be bailed out by the taxpayer (Fahlenbrach and Stulz, 2009). The evidence is, instead, that top management were generally simply unaware of the risks that they were taking, (but maybe in some cases they just did not want to know; in booms the warnings of risk managers can get brushed aside).

If there are limits to the extent that it is possible to lessen the social cost of bankruptcy by a reversion to unlimited liability, for shareholders or bank executives, then it may be possible to do so by increasing the ratio of equity to debt, i.e. reducing leverage, thereby allowing a larger proportion of any loss to be internalised. Moreover, the properly famous Modigliani/Miller theorem states (Modigliani and Miller, 1958) that, under some carefully structured assumptions, the value of a firm should be independent of its capital (liability) structure. The basic intuition is that, as equity capital increases proportionality, the risk premium on debt should fall away *pari passu*.

One reason why this does not happen is that debt is deductible for tax, so a shift from debt to equity gives up a tax wedge. While the tax advantages of debt are occasionally reconsidered – it was once mooted that the UK shadow-Chancellor was thinking along these lines – the international disadvantages of doing so unilaterally would be overwhelming, and there is no likelihood of this being enacted at an international level. The other main reason for debt to be seen as more advantageous is that the benefits of avoiding bankruptcy costs are social (external) rather than internalised, and that the implicit, or explicit, provision of safety nets for TBTF intermediaries, e.g. in the guise of liquidity and solvency support, guarantees and outright insurance, are not priced, yet.

This leads on to three (at least), not mutually exclusive, considerations. First, that, since the benefits of more equity, in avoiding bankruptcies in TBTF intermediaries are mostly social while the costs are private, society has the right to impose regulations, e.g. on capital, liquidity and margins, that should make the possibility of bankruptcy more remote. Such regulation is reviewed in the next Section. Second, that since part of the problem is that the generalised insurance provided to TBTF intermediaries is not priced, a (partial) solution would be to price the risk of such insurance having to be provided, by having a specific risk premium levied. Such a response took a giant step forward when President Obama proposed a specific tax on banks in January 2010. To be sure this was only in small part risk-related, and to be levied on an ex post, not an ex ante, basis and so

incapable of affecting behavioural incentives. Even so, it opened the door to consider how a more careful assessment of what a risk-related, ex ante tax/levy might be designed.

A major objection to this line of attack is that bureaucrats and regulators will never be able to price risk appropriately, and so TBTF intermediaries will engage in regulatory arbitrage. A suggestion put forward by Acharya, et al. (2009 and 2010) is to require the private sector to price the insurance, but who would then insure the insurers? Acharya, et al., respond by suggesting that the private sector only provide a small percentage of such insurance, say 5%, large enough to get them to do the exercise carefully, but small enough for them to absorb any resulting loss without domino contagion. Meanwhile the public sector would provide the bulk of the insurance, but at a price determined by the private sector.

The third approach is to require, or to encourage, more equity to be obtained by TBTF intermediaries, not all the time but only at times of impending distress. The main version of this is the proposal to require banks to issue debt convertible into equity at times of distress, i.e. conditional convertible debt, or CoCos, (Squam Lake, 2009). While there has been some enthusiasm for this in principle, the details of its operation, (e.g. triggers, pricing and market dynamics) still need to be worked out, and the relative advantages of CoCos compared with counter-cyclical macro-prudential capital requirements considered in more detail.

Another version of this general approach has been put forward by Hart and Zingales (2009), who suggest that, whenever a TBTF intermediary's CDS spread rises above a certain level, it then be required to raise more equity in the market, or be closed. This can be viewed both as another version of prompt corrective action, (trying to deal with a failing TBTF intermediary before it runs into insolvency), which general idea is dealt with further in the final Section of this Chapter, and also as a way to require banks to obtain more capital at times of distress. The problem with this particular proposal is that, in my view, the resulting market dynamics would be disastrous. A bank breaking the trigger would be required to issue new equity at a moment when the new issue market would be likely to be unreceptive, driving down equity values. That example would lower equity values, and raise CDS spreads, on all associated banks. It would, in my view, lead almost immediately to the Temporary Public Ownership (nationalisation) of almost all banks in a country.

What is surprising, to me, is the enthusiasm of so many economists to conjure up quite complex financial engineering schemes to deal with such problems, when simpler and/or older remedies exist. Why not just require that no TBTF intermediary can pay a dividend, or raise executive compensation (on a per capita basis) when disastrous conditions prevail, (Goodhart, et al., 2010). One problem with this is that if distress conditions are defined on an individual bank basis, it would provide even more incentive

for manipulating accounting data; while, if done on an overall national basis, it would both have a differential impact on foreign vis a vis domestic banks and unfairly penalise the relatively prudent and successful banks. Perhaps an answer would be to make the requirement only effective when both of these conditions are triggered at the same time.

