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Regulatory Responses to the Financial Sector Crisis

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Introduction

The financial crisis of 2007-2009 prompts a number of important questions for study. What were the causal or contributing factors? What were the propagating mechanisms by which it spread throughout the world financial system? How has it affected the real economy? What are the appropriate macroeconomic responses to deal with those real effects? In what ways, and how well, did financial authorities respond to the financial dislocation? What are the implications for the future of financial regulation?

This paper focuses on the last two of those questions, although the answers clearly depend upon what are perceived to be the answers to (at least) the first two questions about causes and propagation. Thus section 1 provides a (very brief) overview of generally accepted causes and propagation mechanisms. One important factor identified from this overview is the deficiencies in reliable information about financial sector activity, strength, and riskiness, and section 2 thus discusses some of the problems which are apparent and provides a framework for subsequent discussion. Section 3 uses a simple accounting framework to examine the range of responses available to, and used by financial authorities around the globe. Section 4 considers how future financial regulation is likely to be influenced by the recent experience, drawing (in part) upon a range of recent reports by both official and unofficial bodies. Section 5 provides some conclusions.

1. The financial crisis – causes and propagation[1]

The crisis can (at risk of oversimplification) be attributed to four major factors.[2] The first is the growth of financial products and practices which involved high leverage and were sustainable only under conditions of increasing asset prices and investor confidence. Sub prime mortgage lending in the US is the obvious example which triggered the crisis, and clearly illustrates a root cause in the form of inadequate governance, accountability and remuneration practices within financial institutions. But the problem was more pervasive due to the second factor of uncontrolled (and not well recognized) liquidity creation. Financial engineering has prompted the growth of liquidity creation techniques based around collateralized lending (such as repos,

[1] Parts of this section (and some later material) are adapted from an "op-ed" piece contributed by the author to the electronic business news site *Business Spectator*. ("After the Storm" by Kevin Davis, Business Spectator, 29/11/2008 http://www.businessspectator.com.au/bs.nsf/Article/After-the-deluge-LS2YH?OpenDocument&src=srch).

[2] Brunnermeier (2009) provides a more detailed overview of causes, propagation, and a time-line of the financial crisis up to the start of 2009.

securities lending, margin lending), where active securities markets for the collateral meant that lenders did not themselves feel exposed to significant liquidity or counterparty risk. Although asset price inflation was high Central Banks, focused on consumer price inflation targets and real sector activity, did not respond by attempting to restrict liquidity and "pricking the bubble". The growth in international liquidity was aided by global current account imbalances and the willingness of surplus countries to invest in financial assets being created in deficit countries.

A third factor was the growth of the, largely unregulated, "shadow banking" sector, involving investment banks, hedge funds, SIVs, conduits etc., and the construction of complex financial instruments and techniques which saw risk spread throughout the global financial sector and significant interdependencies created. Deficiencies in financial regulation contributed to this as banks adopted funding mechanisms and took on asset and contingent liability positions which exposed both themselves and (through the interdependencies created) the financial system to significant risks. Finally, there was an absence of public information about the level and distribution of risk in the financial system. [3] Inability to assess the risk positions of potential counterparties meant that a crisis induced response for many institutions was simply to cease extending credit – a classic adverse-selection-induced credit rationing outcome.

2. Financial Engineering and Financial Institution Accounting

There has been much debate about the appropriateness of applying mark to market and market to model accounting techniques to balance sheets and income statements of financial institutions. Such approaches may provide a better estimate of the liquidation value of the organization than approaches based on private valuations of assets for which markets are disrupted. However where institutions do not plan to, and do not have to sell such assets, and if the private information of the asset holder justifies the valuation they ascribe to the asset, market value accounting may lead to misstatement of the going concern value of the organization. This can reduce stakeholder confidence, and induce circumstances in which forced asset sales mean that the liquidation value becomes relevant.

[3] Gorton (2008) links the onset of the sub prime crisis to the introduction of the ABX indices in 2006 which provided the first aggregate, market based, estimates of sub prime linked securities values.

