



Topics in

Corporate Finance

*The Global Banking Crisis and the Post-Crisis Banking
and Regulatory Scenario*

DAVID T. LLEWELLYN

in cooperation with

**Gieskes-Strijbis
Foundation**

NIBESVV



UNIVERSITEIT VAN AMSTERDAM
Amsterdam Center for Law & Economics

19

NUMBER

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David T. Llewellyn

ISBN-978-90-77859-11-7

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PREFACE

The financial sector is in a flux. The functioning of the financial system has become one of the most acute public policy issues of our time. The banking crisis that we have observed challenges policy profoundly. What is the desirable regulatory response? The answer is far from obvious, substantial disagreement exists. For this reason the Amsterdam Center for Corporate Finance has dedicated this issue of its Topics in Corporate Finance series to analyzing the key regulatory issues involved.

Professor David Llewellyn, one of the world's most renowned experts on the functioning of financial institutions and markets, provides in this booklet an in-depth analysis of the functioning of the financial sector, how it evolves, what frictions exist and what type of regulatory responses are desirable.

This publication aims to build a further understanding on what is needed to rectify the weaknesses in the financial sector. We hope you enjoy reading it, and that this publication may contribute to bridging the gap between theory and practice.

The ACCF gratefully acknowledges the financial support provided by the Gieskes-Strijbis Foundation.

Arnoud W.A. Boot
Director ACCF

October 2010

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INTRODUCTION AND SUMMARY

The focus of this monograph is on the nature and causes of the banking crisis, and the banking, financial and regulatory scenarios that are likely to emerge in the post-crisis environment. The central theme is that the crisis will prove to be transformational in several dimensions and four in particular: (1) the role of banks and the size of the banking system, (2) the business models of banks, (3) the regulatory regime designed to lower the probability of bank failures, and (4) Intervention and Resolution strategies with a view to minimising the costs of bank failures as opposed to measures to reduce their probability.

The financial crisis that erupted in the summer of 2007 has been the most serious since at least the Great Depression of the 1930s. As put by Charlie Bean of the Bank of England: “the financial crisis is probably the biggest in history”, and also by Adair Turner: “the greatest crisis in the history of financial capitalism”. Former Fed Chairman Greenspan described it as: “the most severe global financial crisis ever”. The sequence of the crisis was put well by Berk (2008): “International markets are currently in a state of turmoil. What started out as a potential problem in a particular segment of a particular market in a particular country, by now has spread to large parts of the world adversely affecting not only financial but real outcomes.”

Several dimensions contributed to the severity of the crisis: it was systemic rather than confined to individual banks in particular countries; it was global in nature; a wide range of financial instruments and asset classes were involved and most notably credit risk shifting instruments; there was major disruption to wholesale markets and the inter-bank markets in particular; massive amounts of bank capital were destroyed; at one point some financial systems came perilously close to financial collapse, and the functioning of the financial intermediation system became seriously impaired as a forced de-leveraging within the banking sector produced a sharp contraction in the volume of loans made by banks with a resultant “credit crunch” in several economies.

A market perspective on the magnitude of the crisis is summarised in the valuations of banks as shown in Table 1 which shows that, between June 2007 and January 2009, the aggregate market capitalisation of thirteen banks most seriously affected by the crisis declined by 70 percent (more than \$1.1 trillion) from \$1,610 billion to \$469 billion. All this in turn induced governments and central banks to take massive and unprecedented intervention measures including, in some cases, full or part nationalisation of banks. In many different ways, bank credit risk was socialised on an unprecedented scale.

**Table 1: Market Capitalisation of Selected Banks
(\$ billion)**

	June 2007	January 2009
Citigroup	255	19
HSBC	215	97
JP Morgan	165	85
Royal Bank of Scotland	120	5
UBS	116	35
Bank Santander	116	64
BNP Paribas	108	33
Goldman Sachs	100	35
Unicredit	93	26
Barclays	91	7
Societe Generale	80	26
Deutsche Bank	76	10
Credit Suisse	75	27

Source: own calculations

After a summary of the arguments in the form of an Executive Summary, the structure of the monograph is as follows. Chapter 1 considers the nature of the crisis, its structural antecedents, the substantial interventions by governments and central banks, and the central role of financial innovation. Chapter 2 outlines the causes of the crisis in the framework of two alternative paradigms: one that emphasizes exogenous pressures and the other which focuses on factors largely endogenous to banks. Chapter 3 argues that the crisis is likely to be transformational in many dimensions and four in particular: the future role of banks and the cost of banking services, the business model of banks, the regulatory regime, and *Intervention* and *Resolution* strategies. Chapter 4 emphasizes the need for a strategic approach to regulatory reform, and reviews a wide range of issues related to regulation, *Intervention* and *Resolution*. With respect to regulation, the analysis considers two dimensions to regulatory strategy: lowering the probability of bank failures *versus* reducing the costs of those failures that do occur, and both *structural* and *behavioral* measures are considered in both dimensions. Within an overall *Regulatory Regime*, emphasis is given to incentive structures, corporate governance arrangements, and the role of market discipline. Chapter 5 focuses on the main conclusions and, in particular, argues that while credit risk shifting instruments and securitization were major factors in the crisis, they also have positive efficiency contributions and that therefore “the baby should not be thrown away with the bathwater.”

A holistic approach to the causes of the financial crisis is given by emphasizing their multi-dimensional nature. Being a central part of the crisis, the analysis considers the nature of financial innovation with special reference to the emergence of instruments and business models that purport to shift credit risk. A central theme is that this changed, in a significant way, the underlying economics of banking, and that a major element in

the crisis was that new business models evolved as a result of financial innovation. In the process, banks stopped behaving like banks. The holistic approach to the analysis of the causes of the crisis also focuses on the incentive structures faced by various agents: banks, shareholders, managers, etc, and also bank supervisors and central banks.

Structure of the Argument

The monograph considers the causes of the crisis and what the post-crisis environment might look like most especially with regard to the regulatory regime. The structure of the argument may be summarized:

- Analysis of causality in the crisis is considered at several levels and is presented in terms of two alternative, though closely related, paradigms: *exogenous pressures* (factors largely outside the control of banks and their business models), and *endogenous pressures* (factors associated with bank models and behavior).
- Leaving aside the many and diverse detailed factors that led up to the crisis, an over-arching factor was an “excess financialisation” of the economy, with banks expanding at an unsustainable pace, and to an unsustainable position, in the years preceding the crisis: banks expanded beyond their marginal economic and social value.
- As a result, of financial innovation, new business models of banks emerged which changed the underlying economics of banking as new financial instruments (most especially credit derivatives) enabled credit risk to be shifted away from the originators of loans.
- However, whilst financial innovation and the emergence of complex credit risk shifting instruments were significant elements in the emergence of the crisis, they have value and efficiency benefits. In particular, securitisation needs to be restored as a means of enabling loans to be made by banks whilst at the same time enabling credit risk to be optimally shifted. Changes to the model will be needed for this to occur. Above all, the “baby (of securitisation) should not be drowned in the bathwater (of regulation)”.
- The crisis will prove to be transformational in several dimensions and, in particular, with respect to the size of the banking system and the role of banks, bank business models, the regulatory and supervisory regime, and *Intervention* and *Resolution* strategies.
- Regulatory reform needs to be *strategic* rather than *incremental* which includes asking fundamental questions such as what regulation is designed to achieve.
- Regulatory strategy needs to focus on two dimensions: lowering the probability of bank failures and minimizing the costs of those bank failures that do occur.
- Problems in banking that threaten financial stability (e.g. excess risk-taking) are partly endogenous to the regulatory regime itself (a feature of the recent crisis), and financial innovation will always seek to find ways around particular regulatory requirements. Regulation to reduce the probability of bank failure will always be shooting at a moving target created by regulation itself.

- This suggests that an alternative approach should be considered. In particular, rather than focus on incremental measures designed to reduce the probability of bank failures, more emphasis needs to be given to designing features of a regulatory regime to reduce the costs of those bank failures that do occur. Given the weaknesses and limitations of regulation, rules may be necessary as part of an overall regulatory regime, but are certainly not sufficient.
- A central focus of regulatory strategy needs to be on institutions that are deemed to be Too Big To Fail.
- In this regard, there are five broad strategic options in the reform debate: *structural* measures, *behavioral* measures, *and intervention*, *taxation* and insurance, and *resolution* arrangements.
- Whilst there is limited scope for structural measures, a more realistic approach is to focus on tax, insurance, Living Wills, and resolution arrangements.
- There needs to be a fourth Pillar to the Basel capital regime: while Pillars 1-3 focus predominantly on reducing the probability of bank failures, Pillar 4 would focus on Resolution arrangements designed to lower the cost of those banks that do fail.

Before considering the transformational nature of the crisis, we first consider how we got to this position because it has implications for how banking is likely to be different in the post-crisis environment.

1 THE BANKING CRISIS

1.1 NATURE OF THE CRISIS

Di Noia and Micossi (2009) argue that “the decision to let Lehman Brothers go bust on 15th September, 2008 marked the shift from a Wall Street crisis to a global banking panic.” This is not the place to offer a detailed scenario of the global financial crisis (for a description of the sequence of events see Brunnermeier, 2008 and BIS, 2009). Nevertheless, the key features are summarized:

- defaults on sub-prime mortgages in the US and a fall in house prices created widespread financial distress,
- intense market uncertainty (rather than risk) emerged with respect to counterparty risks, the value of securities based on derivatives (which created further uncertainty with regard to potential losses), and banks’ own liquidity requirements given potential funding problems with their own Structured Investment Vehicles (SIVs),
- increased concern over the quality of structured instruments and their long-term viability,
- increased volatility in financial markets,
- the erosion of confidence in banks and some markets,
- weak liquidity, and the almost complete drying up of liquidity, in some key markets as trading, and in some cases funding operations, virtually ceased altogether; money market funds in particular withdrew massive amounts of liquidity from the banking system,
- sharp falls in the prices of derivative instruments in some markets, with the result that prices were difficult to determine as there were no trades being conducted and hence posted prices were only nominal,
- the effective closure of interbank markets due to a hoarding of liquidity by some banks, and uncertainty and increasing concern over potential counterparty risks in the inter bank markets,
- a sharp tiering of interest rates in the interbank market,
- enhanced risk aversion across the broad spectrum of financial and banking markets,
- funding problems for both banks and their SIVs and a “re-intermediation” of credit flows: thus the failure of Lehman Brothers and Bear Sterns in the US, and Northern Rock in the UK, were precipitated by an inability to roll-over their maturing short-term borrowings or sell mortgage assets at non-fire-sale prices,
- serious impairment of bank capital due to large losses and write-downs most especially on complex structured securities and instruments, and
- the need for banks to de-leverage following several years of exceptionally rapid balance sheet growth.

The nature of risks also changed. Securitization and other credit derivatives are designed to shift credit risk and, for some years, they did. However, they also changed the nature of risks and, in particular, transformed credit risk into liquidity risk (buyers of the securities issued to purchase securitized assets from banks being unable to trade them), then into a funding risk (the securitizing banks being unable to either sell assets at other than fire-sale prices or roll-over maturing debt), and ultimately into a solvency risk. The last-mentioned arose because banks were unable to sell assets in order to continue funding their securitization programs. A vicious cycle can easily arise in such circumstances: a bank which has engaged in substantial maturity transformation encounters funding difficulty (inability to roll over maturing debt) which it seeks to alleviate by selling assets which in turn depresses asset prices which in turn undermines the solvency of the bank. This problem becomes acute when all banks simultaneously attempt the same strategy of selling assets to replenish liquidity: herein lies the *fallacy of composition* whereby what may be rational for an individual bank acting alone ceases to be so when all banks adopt the same strategy. We find that the *fallacy of composition* is a recurring theme.

The market environment became one of Knightian uncertainty rather than risk that could be priced. In these circumstances, two trends emerged: it became difficult to price risk and assets which meant that trading ceased, and banks began to hoard liquidity rather than make funds available in the interbank market. As a result, a substantial premium opened up between inter-bank interest rates and central bank market intervention rates.

The profile and detailed time-line of the crisis is described well in the Bank for International Settlements (BIS) Annual Report (2009) which describes the various stages in the evolution of the crisis including the gradual deterioration in financial conditions, the emergence of funding and liquidity problems for many banks leading to concerns over solvency, a global loss of confidence followed by massive official intervention, and a flight to quality and the near collapse of the financial system.

In several countries banks reported substantial losses on their exposures to credit derivatives and securities, rather than normal loan defaults although, as many economies moved into recession, loan defaults also began to rise. The volume of losses incurred by banks, and the amounts of intervention by governments, have been massive and unprecedented. Haldane (2009b) estimates that the amount of support operations in the UK, US and euro area has been of the order of \$14 trillion which is equivalent to about 25 percent of world GDP. This dwarfed any previous state support of the banking system. The International Monetary Fund (IMF, 2009) reported an estimated \$2.7 trillion of write-downs on US-originated assets by banks and other financial institutions between 2007 and 2010. Estimated write-downs for mature market-originated assets for the same period were \$4 trillion. At the same time, the IMF calculated that, in order to restore bank capital ratios to the average 4 percent level prior to the crisis, the required capital injections by US and European banks would be around \$800 billion. In the context of these losses, banks have been both de-leveraging and injecting capital some of which (as in the UK) has come from the government, and has exposed the tax-payer to credit and price risk on an unprecedented scale.

A major factor precipitating the crisis was the exposure of banks to large holdings of securities that were hard to value given the absence of liquid markets. In fact, many credit derivatives were hardly ever traded on any significant scale. Banks became exposed to capital market and securities trading risks that they did not themselves manage or truly understand. As argued in a later section, the herd instinct was powerful in banking in the years prior to and during the crisis with collective euphoria in the period running up to the crisis being replaced by collective dysphoria: both phases exaggerate price movements and create a disconnect between actual prices and true underlying values.

A particular feature of the crisis was the intermittent closure of the inter-bank market (notably in the UK) as banks became reluctant to lend to each other because of lack of confidence (or information) about counterparties. This in turn was due largely to the opaqueness of some of the credit-risk-shifting instruments which meant that it became difficult to know who was exposed to what, and how much, risk. This resulted in a hoarding of liquidity by banks. Different banks in the inter-bank market have always had different risk characteristics and this has been reflected in different risk premia paid in the market. However, when uncertainty dominates risk lending ceases altogether.

As already noted, a feature of financial markets was the hoarding of cash by banks. There were several reasons for this: banks became uncertain about the credit standing of potential counterparty banks, and banks increased their precautionary demand for cash lest they be called upon either to honour previously agreed lines of credit to securitisation vehicles, or be required to take back on to their balance sheets loans that had previously been securitised. In addition, many banks became concerned about their own ability to obtain funding in the inter-bank markets. The liquidity problem became serious because securitization vehicles (such as conduits and SIVs) were funding the acquisition of long-term mortgages (and other loans) through issuing short-term debt instruments such as asset-backed commercial paper. As liquidity dried up, banks could not finance their off-balance-sheet vehicles and were forced to take assets back on to the balance sheet or hold on to assets they were planning to securitize. This effectively amounted to a process of “re-intermediation”. The Governor of the Bank of England likened the drying up of wholesale funding opportunities to the equivalent of a bank-run.

The losses that several banks experienced on their sub-prime mortgage loans and their exposure to conduits and other securitisation vehicles and instruments (notably Collateralised Debt Obligations (CDOs)) seriously weakened their capital positions. This forced some major international banks to seek injections of capital from, for instance, Sovereign Wealth Funds in the Far East and elsewhere. In the UK, the government required major banks to inject £50 billion of new capital with a large proportion being from the government itself. The same trends also raised the cost of capital to banks.

Overall, considerable uncertainty developed regarding the true value of credit instruments (partly because the markets had virtually ceased to function effectively) and the risk exposure of banks. As a result, a loss of confidence developed in the value of all asset-backed securities on a global basis.

1.2 INTERVENTION OF THE CRISIS

The crisis forced an unprecedented degree of intervention by central banks and governments both with respect to individual banks and the system. Haldane (2009b) outlines three areas of state insurance: liquidity insurance, deposit insurance, and capital insurance, all of which were applied in the crisis. The Governor of the Bank of England also argued that “the massive support extended to the banking sector around the world... has created possibly the biggest moral hazard in history” which carries with it the danger of sowing the seeds of the next crisis. The argument in later sections is that it is partly because of the massive scale of intervention, and the moral hazard it has created, that fundamental reform of the regulatory, *Intervention* and *Resolution* regimes is needed.

A distinction is made between *Intervention* and *Resolution*: the former relates to measures designed to maintain a failing bank as a going concern, while the latter relates to procedures for closing banks when intervention fails. Intervention measures during the crisis fall into eight main categories though considerable variety exists within each:

- public injections of capital into banks,
- full nationalization of banks,
- various forms of insurance facilities offered to banks,
- liquidity injections by central banks and notably the Federal Reserve, European Central Bank (ECB) and Bank of England,
- asset purchases made by central banks,
- deposit protection/insurance arrangements,
- guarantees of various types of bank debt, and
- forced re-capitalization of banks.

The BIS (2010) and ECB (2009) have identified which countries have used which forms of intervention. Governments and central banks intervened massively by buying a wide range of financial assets (including commercial paper and asset-backed securities) to inject systemic liquidity, support prices, and ease liquidity problems faced by banks. In addition, central banks radically changed the way they intervened in money markets to inject liquidity, by extending the range of counterparties, the asset classes they were prepared to accept as collateral, the amounts of intervention, and the maturity of the assets accepted as collateral.

Three schemes adopted in the UK illustrate the nature of some of the intervention arrangements: the *Special Liquidity Scheme* (SLS), the *Asset Protection Scheme* (APS), and the *Asset Purchase Facility* (APF). The objectives of the SLS were to remove the fear of bank insolvencies arising from the illiquidity of their assets, and to stimulate inter-bank market transactions. Under the scheme, banks have been able to swap AAA, though illiquid, securities backed by mortgages for treasury bills for a period of up to one year. A “hair cut” of up to 20 percent of the market value was imposed, the Bank of England charged a fee, and the credit risk remained with the banks. The Asset Protection Scheme is more of a catastrophe insurance contract as it enables a bank to buy insurance from the government. Under the APS, a bank constructs a portfolio of assets to be protected. Many

features of standard insurance contracts were incorporated in the APS in that banks participating in the scheme are required to pay a fee (calculated as a percentage of the insured portfolio), any participating bank took the first loss (equivalent to a deductible in standard insurance contracts), and banks had to absorb 10 percent of any losses over and above the fixed amount which was determined by the government on a case-by-case basis. The fee could be paid either in cash or the creation of new shares. The two banks that took advantage of the scheme (Royal Bank of Scotland and Lloyds Banking Group) chose to make payment in the form of newly-issued shares which took the government's ownership stake to 84 percent and 77 percent respectively.

Under the Asset Purchase Facility (created in January, 2009), the Bank of England purchases "high quality" assets (such as commercial paper, corporate bonds, syndicated loans and asset-backed securities) in the market and, although this was not originally intended, was the route through which the Bank of England engaged in its substantial "quantitative easing" program. The objectives of the APF were fourfold: to support markets that had become dysfunctional, to increase liquidity and trading activity in these markets, to stimulate the issuance of securities by corporate borrowers, and to restore normal capital market flows.

A major ingredient of public intervention in many countries has been the forced re-capitalization of banks. In the UK, banks were required to inject £50 billion of new capital of which £37 billion was provided by the government in the absence of private market capital raising. Two of the largest banks (Royal Bank of Scotland and the Lloyds Banking Group) received large injections of capital from the government which implies a substantial government ownership stake in both banks. The forced re-capitalization obviated the need for asset sales by banks at fire-sale prices, and it enabled banks to continue lending to support the economy.

An implication of many of the intervention measures, and a unique feature of the crisis, is that credit risk was socialized on a large scale whether this be in the form of government injections of capital into ailing banks, government insurance schemes, public guarantees of one sort or another, or government/central bank purchases of bank assets. In the final analysis the tax-payer became exposed to credit risk through the agency of the government or central bank. The implication is that the tax-payer could make a substantial loss on the transactions or alternatively make a profit. The outcome, which may take many years to materialize, will depend on what happens to bank share prices, the prices of guaranteed or purchased assets, and the extent to which guarantees or insurance arrangements are called upon.

1.3 ANTECEDENTS

Crises never emerge in a vacuum and the antecedents need to be considered. Several structural changes in the global financial system set the background to the financial crisis:

- A defining feature of recent financial history has been the sharp rise in the pace of financial innovation, and especially in the use of credit derivatives designed to shift credit risk from loan originators.

- A major feature of the pre-crisis period was a massive rise in the volume of trading in complex, and sometimes opaque, derivatives contracts, and in the amounts outstanding. The BIS estimates that the outstanding value of Credit Default Swap (CDS) contracts rose to over \$60 trillion.
- An increasing “financialisation” of economies (sharp growth in the value of financial assets and liabilities relative to GDP).
- A more market-centric structure of financial systems which implied a rise in the role of financial markets relative to institutions in the financial intermediation process. Furthermore, banks and markets became increasingly integrated (Boot and Thakor, 2009). One of the many implications of this trend was that losses incurred in markets could be translated into funding problems for banks. Furthermore, financial systems became more susceptible to market shocks.
- An increase in interconnectedness and network externalities.
- So-called (and largely unregulated) “shadow banks” (such as hedge funds and SIVs) emerged as major new players in the financial intermediation process (Tett, 2008). In effect, a shadow banking system emerged.
- An increased globalization of finance and financial markets. The impact of globalization was particularly powerful in the propagation of the crisis: what started as a local mortgage problem in parts of the US was generalized to a wide range of asset classes, the interbank market, several countries, and to several different types of financial institution.
- A sharp rise in gearing and leverage both by banks (including intra-financial sector gearing) and households.
- A sharp fall in the holdings of liquid assets by banks and an increased reliance on wholesale markets for liquidity and funding requirements.
- Higher degrees of maturity transformation by banks.
- Diversification of banks into different business areas with the result that they became increasingly similar to each other. Thus, while individual institutions diversified (which could be regarded as making them less risky through the spreading of different risks), the result was a less diversified system.

As argued in more detail in a later section, a defining structural change has been the combination of increased diversification and reduced diversity. In many ways, financial firms became less differentiated in that they followed a common policy of diversification, applied new business models, used similar risk analysis models, and developed rate of return on equity strategies more forcefully.

It is relevant also to consider the ideological context as the dominant ideology in the industrialized world was been one of de-regulation of banking, and a general belief in rational expectations and the efficient markets hypotheses. This dominant ideology came to overwhelm both the regulatory ethos and strategies in financial markets.

1.4 THE ROLE OF FINANCIAL INNOVATION

A central theme is that, as with many previous financial crises, a major ingredient in the current crisis has been the role of financial innovation. The unique feature of the most recent period of financial innovation has been the emergence of instruments (securitization, Collateralized Debt Obligations, Credit Default Swaps, etc.), and new credit vehicles, all of which purport to shift credit risk from loan originators to other counterparties including investors in SIVs (for a fuller discussion of these instruments see Llewellyn, 2009). In the securitization model, loans are packaged together and sold as bonds to various securitization vehicles in a parallel banking system. These securitization vehicles (such as conduits, SIVs, limited purpose finance companies, collateralized loan obligations, CDOs, collateralized bond obligations, etc) act as a secondary layer of intermediation between ultimate borrowers and ultimate investors: the originating banks and the securitization vehicles act as a dual structure form of intermediation (see Gorton, 2010).

Such instruments have several important properties with respect to: the underlying economics of banking, bank business models, and the distribution of credit risks, the generation of credit, and the structure of financial intermediation in the financial system. They also produced a more market-centric financial system. In particular, instruments that have been designed to shift credit risk have produced new banking models (*originate and distribute*, for example) that change in a fundamental way the underlying economics of banking and also in a way that, under some circumstances, makes the system more crisis-prone. We argue that such business models have been central to the origin of the current financial crisis. It is also evident that the implications of new models were not fully understood by originators, users or supervisors. The main focus is on credit risk shifting instruments which enable credit risk to be shifted, traded, insured, and taken by institutions without the need for them to make loans directly to borrowers.

Given the central importance of financial innovation in the crisis scenario (in particular the role of credit risk shifting instruments), the nature and role of financial innovation is reviewed before considering its special role in the current crisis. In many respects, financial innovation (in particular the development of structured instruments and credit derivatives) became a defining characteristic of national financial systems over the decade or so before the onset of the crisis. We consider its implications for four key issues: how it might contribute to enhancing the efficiency of the financial system; its implications for risk management; how it changed the underlying economics of banking, and its implications for financial stability. A central consideration is the impact that financial innovation has on two key issues in the financial system: its *efficiency* and *stability*.