Another older proposal was to make the equity holder liable for a call for additional capital up to some amount, usually the par value of the share. While commonly adopted in the USA in earlier years, this fell into disuse after the 1930s, having failed to avert bank failures then. Moreover, it can lead to the net present value of a share becoming negative, leading not only to a collapse in equity values, but also to such equities being unloaded onto the ignorant.

What I observe (Goodhart, 2010) is that Europeans tend to focus more on the first of these mechanisms for reducing the frequency and costs of TBTF and bankruptcy in the guise of financial regulations. In contrast, Americans tend to put more emphasis on the second and third mechanism, i.e. introducing and pricing insurance via some kind of market mechanism. This reflects the greater scepticism of Americans about the efficacy of bureaucratic regulation, and the greater scepticism of the Europeans of the efficiency of market mechanisms.

However sceptical one may be about the efficacy of financial regulation, it is certain that one response of the recent crisis will be to tighten and to extend such regulation, and it is to this that we now turn.

D. Tighter Regulation

Any fool can make banks safer. All that has to be done is to raise capital requirements (on risk-weighted assets) and introduce (or constrict) leverage ratios, re-establish appropriate liquidity ratios and apply higher margins to leveraged transactions, such as mortgage borrowing (i.e. loan to value, LTV, and/or loan to income, LTI, ratios). Why then have our banks, and other systemic financial intermediaries, not been made safer already; just foolish oversight? The problem is that there is a cost to regulation; it puts banks into a less profitable, less preferred position, in their activities as intermediaries. Their previous preferred position may well have been partially due to receiving rents from the underpricing of social insurance to TBTF intermediaries. But even so, if such rents are removed, either by regulation or by pricing such risks, bank intermediation will become less profitable. If so, such intermediation will become considerably more expensive, i.e. higher bid/ask spreads, and less of it will be done, bank lending will continue to contract; a credit-less recovery then becomes more likely, as the IMF has warned (Cardarelli et al., May 2009).

Many of the problems in our financial system have arisen because the trend growth of lending (credit expansion) has decisively exceeded the trend growth in retail bank deposits in recent decades, Schularick and Taylor (2009), see their Table 1, p. 6, part of which is reproduced, below:-

Table 1: Annual Summary Statistics by Period

	Pre-World War 2			**Post-World War 2**		
	N	Mean	s.d.	N	mean	s.d.
Δ log Money	729	0.0357	0.0566	825	0.0861	0.0552
Δ log Loans	638	0.0396	0.0880	825	0.1092	0.0738
Δ log Assets	594	0.0411	0.0648	825	0.1048	0.0678
Δ log Loans/Money	614	0.0011	0.0724	819	0.0219	0.0641
Δ log Assets/Money	562	0.0040	0.0449	817	0.0182	0.0595

Notes: Money denotes broad money. Loans denote total bank loans. Assets denote total bank assets. The sample runs from 1870 to 2008. War and aftermath periods are excluded (1914-19 and 1939-47), as is the post-WWI German crisis (1920-25). The 14 countries in the sample are the United States, Canada, Australia, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden and the United Kingdom.

This has induced banks to respond in three main ways:-

(i) To replace safe public sector debt by riskier private sector assets;

(ii) To augment retail deposits by wholesale funding, with the latter often at a very short maturity because it is both cheaper, and easier to get whenever markets get nervous;

(iii) To originate to distribute by securitising an increasing proportion of new lending.

The danger to leveraged intermediaries from illiquidity is now being increasingly realised. Failure then arises from a combination of concern about ultimate solvency, which prevents other ways of raising new funds in the market, and illiquidity, the inability to pay bills coming due, which finally pushes institutions at risk over the edge. In a comparison of failing and more successful banks over the course of the recent crisis, [IMF Global Financial Stability Report, 2009] capital ratios, in the immediately preceding period before the crisis event, did not show any significant difference! This suggests, but certainly does not prove, that the older (pre-1970s and pre-global finance) penchant for

putting much more weight on liquidity ratios, and perhaps slightly less on capital ratios, might be sensible.

There is a counter-argument, advanced by Willem Buiter (2008). This is that any asset is liquid if the Central Bank will lend against it. But the Central Bank can lend against anything. So long as the Central Bank takes an expansive approach to its own role as Lender of Last Resort, there should be no need for specific liquidity requirements. Interestingly Willem Buiter (2009) more recently came up with an entirely contrary argument, following Marvin Goodfriend (2009), that the Central Bank should restrict its operations to dealing in public-sector debt, because of the quasi-fiscal implications of dealing in private sector assets. I do not believe that either, but it does raise the point that operations, (whether outright purchases, or lending against collateral), in private sector debt with narrower and more volatile markets, and hence less certain valuation, does raise the question of what price and terms should be offered by the Central Bank. Too generous terms and it provides a subsidy to the banks, and a potential cost and danger to both the Central Bank and the taxpayer. Too onerous terms, and it would not help the banks or encourage much additional liquidity injection. The advantage of having banks hold a larger buffer of public sector debt is that it both finesses the problem for the Central Bank of pricing its liquidity support and provides all concerned with more time to plan their recovery strategy.