This problem of interdependency between accounting treatment and actual value arises because of the liquidity creation function of financial institutions. If claims on the institution were of the same or greater maturity than its assets, the market value of those claims (equity, debt, deposits) would decline to greater or lesser degree depending on whether the lower market value of assets was perceived to be a signal of a decline in their ultimate realizable value at maturity. But where the maturity of some of those claims is less than that of the assets, investors may react to lower reported mark to market prices by withdrawing funds, necessitating asset sales at current (low) market prices and aggravating the position.

A more general problem is the unsuitability of standard accounting techniques for dealing with sophisticated financial instruments and techniques. In particular, much of the business of modern financial institutions involves the creation of contingent claims, as well as a range of activities which involve linking together of items on both sides of the balance sheet. Traditional accounting has difficulty dealing with these complex arrangements.

Consider first the situation of contingent claims such as derivatives. Current international accounting practice records these in the balance sheet as a fair value figure. For example, the ANZ Bank March 2009 half yearly financial statement[4] reports derivative assets and liabilities of $57.445 bill and $49.439 bill respectively. But, in the notes to the accounts it can be found that the notional principal value of derivative transactions is $1801.5 bill.

The difference is easily explained by reference to the accounting treatment of an interest rate swap with a notional principal of $100. At inception, the fair value is $0, and if the bank is the fixed rate payer (floating rate receiver) and interest rates increase, the fair value might increase to (say) $1, which is the amount reported. But another perception on this transaction is that it was equivalent to issuing a $100 fixed rate note to the other party (whose fair value has declined to $99 when interest rates increased) and purchasing a $100 floating rate note from that same party. Perhaps it may be preferable to report the equivalent underlying amounts (of a $99 liability and a $100 asset) rather than the net $1 fair value?

The answer to this question depends upon the purpose of the accounts. In terms of providing a true and fair view of the value of the entity, both are equally as

[4] http://www.anz.com.au/about-us/shareholders/results-announcements/

good (or bad!) so that the logic for the choice needs to be found elsewhere. One answer might be in terms of the information they provide to the user on the risk associated with the institution. In this regard the two alternatives provide different perspectives on the risks associated with leverage. In particular, use of the net fair value approach may better reflect the credit risk aspects of the transaction, while a "gross" approach which records both replicating legs of the transaction, may better reflect its market (interest rate) risk.

There is also potentially differential treatment accorded to assets which are essentially functionally equivalent. Appendix 1 provides an example by way of comparison of the treatment of assets sold under repurchase agreements with an FRA. For repos, the securities sold are still recorded as an asset and a counterparty liability also recorded, whereas the FRA is recorded at fair value. Alternatively, US investment banks have accounted for securities financed by repo transactions by a liability entry "Securities sold under agreements to repurchase" matched by an asset entry of "cash" (King, 2008).

There is, perhaps, no easy resolution of the difficulties posed by modern financial engineering for accounting systems. But that underscores two major problems faced by financial regulators and regulatory approaches such as Basel 2. First, the lynchpin of the Basel 2 prudential regulation approach is capital, which is essentially a balance sheet residual and whose measurement thus crucially depends upon the validity of measurement of other assets, liabilities and contingent claims. Second, the ability of outsiders (or even senior management) to accurately interpret the accounts and verify the valuations involved is extremely dubious. Regulatory approaches which rely heavily on disclosure, transparency and market discipline face significant challenges. Accounting information may be of limited value, although disclosure about policies and practices may assist outsiders to better assess risk management by the organization – although there is little evidence on that score available.

3. Financial Policy Responses to the Crisis

To understand policy responses to the financial crisis, it is helpful to commence with a hypothetical "T-account" (balance sheet) of an individual financial institution, albeit recognising the problems with financial institution accounting which have been discussed. Table 1 presents such a "T-account" in which the assets of the institution

are divided into three categories based on realizable value relative to historical cost. "Untarnished" assets (A_1) comprises loans and securities about which there have been no substantive declines in, and no substantive concerns about, "true" value. While some may be marketable others, such as loans, may not be realizable until maturity. "Potentially tarnished" assets (A_2) are those for which immediately realizable value is substantially less than "true" value, although the institution anticipates holding them sufficiently long to realize the "true" value. This includes marketable securities where forced sale will involve significant losses due to market disruption, and loans which if called early (or facilities not rolled over), will involve some default losses. "Tarnished" assets (A_3) are those where the true value is significantly below historical cost, and where current market values (if available) provide little guidance to "true" values due to pervasive information deficiencies.