In the following sections, we adopt a *functional* approach to financial innovation. Applying such an approach, financial innovation and instruments may be classified according to their contribution to the basic functions of the financial system: risk-transference, pricing of risk, liquidity-enhancement, credit-generation and financial intermediation, insurance, asset and liability management, the efficiency in the allocation of financial resources, and the funding of financial institutions.

1.4.1 *Financial Innovation and Efficiency*

Applying a *Functional Approach* to financial innovation (Llewellyn, 1992), many instruments and techniques have the potential to enhance the efficiency of the financial system. Financial innovation (and credit-risk-shifting instruments in particular) has the potential to shift risk optimally to those who are most able and willing to absorb it.

Although we argue that financial innovation has been a central factor in the emergence of the financial crisis, this is not to lose sight of its potential efficiency benefits. Greenspan (2004) has argued that: “Credit derivatives and other complex financial instruments have contributed to the development of a far more flexible, efficient and hence resilient financial system”. The BIS has argued:

“the development of credit risk transfer [CRT] has a potentially important impact on the functioning of the financial system. It provides opportunity for more effective risk management, promises the relaxation of some constraints on credit availability, and allows more efficient allocation of risk to a wider range of entities. The pricing information provided by new CRT markets is also leading to enhanced transparency and liquidity in credit markets” BIS (2003).

The efficiency dimension to financial innovation can be summarised by considering in general terms the potential benefits of financial innovation and credit risk shifting instruments in particular.

Costs of financial intermediation: the costs of financial intermediation can be reduced in two ways: by giving borrowers access to a wider range of markets and facilities, and in some cases by allowing different institutions to exploit their comparative advantages in the lending value chain. Thus, a bank might have a comparative advantage in originating loans while an insurance company might have a comparative advantage in taking the associated credit risk.

Wider access to credit: these arguments can equally apply to the issue of access to credit. For instance, by enabling banks to shift credit risk to others, their lending capacity is enhanced because it eases capital and risk constraints on further lending. Indirectly, the lending capacity of risk absorbers is also enhanced as, through credit derivatives, they are able to acquire credit risk without the necessity of directly making loans.

Matching portfolio preferences and enabling optimal portfolio selection: by the same argument, innovation is presumed to increase efficiency as the wider range of facilities and instruments increases the probability that different portfolio preferences can be met. New instruments facilitate a greater ability to unbundle transactions so that various parties are able to construct the risk-return structure most appropriate to them (Italian Bankers Association, 2008). Many instruments allow aggregated risks to be unbundled, separately priced and ‘sold’. By allowing different risks within a given instrument to be separated, priced and held separately, agents are able to choose the particular combination of risks that suits their requirements (Masala, 2007).

Pricing of risk and efficient allocation of resources: some instruments allow risks to be more accurately priced, which in turn enables the financial system to contribute to greater resource efficiency in an economy. To the extent that innovations (and especially derivatives instruments) enable component risks to be identified, separated and accurately priced, funds are allocated more efficiently in the economy.

Arbitrage potential: new instruments facilitate arbitrage between markets which, in principle, erodes pricing anomalies, and reduces market imperfections through greater integration of markets. If an investor judges, for instance, that a particular credit risk is overvalued, (s)he can earn premium income as a protection seller in the CDS market.

Risk transfer and management: financial innovation widens the range of instruments available for risk management and enables various types of risk to be managed and shifted optimally to those who have a greater ability and/or willingness to absorb them. The wide range of financial instruments now available has become an integral part of risk management both for the suppliers of financial services and their customers.

Risk more dispersed: a property of some new financial instruments is that various risks can be dispersed optimally throughout the financial system which reduces the concentration of, for example, credit risk on a particular type of financial institution. This could have the effect of enhancing the stability of the financial system. By the same token, some instruments enable a bank to maintain a customer relationship without incurring an excessive credit-risk exposure. Credit derivatives offer an attractive mechanism for managing exposure concentrations.

Liquidity in credit risk: the traditional model of the bank is that loans are non-marketable and hence the lender is effectively locked-in to the borrower for the maturity of the loan. This limits the ability of a bank to change the composition of its loan portfolio if it is constrained in expanding the overall balance sheet. Many instruments (securitization, CDOs, etc) remove this constraint and effectively create liquidity for loans that have traditionally been illiquid.

Information efficiency: some financial instruments have the potential to increase informational efficiency through the market prices of derivative contracts and instruments including indexes.

Portfolio management: in addition to their risk management potential, to the extent that innovations create secondary markets they facilitate the management and adjustment of portfolios. Furthermore, in many ways, and for some investors, the cost of creating a CDO can be less than the cost of assembling a portfolio of loans and/or bonds to achieve the same risk-return objectives.

Clearly, there are potential efficiency benefits to be derived from financial innovation in terms of enhancing the underlying functions of the financial system. On the other hand, a decidedly more skeptical note is sounded by the Chairman of the Financial Services Authority in the UK:

“Not all innovation is equally useful... If the instructions for creating a CDO squared have now been mislaid, we will I think get along quite well without it. And in the years running up to 2007, too much of the developed world’s intellectual talent was devoted to ever more complex financial innovations, whose maximum possible benefit in terms of allocative efficiency was at best marginal, and which in their complexity and opacity created large financial stability risks” (Turner, 2009).

The main (though not only) potential benefits derive from the risk shifting characteristics of financial instruments. However, whatever are the welfare and efficiency benefits of financial innovation, they will not accrue under all circumstances and the potential efficiency advantages may be compromised if, for any reason, they threaten financial stability. This leads to a consideration of the systemic stability implications of financial innovation and credit-risk shifting instruments in particular.

While credit derivatives can and are used to shift credit risk, this is not the whole story in three respects. Firstly, credit risk is often not shifted as much as might at first appear: originating banks may choose or be required to hold some of the credit risk; banks themselves invest in some derivative instruments such as CDOs; originating banks often offer lines of credit to their securitization vehicles, and if funding of such vehicles weakens banks may find themselves having to keep on the balance sheet loans that they had planned to securitize. Furthermore, although a securitization vehicle might be technically bankruptcy-remote from the bank, if it encounters funding problems or even solvency problems, for reputation reasons the bank might choose to come to its rescue: what might be termed the “boomerang effect”. Secondly, it cannot be assumed that the degree of system-wide risk is exogenous to the instruments that are used to shift it around the system. Thus, the use of credit risk shifting instruments is likely to increase the total volume of loans initiated by banks, and may induce them into making higher-risk loans than would otherwise have been the case. Thirdly, credit derivatives can be used for speculation and trading purposes. It has been estimated that at the end of 2007, the value of CDSs outstanding amounted to over \$60 trillion whereas the maximum value of debt that could conceivably have been insured was probably in the region of \$5 trillion.

There are several advantages to banks in securitising their loans: credit risk is shifted, the need for regulatory capital is lowered, banks are able to exploit their comparative advantages in initiating loans without expanding the balance sheet even if they have no such advantage in funding loans or holding loans and credit risk on the balance sheet, the cost of funding is lowered as investors are attracted by the particular assets being securitised rather than the bank itself, fees are earned by the bank, and it enables customer relationships to be maintained even if their loans cannot be held on the bank’s balance

sheet. Overall, securitisation is an instrument of balance sheet and capital management for banks.

1.4.2 Financial Innovation and Stability

The stability implications of credit derivatives are ambiguous. Until 2007, financial innovation (particularly with respect to credit risk) developed in a largely stable and benign economic environment of strong and reasonably stable growth in the world economy, strong profitability of banks, and low and reasonably stable rates of inflation. This benign combination meant that credit risks *appeared* to be low which required low pay-outs on credit instruments and credit insurance. In essence, the new credit risk shifting instruments had not been tested in a more demanding market environment. The decade before the onset of the crisis was one of apparent stability in many dimensions: the macro economy, inflation, interest rates, etc. In formal terms, the distribution curve of risks became taller and narrower with small tail risks. It was also during this period that data were taken for the purposes of stress tests within banks and this necessarily produced skewed results as the sample period was both short and untypical. In other words, stress tests were being undertaken on the basis of data taken from an exceptionally low risk environment.

Two contrasting views have surfaced regarding the stability characteristics of financial innovation and credit risk shifting instruments in particular. One school argues that, because they have the potential for risks to be shifted optimally, they enhance the stability of the financial system. The IMF 2006 *Global Financial Stability Report* argued that: “the improved resilience may be seen in fewer bank failures and more consistent credit provision. Consequently, the commercial banks may be less vulnerable today to credit or economic shocks”. Similarly, Greenspan argued that:

“if risk is properly dispersed, shocks to the overall system will be better absorbed and less likely to threaten financial stability... These increasingly complex financial instruments have especially contributed to the development of a far more flexible, efficient, and resilient financial system than existed just a quarter-century ago” (Greenspan, 2002).

There are several routes through which financial innovation might enhance the stability characteristics of the financial system, and through which structured finance may make financial systems more resilient to shocks:

- To the extent that financial instruments spread risks more widely within the system (and to those are more willing and able to absorb them), stability is likely to be enhanced.
- In many ways, such credit risk shifting instruments enable banks to respond more easily to certain types of shocks. Several years before the onset of the crisis, Fed Chairman Greenspan suggested that:

“[these episodes] suggest a marked increase over the two or three decades in the ability of modern economies to absorb unanticipated shocks (...) this has doubtless been materially assisted by the recent financial innovations that have afforded lenders the opportunity to become considerably more diversified and borrowers to become far less dependent on specific institutions or markets for funds.” Greenspan (2002).

- A further perspective has been offered by the BIS: “The ability to switch smoothly between balance sheet financing and market-based financing contributes to the robustness of a financial system and improves its ability to deal with strain”, (Knight, 2004).

Against this, others have argued that they have the potential to undermine financial stability not the least because they facilitate substantial leveraging of risk. Borio (2008) suggests that three particular characteristics of these instruments may have contributed to the current financial turmoil: (1) their payoffs may be highly non-linear (Fender, *et al.*, 2008) in that they tend to produce a steady stream of returns in calm times, but in bad times can produce disproportionately heavy losses, (2) the risk profile of structured products can be very different from that of traditional bonds in that they can be subject to high “tail risks” (i.e. higher probability of large losses), and (3) as noted by Fender and Kiff (2004), modeling the future default and risk profile of some structured instruments is subject to considerable uncertainty not the least because of the limitations of current valuation models which often under-estimate the correlation of risks within the instrument.

In addition to the arguments discussed in Borio (2008), the negative stability characteristics of financial innovation may be summarized as follows:

- The introduction of multiple layers between borrowers and lenders may introduce new channels for the transmission of shocks within financial markets.
- In some complex credit derivative instruments, correlations which are zero (or even negative) in normal times can turn out to be positively correlated in abnormal times (see Chan, *et al.*, 2005).
- To the extent that financial innovation has accentuated the market-centric nature of the financial system, shocks in one market may spread to a wider range of markets than was the case before. The experience of the middle months of 2007 and in 2008 illustrates how this can occur. Globalization coupled with financial innovation means that markets have become more closely linked, and shocks are spread more widely.
- The enhanced leverage potential of credit derivatives may increase the vulnerability of the financial system to certain types of shock.

- The use of credit derivatives tends to be inherently pro-cyclical through accentuating credit growth in the upswing of an economic cycle but equally accentuating the opposite trend in the downswing.
- Financial innovation has a general effect of enhancing competition in the financial system as all suppliers of financial facilities face competition from a wider range of channels. Whilst this is generally a beneficial outcome, competition can sometimes have the effect of inducing financial institutions into hazardous and risky behavior as they strive to maintain market share and rates of return on equity.
- The experience of the financial turbulence since the summer of 2007 has been that in practice, credit risk is not always shifted as much as might be thought through the use of securitization and credit derivatives. This in itself can introduce a higher element of instability in the system to the extent that, in the event that risk has not been shifted, banks may need to take back on to their balance sheets credit risks they thought had been shifted. This in turn may induce funding and capital problems for banks.

The Financial Stability Forum report (BIS, 2005) identifies three issues with respect to the stability characteristics of credit derivatives: whether they create a clean and total risk transfer, whether all participants understand the full nature of the risks involved in derivative transactions, and whether they produce a concentration of risks either inside or outside the banking system. A key dimension, therefore, is the extent to which credit derivatives achieve a genuine transfer of credit risk.

More generally, the use of credit derivative instruments, while again designed to shift credit risk from originating banks, also had hazards which contributed to the crisis: there was a lack of transparency, they were often extremely complex and many banks clearly did not fully understand them, the location of risks became difficult to discern, and banks' balance sheets became generally more opaque. They also facilitated more credit generation through the banking system. Greenspan (2010) has further argued that:

“[a major problem] was the vast, and in some cases, the virtual indecipherable complexity of a broad spectrum of financial products and markets”.

One of the characteristics of credit derivatives is that they tend to be opaque. Santomero has raised doubts about some aspects of the use of financial derivatives most especially with regard to transparency:

“Perhaps recent events... suggest that, while we have made assets more tradable, we have not necessarily made their value more transparent. Indeed, the added complexity associated with current asset portfolios drawn from various types of credit and credit derivatives cries out for better transparency and better reporting. This ought to be the agenda for the next decade” (Santomero, 2007).

In essence, there has been a proliferation of opaque and complex financial derivatives and structured instruments which are traded by opaque off-balance-sheet vehicles such as Structured Investment Vehicles. The Financial Services Authority in the UK (FSA, 2008) has argued that:

“Structured finance and the way in which firms have used associated finance vehicles, such as SIVs and conduits, are central to the instability that affected financial markets and financial institutions in the second half of 2007 (...) Liquidity more or less disappeared from the asset-backed commercial paper market after several years of unprecedented growth (...) The lack of liquidity caused significant problems for many products, most notable SIVs, ABCP conduits, CDOs and CLOs”.

In effect, all credit derivative markets were badly affected by the crisis. Gorton (2008) argues that interlinked and nested unique security designs necessary to make sub-prime mortgages function resulted in a loss of information to investors especially regarding the location of risks. They were also based on the assumption (requirement) that house prices would continue to rise so that maturing mortgage loans could be easily rolled-over.

1.4.3 *A Resolution?*

A possible resolution of the apparent conflict between stability enhancing and reducing characteristics of credit risk shifting instruments focuses on the nature of shocks in that the increased use of credit derivative instruments may enhance the stability characteristics of the financial system in the face of small and low-correlated risks, while making the system more vulnerable to large systemic shocks such as the drying-up of liquidity in international markets as in the summer of 2007 and in 2008. The latter may arise because of the herding instinct, the lack of diversity within banking systems, enhanced network externalities, and increased linkages between different markets both between asset classes and internationally. Each of these (and most especially when combined) is likely to increase the occurrence of low-probability-high-impact risks such as occurred in the summer of 2007. Credit derivative instruments may either increase or decrease financial stability dependent on the different types of shock that may occur. Rajan offers the following perspective:

“Have these undoubted benefits [of financial innovation] come at a cost? Have we unwittingly accepted a Faustian bargain, trading greater welfare most of the time for a small probability of a catastrophic meltdown?... while the financial system is more stable most of the time, we may also have the possibility of excessive instability in really bad times (as well as higher probability of such tail events) (...) the linkages between markets, and between markets and institutions, are now more pronounced. While this allows the system to diversify across small shocks, it also exposes the system to large systemic shocks - large shift in asset prices or changes in aggregate liquidity,” (Rajan, 2005).

1.4.4 What is New in Recent Financial Innovation: Credit Risk Shifting

Instruments for the shifting of credit risk are a recent development and raise particular issues both of analysis and practicality. There is a clear difference between a bank protecting itself against a price risk as compared to credit risk as the former is systemic: the risk associated with a price movement is not influenced by the behaviour of the protection buyer which means that the probability is exogenous to the bank. Issues of asymmetric information, *adverse selection* and *moral hazard* therefore do not arise. The probability of these risks emerging is determined independently of the behaviour of the protection buyer. Thus, the probability of currency depreciation or a rise in interest rates is not in any way determined by the fact that a bank might have protected itself against these risks by, for instance, conducting forward transactions or buying option contracts.

Credit risk and its protection, on the other hand, raise different issues. The relationship between a credit risk protection buyer and seller is fundamentally different from that between two counterparties in a swap or forward transaction. One of the features of credit risk is the asymmetric information dimension as the lender has more information about the quality of loans than does a protection seller or a purchaser of a bank's asset-backed securities. The traditional theory of banking is that this asymmetric information acts as a bar to credit insurance or the shifting of credit risk. As with standard insurance theory, there is always a potential for banks to deliberately select high-risk loans to be insured (*adverse selection*) and to deliberately make high-risk loans or to fail to monitor borrowers (*moral hazard*) because the risk is passed to others.

The emergence of securitisation and, more recently, credit derivatives challenges this traditional paradigm. Notwithstanding the problems outlined above, it is possible for a bank to shift credit risk either through asset sales, or through an insurance contract such as a CDS. These recent innovations mean that credit risks can be shifted, traded and insured. Furthermore, they can also be used by a bank or other financial institution to acquire a credit risk without making a loan by, for instance, being a credit-risk protection seller. The main characteristics of the different credit risk shifting mechanisms and instruments are summarised in Table 2.

Table 2: Credit Risk Shifting Instruments

	Credit Guarantee	Credit Insurance	Loan Trading	Syndi- cation	Securiti- zation (ABS)	Conven- tional CDO	Synthetic CDO	Single Name CDS	Portfolio CDS
Funded			√	√	√	√			
Unfunded	√	√		?			√	√	√
Asset Transfer			√		√	√	√		
Insurance								√	√
Tradable			√		√	√	√	√	√
Risk Transfer			√	?	√	√	√	√	√
Single Name	√	√	√	√				√	
Portfolio	√	√	√		√	√	√		√
Counter- party	√	√						√	√

A key issue is the extent to which complex instruments are fully understood by the transactors. New complex products might have consequences that are not fully understood by the initiators, users, or supervisors (Masala, 2007). The full risk implications of some instruments are sometimes determined by the application of complex mathematical models which have to be appreciated as much by users and supervisors as by the institutions making use of them. The FSA has argued (FSA, 2002 and 2008) that complexity and the lack of transparency of many credit derivatives instruments make it difficult for investors to determine precisely how exposed they are to particular risks. In practice, losses may be determined by the correlations of the risks within the portfolio and these are often difficult to calibrate. Furthermore, banks became less transparent as it was difficult to know to what extent credit risks had been shifted through credit derivatives.

1.4.5 *Asymmetric Information Risks*

There are several asymmetric information risks attached to the change in the banking model implied by credit risk shifting instruments with the corollary that standard problems of *adverse selection* and *moral hazard* may arise. The underlying basis is that the initial lender is likely to have more information about borrowers and a greater capacity to conduct post-loan monitoring than the buyers of securitization instruments or writers of CDS contracts. Several problems in particular may arise:

- The initiating bank may have an incentive to shift the risk on its existing low-quality loans (De Marzo and Duffie, 1999, and Pennacchi, 1988).
- A potential *moral hazard* arises to the extent that, as a bank is able to shift credit risk, it has less incentive to accurately assess credit risk. This problem surfaced in the US sub-prime mortgage market during 2007. There is also less incentive to

subsequently monitor the borrower (Gorton and Penacchi, 1995 and Morrison, 2005), and it is unlikely that a seller of credit risk protection (or buyer of CDOs) is able to monitor borrowers because they do not have the information or relationship advantages possessed by the initiating bank. Mian and Sufi (2008) find that default rates tend to be higher on securitized mortgages than those which are held on the initiating bank's balance sheet. Keys *et al.* (2008) also find that securitization tends to weaken screening of borrowers before loans are made.

- A lemons problem can emerge in some credit-risk transfer arrangements in that a lender buys protection on low-quality assets which may drive up the cost of protection on high-quality assets (Duffe and Zhou, 2001). The standard lemons problem (Akerloff, 1970) is that, in the presence of asymmetric information, a market may eventually break down as only low-quality assets are offered for protection.
- In some cases, either the borrower or the credit risk protection buyer (i.e. banks that have made loans) may be able to influence the probability of a relevant "credit event" as the buyer of protection may have the power to determine when a default has occurred. Under some circumstances, there is an incentive for a buyer of credit protection through a credit derivative to trigger a default prematurely by, for instance, refusing to make further loans that it might otherwise have done had it not been for the terms of the CDS contract.
- If contracts are incomplete (in that they do not specify the rights and obligations of all parties in all circumstances) there may be scope for one of the parties (often the risk protection buyer) to act opportunistically against the interests of the risk-absorber.
- The risk shedder may retain a relationship with the borrower after the credit risk has been shifted as an agent of the risk taker. As noted in BIS (2003), this gives rise to a potential principal-agent problem. In whose interest is the bank working?

In some cases, financial innovation contributes to alleviating standard problems associated with asymmetric information and, by adding further instruments to the armory of risk management, may enable transactors to protect against the associated risks. However, in several ways the emergence of credit-risk-shifting instruments has accentuated problems of asymmetric information (Mizen, 2008) identifies several hazardous incentives structures within the "originate to distribute" banking model and in particular: the payment of up-front fees for originating banks and brokers, moral hazard, a bias towards writing business, and the incentives of rating agencies which may be subject to conflicts of interest as they often advise on how to structure instruments in order to receive a favorable rating.

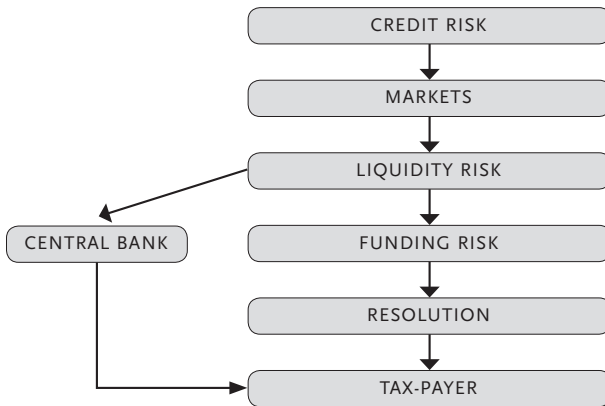
1.4.6 Risk Shifting versus Risk Changing

The financial crisis revealed two major implications of credit risk shifting instruments: (1) in many cases the risk was not in practice shifted as much as banks thought would be the case, and (2) even when credit risk was shifted this was sometimes at the cost of increasing market, liquidity, funding and ultimately solvency risk. In effect, credit risk

that is initially shifted may involuntarily come back on to the balance sheet of the originating bank.

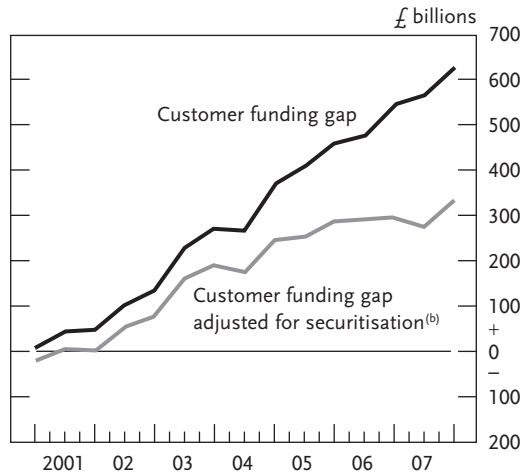
There are several possible reasons for this. Firstly, a bank’s SIV may be unable to continue issuing asset-backed commercial paper. Secondly, loans that were planned to be securitized may prove to be “non-securitizable” because of funding constraints. Thirdly, the originating bank may be called upon to honor agreed lines of credit to SIVs. Fourthly, a bank may be induced to take back securitized assets in order to alleviate a potential reputation risk. In the case of Northern Rock (which developed securitization as a central component of its business strategy, (Llewellyn, 2008)), an initial shifting of *credit risk* through securitization exposed the bank to a *liquidity risk* that it (or its securitizing Special Purpose Vehicle) would not be able to “roll-over” in the wholesale markets its maturing short-term borrowings that were used to fund the acquisition of long-term mortgages. This liquidity risk in turn was quickly transformed into a structural *funding risk* (as alternative sources of funding were unavailable) which was ultimately transformed into a *solvency risk*. The bank of England has described the sequence in chart 1.

Chart 1: Risk Transformation



The use of credit-risk-shifting instruments exposed banks to low-probability-high-impact risks in that the reliance on short-term wholesale market funding to finance long-term mortgages meant that some banks became structurally dependent on a limited number of wholesale markets for their funding. It was always judged that the simultaneous drying up of all these markets would be extremely unlikely as it had seldom, if ever, happened before. Equally, however, it would be very serious if it were to occur. In the event, this is precisely what did happen. Banks ignored the low-probability-high-impact risk of liquidity drying up in all markets simultaneously. Such risks equally applied to institutions and investors who would issue short-term commercial paper in order to acquire asset-backed securities of various kinds. Furthermore, at the same time as encountering borrowing-liquidity problems, banks were unable to sell assets other than at fire-sale prices. The growing importance of non-retail funding for British banks is shown in chart 2.