A liquidity requirement is an oxymoron. If you have to continue to hold an asset to meet a requirement, it is not liquid. What is needed is a buffer, not a minimum requirement. There is a story of a traveller arriving at a station late at night, who is overjoyed to see one taxi remaining. She hails it, only for the taxi driver to respond that he cannot help her, since local bye-laws require one taxi to be present at the station at all times! If the approach towards making banks to be safer is primarily through some form of insurance premia, a pricing mechanism (Perotti and Suarez, 2009), then the levy imposed on the TBTF intermediary can be an inverse function of its liquidity ratio, (possibly amongst other determinants). If the mechanism is to be external regulation, then the objective should be to ensure that it acts as a buffer, not a minimum. That should involve quite a high 'fully satisfactory' level with a carefully considered ladder of sanctions as the liquidity ratio becomes increasingly impaired. Devising a ladder of sanctions is essential and much more critical than the arbitrary choice of a satisfactory level at which to aim. It was the prior failure of the BCBS to appreciate this crucial point that vitiated much of their earlier work.

To recapitulate, there is a trade-off between the extent and degree of regulation on banks, to make them safer, and their capacity to intermediate between lenders and borrowers, in particular their ability to generate credit flows on acceptable terms to potential borrowers. One possible way to combine a smaller/safer banking system with a larger flow of credit is to restart securitisation, the practice of originate to distribute. A problem with this latter is that it largely depended on trust that credit qualities were

guaranteed by the ratings agencies, due diligence by the originators and liquidity enhancement by the support of the parent bank. Absent that trust, the duplication of information can be horrendously expensive. The attempt to restore trust, notably in due diligence, by requiring banks to hold a (vertical) share of all tranches in a securitised product can make the whole exercise less attractive to potential originators. So, the market for securitisation remains becalmed.

Thus, the ability of our financial system to generate credit growth well in excess of deposit growth may be at an end, at a time when deposit growth itself may slow. Phasing the new regulation in gradually over some transitional period may do little more than prolong the adjustment. Quite how the financial system, and the broader economy, may adjust to this is far from clear. What is more worrying is that in the rush to re-regulate and to 'bash the bankers' far too few participants are thinking about such structural problems.

Such structural problems are not, alas, the only ones facing regulators. We turn next to some of these.

E. The Border Problems

There are several generic problems connected with financial regulation. Amongst them, two perennial problems are connected with the existence of important, but porous, borders , or boundaries. The first such boundary is that between regulated and non-regulated (or less regulated) entities, where the latter can provide a (partial) substitute for the services of the former. The second, key, border is that between States, where the legal system and regulatory system differs from state to state.

I have dealt with the first boundary problem at some length, in the National Institute Economic Review (2008) and in the Appendix to the Geneva Report (2009). Forgive me for reproducing a few paragraphs of this:-

> *"In particular if regulation is effective, it will constrain the regulated from achieving their preferred, unrestricted, position, often by lowering their profitability and their return on capital. So the returns achievable within the regulated sector are likely to fall relative to those available on substitutes outside. There will be a switch of business from the regulated to the non-regulated sector. In order to protect their own businesses, those in the regulated sector will seek to open up connected operations in the non-regulated sector, in order to catch the better opportunities there. The example of commercial banks setting up associated conduits, SIVs and hedge funds in the last credit bubble is a case in point.*

But this condition is quite general. One of the more common proposals, at least in the past, for dealing with the various problems of financial regulation has been to try to limit deposit insurance and the safety net to a set of 'narrow banks', which would be constrained to hold only liquid and 'safe' assets. The idea is that this would provide safe deposits for the orphans and widows. Moreover, these narrow banks would run a clearing-house and keep the payments' system in operation, whatever happened elsewhere. For all other financial institutions outside the narrow banking system, it would be a case of 'caveat emptor'. They should be allowed to fail, without official support or taxpayer recapitalisation.

In fact, in the UK something akin to a narrow banking system was put in place in the 19th century with the Post Office Savings Bank and the Trustee Savings Bank. But the idea that the official safety net should have been restricted to POSB and TSB was never seriously entertained. Nor could it have been. When a 'narrow bank' is constrained to holding liquid, safe assets, it is simultaneously prevented from earning higher returns, and thus from offering as high interest rates, or other valuable services, (such as overdrafts), to its depositors. Nor could the authorities in good conscience prevent the broader banks from setting up their own clearing house. Thus the banking system outside the narrow banks would grow much faster under normal circumstances; it would provide most of the credit to the private sector, and participate in the key clearing and settlement processes in the economy.