Chart 2: Major UK Banks' Customer Funding Gap^(a)



Sources: Dealogic, published accounts and Bank of England calculations

(a) Data exclude Nationwide.

(b) Customer funding gapless securitized debt. Where not available, stocks of securitizations are estimated from insurance data.

Problems are compounded in the case of many derivative instruments by the fact that they can become difficult to price not the least because the risk characteristics are opaque and complex. When secondary markets dried up in these instruments market after the summer of 2007, prices became unavailable. This forced holders (banks) to attempt to value their holdings of derivative instruments on the basis of models which were found to be fundamentally flawed in two respects: they were based on an insufficiently long observation period from which to calculate probabilities, and they did not take into sufficient account the tail-risk that the risks attached to many of the assets within CDOs were themselves highly correlated. Thus what were thought to be diversified instruments turned out to be highly concentrated.

In essence, therefore, financial innovation (most especially credit-risk shifting instruments) has both *risk shifting* and *risk-changing* properties, and the specific outcome is not always predictable.

2 CAUSES OF THE CRISIS: HOW DID WE GET HERE

2.1 LAYERS OF CAUSALITY: EXOGENOUS VERSUS ENDOGENOUS PRESSURES

The concept of causality in the crisis is misleading as it emerged as a result of several simultaneous and interactive pressures. The “causes” of the crisis were multi-dimensional and came together in the summer of 2007. The key is the interaction of the various “layers of causation” in that some of the identified “causes” might not have been such had they occurred in isolation and not together with various other factors. In this sense, the total impact is greater than the sum of the parts.

Analysis of causality in the crisis is considered at several levels (summarized in Table 3) and considered in detail in later sections. The analysis is presented in terms of two alternative, though closely related, paradigms: *exogenous pressures* (factors largely outside the control of banks and their business models), and *endogenous pressures* (factors associated with bank models and behavior). The various pressures generating the crisis are brought together in the following strands:

2.1.1 *Exogenous Pressures*

Several pressures developed in the macro economy and in the area of regulation and supervision, that were outside the control of the banks but which had a decisive influence on their business strategies:

- *Proximate causes*: the proximate causes were defaults on US sub-prime mortgages in part induced by a fall in house prices and a tightening of monetary policy in the US.
- *Environmental factors* operated in the context of large global financial imbalances, a global savings glut, asset price bubbles, massive growth of global liquidity, pressure on banks to maintain returns in a low interest rate environment by creating more leverage and moving into higher risk business. Low and less volatile inflation, together with low and stable interest rates and bond yields, created more stable world economic growth which in turn induced sharp growth rates in bank lending.
- *Prevailing ideology*: the dominant ideology of de-regulation and financial liberalization, rational expectations and the dominance of variants of the efficient markets hypothesis, set a powerful intellectual climate which influenced bankers, market participants and also supervisors. This was a view often expressed by Chairman Greenspan, and in the UK it manifested itself in, *inter alia*, the concept of “light touch” regulation by the Financial Services Authority.

- *Specific policy measures*: several specific measures were adopted in the US which fuelled an unsustainable growth in mortgage lending.
- *Regulatory and Supervisory failures*: failures of supervisors to act on identified concerns and to act against excessive risk-taking by banks. While several central banks and international agencies had been warning for some time about hazardous trends (under-pricing of risk, asset price bubbles, etc) little action was taken to address their concerns. Equally, regulation (such as the Basel capital Accord) created incentives for banks to develop off balance sheet business and to shift credit risk.
- *Diversification versus Diversity*: A general trend in the years prior to the onset of the crisis was that, across the board, banks and other financial institutions diversified into areas that were not their traditional business lines which might normally be expected to reduce risk to individual institutions. As a result, banks and other financial institutions became more homogenous and less differentiated and in three dimensions in particular: their business lines, the primacy given to Rate ROE strategies, and the risk models applied. In the process, however, such lack of “bio-diversity” made the *system* more vulnerable: this amounts to a *fallacy of composition* in that what might apply to an individual institutions does not necessarily apply to the totality of all institutions adopting the same business models.

Although these are predominantly exogenous in nature (in that they were not generated by banks) they did have endogenous counterparts as shown in Table 3. The fact that such exogenous pressures existed at all indicates that governments, central banks and regulatory agencies played a part in the generation of the crisis. There were fault-lines in macro-economic and regulatory policies.

2.1.2 *Endogenous Pressures*

At the same time, several pressures leading to the crisis were a product of banks’ strategies even though they may, to an extent, have generated by the exogenous pressures above:

- *Excess Financialisation*: a wide range of pressures on banks that created incentives for banks to grow too fast and to an unsustainable level and range of business.
- *Financial innovation and bank business models*: as already noted, a key role was played by financial innovation which purported to shift credit risk away from the originators of loans; the new business models of banks that resulted from this and which exposed banks to low-probability-high-impact risks; weakening lending standards, and a resultant systemic under-pricing of risk. These factors operated in a context where, around the world, banks became more focused on shareholder value business strategies in an environment where competitive pressures in traditional banking business had become more intense. Many of the particular aspects of new business models were driven by an increased focus on ROE.

- *Incentive structures* of key agents in the system (bank managers, shareholders, rating agencies, supervisors, etc) also became dysfunctional. Furthermore, banks' internal remuneration structures created a bias towards excess risk-taking and herd behavior.
- *Enhanced network externalities*: one of the structural changes identified earlier as preceding the crisis, was the increased power of network externalities associated with increased connectivity between different institutions and between banks and markets. This had the effect of spreading shocks in one market to other markets and institutions.
- *Risk models*: there were evident fault-lines in many of the risk models used by banks based, as many of them were, on various forms of a "normal distribution" of risks which had the effect of under-estimating the probability of fat tail risks and the correlation of risks within supposedly diversified portfolios such as CDOs.
- *Corporate governance weaknesses within banks*: governance arrangements within banks did not prevent the adoption of high-risk profiles.

In each case, the specific factors identified within each "layer of causation" (irrespective of whether they are categorized as predominantly exogenous or endogenous pressures) have both internal and systemic dimensions (Table 3).

Table 3: Crisis Matrix

	Internal	External/Systemic
1. Proximate Cause	<ul style="list-style-type: none"> - Risk analysis and management systems 	<ul style="list-style-type: none"> - Sub-prime defaults - Fall in house prices - Tightened monetary policy - Erosion of confidence - Rating downgrades
2. Environmental factors	<ul style="list-style-type: none"> - Pressure for returns - Optimism and collective euphoria - <i>Shadow Banks</i> 	<ul style="list-style-type: none"> - Asset price bubbles - Global liquidity expansion - Interest rates: levels and stability - Low bond yields - Global financial imbalances - Excess savings in emerging market economies - Inflation: levels and stability - World economy: growth and stability - Perceptions of low risk - Financial liberalisation
3. Incentive structures	<ul style="list-style-type: none"> - Remuneration systems - LPHI risks ignored - Herding behaviour - Short-termism - ROE strategies - Asymmetric rewards - Disaster myopia 	<ul style="list-style-type: none"> - Competition - Collective Euphoria - Safety net
4. Ideology	<ul style="list-style-type: none"> - SHV focus 	<ul style="list-style-type: none"> - Rational expectations - Efficient Markets - Self-correcting properties - De-regulation - Liberal market ideology
5. Supervision	<ul style="list-style-type: none"> - Weak internal mechanisms - Regulatory arbitrage 	<ul style="list-style-type: none"> - Ignored warning signs - Box ticking - Low understanding - Business models - Micro v. systemic focus - Collective euphoria - Incentive structures - Light-touch regulation - Regulatory capture - Disregard of liquidity - Focus on models - Stress-testing - OBS assets without capital

Table 3 continued

6. Network Externalities	<ul style="list-style-type: none"> - Exposures - Derivatives trading - Homogeneity of banks - Wholesale funding markets - Identity of counterparty risks 	<ul style="list-style-type: none"> - Connectedness - Low degrees of separation - Bank-markets link - Externalities - Exposure to common shocks - Fallacy of composition - Small number of hubs/large number of spokes - Small shocks/high impact - Globalisation - More systemically important institutions
7. Risk models	<ul style="list-style-type: none"> - Normal distribution - VAR models - Mathematical models - Under-estimate “fat tails” - Testing of models - Risk management skills 	<ul style="list-style-type: none"> - Fallacy of Composition - Regulation incentives - Network externalities - Correlation of risks
8. Corporate Governance	<ul style="list-style-type: none"> - Weak internal monitoring - Information flows - Independent assessment - Corporate structures - Internal audits - Incentive structures - Lines of accountability - Audit committees - Expertise of NEDs 	<ul style="list-style-type: none"> - Weak external monitoring - Role of NEDs - Weak market discipline - Lack of independent monitoring - Official supervision - Systemic issues ignored - Passive shareholders - Ownership structures
9. Diversification versus Diversity	<ul style="list-style-type: none"> - Excess diversification - Herding - Trading activity 	<ul style="list-style-type: none"> - Lower systemic (bio) diversity - Fallacy of composition - Greater homogeneity
10. Financial innovation & Business models	<ul style="list-style-type: none"> - Use of securitisation and credit derivatives - Adverse selection - Moral hazard - Low understanding - Wholesale funding - Lower lending standards - Under-pricing of risk - Free income - ROE focus - Lower liquidity holdings - O & D models - Maturity mis-matches - Debt & equity finance of risk 	<ul style="list-style-type: none"> - New instruments - New markets - Fallacy of Composition - Under-pricing of risk - Pressure for ROE

Table 3 continued

11. Excess financialisation	<ul style="list-style-type: none"> - Expansion strategies - High gearing - Credit growth - Under-estimation of risk - Under-pricing of risk - Excess optimism - Short-termism 	<ul style="list-style-type: none"> - Low cost equity - Rating agencies - “subsidies” - Safety net perceptions
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A central theme is that, while many factors played their part (and that it is the combination of pressures that proved to be decisive in the emergence of the crisis) none would have had the impact that they did had it not been for financial innovation, the new business models that this made possible, and in particular the emergence of credit risk shifting instruments. For instance, many factors contributed to the sharp rise in bank lending and an under-pricing of risk. However, their impact would have been limited had banks been forced to hold assets on the balance sheet, absorb the associated credit risk, and hold expensive capital against this risk: in other words, had banks not deviated so far from the traditional model of banking.

2.2 EXOGENOUS PRESSURES

2.2.1 Proximate Causes

The *proximate* causes of the crisis (the trigger that started it) was a sharp rise in defaults on sub-prime mortgages in the US (associated in part with a tightening of monetary policy after 2004 following several years of ultra-low interest rates), the sudden and widespread loss of confidence in the securitization model, and a sharp fall in property prices following substantial rises in both house prices and sub-prime mortgages over the previous few years (Jaffee, 2008). There had in particular been strong demand for sub-prime mortgages by FMAC and FMAE. The fall in house prices created re-financing problems for borrowers (given the way that sub-prime mortgage contracts had been structured) and increased both the probability of default and the loss-given-default. As noted by Mizen (2008), for several years mortgage originators had been maintaining the volume of new mortgages for securitization by expanding lending activity into previously untapped areas. The first stage occurred in the early months of 2007 when defaults on sub-prime mortgages emerged on a significant scale. This was followed by a Moody’s review of its ratings of mortgage-backed securities.

2.2.2 The Macro Environment

Financial crises do not emerge in a vacuum but surface in the context of the market environment that preceded it. It is often the case that the seeds of a crisis are sown in an earlier period of euphoria and excessive optimism. For several years prior to the onset of the crisis the external economic and financial environment had been highly conducive to the financial sector and banks in particular (Table 3). Financial liberalization in many

countries created conditions for a sharp rise in lending and balance sheet expansion. For several years the world economy was particularly buoyant in that growth was high and reasonably stable, inflation was similarly low and stable compared with previous decades which in turn brought with it a period of comparatively low and stable interest rates and bond yields around the world: real yields declined from around 4.4 percent in 1990 to 1.5 percent in 2007.

A feature of the cycle was that risks were generally under-estimated and under-priced in the upswing because asset prices were rising and perceived risk was low or falling. In practice, risks were built up during this optimistic phase of the cycle. As a result, and along with herding behavior, some characteristics of regulatory capital regimes, and the emergence of collective euphoria followed by dysphoria, bank and market behavior became pro-cyclical. In the upswing prior to the crisis, banks took advantage of these trends in the market environment by increasing leverage and seeking to reduce the cost of funding by, for instance, securitization and increased access to short-term money markets.

It is sometimes the case that the solution adopted to deal with one crisis sows the seeds of the next. In this regard, the sharp cut in interest rates engineered by the Fed contributed to the subsequent euphoria (Boeri and Guiso, 2008). These conditions combined to create an environment of optimism and collective euphoria and a perception that risks in the world economy generally, and bank lending in particular, were low. A perception of low risk (both in terms of the perceived probability of default and the loss-given-default) in turn induced four hazardous trends: an under-pricing of risk, higher gearing by banks, lower liquidity holdings by banks, and an accelerated growth in bank lending.

The emergence of substantial global financial imbalances created a glut of world's savings, most especially in emerging market economies such as China, India and countries of South East Asia, but also Germany and oil exporting countries. A high proportion of the substantial accumulation of external financial assets of these countries was invested in US government bonds. This in turn produced a sharp fall in US (and global) bond yields. Overall, a major feature of the global environment in the years running up to the onset of the crisis was the burgeoning rise in global liquidity (see various issues of the *IMF Global Financial Stability Report*).

At the same time, and partly because of these trends and the responses made by banks and other lenders, there was a sharp rise in asset prices and most especially property prices in many countries: what turned out to be a substantial asset price bubble both in the stock market and housing market. This created conditions conducive to excessive lending by banks and excessive borrowing by households, most especially in the US and the UK. In the US, the savings ratio declined from 6 percent in the early 1990s to close to zero by 2008 and the UK household savings ratio declined steadily from 11 percent to close to zero by 2008.

Combined, these trends produced a period of several years of excessive optimism and euphoria during which conventional rules of banking were weakened or abandoned. What might be termed a "collective euphoria" (or perhaps collective delusion and disaster myopia) militates against independent judgment by those who are required to monitor the behavior and risk taking of banks.

The environmental conditions in turn induced internal fault-lines within banks (Table 3). In particular, it led to an excessive rise in bank lending and expansion of bank balance sheets. As lending rose at a faster rate than the supply of retail deposits, the resulting “funding gap” was filled increasingly by wholesale funding, securitization, and the use of various credit derivatives. Overall, such lending created excess leverage both within banks and their borrowing customers. The low interest rate and yield environment created a “dash for returns” as banks and investors sought higher returns by moving up the risk-reward curve into higher-risk assets even though their true risk characteristics were either not appreciated or were largely ignored.

The thesis here is that the crisis was preceded by a period of several years during which the external environment induced excessive optimism and encouraged banks to follow potentially hazardous strategies. This collective euphoria meant there was an absence of independent monitoring of bank risk-taking. Such collective euphoria led to under-estimating and under-pricing of risks, the loss of independent monitoring, an erosion of independent monitoring by supervisory agencies, a sharp rise in bank lending, excess leverage, and an artificially low cost of capital for banks.

2.2.3 *The Ideological Framework*

A further layer in the causality paradigm relates to the prevailing ideology of the time. For decades (and in some countries more than others), the growing political and liberal market consensus was based on five key elements: the liberal market economic model, the assumption that markets are efficient, decisions are based on rational expectations, that markets are self-correcting, and the dominance of the share-holder value (SHV) model of companies including banks where the almost exclusive objective of bank managers was to maximize shareholder value and often based on a fairly short time horizon. This was accentuated by investors demanding higher rates of return on equity. With respect to the last-mentioned, the evidence from the UK is that excess returns on equity earned by British banks in the years prior to the crisis were associated more with increased risk taking than genuinely superior performance (Haldane, 2009b). A study of European cooperative banks also indicates that they were not affected by the crisis to anywhere the same degree as their SHV counterparts and that this was due partly to such banks continuing to focus on the traditional model of banking, and not seeking to maximize short-term rates of return on equity. (Ayadi, *et al.*, 2010)

The general ideological climate favored free-market solutions and strategies and tended to down play the role of intrusive regulation. The assumptions in the efficient markets hypothesis are that market prices are good indicators of rationally evaluated economic value, the risk characteristics of financial markets can be inferred from mathematical analysis, and (as argued by Greenspan) market discipline can be relied upon to constrain excessive risk taking. Furthermore, even if markets are at times subject to irrational behavior, policy makers and supervisors will never be able to judge when and how far they are irrational with sufficient confidence to justify intervention. This general, and over-arching, ethos had the effect of militating against regulatory and supervisory intervention. The corollary was that even if markets might not always produce perfect out-

comes, policy-makers would not be in a position to judge when sub-optimum outcomes were emerging or be able to construct an optimal intervention. Overall, the dominant ideology of the time created a bias against regulatory intervention which can be regarded as a new form of “regulatory capture”: regulators were captured by a dominant ideology.

This consensus has come under challenge as a result of the global financial crisis particularly with respect to short-termist SHV strategies, and the assumption that, in efficient markets based on SHV models, markets are self-correcting. There are several reservations to the traditional orthodoxy based on universal rational expectations and the various forms of the efficient markets hypothesis. Firstly, it cannot be assumed that market behavior is invariably rational in the economic sense of the term: behavior of each agent may be determined not by independent judgment of self-interest but by copying the behavior of others in a herding strategy. Secondly, expectations may not be formed independently but on the basis of collective euphoria or dysphoria which induces overshooting and bubbles. Thirdly, rational behavior by individual agents may not be collectively rational because of systemic externalities. Fourthly, a *fallacy of composition* can arise as what is rational for an individual agent acting in isolation may cease to be so when all agents behave in the same manner. An obvious example is the response of banks to an erosion of liquidity: whilst individually it may be rational for an individual bank to sell assets (being a price-taker), this ceases to be the case if all banks attempt to sell assets at the same time as collectively they become price-setters. This can transform what is initially a liquidity problem into a solvency problem as the price and value of assets fall when all banks attempt to offset a liquidity problem by selling assets at the same time. Fifthly, as discussed below, internal reward systems within financial institutions may be perverse and create incentives for excessive risk taking. Furthermore, all decision-makers respond to the macro and policy environment of the time: if this is unstable or unsustainable, rational behavior by individual agents may create systemically sub-optimal or unstable outcomes.

2.2.4 Policy Interventions

In the US several policy initiatives were taken at various times in the years before the onset of the crisis: measures to help low-income families to obtain mortgages such as through zero-equity lending; the deductibility of mortgage interest for tax purposes, and the exemption (after 1997) of capital gains tax on residential homes; general pressure on banks to lend to low-income families, and pressure on FMAC and FMAE to increase lending under the Community Reinvestment Act of 1997. The formal abolition in 1999 of the Glass Steagall restrictions may have accentuated trends towards the emergence of new business models in banks though, in practice, the Glass Steagall restrictions had ceased to bite for many years before the abolition of the Act.

These policy initiatives, coupled with increased capital requirements imposed on FMAC and FMAE, meant that banks were induced to create what amounted to their own in-house FMACs, FMAEs, Structured Investment Vehicles, and CDOs as banks could not so easily sell mortgages to these agencies.

2.2.5 Regulation and Supervision

Some aspects of regulation created perverse incentives for banks to develop off balance sheet business which largely escaped capital requirements. Of equal importance, failures of supervision clearly contributed to the financial crisis. Several areas in particular can be counted as supervisory failures:

- (1) Regulation and supervision has tended to be fixated excessively on capital adequacy which is a lagging indicator of potential trouble and, as the crisis demonstrated, can be destroyed very quickly. Most banks that have failed (including many during the recent crisis) have had apparently strong capital positions immediately before their demise.
- (2) The risk characteristics of new business models (and the use of credit derivatives generally) were not fully understood by supervisory agencies.
- (3) There was insufficient focus on banks' liquidity.
- (4) Banks' business models were not subject to sufficiently rigorous supervisory stress tests.
- (5) Insufficient attention was given to monitoring and testing banks' risk analysis and management systems.
- (6) In some cases the adverse incentive structures associated with banks' internal remuneration systems were not considered to be an issue.
- (7) While some agencies (central banks, the IMF, BIS) had been warning of potential dangers from the sharp rise in bank lending, asset price excesses, the persistent under-pricing of risk, and excess leverage, little or no action was taken. Supervisory authorities were also slow to recognize that regulated banks were engaged in regulatory arbitrage by using securitization and SIVs to circumvent regulation that restricted their ability to expand leveraged risk-taking.
- (8) A more general issue was the focus on the prudential position of individual banks rather than the systemic dimension: this amounted to a lack of macro-prudential focus and recognition that, while individual banks may satisfy prudential requirements set by regulatory agencies, collectively their behavior may be systemically hazardous.
- (9) Regulation and supervisors allowed banks to hold assets and loans off balance sheet without capital backing even though the loans might have been originated by the banks themselves.

In an analysis of the crisis in Ireland, the Governor of the Central Bank of Ireland argued at length that serious supervisory failure contributed substantially, and there were elements of regulatory capture:

“A regulatory approach which was and was perceived to be excessively deferential and accommodating; insufficiently challenging and not persistent enough. This meant not moving decisively and effectively enough with banks with governance issues. It also meant that correctly regulatory intervention for the system as a whole was delayed and timid. This was in an environment which placed undue emphasis on fears of

upsetting the competitive position of domestic banks and on encouraging the Irish financial services industry even at the expense of prudential considerations (...) an unwillingness by the CBFSAI to take on board sufficiently the real risk of a looming problem and act with sufficient decision and force to head it off in time” (Honahan, 2010).

In practice, however, and most especially in the supervisory and ideological context of the time, it was often difficult for supervisors to intervene even when they had concerns. As already noted, the seeds of a financial crisis are often sown in a prior period of optimism, high profitability for banks, strong asset growth and benevolent business and market conditions. It can be difficult for a supervisory agency to intervene (even assuming it has the authority and power to do so) ahead of risks being revealed and when profitability is high. Only weeks before the failure of Northern Rock, the bank had reported record high profits, the FSA had lowered its target risk assets ratio, and the banks’ stock market price had reached a record high. More generally, the incentive structures faced by supervisors may create a bias towards forbearance most especially in circumstances where problems have yet to emerge (Llewellyn, 2001 and 2004).

Particularly in the UK, and with the strong encouragement of the government, the Financial Services Authority adopted a “light touch” approach to regulation partly in order not to undermine the competitive position of the financial services industry. Again, there are elements of regulatory capture as put by Kay (2009):

“Supervision is subject to regulatory capture, an inclination to see the operation of the industry through the eyes of the industry and especially through the eyes of established firms in the industry. Because the supervisor’s conception of best practice is necessarily drawn from current practice, supervision is supportive of existing business models and resistant to new entry” (Kay, 2009).

There is also the context of collective euphoria and the prevailing orthodoxy of the time which applied not only to market practitioners but also to supervisors and other market monitors such as rating agencies, shareholders etc. The role of these stakeholder monitors (see Llewellyn, 2002 and 2004) is to apply an independent check on the strategies and decision-makers in banks. And yet in practice they were subject to the same euphoria as the banks themselves, and were part of a collective myopia based upon the excessive optimism. In this sense their role was undermined by not being sufficiently independent of the climate of the time.

The BIS has also emphasized the weaknesses in the supervisory policies of agencies as indicated by a trenchant comment in the Bank’s 2010 Annual Report:

“Overreliance by regulators and supervisors on market discipline (including the discipline supposedly imposed by credit rating agencies) led to what can only be characterized as an extremely light touch in some countries at the core of the global financial system. And when even that light touch proved too much to bear, financial

institutions found it easy to shift selected activities outside the regulatory perimeter. As a result, by fighting the wrong battles or not fighting at all, weak regulators and supervisors allowed the build up of enormous risk” (BIS, 2010).

2.2.6 *Diversification versus Diversity*

While all banks individually sought to diversify their business operations in order to reduce their overall risk profiles, as they did so in similar ways the system as a whole became less diversified. Banks became more similar to each other in terms of business models, funding operations, the structure of their asset portfolios, increased trading activity, and risk management systems and models, etc. As a result of these trends, Haldane (2009a) describes the system as becoming robust and yet fragile. This has a parallel with the argument in an earlier section: that the result of financial innovation was to make the system both more stable and robust in the face of small and uncorrelated shocks, but potentially less stable in the face of large and correlated shocks. Network risk is an externality for the financial system as a whole which all institutions bear but no individual institution has an incentive acting alone to take sufficient action to guard against. Overall, banks were holding insufficient capital to reflect systemic or network risk.