This might be prevented by law, taking legal steps to prohibit broader banks from providing means of payment or establishing clearing and settlement systems of their own. There are, at least, four problems with such a move. First, it runs afoul of political economy considerations. As soon as a significant body of voters has an interest in the preservation of a class of financial intermediaries, they will demand, and receive, protection. Witness money market funds and 'breaking the buck' [i.e. not being able to repay at par, or better; so involving a net loss to deposit funds] in the USA. Second, it is intrinsically illiberal. Third, it is often possible to get around such legal constraints, e.g. by having the broad bank pass all payment orders through an associated narrow bank. Fourth, the reasons for the authorities' concern with financial intermediaries, for better or worse, go well beyond insuring the maintenance of the basic payment system and the protection of small depositors. Neither Bear Stearns nor Fannie Mae had small depositors, or played an integral role in the basic payment system.

When a financial crisis does occur, it, usually, first attacks the unprotected sector, as occurred with SIVs and conduits in 2007. But the existence of the differential between the protected and unprotected sector then has the capacity to make the crisis worse. When panic and extreme risk aversion take hold, the depositors in, and creditors to, the unprotected, or weaker, sector seek to withdraw their funds, and place these in the protected, or stronger, sector, thereby redoubling

the pressures on the weak and unprotected sectors, who are then forced into fire sales of assets, etc. The combination of a boundary between the protected and the unprotected, with greater constraints on the business of the regulated sector, almost guarantees a cycle of flows into the unregulated part of the system during cyclical expansions with sudden and dislocating reversals during crises."

In so far as regulation is effective in forcing the regulated to shift from a preferred to a less desired position, it is likely to set up a boundary problem. It is, therefore, a common occurrence, or response, to almost any regulatory imposition. A current (2010) example is the proposal to introduce additional regulatory controls on systemically important financial intermediaries (SIFIs). If SIFIs are to be penalised, there needs, on grounds of equity and fairness, to be some definition, some criteria, of what constitutes a SIFI, an exercise with considerable complication. But once such a definition is established and a clear boundary established, there will be an incentive for institutions to position themselves on one side or another of that boundary, whichever may seem more advantageous. Suppose that we started, say in a small country, with three banks, each with a third of deposits, and each regarded as TBTF, and the definition of a SIFI was a bank with over 20% of total deposits. If each bank then split itself into two identical clones of itself, to avoid the tougher regulation, with similar portfolios and interbank linkages, would there have been much progress? Similarity implies contagion. Indeed, regulation tends to encourage and to foster similarity in behaviour. Does it follow then that regulation thereby enhances the dangers of systemic collapse that its purpose should be to prevent? Does the desire to encourage all the regulated to adopt, and to harmonize on, the behaviour of the 'best' actually endanger the resilience of the system as a whole?

The second boundary of critical importance to the conduct of regulation is the border between States, each with their own legal and regulatory structures, the cross-border problem. In a global financial system with (relatively) free movement of capital across borders, most financial transactions that are originated in one country can be executed in another. This means that any constraint, or tax, that is imposed on a financial transaction in a country can often be (easily) avoided by transferring that same transaction to take place under the legal, tax and accounting jurisdiction of another country, sometimes, indeed often, under the aegis of a subsidiary, or branch, of exactly the same bank/intermediary as was involved in the initial country.

This tends to generate a race for the bottom, though not always since the parties to a contract will prize legal certainty and contract reliability. Another aspect of this same syndrome is the call for 'a level playing field'. Any state which seeks to impose, unilaterally, tougher regulation than that in operation in some other country will face the accusation that the effect of the regulation will just be to benefit foreign competition with little, or no, restraining effect on the underlying transactions.

Moreover the cross-border concern may constrain the application of counter-cyclical regulation. Financial cycles, booms and busts, differ in their intensity from country to country. Housing prices rose much more in Australia, Ireland, Spain, UK and USA than in Canada, Germany and Japan in the years 2002-2007. Bank credit expansion also differed considerably between countries. But if regulation becomes counter-cyclically tightened in the boom countries, will that not, in a global financial system, just lead to a transfer of such transactions off-shore; and London has been at the centre of arranging such cross-border financial operations.

F. Are there Solutions?

Perhaps the greatest need is for a fundamental change in the way that we all, but especially regulators and supervisors, think about the purposes and operation of financial regulation, i.e. a paradigm shift. The old idea was that the purpose of regulation was to stop individual institutions assuming excessive risk, and that the way to do this was to encourage, or force, all institutions (banks) to harmonize on 'best practices' by requiring them to hold the appropriate ratios of capital, or liquidity, or whatever.

It is the thesis of this Chapter that this approach has been fundamentally misguided along several dimensions. First, it should not be the role of the regulator/supervisor to seek to limit the risks taken by the individual institution, so long as those risks are properly internalised. The concern instead should be on externalities, i.e. limiting the extent to which adverse developments facing one actor in the financial system can lead to greater problems for other actors. Various methodologies for measuring, and then counteracting, such externalities, such as CoVar, Expected Shortfall, CIMDO, are being developed, but much more needs to be done.[2]

Second, the attempt to limit such externalities should not be done by a process of setting minimum required ratios, whether for capital, liquidity or even, perhaps, for margins more generally. There are two main reasons why not. First, that process sterilises, and makes unusable, the intra-marginal capital or liquidity. Second, no one can ever correctly determine what the 'correct' level of such a safe-guard should be, and effort and time gets wasted in trying to do so. Instead, much more thought needs to be put into devising a, preferably continuous, ladder of penalties, whether pecuniary, e.g. in the form of a tax, or non-pecuniary in the form of prohibitions of increasing severity on the freedom of action of an intermediary as its capital, liquidity and margins decrease and its leverage increases.

[2] This branch of analysis includes the Brunnermeier and Pedersen (2009), Adrian and Brunnermeier (2009), 'CoVaR'; Acharya, et al., 'Measuring Systemic Risk', (2010), 'Systemic Expected Shortfall'; and Segoviano (and Goodhart) (2006, 2009 and 2010), 'CIMDO'. Also see the IMF *Global Financial Stability Report*, April 2009, Chapter 3.

One purpose of having a more continuous function of sanctions is that it might be possible to apply the regulation over a wider range of intermediaries, and thus avoid the boundary problem between the regulated and non-regulated. Thus, all (leveraged) financial intermediaries would come under the regulations, small as well as large banks, and hedge funds and money markets mutual funds as well as banks, but so long as the leveraged institution was small, with few counterparties amongst other financial intermediaries (i.e. not inter-connected), with low leverage and satisfactory liquidity, it should not suffer any penalties. The more that a leveraged institution became a risky 'shadow bank', the greater the penalty (against the risk of externalities and thus imposing costs on society) that should be applied. It will involve a considerable effort to try to recast regulation along such lines, but it could be one way of overcoming the boundary problem between the regulated and the non-regulated.

Incidentally, John Kay's 'narrow banks' and Larry Kotlikoff's all equity-based financial intermediaries would, under this rubric, face no, or very few, penalties or sanctions, whereas there would be increasing penalties/sanctions as intermediaries took on increasingly risky strategies , where the ladder of penalties/sanctions should be calibrated to relate to the additional risk to society. While such calibration is surely hard to do, this would be preferable either to leaving all such 'risky' intermediation either completely unregulated, or banned entirely. Neither of these latter approaches would be sensible, or desirable.

In order to limit and control systemic risk, supervisors have to be able to identify it. That requires greater transparency. That is one reason, but not the only one, for requiring standardised derivative deals to be put through a centralised counter party, and for requiring that remaining over the counter (OTC) transactions be reported to, and recorded by, a centralised data repository. Similarly it would be desirable to simplify and increase the transparency of securitisations. Reliance on credit ratings was a means for enabling buyers in the past to disregard much (legal) detail. In this field the credit rating agencies have, for the time being, lost their reputation, even if in the exercise of sovereign debt rating their clout now seems stronger than ever!

However-much incentives are provided for more prudent behaviour, which implies penalties on imprudent behaviour, failures and insolvencies will still occur. As noted earlier, the occasions of such a bankruptcy is the main source of social risk and reliance on taxpayers. So the need is to try, first to limit and to prevent bankruptcy, and second to lessen its social ramifications should it occur, e.g. by internalising losses.

In addition to the objective of controlling externalities, social risk and the need for reliance on taxpayers, there is also, as already noted in Section B, a rationale for some additional regulation based on asymmetric information and customer protection. It is

largely, though not entirely, under this latter rubric that proposals such as Product Regulation and Deposit Insurance take their place. We will not discuss these further here, since both the difficulties of applying such regulation and the overall costs of regulatory failure are so much less than in the case of macro-prudential regulation.

Considerable weight had been placed by many economists on the concept of prompt corrective action (PCA) as a means of lessening the costs of failure. This had been incorporated into the FDIC Improvement Act of 1991, whereby any bank that was severely undercapitalised, under 2% (i.e. a leverage ratio greater than 50), either had to raise more equity rapidly or be closed, with the aim of doing so before there was a burden of losses to be somehow shared.

Yet this did not prevent the crisis in the USA, though the main initial failures, Fannie Mae, Lehman, AIG, occurred in intermediaries to which such PCA was not applicable. Even so, PCA was less effective than had been hoped. In crises the estimated residual value of equity can erode fast; and, prior to the final collapse, may be manipulated by accounting dodges (such as the Repo 105 used by Lehman Bros). In extremis, liquidity may be a better, or even more desirable supplementary, trigger than capital.