In the process, while individual banks might have become more diversified, there was less systemic diversity. If all banks adopted the same models, they would all become potentially exposed to the same shocks. This could also give rise to the *fallacy of composition*. Overall, these trends reduced the resilience of the system because all banks tended to adopt the same business model, and also applied the same risk management models. Drawing parallels in the natural world, diversity in the gene pool (bio-diversity) tends to greater durability, (Haldane, 2009a). The greater role of network externalities (where the actions of individual institutions have systemic effects) also implies that more institutions become systemically important.

2.3 AN ALTERNATIVE PARADIGM: ENDOGENOUS PRESSURES

Two alternative paradigms with respect to the factors that lead to the banking crisis (the *exogenous pressures* paradigm and the *endogenous pressures* paradigm) were outlined earlier. The endogenous paradigm focuses upon six key components related to bank models, internal incentive structures, risk models, and corporate governance weaknesses:

- (1) Excess “financialisation” and the factors that gave rise to it.
- (2) Banks developed business models (such as “originate to sell”) which meant that they stopped behaving as banks in terms of the traditional banking model. In particular, securitisation and the emergence of credit risk shifting instruments meant that originating banks were not required to absorb the risk of their loans.
- (3) Perverse incentive structures within banks associated with reward structures most especially for those writing business.
- (4) The greatly enhanced role of network externalities associated with an increased degree of connectedness between banks and between banks in general and financial markets.

- (5) Faulty risk models and weak internal risk analysis and management systems within banks.
- (6) Serious failures in corporate governance arrangements within banks both with respect to the monitoring role of *inter alia* shareholders, and internal governance arrangements with respect to risk management procedures.

These components of the *endogenous pressures* paradigm are each considered in the following sections.

2.3.1 Excess Financialisation

Our general theme is that an overarching factor was an increased “financialisation” of the economy. The argument is that this became excessive and unsustainable because it was based on factors that were themselves “artificial” and unsustainable. In particular, the banking sector became excessively large and based on various forms of internal and external “subsidies” that could not be sustained in the long run. In this regard, banks expanded beyond their marginal economic and social value. Although banking seemed to be extremely profitable in the years prior to the crisis, this was misleading as such seemingly excess returns were based on various unsustainable “subsidies” and an under-estimation and under-pricing of risk.

Excess financialisation can be seen in various dimensions: the increasing role of banks in the financial intermediation process; a sharp rise in the assets of the banking system relative to GDP; the rapid growth and overall size of the financial system in the economy; the burgeoning leverage of banks (as measured by their gearing ratios) and the overall debt-GDP levels in the economy; the degree of intra-sector leverage (the extent to which leverage increased within the financial sector as financial institutions became increasingly exposed to other financial institutions); the frenetic pace of financial innovation; the sharp rise in trading volumes of banks; the market capitalisation of banks relative to overall market capitalisation of stock market companies (Van Wensveen, 2008), and the share of total profits in the economy accounted for by banks.

In the UK, banking sector assets as a proportion of GDP rose from 40 percent in 1960 to 220 percent in 1990 and to 540 percent in 2008. Although this ratio tends to rise in all countries as national income rises, our theme is that these measures of “financialisation” became excessive and unsustainable. Similarly, for the ten largest US banks, total assets doubled in the period mid-2004 to mid-2007 while the sum of risk-weighted assets (against which capital needed to be held) rose by only 20 percent. Furthermore, the loan-to-assets ratio of these banks declined from 52 percent in 1997 to less than 40 percent recently, while the investment-to-asset ratio rose from 32 percent in 1998 to 54 percent by 2008. At the same time, the deposit-to-asset ratio declined from 45 percent in 1998 to 36 percent in 2008.

Crises are often preceded by periods of rapidly growing banking activity with banks expanding at unsustainable rates and to unsustainable levels of activity. Financial innovation, and banks diversifying into new areas and with new business models, are common features in the emergence of crises. Several factors lay behind the increasing role of banking in the years leading up to the crisis:

- Excess gearing, and an under-capitalisation, meant that banks could expand at a faster rate, and to a higher level, compared with the position had they maintained a level of capital commensurate with their risks. Overall, banks became highly leveraged with a rise in assets on the balance sheet relative to total capital, (Alessandri and Haldane, 2009, and Wehinger, 2008). Although banks appeared to be well-capitalised, this was largely because they were under-estimating risks and holding assets off balance sheet without capital backing even though there was often a contingent liability attached.
- The macro economic environment, and the collective euphoria of the pre-crisis years, meant that risks were systematically under-estimated and also under-priced. This increased both the demand for loans and the willingness of banks to meet that demand. The sharp rise in the size of bank balance sheets was compounded by a persistent under-estimation and under-pricing of risk which became generalized within financial systems. Several supervisory agencies and others (including the Bank of England (2006 and 2007), IMF and the Bank for International Settlements) gave frequent warnings that risks were being systematically under-priced.
- The collective euphoria, and the high profitability of banks at the time, meant that the cost of capital was artificially low because it did not reflect the true risks that banks were incurring. This amounted to an effective subsidy to banks.
- The perceived safety-net for banks (government support, etc) also had the effect of lowering the cost of funding for banks.
- For various reasons, including the nature of the competitive environment at the time, banks adopted more short-termist strategies to maximise the rate of return on equity. In truth, profitability was enhanced not by superior banking performance, but by banks raising their risk threshold and moving up the risk ladder. Internal reward and bonus structures created a bias towards short-termism and also to excess risk taking (see below).
- The universal optimism generated by the dominant economic ideology of the time meant that rating agencies, central banks, governments, supervisors and many other agents were not inclined to challenge the strategies and business operations of banks.

Each of these factors, both individually but most especially when combined, created sufficient conditions for an over-expansion of banking activity, and an artificially enhanced role of banks. As might have been put by the famous mythical detective Sherlock Holmes: “It is elementary Dear Watson: if any industry is ‘subsidised’ or under-prices its product, it will grow too fast and become too big and to a level that becomes unsustainable without the subsidy.”

2.3.2 New Business Models

A theme of this monograph is that financial innovation and the emergence of new banking models was a major factor in the emergence of the current crisis. This was considered in some detail in an earlier section. The background was also a decline in profitability of banking based on traditional models.

As noted by Borio: “the two most salient idiosyncratic aspects of the current turmoil are the role of structured credit products and that of the O&D (originate and distribute) business model,” (Borio, 2008). The Bank of England also notes that, on the basis of increased gearing, banks expanded into higher-risk assets whose underlying value, quality and liquidity were unknown (Bank of England, 2008). The use of securitisation and credit derivatives were themselves vehicles for an excessive expansion of bank lending.

As part of this overall strategy, there was a substantial rise in the leverage of banks in the years prior to the onset of the crisis. In its *Financial Stability Report*, the IMF noted “a collective failure to appreciate the extent of the leverage taken on by a wide range of institutions and the associated risks of a disorderly unwinding.” In addition to all this, there was an increasing volume of trading in credit risks in a situation where it had become evident that the risks in such trading were not always clearly understood.

Banks developed new business models and moved away from their traditional model of originate-to-hold. The emergence of new business models focussed largely, though not entirely, on new credit risk shifting instruments. Several trends in bank business models emerged in the years leading up to the crisis:

- Banks increasingly diversified into more lines of business activity some of which had previously been inhibited by regulation.
- Bank assets expanded at a substantially faster rate than that of retail deposits (Chart 1).
- The rise in bank loans substantially exceeded the rise in banks’ risk-weighted assets held on the balance sheet.
- Securitisation of loans became a central business strategy for many banks.
- Investment and trading activity increased sharply, and the proportion of traded assets in the total balance sheet rose substantially in many cases.
- Banks reduced their holdings of liquid assets as they developed greater access to wholesale funding markets.
- The extent of maturity transformation also increased sharply as increasing use was made of short-maturity money market funding sources.
- An increased dependency on wholesale and money market funding.
- A powerful trend emerged towards using credit derivatives as a means of supposedly shifting credit risk.

Over-arching all of this was a clear shift in overall business strategy towards a focus on the rate of return on equity (Llewellyn, 2007).

A central theme is that, in some important respects, financial innovation (and most especially the emergence of credit derivatives) has changed the underlying economics of

banking. Earlier sections have outlined how new financial instruments have the potential to enhance the efficiency of the financial system in the performance of its core functions. We now consider how the economics of banking was changed in part due to financial innovation. For illustrative purposes, a distinction is made in Table 4 between the *traditional model* of the bank (originate and hold), the *securitisation variant* (originate and sell), and the use of *credit default swaps* (originate, hold and externally insure).

It is instructive to begin with a stylised review of the traditional model of the banking firm (see Llewellyn, 1999a for a fuller discussion). Banks traditionally have information, risk analysis, and monitoring advantages which enable them to solve asymmetric information problems and hence mitigate *adverse selection* and *moral hazard*. Banks accept deposits and utilise their comparative advantages to transform deposits into loans. In this model, the bank accepts the credit (default) risk, holds the asset on its own balance sheet, monitors its borrowing customers, and holds appropriate levels of capital to cover unexpected risk. It also effectively “insures” its loans internally through the risk premia incorporated into the rate of interest on loans. This is described in the *traditional* model in Table 4. In this process, the bank offers an integrated service in that it performs all the core functions in the financial intermediation process.

Furthermore, in this traditional model the bank is not able to shift credit risk to other agents because of its asymmetric information advantages: a potential buyer or insurer of a loan from a bank might judge that, because of the bank’s information advantage, there is an *adverse selection* and *moral hazard* problem in that the bank might select low-quality loans to pass on and, if it knew that it could pass on risk, it might be less careful in assessing the risk of new loans and would conduct less intensive monitoring of borrowers after loans have been made. For the same reason, the traditional view of the bank is that it is unable to externally insure its credit risks and instead applies a risk (insurance) premium on loans and holds capital as an internal insurance fund. The reason for this is that, given the uncertainties outlined above, an external insurer would reflect this uncertainty in the insurance premia charged to the bank. In this traditional view of the bank, therefore, credit risk cannot be shifted or insured, there is no liquidity in bank loans, and banks are locked into their loan portfolios.

However, as noted in earlier sections, many aspects of this traditional model came to be questioned. In the securitisation model in Table 4, the process of securitisation (including via CDOs) means that the bank is able to sell loans (which the traditional model denies) and hence the bank does not hold the loan asset on its own balance sheet, does not absorb the credit risk, and hence does not need to hold capital against the credit risk. However, this depends upon precisely how the securitisation is conducted and most especially whether the SPV is truly bankruptcy-remote from the bank and *vice versa*.

The CDS model is similar to the securitisation model except that, while the credit risk is passed to the protection seller, the asset remains on the balance sheet of the originating bank. In this model there is explicit external insurance of bank loans.

Table 4: Alternative Bank Models¹

	Traditional	Securitisation	CDS
(1) Accept Deposits	√	(√)	√
(2) Originate Loans	√	√	√
(3) Utilise Comparative Advantage <ul style="list-style-type: none"> • Information • Risk Analysis • Monitoring 	√ √ √	√ √	√ √
(4) Transform into Loans	√	√	√
(5) Accept Risk	√		
(6) Hold on Balance Sheet	√		√
(7) Capital Backing	√		
(8) Insurance	Internal	Shift	Insure

The two simple examples of financial innovation in Table 4 related to credit risk illustrate that the traditional model of the banking firm came to be modified. In particular, these examples of financial innovation meant that the banks were no longer required to perform all the functions in the bank intermediation business. Furthermore, banks were also able to outsource some of their other activities such as loan administration, credit assessment through credit scoring models of other banks, etc. This further challenged the traditional view of the integrated bank. Banking was no longer a totally integrated process whereby banks conduct all the functions in the loan process. Credit risk transfer facilities and instruments changed the relationship between borrowers and lenders and created different incentive structures than contained in the traditional model of the banking firm.

As a result of all this, banks stopped behaving as banks in the traditional way and, in effect, came to act as brokers in credit risk between ultimate borrowers and those who either purchased asset-backed securities or who offered CDS insurance, rather than their traditional role as market-makers in credit risk.

Our theme is that a central contributory cause of the banking crisis was that banks changed their model in a fundamental way: banks stopped behaving like banks! It is interesting to note that in two countries which escaped the crisis largely unscathed (Canada and South Africa), banks stuck to the traditional model and remained conservative institutions with comparatively little use of securitisation and credit derivatives. In Spain heavy regulatory costs were imposed on banks SIVs which also limited the exposure of Spanish banks to the crisis. Furthermore, a recent study by the Centre for European Policy Studies (Ayadi, 2010) finds that cooperative banks in Europe were also affected considerably less by the crisis than many other banks in Europe largely because they maintained the traditional

¹ 'Traditional' refers to originate hold; securitisation is originate and sell; CDS is originate and insure.

business model of banking. Similarly, in the UK mutual building societies were also generally less affected by the crisis though some did get into difficulty and needed to be supported (Llewellyn, 2009b). Interestingly, those building societies that needed support were those which deviated most from the traditional business model.

2.3.3 *Incentive Structures*

Linked to new business models were internal incentive structures and reward structures. Earlier sections have discussed the incentive structures inherent in the originate-and-distribute bank models. Kashyop, *et al.* (2008) give particular emphasis to the potentially perverse incentive structures in securitization models.

Several dimensions to bank incentive structures were relevant in the crisis: the extent to which reward structures were based on the volume of business undertaken; the extent to which the risk characteristics of decisions were incorporated (or not so) into management reward structures; the nature of internal control systems within banks; internal monitoring of the decision-making of loan officers; the nature of profit-sharing schemes, and whether or not decision-makers also shared in losses. In many cases rewards were asymmetric as substantial bonuses were paid in the event of high short-term profitability, while losses were not equally reflected in reward structures. Reward systems based on short-term profits and front-loaded payoffs are hazardous as they can induce managers to pay less attention to the longer-term risk characteristics of their decisions. High staff turnover, and the speed with which officers are moved within the bank, may also create incentives for excessive risk-taking. A similar effect can arise through the herd-behavior that is common in banking. The incentive structures favoring “short-termism” is epitomized in the now infamous statement of the Chairman of Citi (Chuck Prince): “As long as the music is playing, you’ve got to get up and dance. We’re still dancing”.

Overall, the evidence suggests that reward structures within banks (which often focus on short-term profitability) can produce a bias to excessive risk taking. In particular, UBS (2008) has identified systemic deficiencies in its compensation policy as a contributory factor in the substantial write-downs it suffered at the height of the crisis. It emerged that at UBS triple-A rated mortgage-backed securities were charged a very low internal cost of capital. Traders holding such securities were allowed to count any spread in excess of this low hurdle rate as income which in turn determined their bonuses. If the internal cost of capital is under-priced, and bonuses are paid on any excess return over this low cost of capital, there is an inevitable tendency for traders to take excessive risk. The position has been put well by Kodres (2008):

“Unless the governance structure within major financial institutions changes so that both risk and business line managers have equal weight in senior management’s eyes, senior managers are unlikely to pay sufficient attention to the risk part of the risk-reward trade-off. Ideally, traders should be rewarded on a risk-adjusted basis and managers on a cyclically adjusted basis”.

Linked to such short-termism is the concept of *disaster myopia* where low-probability-high-impact risks tend to be ignored most especially if competitors are adopting such myopia (the herd-instinct). Internal reward structures within banks often make it difficult for managers to stand aside from the herd (can a hundred thousand lemmings all be wrong?!).

Buiter (2008) suggests that “one of the key drivers of the excesses of the most recent (and earlier) financial booms has been the myopic and asymmetric reward structure in many financial institutions.” The new business models of banks often created dysfunctional incentive structures. The President of the European Central Bank has argued that:

“[there are] lessons to be drawn in terms of the structure of incentives in all stages of the securitization process and the ‘originate to distribute’ model. All the relevant players – including originators of loans, arrangers of securitized products, rating agencies, conduits and SIVs, and final investors – should have the right incentives to undertake a proper assessment and monitoring of risks” (ECB, 2008).

The perversity of incentive structures within banks was revealed by the Governor of the Bank of England (Mervyn King) who, in oral evidence to the House of Commons Treasury Committee in April 2008, argued that “banks themselves have come to realize, in the recent crisis, that they are paying the price themselves for having designed compensation packages which provide incentives that are not, in the long run, in the interests of the banks themselves”. The hazardous incentive structures implicit in new banking models have been put well by Caprio, *et al.* (2008) who argue that “exploitive risk-taking took place at every stage in the financial engineering process”. They cite several examples including *inter alia*: lenders collecting up-front fees, passing the risks on to others, slicing and dicing cash flows without requiring appropriate documentation or performing due diligence, the use by rating agencies of poorly-tested statistical models.

2.3.4 The Role of Network Externalities

The crisis revealed the growing importance of network externalities and the increasing connectedness of financial institutions with each other and with markets. In the run up to the crisis, banks became exposed to capital market risks that they did not themselves manage or, in some cases, even understand. A major factor in the crisis was the exposure that banks had to large holdings of securities that were difficult to value given the absence of liquid markets. Many credit derivatives were not in fact traded at all.

Haldane (2009a) defines the network as being both *complex* and *adaptive*: complex by virtue of the many interconnections within the network, and adaptive in that behavior is driven by the interactions between optimizing agents. He describes trends in the network as increased connectivity, there being a small number of hubs with multiple spokes, and the average path length within the network becoming shorter over time: a small number of degrees of separation between countries and institutions. This was described as being an “unholy trinity”.

This focuses on the various mechanisms through which institutions and markets are

linked and how shocks in one part of the system affect the system as a whole via the network (see Haldane, 2009a). Comparatively small shocks can have large systemic implications. For instance, the net payouts on Lehman Brothers CDOs has been estimated at being only around \$5 billion and yet the fall-out after its collapse was several multiples of this.

This increased connectedness implies that the number of banks that have become “systemically significant” has increased. The increased connectedness arose through many channels including, *inter alia*: exposures in the inter-bank market, banks buying credit risk shifting instruments and other derivatives issued by other banks, all banks trading in the same instruments, and the reduced systemic diversity as banks adopted similar business models. The increased connectedness meant that there were fewer “degrees of separation” in the markets: it has been estimated, for instance, that in 2007 there would have been only a few (if any) large banks that were more than two or three degrees of separation from AIG which failed in 2008.

Several factors contributed to the rise in network externalities including: the enhanced trading in derivatives (and credit derivatives in particular), the growing links between instruments and institutions, the increased globalization of finance, the trend towards de-regulation, banks diversifying into a wider range of business lines and into securities trading in particular, the growing homogeneity of banks in their business models, and the greater use by banks of wholesale market funding. Each of these trends had the effect of increasing the degree of connectedness between institutions and, as a result, the potential power of network externalities.

Increased connectivity also complicates the monitoring of indirect counterparty risks (Haldane, 2009a). While bank A may be able to monitor its individual exposure to bank B, it becomes increasingly complex when bank B has a multitude of exposures within the network via derivatives and contingent liabilities as this gives rise to indirect counterparty risks originating elsewhere in the network.

2.3.5 Risk Management Models

Evident weaknesses in banks’ risk management models were revealed in the crisis with some key risk management techniques and models being based on various strong or weak forms of a “normal distribution” of risks. Many models were not appropriate for either the nature of the risks banks were exposed to, or to the business strategies being adopted by banks. The alleged “normal distribution” of risks is misleading as empirical evidence suggests that extreme events (fat tail risks) tend to occur more frequently than is implicit in the normal distribution curve. Thus if decisions are based on 98 percent probabilities, risks are ignored that in practice are more common than implied by a normal distribution and which can impose very substantial losses. The problem, as was revealed in the crisis, is that it is not feasible to model extreme events. Problems arise when key risks turn out to be highly correlated because when crises occur the correlations of risks tend to be greater than assumed in the models. It may also be the case that the widespread use of derivative contracts (which have the effect of optimally spreading risks in “normal” times) accentuate risks in “abnormal” times. This is a difficult trade-off to manage both by banks and their supervisors.

It is beyond the scope of this monograph to consider in any detail the nature and weaknesses of bank risk models used at the time. Nevertheless, the essence of the problem can be summarized by highlighting key fault lines in many of the models adopted:

- Fat Tail (low-probability-high-impact) risks in financial markets are in practice more common than suggested by the assumption of a normal distribution.
- The most commonly used tools of risk management are based on VAR models which, notwithstanding many refinements, are ultimately based on the assumption of a normal distribution of risks. VAR models assume security prices are generated by a normal distribution. Furthermore, VAR models do not include risks held off balance sheet.
- To the extent that the models were subject to any form of rigorous empirical testing, they were generally based on a short (five year) period of observations. Furthermore, the data upon which empirical testing was based was the period prior to the onset of the crisis which was when banks were unusually profitable and key risks were yet to be revealed. The sample period was, therefore, highly skewed towards optimism and a seemingly low risk environment.
- The underlying distribution of risks may not be stable but change over time. Correlation between risks tends to rise when volatility in markets increases because volatility tends to spread across asset classes. Thus risks within a portfolio that may be negatively (or non-positively) correlated in calm markets become positively correlated when market volatility moves beyond a certain threshold. This implies that traditional hedging across assets becomes weaker precisely when it is most needed.
- Risk management models applied to individual banks ignore network externalities and the risk profiles that emerge when all banks adopt the same business models and strategies.
- They also ignore the fact that, under some circumstances, individual actions have systemic implications which in truth (because of the *fallacy of composition*) undermines their rationale. As noted in an earlier section, actions that are rational for a bank when it is acting alone may be ineffective (or even become perverse) when all banks behave in the same way.
- It is difficult for any risk model to identify counterparty risk in complex networks.

More generally, because risks tend to build up in the optimistic environment prior to the onset of a crisis, and take time to be revealed, systemic risk may be highest when measured risk is lowest which in turn encourages reinforcing and bubble behavior which itself accentuates systemic risk.

Overall, capital and liquidity buffers were too small for the business being undertaken which was due, in part, to faulty risk models under-estimating risks and hence the extent of required capital backing. More fundamentally, undue reliance was placed on the veracity of mathematical models to assess risk. As put succinctly by Greenspan (2010):

“(…) in the years leading up to the crisis, financial intermediation tried to function on too thin a layer of capital, owing to a misreading of risk embedded in ever-more complex financial products and markets.”

Overall, too much credit was financed by debt rather than equity.

Difficult valuation problems also arise with some instruments. Because they may not always be actively traded in secondary markets, it becomes difficult for accurate market valuations to emerge. The alternative that was commonly used was for valuations to be made by investors on the basis of complex mathematical formulae which, as noted in Ayadi and Behr (2009), may not account for the true risk and which may apply oversimplistic methods to assess the risk profile (see also BIS, 2003). In particular, as noted in Masala (2007), there is uncertainty about how new products, instruments and markets might interact in the face of extreme stress and shocks. The familiar “tail problem” (low-probability-high-impact risks) caused severe difficulties for some institutions trading in complex derivative instruments.

2.3.6 *Corporate Governance*

In the final analysis, all aspects of the management of financial firms are corporate governance issues which cover two areas: (1) the role of the Board as the representative of shareholders’ interests, and (2) internal mechanisms for managing risk. While shareholders may at times have an incentive to take high risks, if a financial firm behaves hazardously it is, to some extent, a symptom of weak corporate governance. This may include, for instance, a hazardous corporate structure for the financial firm; lack of internal control systems; weak surveillance by directors, and ineffective internal audit arrangements which often includes serious under-reporting of problem loans. Corporate governance arrangements were evidently weak and under-developed in banks in many of the countries that have recently experienced bank distress. The OECD has argued:

“the financial crisis can be to an important extent attributed to weaknesses in corporate governance arrangements (...) (which) did not serve their purpose to safeguard against excessive risk taking” (Kirkpatrick, 2009).

There are several reasons why corporate governance arrangements operate differently with banks than with other types of firms. Firstly, banks are subject to regulation which adds an additional dimension to corporate governance arrangements. Secondly, banks are also subject to continuous supervision and monitoring by official agencies. This has two immediate implications for private corporate governance: shareholders and official agencies are to some extent duplicating monitoring activity, and the actions of official agencies may have an impact on the incentives faced by other monitors, such as shareholders and depositors. However, official and market monitoring are not perfectly substitutable. Thirdly, banks have a fiduciary relationship with their customers (e.g. they are holding the wealth of depositors) which is rare with other types of firm. This creates

additional principal-agent relationships (and potentially agency costs) with banks that generally do not exist with non-financial firms.