A widespread complaint has been that too little of the losses suffered have been internalised amongst bond holders and transferred to taxpayers instead, thereby increasing externalities and social cost. But we need to remind ourselves why this was done. This was because many such bond-holders were either themselves leveraged intermediaries, such as Reserve Primary Fund, whose 'breaking of the buck' unleashed the run on money-market mutual funds, or had sufficient power (the Chinese?) to threaten to withdraw funds massively from this market, and thereby unleash an even worse disaster. So, contagion was as much an issue amongst bond-holders as amongst depositors.

One conclusion is that if losses cannot, in the event of a financial crisis, be internalised amongst either bond-holders or depositors, then banks should be induced and encouraged (n.b. by a continuous ladder of penalties, not by a required minimum) to hold more tangible core equity. Another approach is to precommit, e.g. by contract, to make bond holders face equity-type losses in a crisis. This is one of the purposes of the proposed conditional contingent bonds (CoCos) which are to be forcibly transmuted into equity format under certain triggers of distress. As with ordinary bank bonds, this could lead to contagion if such CoCos were held by other levered financial intermediaries. Even absent such contagion, the relative cost, and market dynamics of such CoCos in a crisis, has yet to be clearly observed. And how for their use would be preferable to the simpler procedure of encouraging more equity holding, perhaps in counter-cyclical format, has yet to be fully worked out.

One important way of diminishing both the probability and the cost of failure is to get the levered institution and its supervisor(s) to plan for such adverse eventualities in advance. This is the purpose of the concept of the 'Living Will', or Special Resolution Regime (SRR) which has obtained (and rightly so) much traction recently as a desirable initiative in the field of financial regulation. Such a 'living will' has two parts, see Huertas 2010, (a, b and c). The first part consists of a recovery plan, which outlines how, in the face of a real crisis, a leveraged institution could bolster its liquidity and its capital, for example by disposing of non-core assets, so as to remain an on-going business. This could be agreed between an institution and its lead (home) supervisor, though there would be implications for host supervisors.

The second part of a 'Living Will' involves planning for the resolution of a failing financial institution, should the recovery plan be insufficient. In this case the supervisor(s) may require the financial institution to take certain preparatory actions, for example to maintain a data room (that would enable an outside liquidator/administrator to have sufficient knowledge of the current condition of a financial intermediary to wind it down) and, perhaps, to simplify its legal structure, for the same purpose. But the agreement on how to resolve the intermediary, and to share out residual losses, would need to be amongst its regulators/supervisors.

Even within a single country many, particularly large 'universal', intermediaries may have several supervisors, and each should know their role in advance. But almost all systemically important financial intermediaries (SIFIs) have significant cross-border activities, and, while they may be international in life, they become national in death. Indeed some of the worst complications and outcomes, following bankruptcy, arose from the difficulties of international resolution, notably in the cases of Lehman, the Icelandic banks, Fortis and Dexia.

Avgouleas, Goodhart and Schoenmaker (2010) have suggested building on the concept of 'living wills' in order to develop an internationally agreed legal bankruptcy procedure for SIFIs, but, given the entrenched preferences in each country for their historically determined legal traditions and customs, this may well be utopian. Instead Hüpkes (2009a and b) has proposed that, for each SIFI, an international resolution procedure be adopted on a case by case basis.

Such a procedure might, or might not, also include an ex ante burden sharing agreement (Goodhart and Schoenmaker, 2006). Apart from the difficulty of doing so, arguments against are that attempts would be made, ex post, to renegotiate; that the prior agreement might seem unfair or inappropriate in unforeseeable circumstances, and that it might involve moral hazard. While this last claim is often made, so long as the executives, who actually take the decision, are sacked whether, or not, the entity is kept as a going concern, it can be over-stated. The arguments for such an ex ante exercise is that,

without it, uncoordinated and costly failure and closures will be much more likely (Freixas, 2003).

More generally, financial globalisation in general, and the cross-border activities of SIFIs in particular, mean that the level-playing-field argument is advanced to oppose almost any unilateral regulatory initiative. The main response to this, of course, is to try to reach international agreement, and a whole structure of institutions and procedures has been established to try to take this forward, with varying degrees of success. Inevitably, and perhaps properly, this is a slow process. Those who claimed that we were losing the potential momentum of the crisis for reforming financial regulation simply had no feel for the mechanics of the process. Moreover, any of the major financial countries, perhaps some three or four countries, can effectively veto any proposal that they do not like, so again the agreements will tend to represent the lowest common denominator, again perhaps desirably so.

Finally, there can be circumstances and instances when a regulator can take on the level-playing-field argument and still be effective. An example can be enforcing a margin for housing LTVs by making lending for the required down-payment unsecured in a court of law. Another example is when the purpose of the additional constraint is to prevent excessive leverage and risk-taking by domestic banks, rather than trying to control credit expansion more widely (as financed by foreign banks).

G. Conclusion

The current crisis has forced a fundamental reconsideration of financial regulation; and rightly so since much of the focus, and of the effects, of the existing system were badly designed, with its concentration on individual, rather than systemic, risk and its procyclicality. In response now we have a ferment of new ideas, many touched on here. A great deal of further work needs to be done to discern which of these ideas are good and which less so.