A fourth reason why corporate governance mechanisms are different in banks is that there is a systemic dimension to banks. Because in some circumstances (e.g. the presence of externalities) the social cost of a bank failure exceeds the private costs, there is a systemic concern with the behavior of banks that does not exist with other companies. Fifthly, banks are subject to safety-net arrangements that are generally not available to other companies. This has implications for incentive structures faced by owners, managers, depositors and the market with respect to monitoring and control. Monitoring is a costly activity which means that agents willingly incur such costs if there are clear incentives to do so such as, for instance, losing money if the absence of monitoring leads to a bank failure. Even when there may be such incentives, the free-rider problem emerges as everyone believes they are only duplicating the monitoring activity of others, and no-one believe they can appropriate to themselves the full benefits of their monitoring.

A key issue in the management of banks is the extent to which corporate governance arrangements are suitable and efficient for the management and control of risks. In the UK, the FSA has argued as follows:

“Senior management set the business strategy, regulatory climate, and ethical standards of the firm (...) Effective management of these activities will benefit firms and contribute to the delivery of the FSA’s statutory objectives.”

Corporate governance arrangements include issues of corporate structure, the power of shareholders to exercise accountability of managers, the transparency of corporate structures, the authority and power of directors, internal audit arrangements, and lines of accountability of managers. In the final analysis, shareholders are the ultimate risk-takers and agency problems may induce managers to take more risks with the bank than the owners would wish. This, in turn, raises issues about what information shareholders have about the actions of the managers to which they delegate decision-making powers, the extent to which shareholders are represented on the board of directors of the bank, and the extent to which shareholders have power to discipline managers.

Several weaknesses emerged in governance arrangements during the crisis: incentive structures within banks were often not compatible with minimizing risk, risk monitoring procedures were inadequate, the lack of risk management skills amongst senior management and boards of banks, information about risk exposures were often not passed to the board, inadequate attention to the risk profile of the bank overall rather than individual risks, and shareholders were in most cases too passive and possibly bemused by several years of buoyant profits. It is also clear that many of those who should have been monitoring and controlling risks did not understand the nature and depth of the risks in complex financial products.

Corporate governance arrangements need to provide for effective monitoring and supervision of the risk-taking profile of banks. These arrangements need to provide

for, *inter alia*, a management structure with clear lines of accountability; independent non-executive directors on the board; an independent audit committee; the four-eyes principle for important decisions involving the risk profile of the bank; a transparent ownership structure; internal structures that enable the risk profile of the firm to be clear, transparent and managed; and the creation and monitoring of risk analysis and management systems. There would also be advantage in having a named board director being responsible for the bank's risk analysis, management and control systems. Some bank ownership structures also produce ineffective corporate governance. Particular corporate structures (e.g. when banks are part of larger conglomerates) may encourage connected lending and weak risk analysis of borrowers. Some corporate structures also make it comparatively easy for banks to conceal their losses and unsound financial positions.

The Basel Committee has argued that effective oversight by a bank's board of directors and senior management is critical. The Institute of International Finance (2008) has argued: "events have raised questions about the ability of certain boards properly to oversee senior management and to understand and monitor the business itself." The Basel Committee suggests that the board should approve overall policies of the bank and its internal systems. It argues in particular that: "lack of adequate corporate governance in the banks seems to have been an important contributory factor in the Asian crisis. The boards of directors and management committees of the banks did not play the role they were expected to play" (Basel Committee, 1999). According to the Committee, good corporate governance includes:

- establishing strategic objectives and a set of corporate values that are communicated throughout the banking organization,
- setting and enforcing clear lines of responsibility and accountability throughout the organization,
- ensuring that board members are qualified for their positions, have a clear understanding of their role in corporate governance and are not subject to undue influence from management or outside concerns,
- ensuring there is appropriate oversight by senior management,
- effectively utilizing the work conducted by internal and external auditors,
- ensuring that compensation approaches are consistent with the bank's ethical values, objectives, strategy and control environment,
- conducting corporate governance in a transparent manner.

Useful insights have been provided by Sinha (1999) who concludes, for instance, that while the regulatory authorities may approve the appointment of non-executive directors of banks, such directors often monitor top management less effectively than is the case in manufacturing firms. Sinha compares corporate governance arrangements in banks and manufacturing firms in the UK and finds that top management turnover in banks is less than in other firms, and that turnover seems not to be related to share price performance. Prowse (1997) also shows that accountability to shareholders, and the effectiveness of board monitoring, is lower in banks than in non-financial firms.

An interesting possibility is the extent to which all this results from moral hazard asso-

ciated with official regulation and supervision. The assumption that regulatory authorities impose regulation and monitor banks may reduce the incentive for non-executive directors and shareholders to do so. The presumption may be that regulators have more information than do non-executive directors and shareholders, and that their own monitoring would only be wastefully duplicating that being conducted by official supervisors.

An additional dimension is that financial conglomerates are complex and difficult to manage, monitor and control. This is made all the more difficult by the substantial differences in culture that exist as between different business lines such as commercial banking and securities trading. It may be the case that particular corporate governance problems arise in large financial conglomerates simply because of the complexity of their structures, and the diversity of risks to which they are subject.

3 THE CRISIS AS TRANSFORMATIONAL

Having considered the complex set of factors behind the crisis, the following sections consider possible post-crisis scenarios. The central theme is that the crisis will prove to be transformational in several dimensions and four in particular:

- (1) the *size of the banking industry*,
- (2) *bank business models*,
- (3) the *regulatory and supervisory regime*, and
- (4) *intervention and resolution strategies* applied by governments and regulatory agencies.

If a parallel is drawn with the natural world, the crisis is equivalent to a Punctured Equilibrium which brings with it some extinctions of species, new evolutionary patterns, new survival models, and some extinctions even within species that survive the shock.

3.1 SIZE AND COST OF THE BANKING INDUSTRY

As many of the trends that supported the “excess financialisation” and growth of banks were unsustainable, their removal is likely to have the reverse impact towards a more sustainable system. As a result, banks may become less significant in the financial intermediation business than in the past. A member of the Bank of England’s Monetary Policy Committee takes a similar view arguing that it is likely, and probably desirable, that “banks will become less significant intermediaries in channelling savings from households to companies and other households,” (Miles, 2009). In particular, there is likely to be slower growth in bank balance sheets, bank business will decline as a share of GDP, they are likely to be less profitable than in the period running up to the crisis, and bank services are likely to become more expensive. The IMF has also argued:

“immediate, short-run policies and actions taken need to be consistent with the long-run vision of a viable financial system (...) and that the viable financial sector of the future will be less leveraged and therefore smaller relative to the rest of the economy” (IMF, 2009).

Several factors work in this direction. Banks are likely to become more realistic about risks and their pricing and reverse the earlier under-pricing of risk. In addition, in the short run at least, they are likely to become more risk averse. The requirement to operate with significantly higher capital ratios and lower gearing will also limit the role of banks compared with the years prior to the onset of the crisis. This is likely to be reinforced by banks facing a higher cost of equity capital. Regulatory costs more generally (including the requirement to hold more liquidity on the balance sheet) will also rise. It is also likely that internal reward and bonus structures will change to remove the bias towards excess

risk-taking. Furthermore, banks will receive less comfort from being “too-big-to-fail” for two reasons: under new intervention arrangements (such as, in the UK, the *Special Resolution Regime* recently introduced as a result of the crisis) banks may be closed before they become insolvent, and penalties (including tax) could be imposed on banks with access to safety nets. The latter could take the form of what amounts to *ex ante* insurance premia to be paid by banks to pay for rescues that might be needed in the future and in order to minimise the potential burden on the tax-payer. Hitherto, the tax-payer has effectively acted as an “insurer of last resort” but without extracting *ex ante* premiums.

For all these reasons, the cost of bank services is also likely to rise and the intermediation margin (the difference between lending interest rates and the rate of interest on deposits) is likely to widen. If anything, and because there will be a strong demand for retail deposits as banks shift away from wholesale funding, the widening of margins is likely to take place more in terms of lending rates than deposit rates.

These trends are likely to produce two outcomes: less credit generation in total, and some displacement of credit from banks to other routes: a process of *disintermediation*. If banks become more constrained in the post-crisis environment, a key issue is who will provide the credit previously generated in the banking sector. Displacement could occur, for instance, through a re-activation of securitisation, non-finance companies such as supermarket banks, and the capital market as bond financing displaces bank financing. Siemens has announced that it is to establish its own bank in order to reduce reliance on bank financing and to give it access to deposit facilities at the central bank.

3.2 BANK BUSINESS MODELS

Bank business models are also likely to change as a result of the trauma of the banking crisis. This is likely to involve a reversion to the more traditional model of “originate to hold.” This would imply originating loans, holding the assets on the balance sheet, monitoring borrowers, and holding capital against the credit risk. It also implies the absence of external insurance of credit risk rather than the traditional model where risk premia in bank lending interest rates incorporate a form of insurance premium paid by all borrowers. In other words, internal insurance is likely to displace external insurance instruments such as CDSs.

The change in the nature of bank business models is also likely to include less reliance on more volatile wholesale funding sources and greater reliance on traditional retail deposits. This will be accentuated by the withdrawal of official exceptional funding and liquidity support. Holdings of liquid assets will also be higher than in the immediate past.

Regulation (and the requirement to create “Living Wills”) is likely to induce banks to create less complex business structures, and higher regulatory capital requirements on banks’ trading book may limit the extent of this business.

In many ways, each of these reverses the trends that emerged in the years prior to the crisis and a reversion to more traditional banking models: the *status quo ante ante*. The two major changes (smaller role of banks and the reversion to traditional bank models) could have two effects: the volume of credit is, other things being equal, likely to be less

in total than in the past, and some credit that was previously generated by banks is likely to be displaced from banks towards other routes (a process of disintermediation).

A key issue centres on the future role of securitisation in bank business models. There is an economic imperative to resurrect the securitisation market. Citigroup estimates that in 2008 securitisation supplied between 30 and 75 percent of credit in different sectors. While a proportion of this total credit might have been excessive, if securitisation were to remain dormant, a serious credit crunch could emerge as, for reasons outlined, banks are unlikely to be able to hold the loans shifted from the securitisation sector on their own balance sheets.

Notwithstanding the problems that emerged with securitisation, and the fact that very little has been undertaken since the onset of the crisis, it remains a viable model and needs to be a major technique in the financial system. This is most especially the case if, as has been argued, banks will face more balance sheet constraints than in the past. We have argued above that there are systemic advantages to securitisation. The skill lies in developing the securitisation model while avoiding some of the pitfalls. This could include, for instance, greater transparency, a requirement for banks to keep some of the credit risk on their own balance sheets, and techniques should be less complex than has been the case in the past.

4 REGULATION, INTERVENTION AND RESOLUTION

4.1 REGULATORY REFORM: STRATEGIC VERSUS INCREMENTAL

We now turn to the regulatory issues which will be part of the transformational nature of the post-crisis environment. This chapter considers the distinction between regulatory strategy and incremental regulation, the key issues involved in regulatory reform, and the objectives of regulation and the range of six strategic options in the reform debate (*structural* measures, *behavioral* measures, *intervention*, *taxation* and *insurance*, *Resolution* arrangements, and *Living Wills*). Subsequent sections consider the various strategic options with respect to the two key objectives: reducing the probability of bank failure, and lowering the cost of those failures that do occur.

The central theme in this section is that regulatory reform needs to be *strategic* rather than *incremental*. This is a challenge because having a strategic focus is more demanding than adopting an incremental approach. A strategic focus implies that the regulatory reform process goes back to basics including considering what the ultimate objectives of regulation are, and what it is trying to achieve. This requires a different paradigm than with *incremental* reform which restricts itself to refining existing regulatory requirements (capital ratios, etc).

There are two broad objectives of any regulatory regime: (1) to reduce the probability of bank failures, and (2) to lower the cost of those failures that do occur. In a regulatory matrix (chart 3) the possibility of a trade-off between the two are suggested: if the *costs* of failure can be lowered, there might be less concern about the *probability* of failures. In the extreme (totally unrealistic) case, if the costs of bank failures could be reduced to zero, we could be indifferent about the probability of failures.

Within this paradigm, the argument is that structural regulation is largely irrelevant because it was not structural issues that were the root cause of the banking crisis: in this sense, it is the wrong solution to a wrong definition of the problem. On the other hand, there can be doubt about the power of behavioural regulation because through financial innovation banks will always seek (with varying degrees of success) to find ways around regulatory requirements. Indeed, it could even be that regulation is part of the problem rather than the solution. Thus, it was largely the Basel Capital Accord that induced banks to engage in securitisation and to develop credit-risk shifting instruments (CDOs, CDSs etc).

The implication is that more weight needs to be given to arrangements to lower the cost of bank failures and, therefore, *Intervention* and *Resolution* with the latter including the ability to “close” a bank (but without disturbing customer business) even before it is technically insolvent. It also includes the creation of Living Wills. This also leads to a consideration of whether taxation and *ex ante* insurance arrangements related to banks are to be considered. The former suggests that taxation could be used to require banks to recompense (*ex post*) the tax-payer for past “bail-outs”, and insurance could be an *ex ante* protection for the tax-payer. The point is that, as there will always be banks that are Too-

Big-To-Fail (TBTF), the tax-payer acts as an “insurer-of-last-resort” but without requiring insurance premiums to be paid.

This is not to suggest that there is no role for *structural* or *behavioral* regulation. Regulatory strategy needs to base reform across all dimensions and, in the process, giving more weight than in the past to *Intervention* and *Resolution*. In particular, more weight needs to be given in the Basel Capital Accord to Pillar 4. Of course, there is no Pillar 4. The point is that there needs to be a Pillar 4 which would encompass *Intervention* and *Resolution* arrangements as part of an overall regulatory strategy and regulatory regime. The objective is to optimise the regime as a whole rather than refine existing rules within the current framework. This also means that the possibility of failure needs to be built into the overall regime.

4.2 KEY ISSUES

As has always been the case following crises, the current turbulence will bring forth a host of ideas for regulatory reform and changes will undoubtedly be made. Substantial measures have already been discussed by both Houses of the US Congress. There have been many other sets of proposals from agencies such as the Institute of International Finance, Financial Stability Forum, US President’s Working Group on Financial Markets, the European Union, Group of Thirty and many others. The key issue discussed below is not so much the detail of reform (though this is important) but whether reform is based on modifying the existing regulatory regime (such as making technical changes to the Basel Capital Accord), or whether a more radical approach is adopted perhaps implying a different methodology to that which has been dominant in the past.

Regulation will be a major driver of banking business and structures in the years ahead. As put by the FSA (2010):

“The crisis revealed the need for fundamental reform in our regulation and supervision of solvency and liquidity risks in banks.”

Because of the magnitude and severity of the recent crisis, the regulatory response is likely to be more far-reaching than in the past: a bias towards conservatism.

A central, if not paramount, issue is how to address the TBTF problem and the associated moral hazard as there always will be banks that are deemed too big to be allowed to fail because of their systemic implications. Six main strategic options are available and discussed in subsequent sections:

- (1) *Structural* regulation (such as Glass-Steagall-type measures and Narrow Banks) is designed to limit the size and/or allowable business of those banks that are deemed to be TBTF so as to limit potential tax-payer liability. In these structural options, tax-payer risk would not extend to supporting anything other than “core” banking activity.

- (2) *Behavioural* regulation (such as capital requirements) imposed specifically on TBTF institutions.
- (3) *Intervention measures* (such as Structured Early Intervention and Resolution (SEIR) regimes) designed to maintain a failing bank as a going concern. Intervention arrangements focus on the nature of remedial action imposed by supervisors in the event of a deteriorating position of a bank.
- (4) *Tax and Insurance* measures whereby banks would pay *ex post* for the costs of rescues (tax) and *ex ante* to cover possible future interventions (insurance). They would also be designed so as to compensate the tax-payer for the implicit subsidy given to TBTF institutions.
- (5) *Resolution* arrangements for closing banks and their subsequent resolution: bank bankruptcy laws, etc, and how, in the event of a failure, the process is managed in order to minimise costs.
- (6) *Living Wills* are designed to make explicit how banks will respond to problems that threaten solvency, and how, in the event that a bank fails, different parts of the business are to be separately identified so that some can be rescued while others are not.

Our central conclusion is three-fold. Firstly, given the limited role of regulation to reduce the probability of bank failures, more strategic attention needs to be given to lowering the costs of those bank failures that do occur. Secondly, problems of excess risk-taking etc are partly endogenous to the regulatory regime. Thirdly, while there is limited scope for *structural* measures, a more realistic approach is to focus on tax, insurance, Living Wills and Resolution arrangements.

In the final analysis, the various measures focus on reducing the probability of TBTF banks failing, and reducing the systemic cost of those banks that do fail.

There is no shortage of ideas for regulatory reform and it is not our purpose to offer a comprehensive review of the alternatives being proposed. Rather, it is to review alternative strategies for regulatory reform. Our theme is twofold: that reform needs to be holistic and cover the full range of elements to the regulatory regime including intervention and resolution arrangements, and that a different methodology or paradigm needs to be applied.

There are many reasons why a comprehensive review of regulatory, supervisory, and intervention arrangements needs to be made in the wake of one of the most serious banking crises ever. Firstly, given the enormity and costs of the crisis, there clearly were serious fault lines in regulatory and supervisory arrangements: the rules enshrined in thousands of pages behind the Basel 2 Capital Accord did not prevent the crisis. Secondly, the crisis has imposed substantial costs and/or risks on the tax-payer. Thirdly, as argued below, regulatory arbitrage will always find routes around particular regulations which leaves open the question about whether detailed and prescriptive rules are the right approach. Fourthly, there is a need to consider reform strategy in terms of a risk matrix which considers measures to both lower the probability of bank failures and to lower the cost of those failures that do occur. Fifthly, there is the important issue about whether the

focus should be on individual banks or the system in aggregate because, *pace the fallacy of composition*, it does not follow that regulating individual nodes in a network is necessarily the optimal approach to ensuring the stability of the network as a whole. A further factor to consider is the moral hazard that has been created as a result of the massive interventions that have been made by governments and central banks. Finally, but by no means least, past approaches to regulation have largely failed, and probably to an extent that is greater than can be rectified by adjustments within the existing regime.

The current policy agenda is focussed on four areas: regulation, the structure of banks, intervention and resolution arrangements, and tax and insurance measures. In this context, ten main themes emerge in the sections to follow:

- (1) Regulatory reform needs to be *strategic* rather than *incremental*.
- (2) Regulatory reform needs to encompass all dimensions to the regulatory regime and not just the rules component: a holistic, rather than a piecemeal, approach is needed.
- (3) There needs to be a greater focus on the system as a whole and less of a myopic focus on individual banks.
- (4) Regulatory strategy should be designed to reduce both the probability of bank failure and the costs of failures.
- (5) The TBTF issue needs to be addressed.
- (6) Problems of excessive risk and potentially hazardous business models are partly endogenous to the prevailing regulation regime.
- (7) For this reason, there is a dilemma in the approach to regulatory reform. We are sceptical about the relevance and practicality of many *structural* measures designed to reduce the probability of bank failures, and equally questioning of the ability of *behavioral* regulation.
- (8) This suggests that greater emphasis needs to be given to lowering the cost of bank failures rather than attempts to reduce their probability. In truth both are needed though greater emphasis than in the past needs to be given to the former.
- (9) Both *structural* and *behavioral* regulatory measures need to be considered whereas the traditional approach has focussed on the latter to the almost exclusion of the former.
- (10) Explicit *Intervention* and *Resolution* arrangements need to be part of the reform agenda.

4.3 DIMENSIONS AND TYPES OF MEASURES

Several dimensions to regulatory strategy need to be considered which involve far more than piece-meal reforms to existing approaches such as enshrined to the Basel 2 Capital Accord. The multi-dimensional causes of the crisis requires that a holistic approach is needed. The theory of the second best also points in this direction: micro reform in one part of the regime (e.g. regulation) does not necessarily move closer to an optimum. The

issues to be considered are far wider and may, in some areas, imply a radically new strategic approach. Our purpose here is not to consider the host of comprehensive reform measures in detail, but to focus on the key elements of regulatory strategy within an inclusive regulatory reform paradigm.

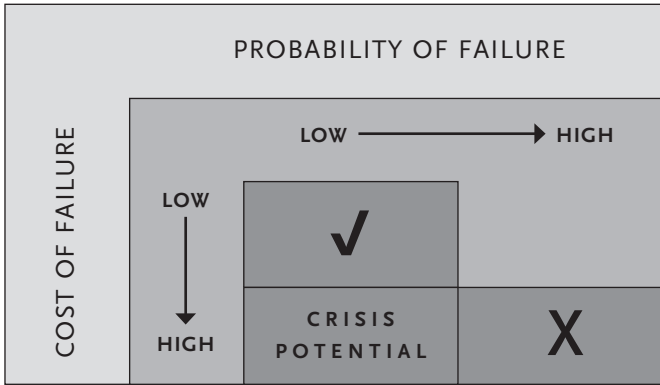
As in any risk analysis, two dimensions need to be considered with respect to the objectives of any regulatory regime:

- (1) Reducing the probability of bank failures and excess risk-taking by financial firms, and
- (2) Measures and institutional arrangements designed to reduce the cost of those bank failures that do occur.

Given that all regulatory measures to reduce the probability of bank failures have costs, and the excessive costs that would arise in seeking to reduce the probability of failure to zero (even if it were at all possible even with the most draconian regulatory impositions), would be very substantial, there is a trade-off between these two dimensions. Thus, there may be less need for measures to lower the cost of failures if the probability of failure were to be reduced to a very low level. Conversely, if this were to be either impossible (or achievable only with draconian and high-cost regulation), the greater is the need to have in place measures to minimize the costs of those bank failures that do occur. Historically, the focus of regulation has been more on reducing the probability of failures rather than minimizing their costs. Indeed, in many countries the second issue has only been addressed in a serious way since the current crisis. For instance, the UK adopted a *Special Resolution Regime* in 2009 in the context of the absence of any special insolvency arrangements for banks, and weak and ill-defined institutional arrangements to deal with failing institutions.

In a standard risk matrix, the probability of an event (in this case of a bank failing) is measured on the horizontal axis while the costs of failure are identified on the vertical axis (chart 3). The costs of bank failures relate to those incurred directly or indirectly by *inter alia* the system as a whole (the systemic stability dimension), tax-payers who might be called upon to finance rescue operations, depositors, deposit protection funds, and customers in general if banking services are disrupted. The central strategic issue in any comprehensive regulatory and institutional reform is the positioning to be made on the risk matrix. The less confidence there is that the probability of bank failures can be reduced by regulation (towards the east of the matrix), the greater the need for institutional arrangements designed to reduce the costs of failures (north in the matrix). A combined strategy would move in a north-west direction in the matrix.

Chart 3: Probability versus Cost Trade Off



4.3.1 Six Types of Measures

Within this paradigm, six types of measures are considered with respect to reducing the probability of bank failures and reducing the costs of those failures that do occur although in some cases the identified measures reduce both the probability of failure and the costs of failures:

- (1) *structural* measures,
- (2) *behavioral* measures,
- (3) *intervention* measures,
- (4) *taxation* and *insurance* measures,
- (5) *resolution* arrangements, and
- (6) *Living Wills*

Measures to lower the probability of bank failures can be divided between *structural* (such as Glass Steagall-type measures and Narrow Banks), and *behavioral* measures such as the imposition of capital and liquidity requirements, and *intervention* (Table 5).

Five broad types of measures are available to reduce the cost of bank failures (Table 5): (1) *structural measures* (such as limits on the size of banks to address the TBTF issue), (2) *intervention* measures to keep a falling bank as a going-concern (such as Structured Early Intervention and Resolution (SEIR) regimes), (3) the charging of *ex post* tax on banks to recoup the cost of past bailouts, and *ex ante* insurance and charges, and (4) *resolution* arrangements for closing banks and their subsequent resolution: bank bankruptcy laws, and (5) *Living Wills*.

Whilst our conclusion is that the reform agenda needs to consider some structural measures, there are problems with such an approach: it is not always clear what an optimal structure is (e.g. the allowable business mix of banks), arbitrage will often be able to circumvent it (e.g. the various ways around the Glass-Steagall Act), and there may be superior *behavioral* alternatives (e.g. differential capital requirements). Furthermore, reformed resolution arrangements may be a superior way of addressing the issues than structural measures.

Table 5: Regulatory Strategy

	Lower Probability Of Failure	Reduce Costs of Failure
Structural Measures	<ul style="list-style-type: none"> - Glass Steagall - Narrow Banks - Casino v. utility - Derivatives trading - Equity Banks 	<ul style="list-style-type: none"> - Limits on size - SIBs - Narrow Banks
Behavioral Measures	<ul style="list-style-type: none"> - Capital - Liquidity - Remuneration - Connectedness - Funding rules - Macro-prudential focus 	
Intervention Measures	<ul style="list-style-type: none"> - PCA /SEIR 	<ul style="list-style-type: none"> - PCA /SEIR
Taxation and Insurance		<ul style="list-style-type: none"> - Taxation of banks - Ex ante insurance
Resolution Measures		<ul style="list-style-type: none"> - Bank insolvency laws - Private purchase of banks - Bridge Bank - Bad bank - Nationalization
Living Wills	<ul style="list-style-type: none"> - Recovery measures 	<ul style="list-style-type: none"> - Resolution measures - Wind-up plans

4.4 REGULATORY STRATEGY: TWO STRATEGIC APPROACHES

There is a more fundamental methodological issue to consider about the regulatory process itself. Regulatory strategy conventionally assumes that the problems to be addressed (e.g. excessive risk-taking by banks) are exogenous to the regulatory process. In which case a problem is observed and a regulatory requirement is imposed to deal with it: i.e. to reduce the probability of it happening. This is, however, a bold assumption as problems may be at least partly endogenous to regulation, i.e. caused by the very regulation designed to reduce the probability of problems emerging. This is because banks always seek to circumvent regulation through financial innovation and by changing the way that business is conducted. This in turn calls forth more regulation. This process of regulatory arbitrage simply diverts the nature of the problem. Because of this, regulation is always shooting at a moving target, and the target moves partly because of regulation itself. For instance, the Basel capital regime created incentives to remove assets from banks' balance sheets, securitisation, the creation of SIVs and other off-balance sheet vehicles, and the use of credit risk shifting derivatives: all of these featured as central features in the banking crisis. Clearly, detailed rules at the time did not prevent the crisis. Kay (2009a), in the context of a proposal to establish Narrow Banks, takes a view at one end of the spectrum:

“The lesson of the failure of the Basel Accords is not that the regime should be elaborated beyond the 4000 pages of text in the current accords. It is that the whole system should be swept away, and the responsibility for capital adequacy and risk management put back where it belongs – in the hands of the executives of banks, who should then carry heavy and exclusive responsibility for failures of control.”

Kay (2009a) addresses the conundrum (that regulatory arbitrage will always find ways around detailed and prescriptive rules) by arguing the case for Narrow Banks with all other banks being subject to virtually no regulation.

Although precise rules have their attractions for both regulators and regulated firms, there are several particular problems with a highly prescriptive approach to regulation:

- Risks are often too complex to be covered by simple rules.
- Balance sheet rules reflect the position of an institution only at a particular point in time, and its position can change substantially within a short period.
- An inflexible approach based on a detailed rule book has the effect of impeding firms from choosing their own least-cost way of meeting regulatory objectives.
- Detailed and extensive rules may stifle productive innovation.
- A prescriptive regime tends to focus upon firms’ processes rather than outcomes and the ultimate objectives of regulation. The rules may become the focus of compliance rather than the objectives they are designed to achieve. In this regard, it can give rise to a perverse culture of “box ticking” by regulated firms. The letter of the regulation may be obeyed but not the spirit or intention.
- A prescriptive approach is inclined towards “rules escalation” whereby rules are added over time, but few are withdrawn.
- A prescriptive rules approach may in practice prove to be inflexible and not sufficiently responsive to market conditions.
- A potential moral hazard arises in that firms may assume that, if something is not explicitly covered by regulation, there is no regulatory dimension to the issue.
- Detailed rules may also have perverse effects if they are regarded as actual standards to be adopted rather than minimum standards with the result that, in some cases, actual behavior of regulated firms may be of a lower standard than without rules. This is most especially the case if each firm assumes its competitors will adopt the minimum regulatory standard.

A critique of current arrangements is that it has been excessively “rules-based” with insufficient attention to the other components of the regulatory regime and namely incentive structures, the role of market discipline, corporate governance arrangements within banks and the moral hazard of official intervention in the case of seriously troubled banks. The challenge for future regulatory strategy is to optimize the whole regime and in particular to give less emphasis on detailed and prescriptive rules, and more to incentive structures within financial firms, a strengthening of market discipline, more focus on banks’ risk analysis and management systems, a strengthening of corporate govern-

ance arrangements within financial firms, and more explicit *Intervention* and *Resolution* arrangements.

The limits of regulation can be seen in the capital regime. Many banks that got into serious trouble entered the crisis with excess regulatory capital and in some cases substantially so: sometimes by as much as 100 percent. For instance, the five largest banks in the US that failed or needed to merge (Bear Sterns, Washington Mutual, Lehman Brothers, Watchover and Merrill Lynch) all had capital ratios between 12.3 and 16.1 percent. The lesson of the crisis is that capital can be destroyed very quickly which puts further doubt on relying on capital regulation to reduce the probability of bank failures. Indeed, and apart from the potential for regulatory arbitrage, it is possible that, under some circumstance, capital requirements may induce banks into more risky business. Blundell-Wignall, *et al.* (2008) show a positive correlation between losses and banks' Tier 1 risk-weighted capital ratio, although a negative correlation between losses and the leverage ratio. This suggests that the risk-weight approach to capital adequacy may induce banks to incur more risk through increased leverage as was the case in the years prior to the crisis.

Unless regulation is to become grossly repressive, regulatory arbitrage will always be a major feature of bank business models. This suggests that an alternative approach should also be considered. In particular, rather than focus on incremental measures designed to reduce the probability of bank failures, more emphasis needs to be given to designing features of a regulatory regime to reduce the costs of those bank failures that do occur. Given the weaknesses and limitations of regulation, rules may be necessary as part of an overall regulatory regime, but are certainly not sufficient.

The need to minimise the disruption of bank business for customers is equally important. The alternative approach attempts to lower the cost of bank failures by keeping risks private rather than, as has massively been the case in the recent crisis, socialised by shifting risks to tax-payers. Under this approach, the strategy is not so much a focus on reducing the sources of individual bank risk, but intervention and other mechanisms to minimise systemic risk and to avoid losses for depositors and claims being made on the tax-payer through rescue operations. It would also include measures to enable failing (but not insolvent) banks to be closed without disturbing the banking business of customers which implies various mechanisms to wrest the ownership of a failing bank from its existing shareholders before it becomes insolvent.

In practice, both approaches are needed, and regulatory strategy needs to consider both lowering the probability of bank failure and limiting the costs of failures. The debate needs to be about the appropriate weight to be given to the two dimensions. While accepting that both approaches are needed, more emphasis needs to be given to the latter than the former given that, however carefully constructed, regulation will never prevent bank failures and neither should it attempt to do so. In principle, and returning to the trade-offs in the risk matrix, if the costs of failure can be reduced through such a mechanism there can be a greater acceptability of the probability of bank failures.

4.5 IMPLICATIONS OF NETWORK EXTERNALITIES

One of the structural changes identified in an earlier section as preceding the crisis was the intensification of “network externalities” and the growing connectedness of financial institutions. One implication of strong network externalities through increased connectedness is that the costs of a shock to the system as a whole may be greater than those on the institution subject to the shock. The crisis revealed the importance of network externalities. This in itself has three regulatory dimensions: (1) systemic focus, (2) regulatory/supervisory focus on key institutions in the network, and (3) the structure of some aspects of the network itself.

Regulation and supervision has traditionally been focussed on the safety and soundness of individual banks and financial institutions rather than the stability characteristics of the system as a whole, even though the ultimate objective of regulation is to ensure the stability of the system rather than individual banks. In this sense, regulation has been too atomistic. Thus, for instance, VAR models do not consider the system network. What has evidently been revealed in the crisis is that this bias needs to be reversed with emphasis to be given to the links between banks within the network. As put by Haldane (2009a), when drawing a parallel with electricity power station networks, it can be the case that each power station in the network is safe and working efficiently, but if the connections and power lines are faulty, individual units will not work effectively and the supply of electricity can be interrupted. Equally, individual banks may be judged to be safe and sound, and adhering to all the regulatory requirements, but the system as a whole may be vulnerable, perhaps because they may all have the same business models and apply identical risk models.

A second consideration following from network externalities is the case for focussing regulatory and supervisory intensity on those institutions that are deemed to be systemically important in that they are either big (the TBTF dimension), or in some other way having a pivotal position in the financial system. This could involve, for instance, imposing heavier regulatory capital requirements on such banks and requiring such banks to have Living Wills. In fact, the evidence suggests that, to date, there has been a negative correlation between the size of banks and their equity capital ratios, and no attempt has been made to apply differential capital ratio requirements on banks that are deemed to be systemically significant.

Addressing the structure and operation of the network itself is a third regulatory strategy to consider. One dimension to this, for instance, would be to require all derivatives trades to be conducted through an Exchange which, because there would be a centralised counterparty to each trade, would minimise counterparty risks between banks. Another possibility would be to impose limits on the type of business that can be conducted by different institutions such as was the case with the Glass Steagall Act. These issues are discussed further in later sections.

Overall, more focus needs to be made on the systemic stability dimension in banking regulation rather than, as hitherto, on the micro regulation of individual banks: regulatory strategy needs to become less atomistic.

4.6 REDUCE PROBABILITY: STRUCTURAL REGULATION

As outlined above (Table 5), measures to reduce the probability of bank failure can be categorized as *structural, behavioral, or intervention*. There is a long history of structural regulation in many countries and many of the arguments now being considered are certainly not new. Several controversial structural measures are being considered and are on the regulatory reform agenda. One of the first decisions of the in-coming Coalition government in the UK in 2010 was to establish an independent Banking Commission charged with considering various structural measures for reform of the banking system. Our theme, however, is that in practice most of the proposed structural measures are either impractical or largely irrelevant. The evidence of the crisis indicates that a wide range of different types of banks failed: large, small, highly diversified, focused, commercial banks and investment banks.

Structural measures relate to regulation that prescribes the nature, structure and allowable business of banks and other financial firms, and the micro structure of financial markets. In other words, they relate to prescribed structural aspects of banks and financial markets rather than the way that business is conducted. The most important set of such structural measures relates to the definition of banks and the type of business different types of financial institutions are legally able to conduct. Two dimensions of structural regulation are particularly central in the debate: the distinction between “commercial banks” on the one hand, and “investment banks” and trading activity on the other; and the concept of “narrow banking”. Although these two dimensions are related, they are not the same and different issues arise.

We briefly consider three of the key structural measures under consideration: measures to define and limit the allowable business of banks (the Glass Steagall debate), the concept of “narrow banking” (the distinction that might colloquially be made between “casino” and “utility” banking), and measures related to the trading in derivatives and in particular the role of Exchanges and central counterparties. If any of these measures were adopted, it would transform the nature and business of banking. The ultimate objective of structural measures is to limit the risk profile of certain types of banks and most especially those banks conducting core commercial banking business in the economy. One of the objectives is to prevent commercial banks being “contaminated” by different types of risk encountered in investment banking and securities trading.

This raises two general questions about structural measures: whether, in practice, a clear distinction can be made between different types of institution and business, and whether it is possible to define institutions that are systemically important as against those that are not. Thus prohibiting commercial banks from conducting some forms of speculative activity would simply shift that activity elsewhere in the system and there can be no confidence that the institutions conducting this business would not be systemically significant even though they were not conducting core commercial banking business. For instance, Lehman Brothers was not a commercial bank conducting core banking business, and yet its failure clearly did impose substantial systemic costs.

4.6.1 *Glass Steagall Approach*

One of the main items on the agenda of those who favor structural reform is the strategy of limiting the business powers of banks. One particular example is the recent proposal of the Obama administration for there to be a ban on commercial banks from conducting proprietary trading on their own account or owning or investing in hedge funds and private equity pools (the “Volker Rule”) which is a form of Glass-Steagall lite. However, these were not major contributory factors in the crisis.

The historical precedent for such structural measures is, of course, the Glass Steagall Act in the US which, in 1933, made clear divisions between commercial and investment banking, with commercial banks being barred from a range of investment banking activity and securities trading on their own account. Although this is a very old debate, a new slant is the distinction that is sometimes made between “casino banking” and “utility banking” (Kay, 2009a). Casino banking includes the more speculative activity that some banks have conducted in recent years.

The arguments in favor of a Glass Steagall type of approach (even if it were not as extreme as the 1933 Act in the US) is that of separating the different risks of commercial and investment banking and not contaminating commercial banking with investment banking and securities trading risks. Haldane (2010) suggests that size and diversity have been positively correlated with recent write-down experience. The argument is also that if customers’ deposits are to receive some form of protection or insurance, it is inappropriate for such deposits to fund speculative activity, or that (in the event of any form of tax-payer funded rescue intervention) for this to effectively underwrite the risks attached to securities trading. As put by De Grauwe (2008): “banks are excluded from investing in equities, derivatives and complex structured products. Investment in such products can only be performed by financial institutions, investment banks, which are forbidden from funding these investments by deposits.” In effect, there would be a compact with the tax-payer that, if they are liable to be forced to absorb bank risks in the event of failures, this would only be for a limited range of banking business. In these models, commercial banks (or utility-type banks) which would have the implicit last-resort support of the tax-payer would have only a limited range of risks. It is further argued that the regulation and supervision of complex bank structures becomes very difficult and that a strict division of different types of banks would make the regulatory and supervisory process easier to conduct. It would also allow different types of banks to be regulated differently.

There are, however, both practical and analytical problems with a Glass Steagall-type approach. The practical difficulties of making a formal separation are formidable and the distinction between different types of business is fuzzy at the margins. In fluid markets, and with constant financial re-engineering, it is difficult in practice to separate different types of risks even when they can be distinguished theoretically. It might also be argued that large corporate customers demand a fully integrated service from their main banks. Banks would also doubtless find ways around any such Glass Steagall imposition. It is also not at all clear that the empirical evidence supports such a distinction in that, in the recent crisis, a wide range of different types of banks got into serious difficulty: some banks that failed were retail banks. Thus, in the UK, the most spectacular bank failure was

that of Northern Rock which was quintessentially a retail commercial bank even though it adopted a different model of banking with heavy use of securitisation and wholesale funding (Llewellyn, 2008). Equally, not all universal banks which combined the full range of activities (such as HSBC) encountered serious problems in the crisis.

It can also be argued that a Glass Steagall-type of approach is based on a faulty diagnosis of the cause of the crisis which was more to do with *inter alia* excess gearing and inter-connectedness which a Glass Steagall approach would not in and of itself address. A further consideration is that systemic problems arise largely through cross-sector contagion and the connectedness of banks and it is not self evident that a formal separation of different types of banking activity would address this central issue. Furthermore, it is unlikely that Glass-Steagall would protect against systemic risk between firms in a crisis.

In contrast to the argument supporting the separation of different types of risk, diversification of risks can equally reduce the overall risk profile of a universal bank. In the UK, for instance, the sharp rise in profitability of universal banks during 2009 arose largely in their investment banking activity. A formal separation might also destroy the alleged synergies between different activities within a universal bank, and the advantage to business customers of having the option of dealing with a single bank for the full range of their banking requirements. However, the empirical evidence regarding economies of scale and scope is, at best, equivocal and certainly offers no strong support. This is also seen in the conglomerate discount (Laeven and Levine, 2007 and Schmid and Walter, 2009).

A formal separation of different types of banks could also reduce competitive pressures by creating regulatory-imposed entry barriers into different areas of banking business. There are, therefore, both practical and empirical questions surrounding a Glass-Steagall-type structural approach to reducing systemic risk. An approach based on risk management and capital adequacy regulation and supervision might, therefore, be a more practical and appropriate approach. Furthermore, differentiated capital adequacy regulation could achieve the same result as any structural regulation designed to enforce separation of different types of banks. For instance, a higher regulatory capital requirement could be imposed on Universal Banks rather than specialist institutions. In addition, the main alleged benefits of a Glass Steagall approach could equally be achieved through Living Wills.

It is unlikely that a Glass Steagall type of approach will be adopted in any significant way in Continental Europe given the strong adherence to the Universal Bank model in many countries.

4.6.2 *Narrow Banks*

The basic idea behind the Glass Steagall-type arrangements is to make a clear distinction between commercial and investment banking. A yet more restrictive arrangement, albeit along the same lines, is the *Narrow Bank* model of which there are many variants. While this is being discussed here in terms of reducing the probability of failures, the model can equally be regarded as one to reduce the costs of failure. A new terminology has emerged with a distinction made between what has been termed *utility* banking and *casino* bank-

ing. Kay (2009a) in particular makes this distinction and argues that casino banking cannot in practice be controlled by regulation and hence no attempt should be made to do so. And yet there remains a need to prevent failures in casino banking having systemic effects and jeopardizing depositors and potentially making claims on the tax-payer. The current debate about Narrow Banking is a resurrection of a much older idea first suggested in Litan (1972) where banks receiving insured deposits should be constrained in the risks that they would be allowed to take on the basis of such “subsidized” deposits.

Whilst there are various versions of the Narrow Bank model (involving different degrees of restriction) the basic ideas are common: in particular, that there should be a separation between utility and casino banking. As put by Kay (2009b):

“The primary objective of the regulation of financial services going forward is that the casino should never again jeopardize the utility”.

As in the Litan model, banks should not be able to use protected or insured deposits for speculative and casino-like activities. Kotlikoff and Ferguson (2009) argue that banks should not hold risky assets and that, while banks should be free to originate loans, these should then be securitized. The business of a Narrow Bank would be restricted to accepting deposits and supplying basic banking services (such as payments facilities) and holding low-risk and highly liquid assets. In some versions of the model, the Narrow Bank would be required to hold 100 percent liquidity backing. In other versions, Narrow Banks would be able to make low-risk loans. The key property of the model is that retail deposits (and the assets backing them) would be segregated from any other business that the institution incorporating a Narrow Bank might conduct. The essence of the model is that the allowable business of a Narrow Bank would be severely restricted. Furthermore, if they are incorporated within the same organization (such as a Bank Holding Company) the structure of the bank should allow for the utility part of the bank to be easily separated from the casino part in the event of a failure of the bank.

A property of the Narrow Bank proposal is that only a Narrow Bank would be rescued in the event of failure though, given the very nature of the model, the need for this would be unlikely given the risk profile of the bank. Some proponents of the model also argue that institutions that are not defined as narrow banks would not be subject to regulation but would be allowed to fail.

In operational terms, two structures are possible: (1) Narrow Banks could be stand-alone institutions, (2) Narrow Banks could be incorporated within a Bank Holding Company and be separately capitalized within the group such that, in the event of a resolution, it could be easily extracted. In the case of the second option, all that would be required of existing universal banks or financial conglomerates would be a different business and capital structure though in practice that could be disruptive. It need not mean that existing Universal Banks would need to lose business lines. In some cases this would be an extension of existing structures. For instance, in the UK insurance subsidiaries and investment banking of financial conglomerates are in principle required to be conducted in separately capitalized business units. However, losses in these areas would apply to the

bank as a whole whereas in the Narrow Bank concept the failure of a casino operation within the BHC would not affect depositors in the utility part.

While such a model might appear attractive in terms of shielding depositors from excessive risk taking in the investment part of the business, and possibly allowing the latter to fail without a bail-out, the attractions are not altogether convincing:

- All institutions can have powerful and de-stabilizing systemic implications which means that, in practice, there is no clear-cut division between those banks (Narrow Banks) that will always be supported while others (investment banks) which will be allowed to fail. Bear Sterns had no utility banking operations. As argued in earlier sections, the key systemic issues arise through connectedness and it is difficult to imagine that in practice Narrow Banks would be entirely immune from the failure of a casino operation.
- To some extent, the same objectives could be achieved through a combination of higher capital requirements on the investment business of a universal bank, more intensive regulation and supervision generally, and Living Wills. Again, behavioral regulation might be a less disruptive alternative to structural regulation.
- The Narrow Banking model could prove to be pro-cyclical. In the optimistic part of the cycle, depositors and business would likely gravitate to the unprotected sector (thereby accentuating the upswing) whereas when trouble strikes a migration of funds to Narrow banks is likely to occur which would aggravate the downswing and make the crisis worse. As put by Brunnermeier, *et al.* (2009):

“The combination of a boundary between the protected and the unprotected, with greater constraints on the business of the regulated sector, almost guarantee a cycle of flows into the unregulated part of the system during cyclical expansions with sudden and dislocating reversals during crises.”

4.6.3 *Trading in Derivatives*

A key dimension in the crisis was the uncertainty created by the difficulty of estimating counterparty risks in derivatives trading. This could be mitigated by a change in the micro structure of the market by, for instance, requiring all standardized OTC bilateral contracts in derivatives instruments to be conducted through an Exchange or a central clearing house rather than bilaterally between counterparties. Five main advantages emerge from this. Firstly, counterparty risk is substantially reduced as each counterparty's transaction is with the Exchange rather than another trader: the Exchange guarantees all trades. Central Counterparties (which can exist for both OTC and Exchange transactions) serve to reduce counterparty risk by guaranteeing the performance of the contracts that it clears. Through economies of scale, and the way that Exchanges are able to manage their exposures by, for instance, calling for margin, counterparty risk is substantially attenuated. Secondly, and largely for the same reasons, counterparty risk becomes more diversified via the Exchange rather than directly with other traders. Thirdly, there would be more transparency to trading in derivatives and potentially more information

available to supervisors which could be important in the event of intervention and/or resolution. Fourthly, price formation is likely to become more efficient. Finally, liquidity in the traded instruments would be enhanced.

In contrast to some of the other proposals under consideration, this is one area of structural regulation to reduce the probabilities of bank failure that could make a significant and realistic contribution.

4.7 REDUCE PROBABILITY: BEHAVIORAL REGULATION

Most regulation is not *structural* in nature but *behavioral* in that it imposes requirements that affect the way business is conducted and is designed to create incentives for prudent behavior.

There are several areas in which changes will be made and which will make regulation more demanding: higher capital requirements possibly including the imposition of maximum leverage ratios, more emphasis on Tier 1 (equity) capital (i.e. a focus on both the quality and quantity of capital), the requirement for banks to issue convertible capital (i.e. debt capital that, when required, would automatically convert into equity capital), the regulatory treatment of off-balance-sheet vehicles, higher capital requirements against banks' trading books most especially as Basel 2 allows banks to hold CDO assets on their trading book without capital, the calibration of capital requirements on the basis of a supervisory judgement about the risk characteristics of banks' internal incentive and reward structures, and more explicit and precise regulatory requirements with respect to banks' liquidity. With respect to the last-mentioned, capital requirements could be calibrated with respect to a bank's holding of liquid assets, the bank's maturity transformation position, and the extent to which a bank is relying on short-term funding (see Brunnermeier, *et al.*, 2009). The rationale is that the risk of an asset is determined in part by the maturity of its funding. It is a moot point, for instance whether Northern Rock might have survived had it had longer-term funding.

The Basel committee has proposed raising capital requirements, more emphasis to be given to Tier 1 capital, more stringent capital requirements on banks' trading books, and a leverage ratio which would cap the size of a bank relative to its holding of capital irrespective of the sum of risk weighted assets which proved to be an easy form of arbitrage in the years prior to the crisis.

All of these areas are currently the focus of regulatory attention and, in some areas, action has already been taken. Many of these specific regulatory measures amount to an extension of what is already within the current regulatory regime and the Basel Capital Accord in particular. The question still arises as to how effective such reforms to existing arrangements are likely to be given, as argued earlier, the ingenuity of banks in circumventing some aspects of regulation, and the role of financial innovation in facilitating the process of regulatory arbitrage.

It is not our purpose to survey the full range of behavioural regulatory reform. However, two reforms in particular are considered: a macro-prudential approach to regulation, and measures focussed on the degree of connectedness.

4.7.1 Macro Prudential Regulation

A weakness of the regulatory regime practiced in most countries (with the notable exception of Spain) has been the excessive emphasis given to prudential regulation on the basis of the risk characteristics of individual banks rather than the system as a whole. In many dimensions, this has proven to be pro-cyclical in that it accentuated the cyclicity of the economy. Thus, capital requirements would often be low at the peak of a cycle (because risks appear to be low and well-contained at this phase in the cycle) and, for the opposite reason, high in the low point of a cycle. Macro-prudential regulation adjusts regulatory requirements based on what is happening in the system as a whole and can be calibrated to be counter-cyclical. The objective of macro prudential regulation is partly to act anti-cyclically.

One proposed reform would be to calibrate capital requirements on the basis of the cycle by, for instance, raising capital requirements in the upswing and peak of the cycle (which should moderate the upswing via the cost of credit induced through the higher cost of capital) and lowering them in the downswing and at the trough of the cycle. In effect, through cyclically-adjustable capital requirements, banks would build up capital buffers in the upswing and run them down in the downswing. Similarly, capital requirements could be raised in the face of an asset price bubble.