References

Acharya, V., Pedersen, L.H., Philippon, T., and M. Richardson, (2010), 'Measuring Systemic Risk', Stern School of Business, New York University, work in progress.

Acharya, V., Pedersen, L.H., Philippon, T., and M. Richardson, (2010), 'A Tax on Systemic Risk', Stern School of Business, New York University.

Acharya, V., and M. Richardson, (eds), (2009), *Restoring Financial Stability: How to Repair a Failed System*, John Wiley & Sons, Inc., New Jersey.

Adrian, T., and M.K. Brunnermeier, (2009), 'CoVaR', Federal Reserve Bank of New York Staff Reports, 348, August.

Adrian, T., and H.S. Shin, (2008), 'Liquidity, Monetary Policy, and Financial Cycles', *Current Issues in Economics and Finance*, Vol. 14, No. 1, January/February.

Avgouleas, E., Goodhart, C., and D. Schoenmaker, (2010), 'Living Wills as a Catalyst for Action', work in progress, contact Dirk Schoenmaker at dirk.schoenmaker@duisenbergschooloffinance.com.

Bebchuk, L.A., and H. Spamann, (2010), 'Regulating Bankers' Pay', *Georgetown Law Journal*, Vol. 98(2), January, pp 247-287.

Bebchuk, L.A., and J.M. Fried, (2009), 'Paying for Long-Term Performance', Harvard Law and Economics Discussion Paper No. 658, December 1.

Beltratti , A., and R.M. Stulz, (2009), 'Why Did Some Banks Perform Better during the Credit Crisis? A Cross-Country Study of the Impact of Governance and Regulation', Fisher College of Business Working Paper No. 2009-03-012, July 13.

Brunnermeier, M.K. and L.H. Pedersen, (2005), 'Predatory Trading', *The Journal of Finance*, Vol. LX, No. 4, August.

Brunnermeier, M.K., Crockett, A., Goodhart, C.A.E., Persaud, A., and H.S. Shin, (2009), *The Fundamental Principles of Financial Regulation*, Geneva Reports on the World Economy, 11, (Geneva: International Center for Monetary and Banking Studies, ICMB, and Centre for Economic Policy Research, CEPR).

Brunnermeier, M.K. and L.H. Pedersen, (2009), 'Market Liquidity and Funding Liquidity', *Review of Financial Stability*, 22(6).

Buiter, W., (2008), 'Central Banks and Financial Crises', Financial Markets Group Discussion Paper 619, London School of Economics.

Buiter, W., (2009), 'Reversing Unconventional Monetary Policy: Technical and Political Considerations', Centre for Economic Policy Research Discussion Paper 7605, December.

Cardarelli, R., Elekdag, S., and S. Lall, (2009), 'Financial Stress, Downturns, and Recoveries', IMF Working Paper 09/100, May.

Chamley, C., and L. Kotlikoff, (2009), 'Toolbox: Limited Purpose Banking', in *American Interest Online*, 1 April.

Danielsson, J., (2002), 'The emperor has no clothes: Limits to risk modelling', *Journal of Banking and Finance*, 26, pp 1252-1272.

Fahlenbrach, R., and R.M. Stulz, (2009), 'Bank CEO Incentives and the Credit Crisis', National Bureau of Economic Research Working Paper 15212.

Ferguson, N., and L. Kotlikoff, (2009), 'Reducing Banking's Moral Hazard', in *Financial Times*, 2 December.

Freixas, X., (2003), 'Crisis Management in Europe', in Financial Supervision in Europe, ed. J. Kremers, D. Schoenmaker, and P. Wierts, Cheltenham: Edward Elgar, pp 102-19.

Geneva Report, by Brunnermeier, M.K., Crockett, A., Goodhart, C.A.E., Persaud, A., and H.S. Shin, (2009), *The Fundamental Principles of Financial Regulation*, Geneva Reports on the World Economy, 11, (Geneva: International Center for Monetary and Banking Studies, ICMB, and Centre for Economic Policy Research, CEPR).

Global Financial Stability Report, (2009), 'Responding to the Financial Crisis and Measuring Systemic Risks, International Monetary Fund, April.

Goodfriend, M., (2009), 'Central Banking in the Credit Turmoil: An Assessment of Federal Reserve Practice', presented at the Conference on 'Monetary-Fiscal Policy Interactions, Expectations, and Dynamics in the Current Economic Crisis', May 22-3, Princeton University, Princeton, New Jersey.

Goodhart, C.A.E., (2008), 'The Boundary Problem in Financial Regulation', *National Institute Economic Review*, Vol. 206, No. 1, pp 48-55.