Equally, banks could be required to adopt dynamic provisioning strategies (as in Spain) whereby the rate of provisions is increased in the upswing of the cycle (when risks appear to be low but might be building up) and lowered in the downswing. Given that problems in banks often arise when they grow at a fast rate, other proposals have proposed a regime where, in the case of individual banks, capital requirements are raised when a bank's asset growth exceeds a particular threshold or is significantly above the average growth of other banks. The BIS (2010) suggests that when credit/GDP and real asset prices simultaneously deviate by large amounts from their trends, this is a signal of potential danger.

All of these measures could make a significant contribution to alleviating the current pro-cyclicality of regulation, and addressing the needed macro dimension to regulation.

4.7.2 Connectedness

One of the central features of the crisis was the high degree of connectedness between banks with the corollary that it is difficult to measure risk exposures of individual banks, and that shocks in one part of the system can magnify and have a substantial systemic impact. This increased inter-connectedness of risks applies both as between banks and also between different markets. It also means that shocks or disturbances in one market can be transmitted to other markets and asset classes. This also means that, in practice, the number of banks that are, or are potentially, systemically significant has risen.

One possibility to address this central issue is to have greater transparency about connectedness so that banks, other market transactors, and supervisory agencies are able to make more informed judgments both about the risks attached to individual institutions, but also system risks. On the strength of more accurate and extensive data, higher regulatory capital requirements could be imposed on banks which are deemed to be highly

connected with others. This in turn might create incentives for banks to manage their connectedness, and hence vulnerability to shocks emanating from other banks, more effectively. Banks with higher levels of connectedness could also be required to hold greater levels of liquidity.

4.8 LOWER THE COSTS OF FAILURES: STRUCTURAL REGULATION

Our theme is that regulatory reform needs to focus not only structural and behavioral measures to reduce the probability of bank failures, but also that both types of measures can be applied to reduce the cost of those failures that inevitably will occur under any regulatory regime. Although reform needs to encompass both strands, we further argue that the balance of priorities between the two approaches needs to shift towards the latter. This section outlines some of the structural measures designed to lower the cost of bank failures borne by tax-payers, the system, depositors or deposit protection funds, and bank customers. Two areas in particular are briefly considered: (1) the size of banks and the TBTF issue, and (2) measures addressed specifically at systemically important banks. Our objective is not to consider these in any detail but rather to illustrate the type of measures that are being considered.

One such area is the possibility of calibrating regulatory requirements on the basis of institutions' contribution to systemic risk which would in turn be reflected in their cost of business. Thus, while this might mean that consumers pay more for banking services from such institutions, there would in principle be an offsetting welfare gain by lowering the probability of failure of systemically important banks. The BIS has argued that the rationale of a Systemic Capital Charge would be to create a distribution of capital that reflects the systemic risk posed by individual firms (BIS, 2010).

4.8.1 TBTF and the Size Issue

A central issue in regulatory reform centers on the TBTF syndrome. In evidence to the UK House of Commons Treasury Committee, the Governor of the Bank of England argued that this is probably *the* most important single issue to address. He has also suggested that "if a bank is too big to fail, it is too big!" The Bank of England has pondered the issue of size: "The current size and structure of financial systems may be incompatible with maintaining financial stability and containing calls on public resources" (Bank of England, 2009). On the other hand, in some cases such banks might also be too big to rescue because of the size of the potential tax-payer liability.

As a point of perspective, in 1985 the five largest banks in the world controlled 8 percent of global bank assets while this had risen to 16 percent by 2008. One regulatory strategy could be to impose higher capital requirements on banks related to their size whereas, in practice, to date there has been something of a negative correlation between bank size and capital ratios which, to some extent, has been perversely encouraged by the Basel Capital Accord and especially Basel 2.

Several problems emerge when the system is populated with banks that are deemed to be Too Big To Fail:

- The system may be exposed to more risk.
- A moral hazard is created if banks or depositors know that a rescue will be mounted in the event of a potential insolvency (Stern and Feldman, 2004, and Mishkin, 2006) which may induce such banks to take excessive risks.
- It may have the effect of creating incentives for banks to become big in order to secure TBTF rents, especially because evidence from ratings suggests that there is something of what might be termed a “TBTF ratings premium” (2010).
- Competitive neutrality between banks of different size is infringed.
- The tax-payer is potentially exposed to a large liability in the event of a failure of a TBTF bank: the tax-payer may be called upon to be an insurer-of-last-resort.
- In the event of a bailout, the effect may be to keep zombie banks alive.
- This might also imply that, when a bank is bailed-out, there may be a privatization of profits and socializing of risk although this depends upon how the bail-out is conducted.

In the 2010 UK General Election, two of the major parties (Conservative and Liberal Democrats) favored breaking up banks that are deemed to be too big and, in the Coalition government that was formed after the election, the Liberal Democrat’s chief economics spokesman was appointed as Minister of Industry.

Haldane suggests that a key issue is how to break out of a “doom loop”: expectations of some banks being TBTF create a moral hazard and excess risk which may lead to failures and the rescue of those banks (and possibly an easing of monetary policy). The resurrected banks are then free to repeat the process. In this vicious circle, the apparent solution to one problem sows the seeds of the next.

The central objective is to lower the systemic costs of failure although some of the measures would also lower the probability of failure of large banks. In principle, there are five alternative regulatory strategies to limit the TBTF problem. Firstly, although in practice unrealistic, a limit could be placed on the size of banks. Secondly, large banks could be broken up. A third option, and more realistic than limiting size, would be to impose capital charges based on the size of banks. This might, in practice, have the same effect as imposing size limits in that it would raise the costs of large banks. A fourth alternative would be to impose a tax on size. Finally, “wind-up” plans and/or Living Wills could be imposed on large institutions. Overall, large banks could be subject to a higher degree of regulatory intensity.

Herring (2010) suggests two alternatives to bail-outs of TBTF banks: more stringent capital and regulatory requirements on such banks, and the imposition of “wind-up plans.” The latter is similar to the Living Wills proposal discussed in a later section. Other alternatives (such as the imposition of regulatory leverage ratio limits) to address the TBTF problem are outlined in Warwick Commission (2009).

There are, however, several problems to these structural measures. Firstly, it is difficult in practice to define the size of a bank which triggers the TBTF problem. For instance, in the UK while Northern Rock in the UK was not a large bank (it had assets of around £100 billion) the government judged that, faced with a run on the bank in August 2007,

it needed to intervene with a rescue operation. Secondly, in a world of network externalities and high connectedness, even the failure of relatively small banks can create systemic problems: Lehman Brothers was not a particularly big bank. It cannot be claimed that only large banks pose systemic vulnerabilities, and in a crisis all banks can become systemically significant. Thirdly, to the extent that there are economies of scale in banking (though the empirical evidence is at best ambiguous), there could be costs associated with any structural regulation that sought to limit size. Furthermore, if regulatory arbitrage and competitive neutrality problems are to be avoided, any such measures would need to be internationally coordinated and this is unlikely in practice. Such measures could also impose a “tax” on efficiency in that large banks may have got to their size because of their superior efficiency and performance.

Our conclusion is that most structural measures to address the TBTF problem are not in practice feasible options even though the problem is real enough. However, as noted in a later section, the creation of Living Wills could be a workable structural measure to address this key issue. It recognizes the *status quo* that some banks are big and complex and that it is not feasible to limit their size or break them up.

4.8.2 Systemically Important Banks

Many of the structural measures described above relate to the size issue, apply equally to systemically important banks in that large banks are usually systemically significant. However, some banks may be systemically significant irrespective of their size. A higher degree of regulatory intensity could be applied to such banks.

Brunnermeier *et al.* (2009) suggest four types of banks regarding their systemic significance: individually systemic (large and interconnected banks which cannot be allowed to fail), those which become systemic as part of a herd (small banks, including high-leveraged hedge funds, which are not systemically significant on their own but become so when all banks move together), non-systemic large banks, and what are termed “tinies”. This illustrates that it is difficult to differentiate under all circumstances which banks are, and which are not, systemically important. It is not always exclusively about size or business structure.

In their report to the G20 Finance Ministers, the Financial Stability Board, the IMF and the BIS recognized three key criteria which are helpful in identifying the systemic importance of banks: *size* (defined as the volume of financial services provided by the individual component of the financial system); *substitutability* (the extent to which other components of the system can provide the same services in the event of a failure), and *interconnectedness* (the extent to which the bank is related to other components of the system).

However there cannot be an exhaustive list of systemically and non-systemically relevant institutions. Making such a clear distinction could result in overlooking important sources of systemic risk. A bank that might not be systemic in normal times may become so in a crisis.

One option to deal with banks regarded as potentially systemically important is to impose higher capital charges on such institutions as advocated, for instance, by Acharya

and Richardson (2009), Brunnermeier *et al.* (2009) and Bernanke (2009). More generally, regulatory requirements could be calibrated on the basis of individual bank's systemic significance whereas, in practice and as already noted, some regulatory requirements seem to work in the opposite way as large banks have tended to have lower capital ratios than smaller institutions. Chan-Lau (2010) suggests a practical methodology for levying capital charges based on degrees of interconnectedness. These would be based on a bank's incremental contribution to systemic risk and its contribution to increased risk of other institutions. The approach is designed as a way of internalizing negative externalities associated with too-connected-to-fail institutions.

4.9 LOWER THE COSTS OF FAILURES: INTERVENTION

A key component of a regulatory regime, and strategies to reduce the cost of failures, is the nature, timing and form of intervention (assistance - such as through a government capital injection - to maintain a failing bank as a going concern), and Resolution (how to resolve banks that cannot be kept as a going concern) in the event of the failure of a bank. Resolution kicks in when intervention has failed or has been delayed too long to save the bank as a going-concern. There are always problems of credibility when governments declare a "no bail-out" policy which has to be suspended in particular cases. This time-inconsistency problem needs to be addressed.

With respect to intervention (which can be viewed both as a means of lowering the probability of bank failure and lowering the costs of failure), strategies should be based on a Prompt Corrective Action programme (i.e. intervention should be made early), and there is a lot to commend the strategy based on the SEIR regime in the US. This is very similar to the Recovery and Resolution arrangements within Living Wills discussed in a later section.

Intervention arrangements are important not the least because they have incentive and moral hazard effects which potentially influence future behavior of banks and their customers. These arrangements may also have important implications for the total cost of intervention (e.g. initial forbearance often has the effect of raising the eventual cost of subsequent intervention), and the distribution of those costs between tax-payers and other agents. Different intervention arrangements also have implications for the future efficiency of the financial system in that, for instance, forbearance may have the effect of sustaining inefficient banks and excess capacity in the banking sector. The issue focuses on when intervention is to be made. The experience of banking crises in both developed and developing countries indicates that a well-defined strategy for responding to the possible insolvency of financial institutions is needed.

A key issue relates to rules *versus* discretion in the event of bank distress: the extent to which intervention should be circumscribed by clearly-defined rules (so that intervention agencies have no discretion about whether, how and when to act), or whether there should always be discretion simply because relevant circumstances cannot be set out in advance. The obvious *prima facie* advantage for allowing discretion is that it is impossible to foresee all future circumstances and conditions for when a bank might become dis-

tressed and close to (or actually) insolvent. It might be judged that it is not always the right policy to close a bank in such circumstances.

However, there are strong arguments against allowing such discretion and in favor of a rules approach to intervention. Firstly, it enhances the credibility of the intervention agency in that market participants, including banks, have a high degree of certainty that action will be taken. Secondly, allowing discretion may increase the probability of forbearance which usually eventually leads to higher costs when intervention is finally made. It guards against hazards associated with risk-averse regulators who themselves might be disinclined to take action for fear that it will be interpreted as a regulatory failure, and the temptation to allow a firm to trade-out of its difficulty: a policy that amounts to the regulator also “gambling for resurrection”. Kane (2000), for instance, argues that officials may forbear because they face different incentives from those of the market: their own welfare, the interests of the agency they represent, political interests, reputation, future employment prospects, etc. Perhaps less plausibly, he also argues that, under some circumstances, the present generation of tax-payers may believe they can shift the cost of resolution to future generations. Thirdly, it removes the danger of undue political interference in the disciplining of banks and regulated firms. Experience in many countries indicates that supervisory authorities face substantial pressure to delay action and intervention. Fourthly, a rules approach guards against supervisors focusing on the short-term costs of intervention compared with the longer-term costs of delaying intervention. Fifthly, it guards against the “collective euphoria” syndrome discussed in an earlier section. Finally, and related to the first, a rules approach to intervention is likely to have a beneficial impact on *ex ante* behaviour of financial firms, and create incentives for management to manage their banks prudently so as to reduce the probability of insolvency, (Glaessner and Mas, 1995). Furthermore, a rules approach should also reduce the possibility of banks bargaining for economic rents in the event of a seriously deteriorating position. It also enhances the credibility of the regulator’s threat to close institutions.

Put another way, time-inconsistency and credibility problems should be addressed through pre-commitments and graduated responses with the possibility of over-rides. Many analysts have advocated various forms of pre-determined intervention through a general policy of SEIR. The case for a graduated-response approach is that there is no magical capital ratio below which an institution is in danger and above which it is safe. Other things equal, potential danger gradually increases as the capital ratio declines. This in itself suggests there should be a graduated series of responses from the regulator as capital diminishes. No single dividing line should trigger action but there should be a series of such trigger points with the effect of going through any one of them being relatively minor, but the cumulative effect being large. Goldstein and Turner (1996) argue that SEIR is designed to imitate the remedial action which private bond holders would impose on banks in the absence of government insurance or guarantees. In this sense it is a mimic of market solutions to troubled banks.

An example of the rules-based approach is to be found in the Prompt Corrective Action (PCA) rules in the US. These specify graduated intervention by the regulators with pre-determined responses triggered by capital thresholds. In fact, several countries

have such rules of intervention (Basel Committee, 1999). SEIR strategies can, therefore, act as a powerful incentive for prudent behavior.

The need to maintain the credibility of supervisory agencies creates a strong case against forbearance. The overall conclusion is that there should be a clear bias (though not a total bar) against forbearance when a bank is in difficulty. While there needs to be a strong presumption against forbearance, and that this is best secured through having clearly-defined rules, there will always be exceptional circumstances when it might be warranted in the interests of systemic stability. However, when forbearance is exercised the regulatory agency should be made accountable for its actions.

4.10 LOWER THE COSTS OF FAILURES: TAXATION AND INSURANCE

The wide range of intervention measures applied by governments and central banks in the wake of the crisis have involved a substantial tax-payer commitment. Tax payers became what amounted to an “insurer of last resort” but with a very inefficient insurance contract in that no *ex ante* premiums were paid by the insured entities (banks and some other financial institutions, such as AIG in the US). The contract was implicit. In effect, tax-payers became exposed to bank credit risks that they themselves had no part in creating and for which no *ex ante* premiums were received.

4.10.1 Taxation

The rationale for imposing special taxation on banks is three-fold: (1) to recoup the costs of any past bail-outs and intervention, (2) to compensate for the effective subsidy received by banks by virtue of possible future bail-outs and being TBTF by and, (3) creating incentives to alter funding structures and perhaps becoming “too big”. The incentive structure with regard to funding is seen in the UK case where the proposed tax will relate to a bank’s balance sheet size minus the sum of core capital, insured (retail) deposits, and cash raised against holdings of government bonds: this is, in effect, a tax on wholesale market borrowing. It amounts to a systemic risk levy whereby the tax internalizes to banks the social (systemic) costs they potentially create.

The issue is of whether banks should be required to pay *ex ante* premiums, and/or whether, *ex post* the costs of rescue operations. In other words, whether banks should be required to pay for the costs of the crisis and the benefits received through public intervention. The distribution implications of such a move would be difficult to unravel although each bank’s liability to pay could be related to a measure of its systemic significance.

The International Monetary Fund was mandated by governments to report to the G20 on options for raising money from the financial sector to pay for the costs of government intervention. Two proposals were subsequently made by the IMF: a *Financial Stability Contribution* and a *Financial Activity Tax*. In the former case, banks would be required to make payments *ex ante* through a levy on their balance sheets. This would imply payments to cover Intervention and Resolution costs. The Financial Activity Tax would be similar to the application of Value Added Tax.

In the US, the President has proposed a *Financial Crisis Responsibility Fee* in order to pay for the costs of the current crisis. It would be a fee based on banks' liabilities and levied on the basis of: $A - [T1 + D]$ where A is the value of a bank's assets, T1 is the bank's tier 1 capital, and D is domestic deposits. It is designed as a charge on banks to cover the losses incurred through the Toxic Assets Recovery Programme which are estimated to be around \$120 billion. It is envisaged that about 150 banks (including some non-US banks) would be included. The levy would amount to 0.15 percent per annum for a period of ten years. The scheme would create incentives for banks to reduce the extent of their wholesale funding, limit their own size, and increase their Tier 1 capital base. In the context of the origins of the crisis, these incentives could contribute to enhanced systemic stability.

While taxation would have the effect of raising the cost of banking to consumers, the consumer would gain through a more stable banking system, and a withdrawal of the implicit tax-payer subsidy given to banks.

4.10.2 Insurance

The previous section considered the case for imposing an *ex post* tax on banks after a crisis in order to recoup for the tax-payer some of the costs of rescue operations. An alternative approach would be to charge banks *ex ante* insurance premiums to cover the possibility of tax-payer liabilities emerging through future rescue operations. Such insurance premiums would be based on assessments of a bank's potential contribution to systemic risk which in practice means that a bank's size would be an important, though not exclusive, component. In practice, the distinction between an insurance premium and an *ex ante* tax (i.e. one imposed to cover possible future tax-payer liabilities) is minor. Banks would claim that any such premiums are no more than an alternative way of taxing banks.

A key issue arises as to whether such premiums would be allocated to a dedicated "rescue fund" (and invested in appropriate assets such as government debt), or whether such payments would be regarded as contributions to general government revenues and used to reduce budget deficits and/or finance rises in government expenditure or lower taxation. There are problems with both. A possibly serious drawback of creating a "rescue fund" would be the moral hazard associated with all forms of insurance: if funds are known to be available for a rescue operation, the insured banks might be induced to take excessive risk. A second problem is that it might be viewed as undermining a government's commitments not to bail out failing banks. Thirdly, the logic of creating alternatives to bail outs (such as Living Wills and SEIR regimes) would be undermined as the creation of a fund would appear to be an admission that the planned alternative strategy might not work. This would amount to a public policy that says that mechanisms have been introduced to avoid the need for any future bail-outs, and yet a fund has been created on the basis of tax or insurance premiums levied on banks in case a bail out is needed! This could undermine credibility, and create uncertainty about what government policy is.

On the other hand, if any premiums were to go to governments' general accounts, the credibility of the scheme could be undermined in that there might be doubt about whether, notwithstanding that premiums have been paid, the government would have

the resources to rescue a large failing bank. This could also raise the potential hazard of weakening pressure on governments to pursue responsible and stable fiscal policies. On the other hand, in the event that the proceeds of the premium payments were taken into the government's general accounts, the tax-payer would receive the benefits of higher public spending and/or lower taxation as the compensation for possibly having to use public resources for bank bail-outs. There would be the benefit of lower taxation but with a potential future liability to pay higher tax in the event that a bank rescue operation is needed.

In some cases banks have been required to pay fees and insurance premiums for some of the intervention measures such as in the case of the UK's *Asset Protection Scheme*. Under this scheme, banks are offered the facility to select a portfolio of loans to be "insured" by the government. A fee is paid to enter the facility and participating banks are required to pay the first loss on the portfolio (the amount of which is set on a case-by-case basis for each bank) and 10 percent of any losses over and above this amount. This effectively amounts to the payment of an insurance premium plus a deductible on any claim made. This brings the scheme more in line with many standard insurance contracts.

4.11 LOWER THE COSTS OF FAILURES: RESOLUTION

Whatever regulatory regime exists to reduce the probability of bank failures, it can never, and should not attempt, to reduce the probability to zero. Any regime that did so would imply gross over-regulation which would undermine the effectiveness and efficiency of the financial system in general and the banking sector in particular. Failures will always occur under any regime and with varying degrees of regularity and seriousness. There always will be banks that are TBTF, and there always will be bank failures. It is, therefore, necessary to install an explicit Resolution regime so as to reduce the costs of those failures that do occur. The issue arises, therefore, about how banks are to be allowed to fail while minimizing costs to depositors, bank customers, the tax-payer and any deposit protection arrangements that might be in place. Resolution needs to be orderly and predictable. The objective is to minimize the trade-off between lowering the cost of bank failures and minimizing moral hazard created by bank rescues (see Beck, 2004 for a discussion of this trade-off).

'Closure' does not necessarily mean that, even in the absence of deposit insurance, depositors lose. Nor is it necessary for bank-customer relationships and information sharing to be destroyed. The objective is to allow a bank to "fail" without disturbing business and customer relationships, and to ensure that the costs of default fall on equity and bond holders. In effect, the "socialization" of the costs of failure is to be avoided. This can be engineered by, for instance, requiring uninsured creditors to provide capital support via "hair-cuts" and having convertible bonds: bonds that become equity when needed. Bank closure may simply mean a change in ownership of a bank and the imposition of losses on equity holders. In many countries, 'bank closure' has not always meant the destruction of the bank, and in many instances, regulatory authorities have brokered a change in ownership of failing banks while imposing losses on shareholders.

A response strategy in the event of bank distress needs three key components: (1) taking prompt corrective action to address financial problems before they reach critical proportions; (2) being prepared to close insolvent or near-insolvent financial institutions while nevertheless not destroying what value remains; and (3) closing of unviable institutions, and vigorously monitoring of weak and/or restructured institutions.

Many countries entered the crisis without clearly-defined special resolution arrangements for banks and without the legal structure giving powers of intervention before insolvency is reached. Unique resolution arrangements are needed for banks (compared with other companies) because of their special characteristics: in particular, that the social cost of failure exceeds the private costs. Serious problems emerge when resolution arrangements are not clear. Firstly, it creates uncertainty for all concerned including depositors and other banks in the system. Secondly, it creates time-consistency problems (and hence credibility issues) as governments may be induced to behave differently over time. Thirdly, stakeholders are inclined to bargain for economic rents often (if not usually) at the expense of the tax-payer if resolution arrangements are not clearly defined in advance. Fourthly, as argued above, it can lead to political pressures for forbearance. Fifthly, it can lead to costly and unnecessary delays in resolution. Finally, the absence of a clearly-defined set of resolution procedures means that uncertainty is created over rights and obligations of various stakeholders in a failed bank.

Given the strong presumption in favor of clearly-defined, explicit and predictable Resolution procedures to be in place, a set of key criteria can be established when constructing such a Resolution regime:

- Minimal loss or risk to the tax-payer.
- No disruption to the business of the bank for its customers.
- Any pay-outs to depositors should be made with minimal delay.
- Shareholders should never be protected, and non-insured creditors should share in any costs of insolvency.
- Where possible, closure and resolution should be instigated before the bank becomes insolvent. This should have the beneficial effect of enhancing market discipline.
- If a bank cannot survive without prolonged public support, it should be placed in the resolution procedure.
- Arrangements should not create moral hazard for the future.
- The arrangements should sustain financial stability and public confidence.
- There should be minimal distortion to competitive neutrality between banks: for EU countries this also implies adherence to EU competition requirements.
- Large, and systemically significant, firms should be required to construct their own Resolution plans (Living Wills as discussed below).

The ultimate objective is to have arrangements in place to resolve distressed banks with the minimum of costs and disruption which implies allowing banks to fail without disturbing systemic stability: the objective is to lower the cost of bank failures.

4.11.1 Living Wills²

Living Wills make recovery and resolution plans more explicit. Banks are particularly complex organizations and generally have more subsidiaries than most other types of company. Banks can be horrendously complex with subsidiaries, SIVs, SPVs, and with complex relationships between different parts of the business. HSBC, for instance, has in excess of two thousand entities although in many cases they are separately capitalized which makes the bank something of a Bank Holding Company. The structural complexity of large, conglomerate banks creates particular problems for the resolution regime most especially when the objective is to separate the essential parts of a bank (which are to be sustained) from its other activities.

The British government has imposed a requirement on large banks to create Living Wills which explain how a bank is to be broken up in the event of resolution. In the UK, the Financial Services Act of 2010 places a duty on the Financial Services Authority to require firms to produce *Recovery and Resolution Plans* to be agreed case by case by the FSA. The G20 has made a similar proposal in order to “develop internationally consistent firm-specific resolution plans” (Group of Twenty, 2009). Living Wills would, *inter alia*, give a clear mapping of relationships within a bank, and give clear wind-down plans for all parts of the bank. In particular, they would give information about how any wind-down would be executed in practice. Living Wills are also to include mechanisms to separate the components of a financial firm that are critical as opposed to those that are not, (Hupkes, 2009): in particular, deposits, some lending business, and payments services are to be ring-fenced. This suggests having simple structures so that parts of the bank can easily be sold (Tucker, 2010). The main purpose is to lower the cost, and speed up the process, of intervention and resolution by making it easier to sell different parts of the bank, and to protect the tax-payer by giving an alternative to bail-outs. In effect, they force banks to anticipate and internalize their spill-over costs. They are also designed to create incentives for banks to have less complex business structures.

Prior to the crisis, most countries did not have in place the necessary tools to wind down their domestic financial conglomerates. A new dimension to structural regulation to lower the costs of bank failure is the requirement for banks to have in place what have been colloquially termed Living Wills. However, some Living Wills only specify what an institution is to do in the event of insolvency (the Resolution part) and not explicit plans to deal with an incipient problem (the Recovery component). Huertas (2010) of the UK Financial Services Authority argues that Living Wills can in theory create a financial system that is “resilient to shocks and one that assures that banks are not ‘too big’ or ‘too interconnected’ to fail.” Living Wills are, in practice, a superior and more realistic alternative to other structural measures to address the TBTF issue that were briefly outlined above. Living Wills seek to prevent the failure of one bank having broad systemic consequences leading to the failure of other innocent banks. As put by Huertas (2010): “Living Wills offer the prospect that society can create a lower impact/lower cost solution to the problem posed by large, systemically important banks.”

There are two key components of Living Wills: Recovery mechanisms and Resolution

² This section draws heavily on Huertas (2010).

arrangements. The Resolution component kicks in when the Recovery component has failed. In essence, the recovery component is within the power of banks whereas resolution plans apply more to regulatory and political authorities although banks would be required to state in advance how they would provide the necessary information to these agencies in the event that a resolution of a failed bank is required. In principle, clearly-defined and credible recovery plans should lower the probability that resolution will be needed because such plans outline how the bank will respond to distress situations. They are designed to maintain the bank as a going-concern. Living Wills require banks to have in place clear recovery plans in the event of distress applying to their institution rather than the system as a whole. As put by Huertas (2010): “the bank is forced to think through in advance what it would do if the bank were to fall under extreme stress.” In particular, the bank is required to have plans in place to ensure that, in such circumstances, it could maintain adequate capital and liquidity, and have a Contingency Funding Plan in place.

There are several advantages to Living Wills in the case of complex and potentially systemically important institutions. Firstly, to the extent that it induces simplified structures in complex banks, interconnectedness might be lowered. Secondly, they are designed to lower the probability of failure through the Recovery component. Thirdly, systemic costs of any failures that do occur should be lowered because clear and credible Resolution plans are put in place in advance. Fourthly, the resolution process should be made easier and less complex. Fifthly, such Living Wills would give more information to supervisors in the process of resolution operations. Finally, there would be general advantages through reducing the need for rescues or bail-outs because alternative resolution mechanisms would be in place. It needs to be clear which parts of a bank’s business are to be supported and kept solvent.

Above all, they would mitigate moral hazard to the extent that Living Wills make it clear to creditors that resolution can take place without a bail-out and, as a result, market discipline should be enhanced. The rationale of Living Wills is that the “recovery” component should lower the probability that a bank would require intervention by the regulatory authorities, and the “resolution” part should lower the costs to society of a bank failure. Amongst other things, the Living Will would specify what an institution will do in the event of insolvency.

The key aspect of the recovery component of Living Wills is that the bank needs to have clearly-defined and credible plans for how to maintain capital and liquidity adequacy in the event of distress. The requirement to have Convertible bonds (debt instruments which convert into equity when circumstances require it) as part of a bank’s capital base could be part of a Living Will arrangement with the circumstances under which the conversion would take place being specified in advance.

The FSA requires that such plans should: be capable of execution within a fairly short period and with a high degree of certainty; be of a size that would have a substantial impact and be capable of turning round a distressed institution, and contain a wide range of alternative options to bolster capital and liquidity when necessary. Several possible routes to recovery are available to banks in distress: raising additional capital, bolstering the bank’s liquidity, selling parts of the business, exiting from some business

lines, running down the scale of the bank, selling the entire business, etc. The essence of Living Wills is that clearly-defined and credible plans are outlined in advance in each of the areas available to the bank. For instance, what plans does the bank have to raise additional capital in times of stress and does it have agreed lines of credit and sufficient collateral to bolster liquidity when necessary? If the supervisor judges that a plan is not feasible, or would take too long to execute, they could have the power to compel an alternative to simplify a bank's corporate structure.

The realisms of the plans will be determined in part by the structure of the institution. A key consideration (most especially if sales of parts of the business are envisaged) is the extent to which different business lines are housed within fairly independent subsidiaries that could easily be sold if necessary. Thus the requirement to have Living Wills has incentive implications with respect to the structure of the bank.

Our conclusion is that Living Wills are a more realistic option within the range of *structural* mechanisms for addressing the problems of TBTF banks than most of the other options that are theoretically possible.

4.11.2 *Insolvency Arrangements*

A basic principle in reducing the cost of bank failures is that it should be possible for the problems of a failed bank to be addressed quickly including various measures of Resolution. This means that insolvency and bankruptcy procedures need to be clear and appropriate for the special position of banks. The legal position and practice varies between countries. In the case of Northern Rock in the UK, one of the problems was that there were no special bankruptcy arrangements for banks. Instead, banks were subject to the standard arrangements that applied to all companies which could involve a complex, convoluted and time-consuming process. There is a case for treating banks differently in this regard: the uncertainty surrounding a drawn-out procedure can create uncertainty for the financial system as a whole, and there is the important issue of depositor protection and the systemic dimension to bank insolvencies. In reform programmes, the special position of banks needs to be reflected in bankruptcy law so that early and decisive resolution can be made.

In the UK, a new special bankruptcy code for banks is being created which will take a failing bank out of normal bankruptcy procedures. As part of this, the *Special Resolution Regime* has options such as deposit transfers to other banks, a Bridge Bank mechanism in addition to liquidation and temporary nationalization. A Bank Insolvency Order can be made to the courts by the Bank of England, the FSA, or the government on grounds such as: the bank is unable, or unlikely to become unable, to pay its debt, that the winding up of the bank would be in the public interest, and that the winding up of the bank would be fair. At which point, the bank liquidator has two objectives: (1) to ensure that each eligible depositor has accounts transferred to another financial institution or receives payment from the Financial Services Compensation Scheme, or (2) to wind up the affairs of the bank so as to receive the best result for the bank's creditors as a whole. The result is that a different insolvency regime is to be applied to banks.

4.11.3 A Case Study of the UK

The UK was one of the countries which did not have clearly-defined resolution procedures in place prior to the onset of the crisis. However, the government moved quickly to create a new resolution regime which was enshrined in the Banking Act, 2009. In the *Special Resolution Regime* (SRR), a range of tools were created to deal with banks in difficulty and use was made of them within weeks. Several features of the new regime address the issues discussed above and which are relevant for all countries. Firstly, there is power to intervene in the affairs of a bank when its likely failure threatens financial stability or the interests of the tax-payer. Secondly, the SRR allows for resolution to be instituted even when the bank has positive net worth: i.e. before it has become insolvent. Thirdly, it allows for the continuation of business and fast pay-outs in the event that the deposit protection scheme needs to be invoked.

The main feature of the SRR is that four resolution options are created: (1) private sector purchase of a failing bank, (2) the transfer of the bank to a Bridge Bank, (3) a partial transfer of ownership (such as splitting an institution into a Good and Bad Bank with the good parts - including the deposits - being sold to another bank, while the Bad Bank is put into administration), and (4) a temporary public ownership option. The rationale of the Bridge Bank (as in the US) is that services and access to the bank are not disrupted, it buys time for a permanent resolution plan to be constructed, and it gives time for the bank to be restructured to make it viable for a trade sale in due course. The third option (partial transfer of ownership) was invoked in the case of Bradford and Bingley Bank when its deposits were sold to Bank Santander while the assets were taken into state ownership. For a more detailed discussion of the four options see Huertas (2009a and 2009b) and OECD (2009).

4.12 A REGULATORY REGIME PARADIGM

As bank failures involve avoidable costs, there is a welfare benefit to be derived from lowering their probability and reducing the cost of those that do occur. These are the ultimate objectives of what will be termed the *Regulatory Regime*. Just as the causes of banking crises are multi-dimensional, so the principles of an effective *regulatory regime* also need to incorporate a wider range of issues than externally imposed rules on bank behavior.

Our central theme is that the principles of an effective *regulatory regime* need to incorporate a wider range of issues than externally imposed rules on bank behavior. The key components of the regime are: (1) the *rules* established by regulatory agencies; (2) *monitoring and supervision* by official agencies; (3) the *incentive structures* faced by regulatory agencies, consumers and banks; (4) the role of *market discipline* and monitoring; (5) *intervention arrangements* in the event of incipient bank failures; (6) *resolution* arrangements, (7) the role of internal *corporate governance* arrangements within banks, and (8) the *disciplining and accountability arrangements* applied to regulatory agencies. These are discussed in more detail in Llewellyn (2001). A central theme is that, what are often viewed as alternatives, are in fact complements within an overall regulatory strategy.

When a particular regulatory problem emerges, the instinct of a regulator is often to

respond by creating new rules. This implies an incremental approach to regulation by focusing upon the rules component of the regime. There are, however, problems with such an incremental rules-approach as it may blunt the power of the other components of the regime and may, in the process, reduce its overall effectiveness.

The central theme is that the components of the regulatory regime need to be combined in an overall regulatory strategy, and that while all are necessary, none are sufficient. The objective is to optimize a regulatory strategy by combining the components of the regime, bearing in mind negative trade-offs between the different components. Thus, if regulation is badly constructed or taken too far, there may be negative impacts on other components to the extent that the overall effect is diluted. There is always a potential danger that the regulation component, if pressed too far, will blunt other mechanisms and in the process compromise the overall impact of the regime.

We develop the argument for a holistic approach to achieving the objective of financial stability. In essence, the focus is on how the components of a regulatory regime are to be combined to produce an optimum regulatory strategy. This follows on the tradition of Lindgren *et al.* (1996) who emphasize the three key strands of governance: internal to the firm; the discipline of the market, and regulation and supervision by official agencies. Their paradigm is taken further by focusing on a holistic approach to regulation and supervision.

This all amounts to emphasizing a regulatory strategy rather than focusing on regulation *per se*. A central theme is that regulation is an important, but only one, component of a regime designed to achieve the objectives of systemic stability and the safety and soundness of financial institutions. Giving too much emphasis to regulation *per se* has the danger that the importance of the other components are down-played, or even marginalized.

Regulatory strategy is not solely about the rules and supervision of regulatory agencies. The debate about regulation is often too narrow because it focuses almost exclusively on the first component of the regime, namely rules imposed by the regulator. The debate should rather be about how to optimize the combination of the key components of the regime. Strategy should focus on optimizing the overall regulatory regime rather than any one component. This is a difficult and demanding mandate, and to the regulator the more effective approach in the short-run might appear to be imposing more rules. The danger is of thinking in terms of incremental change to regulation, rather than strategically with respect to the overall regime. The objective is to move towards an optimum mix of the various components.

Earlier sections considered the roles of the regulation component, supervision, incentive structures, and *Intervention* and *Resolution* arrangements. The following two sections consider the roles of market discipline and corporate governance.

4.12.1 Market Discipline

One of the components of the *regulatory regime* relates to the arrangements for market discipline on banks. Regulation can never be an alternative to market discipline. On the contrary, market discipline needs to be reinforced within the regime. Monitoring is not

only conducted by official agencies whose specialist task it is. In well-constructed regimes, market practitioners have incentives to monitor the behavior of financial firms. The disciplines imposed by the market can be as powerful as any sanctions imposed by official agencies. However, the disciplining role of the markets (including the inter-bank market) was weak in the recent crisis. This is not new: for instance, Nakaso *et al.* (2000) argue that market discipline did not operate efficiently in Japan due largely to insufficient financial infrastructure (weak accountancy rules, inadequate disclosure, etc.).

Market discipline works through three channels: prices (of, for instance, the cost of debt and equity), quantities (the willingness of investors to supply resources to a bank), and triggers for official supervisory intention. With respect to the last-mentioned, supervisors need to use market signals as one of their information sources upon which to base a case for intervention.

A paradigm for considering the required conditions for market discipline to work effectively is outlined in Llewellyn (2004) which also introduces the concept of Stakeholder Monitors (SHMs): those who have an incentive to monitor the risk-taking and other strategies of banks. Monitoring is a costly activity which means that for there to be incentives for SHMs to undertake it, there needs to be a balance between costs and benefits. This in turn implies that stakeholders need to be at risk of loss if monitoring is not conducted. This may be undermined by, for instance, perceptions that particular banks are regarded as being TBTF, generous deposit protection arrangements, policies (or perceived policies) of forbearance, and bail-outs of one sort or another. If stakeholders believe they will not lose out in the event of a bank's hazardous behavior, they have no incentive to engage in costly monitoring. On the contrary, if they gain when risky behavior is profitable but believe they will not lose in the event of failure, the perceived asymmetric reward structure is a clear disincentive for monitors to seek to limit the risk-taking of banks. This implies that regulatory strategy should focus on what can be done to lower the costs of monitoring (by, for instance, requiring more, relevant and comparable information disclosure by banks) and increasing the benefits (by, for instance, limiting the perception that stakeholders will not lose if they fail to limit banks' risk-taking). Adequate information and disclosure requirements are at the centre of a regime to enhance the potential for market discipline. Such information disclosure needs to relate to all aspects of a bank's risk profile including, for instance, the exposure to off-balance-sheet vehicles, the nature of a bank's total risk exposure, and the quality of collateral.

Market discipline works effectively only on the basis of full and accurate information disclosure and transparency. Good quality, timely and relevant information needs to be available to all market participants and regulators so that asset quality, creditworthiness and the condition of financial institutions can be adequately assessed. The central importance of transparency is emphasised in Borio and Tsatsaronis (2004 and 2006).

Several parties are potentially able to monitor the management of banks and other financial firms: owners, bank depositors and customers, rating agencies, official agencies (e.g. the central bank or other regulatory body), and other banks in the market. In practice, excessive emphasis has been given to official agencies. The danger is that a monopoly monitor is established with many of the standard problems associated with

monopoly power. There may even be adverse incentive effects in that, given that regulatory agencies conduct monitoring and supervision on a delegated basis, the incentive for others to conduct monitoring may be weakened.

In the interests of an effective and efficient regulatory regime, the role of all potential monitors (and notably the market) needs to be strengthened, with greater incentives for other parties to monitor financial firms in parallel with official agencies. The merit of increasing the role of market discipline is that large, well-informed creditors (including other banks) have the resources, expertise, market knowledge, and incentives to conduct monitoring and to impose market discipline. A further advantage of having agents other than official supervisory bodies monitor banks is that it removes the inherent danger of having monitoring and supervision conducted by a monopolist with less than perfect and complete information with the result that inevitably mistakes will be made. It has been noted that “Broader approaches to bank supervision reach beyond the issues of defining capital and accounting standards, and envisage co-opting other market participants by giving them a greater stake in bank survival. This approach increases the likelihood that problems will be detected earlier... [it involves] broadening the number of those who are directly concerned about keeping the banks safe and sound,” (Caprio and Honahan, 1998).

4.12.2 Governance Arrangements

At one level, the crisis has been a failure of corporate governance in banks in that there has been insufficient monitoring of the risk-taking strategies of banks, and internal mechanisms within banks have been inadequate. Part of both elements was a failure to create appropriate internal incentive structures to control risk. While it would be inappropriate for supervisory agencies to intervene directly in remuneration packages within banks, they could have the power to impose tighter regulation (e.g. with respect to capital adequacy) if a judgment is made that internal mechanisms and incentive structures were deemed to create a bias towards excessive risk-taking by managers and traders.

Corporate governance arrangements need to provide for effective monitoring and supervision of the risk-taking profile of banks. These arrangements need to provide for *inter alia* a management structure with clear lines of accountability; independent non-executive directors on the board; independent audit committees; the “four-eyes” principle for important decisions involving the risk profile of the bank; a transparent ownership structure; internal structures that enable the risk profile of the firm to be clear, transparent and managed; and the creation and monitoring of risk analysis and management systems. Some bank ownership structures also produce ineffective corporate governance, and make it comparatively easy for banks to conceal their losses and unsound financial position.

There are several mechanisms within banks’ remuneration packages that could contribute to appropriate incentive structures. For instance, bonuses could be spread over a longer time horizon than the year in which profits were seemingly generated so as to reflect the longer period over which problems emerge. They could also be constructed in a way that focuses more on the contribution of decisions to risk-adjusted rates of return

on equity rather than the volume of business written. Equally, there could be claw-back mechanisms in bonus payments as and when risks materialize over a longer time horizon.

In the UK, Sir David Walker was charged to investigate governance arrangements in banks and to bring forward proposals for reform. The subsequent report (Walker, 2009) made a series of recommendations focused on five areas: the size, composition, and appropriate expertise of Boards of Directors; the functioning of boards, their ability to challenge management, and the evaluation of performance; the role of institutional shareholders; the governance of risk; and remuneration policies of banks. The recommendations encompassed both “external” features of governance (the role of boards, etc) and internal mechanisms and procedures regarding risk management. A central theme is that boards should be more centrally engaged in the risk strategies of banks, and that they should be more active in challenging management.

The overall requirement is that “a firm must establish, implement and maintain remuneration policies, procedures and practices that are consistent with and promote effective risk management”. Several general principles were established including, *inter alia*:

- Remuneration committees should be constructed in such a way that enables them to exercise independent judgment, and have the skills and experience to reach an independent judgment on the suitability of the bank’s remuneration policy, including its implications for risk management.
- The procedures for setting remuneration within a bank should be clear and explicit.
- Assessment of financial performance used to determine bonus payments should be based mainly on the bank’s profits but including an adjustment for current and future risk and also the cost of capital.
- Performance-related remuneration should be based on longer-term performance rather than the immediate profitability of the bank.
- There should also be non-financial performance metrics in determining remuneration including adherence to effective risk management and compliance.
- Performance metrics should always be risk-adjusted.

A total of close on forty specific recommendations that would improve upon governance arrangements were made which included, *inter alia*: that non-executive directors should have appropriate knowledge and understanding of the business of the bank; the time commitment of non-executive directors should be greater than has been the case in the past, and the Board should establish a Board Risk Committee separately from the audit committee.

The Group of Thirty (2009) has also addressed governance issues and has made a set of recommendations consistent with the Walker report including: the need to strengthen Boards of Directors and their expertise with respect to risk management; Boards should be focused on remuneration and risk management policies of a bank; and should ensure that risk management functions are fully independent and adequately resourced.

5 ASSESSMENT

While there are new characteristics in the current financial crisis (largely centered on new banking models) there are also elements which are common to virtually all crises. As in many past crises, the idea that “it is different this time” because of financial innovation has proven to be seriously mis-guided. Some of the lessons to be learned, therefore, are not only new and related to the specific circumstances of the recent crisis, but are common to all past crises.

Several common themes emerge which in varying degrees feature in most financial crises:

- The benefits of financial innovation, and the extent to which new instruments mitigate risk, are frequently over-stated in two respects: an exaggerated view above the extent to which they mitigate particular risks, and a failure to appreciate that, even when particular risks are shifted, they may do so at the expense of creating different risks.
- Crises have often followed periods of de-regulation and increased competitive pressures in the financial system.
- Incentive structures within banks can be perverse and create a bias towards excessive risk taking. It has often been the case that financial innovation leads to increased leverage.
- Periods of collective euphoria tend to induce herd behaviour. Demircuc-Kunt and Detragiache (2005) find that the likelihood of crises increases with the strength and duration of economic booms. Weak internal risk analysis and management systems tend to emerge in periods of collective euphoria.
- Such periods of euphoria also tend to undermine independent monitoring of banks because stakeholder monitors such as rating agencies and even supervisors tend to be subject to the same euphoric mentality.
- Short-termist behavior of banks (with a focus on short-term profitability) is often hazardous.
- Periods of rapid and substantial credit expansion tend to produce an over-expansion of banks’ balance sheets, and in such periods risk analysis and management systems are often weak.
- Similarly, asset price bubbles (often associated with the property market) frequently lead to an over-shooting of sustainable values leading to a subsequent (and sometimes large) correction. Movements of asset prices often overshoot in both directions in that, just as the rise in prices goes too far in the euphoria so, in the short-run at least, do the subsequent and necessary corrections.
- A common feature of banking crises is that risks (and especially credit risks) are under-priced in two respects: risks are under-estimated and, even on this basis, are often under-priced. Furthermore, losses-given-default also tend to be under-estimated.
- Low-probability-high-impact risks are ignored.

While the mix of these characteristics varies from one crisis to another, they represent common features. The seeds of the problem are sown in the previous period of optimism which generate sharp asset growth by banks, an under-pricing of risks, excessive optimism about the risk-shifting properties of financial innovation, and weak supervision where supervisors find it difficult to interfere when the collective climate of opinion is optimistic.

The global banking crisis is likely to be transformational in many dimensions. The banking landscape in the US has already changed radically with the demise of leading independent, stand-alone Investment Banks. It is likely that the traditional model of banking will become more dominant with less reliance on wholesale funding and many of the complex credit-risk shifting instruments discussed in earlier sections. More attention is likely to be given both by banks and their supervisors to how to manage low-probability-high-impact risks. There is also likely to be less reliance on rating agencies.

The financial crisis followed a period of several years where, throughout the world, banks had experienced exceptionally benign market conditions which had the effect of generating rapid and substantial growth of business, enabling banks to diversify their business structures, generating new business models, and ushering a period of exceptionally high profitability. The period 2000 to 2007 was, in many countries, one of the most profitable periods ever for banks in particular and the financial sector in general. However, the fall-out from the most serious financial crisis since the Great Depression is likely to reverse many of these trends and force a re-think of business models.

The traditional text-book model of a bank whereby it makes loans, keeps the asset on the balance sheet, holds capital against the risk, and is unable to externally insure its credit risk seemed to have evaporated with the experience of the early years of this century. Banks managed to do what the traditional text-book model said was not possible.

5.1 THE BABY AND THE BATHWATER

The causes of one of the most serious banking crises ever are complex and multi-layered and the change in the traditional banking model played a central part. Many analysts (and even some regulators) have argued the case for a return to the traditional model. Some go further in developing the case for Narrow Banking. Those in this camp, if they are devotees of Dad's Army (one of British television's favourite sitcoms) would incant: "Come back Captain Mainwaring – all is forgiven".

The argument in this monograph is far less extreme because there are potential advantages to a revival of the securitisation model and to credit risk shifting instruments such as CDSs, etc. This is especially the case if, as argued above, banking is likely to be more constrained in the future. There is nothing inherently flawed in the principle of these techniques and instruments even if they were sometimes used inappropriately in the past, and not fully understood. This is not unusual when new instruments are first introduced. There is a learning process to be undertaken. The skill lies in restoring these markets with necessary safeguards: the "baby should not be thrown away with the bathwater!" The potential efficiency benefits of financial innovation in general (and credit

risk shifting instruments in particular) need to be harnessed albeit in a way that mitigates their potential systemic hazards. There would clearly be a welfare loss if the potential efficiency benefits were to be lost. As always, a balance needs to be struck between the interests of efficiency and stability.

Finance is ultimately about risk and the danger must be avoided of effectively regulating away some of the basic functions of finance and impeding instruments that enable banks and others to manage risk. As much as the inappropriate use of some instruments contributed to the crisis, this should not blind us to their potential efficiency advantages: their contribution to the armoury of banks' risk management techniques, their potential to allocate risk across the financial system as a whole with a more dispersed allocation of risk, and their ability to enable different agents to exploit their comparative advantages as between originating loans and absorbing the concomitant credit risk.

5.2 A FINAL WORD ON REGULATION

The monograph has introduced the concepts of *regulatory regime* and *regulatory strategy*. Eight key components of the regime have been identified: each is important but none alone is sufficient for achieving the objectives of regulation. They are complementary and not alternatives. Regulatory strategy is ultimately about optimizing the outcome of the overall regime rather than any one of the components. Regulators need to consider that, if regulation is badly constructed or taken too far, there may be negative impacts on other components to the extent that the overall effect is diluted.

Effective regulation and supervision of banks and financial institutions has the potential to make a significant contribution to the stability and robustness of a financial system. However, there are limits to what regulation and supervision can achieve in practice. Although regulation is an important part of the *regulatory regime*, it is only a part and the other components are equally important. In the final analysis, there is no viable alternative to placing the main responsibility for risk management and general compliance on the shoulders of the management of financial institutions. Management must not be able to hide behind the cloak of regulation or pretend that, if regulation and supervisory arrangements are in place, this absolves them from their own responsibility. Nothing should ever be seen as taking away the responsibility of supervision of financial firms by shareholders, managers and the markets.

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