Goodhart, C.A.E., (2010), 'The Role of Macro-Prudential Supervision', paper presented at the 2010 Financial Markets Conference of the Federal Reserve Bank of Atlanta, George, entitled 'Up from the Ashes: The Financial System after the Crisis', May 11-12.

Goodhart, C.A.E., Peiris, M.U., Tsomocos, D.P. and A.P. Vardoulakis, (2010), 'On Dividend Restrictions and the Collapse of the Interbank Market', *Annals of Finance*, forthcoming.

Goodhart, C., and D. Schoenmaker, (2006), 'Burden Sharing in a Banking Crisis in Europe', *Sveriges Riksbank Economic Review*, No. 2, pp 34-57

Goodman, J. C., and L. Kotlikoff, (2009), 'The only way Obama can fix the economy is by changing the way banks do business', in *The New Republic*, 14 May.

Hart, O.D., and L. Zingales, (2009), 'A new capital regulation for large financial institutions', Centre for Economic Policy Research Discussion Paper no. DP7298.

Hellwig, M., (1996), 'Capital Adequacy Rules as Instruments for the Regulation of Bank', *Swiss Journal of Economics and Statistics*, vol. 132(IV), December, pp 609-612.

Hellwig, M., (2008), 'Systemic Risk in the Financial Sector: An Analysis of the Subprime-Mortgage Financial Crisis', Max Planck Institute for Research on Collective Goods, November; also found in *De Economist*, Springer, Vol. 157(2), pp 129-207, June 2009.

House of Commons Treasury Committee, (2010), 'Too Important to Fail – Too Important to Ignore', Ninth Report of Session 2009-10, Volume 1, HC 261-1, 29 March

Huertas, T., (2010a), 'Improving Bank Capital Structures', speech by T.F. Huertas, Director, Banking Sector, FSA and Vice Chairman, CEBS, at London School of Economics, London, 18 January.

Huertas, T.F., (2010b), 'Living Wills: How Can the Concept be Implemented?', remarks before the Conference 'Cross-Border Issues in Resolving Systemically Important Financial Institutions', at Wharton School of Management, University of Pennsylvania, February 12.

Huertas, T.F., (2010c), 'Resolution and Contagion', Remarks before the Centre for Central Banking Studies/Financial Markets Group Conference, 'Sources of Contagion', 26 February.

Hüpkes, E., (2009a), 'Bank Insolvency: The Last Frontier', in *Towards a New Framework for Financial Stability*, edited by D. Mayes, R. Pringle and M. Taylor, London: Risk Books.

Hüpkes, E., (2009b), 'Complicity in complexity: what to do about the 'too-big-to-fail' problem', *Butterworths Journal of International Banking and Financial Law*, October.

International Monetary Fund, (2009), 'Detecting Systemic Risk', Chapter 3, in 'Responding to the Financial Crisis and Measuring Systemic Risks', *Global Financial Stability Report*, April.

Kay, J., (2010), 'Narrow Banking', *World Economics*, Vol. 11, No. 1, pp 1-10.

Kay, J., (2010), 'Should we have narrow banking?', Chapter 8 in this Volume.

Kotlikoff, L., and E. Leamer, (2009), 'A Banking System We Can Trust', in *Forbes*, 23 April.

Large, A., (2010), 'What framework is best for systemic, macroprudential policy?', Chapter 7 in this Volume.

Modigliani, F., and M.H. Miller, (1958), 'The Cost of Capital, Corporation Finance and the Theory of Investment', *American Economic Review*.

Perotti, E., and J. Suarez, (2009), 'Liquidity Insurance for Systemic Crises', Centre for Economic Policy Research Policy Insight No. 31.

Record, N., (2010), 'How to make the bankers share the losses', *Financial Times*, 6 January.

Schularick, M. and A.M. Taylor, (2009), 'Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial, Crises, 1870-2008', National Bureau of Economic Research Working Paper 15512, November.

Segoviano, M., (2006), 'Consistent Information Multivariate Density Optimizing Methodology', Financial Markets Group Discussion Paper No. 557, (London: London School of Economics).

Segoviano, M., (forthcoming), 'The CIMDO-Copula. Robust Estimation of Default Dependence under Data Restrictions', IMF Working Paper, (Washington: International Monetary Fund).

Segoviano, M. and C. Goodhart, (2009), 'Banking Stability Measures', IMF Working Paper 09/04, (Washington: International Monetary Fund).

Shleifer, A., (2010), 'Efficient Regulation', National Bureau of Economic Research Working Paper No. w15651, January.

Smithers, (2011), 'Can we identify bubbles and stabilise the system?', Chapter 6 in this Volume.

Squam Lake Working Group on Financial Regulation, (2009), 'An Expedited Resolution Mechanism for Distressed Financial Firms: Regulatory Hybrid Securities', Council on Foreign Relations Press.

Squam Lake Working Group on Financial Regulation, (2010), 'Regulation of Executive Compensation in Financial Services', Council on Foreign Relations Press.