On the liability side of the T-account are identified deposits (D), wholesale debt market borrowings (B), Subordinated debt, preference shares and hybrid securities (P) which may count as regulatory capital, and shareholders equity (E). The quantum of recorded shareholders equity (E) is derived as a residual from the difference between the recorded value of assets and other liabilities (ie $E = A_1 + A_2 + A_3 - D - B - P$), and thus depends crucially on the accounting treatment of those items.

Assets		**Liabilities**	
Untarnished	A_1	Deposits	D
Potentially tarnished	A_2	Wholesale funding	B
Tarnished (impaired,"toxic")	A_3	Preference shares	P
		Shareholders equity	E

TABLE 1: "T-account" of a hypothetical financial institution

The problems, at the individual financial institution level, induced by the financial crisis can be viewed within this simple framework as involving (a) situations where shareholders equity is negative ($E<0$) or it is perceived that more reliable recording of asset values would lead to that outcome, and (b) concerns that outflows of liabilities (depositor withdrawals, inability to roll-over wholesale funding) in excess of marketable assets in the A_1 category would force liquidation of assets in the A_2 category creating losses and leading to negative shareholders equity.

More generally, regulators have faced system-wide issues, including the "freezing" of financial markets (including for the assets and liabilities in Table 1) in which financial institutions participate, spill-over effects (contagion), and equity market collapses. As well as direct effects on financial institution "T-accounts" (with loss-making equity investments falling into the A_3 category), equity market collapses have increased the cost of equity capital, and at the individual financial institution level can induce uncertainty among other liability holders (who interpret equity price movements as signals of the institution's risk of failure) about the true value of their investments, with potential consequences of liability outflows.

Faced with this situation, what alternative actions are available to financial authorities, and what has been done? Table 2 provides a list of possible actions, which can be categorized within the "T-account" structure outlined above. Around the globe, virtually all of these approaches have been tried, with financial authorities in some countries using many of them in a "belts and braces" response. Most of these focus primarily on offsetting the immediate effects of the crisis rather than addressing the underlying causal factors which are seen to be requiring of longer-term, more considered, actions.

First, there have been actions to shore up public confidence in national banking sectors, involving broad extensions of deposit insurance, guarantees, and government equity injections into or full or partial nationalizations of banks (items xii, xiii, xiv in Table 2). Requiring financial institutions to raise more equity capital is another response (item xi). Government guarantees of minimum values for particular asset portfolios of troubled institutions, or purchase of "toxic" assets to construct a "good bank – bad bank" structure (items iv, v, vi) also fit into this category, as (arguably) do government assistance to troubled borrowers from banks and provision of credit guarantees for new loans made by banks (items vii and viii).

Second, there have been actions to unfreeze and/or restore liquidity to asset markets and financial institutions, via widening of acceptable collateral in Central Bank repurchase agreements, and Government purchases of particular types of assets including mortgage backed securities (items i,ii,iii). Central Banks have also increased aggregate liquidity through their open market operations to cater for the fear- induced increase in demand for liquidity and to lower official interest rates to offset adverse effects on the real economy arising from higher credit spreads on private sector lending (item x).

A third response has been the “bail out” of systemically important non-bank financial institutions such as investment banks and insurance companies in the US, and commercial banks worldwide, through arranged mergers (item xviii) or via government provision of equity, guarantees etc. The interdependencies within the financial system have been reflected in the role of investment banks as prime brokers for hedge funds, significant counterparties in derivatives transactions, and providers of credit through collateralized lending techniques. Ultimately, the disruption to asset markets from disorderly failure (item xxii) was deemed (with the aid of hindsight from the Lehman example) to be unacceptable.

A fourth response has been the introduction of new, temporary, regulations on financial markets and institutions. Particularly notable here has been the introduction of temporary bans on short selling of (some or all) equities on national stock exchanges, driven by concerns about destabilizing speculation (item xxi). Allowing institutions, such as unlisted unit trusts/mutual funds or banks (the freezing of deposits in Icelandic bank branches in the UK in October 2008 is one example) to freeze redemptions (item xv) also fits into this category.

Undoubtedly, there are also instances of forbearance (item xx), while modifications to accounting techniques (xv) have also been permitted.

These responses (and the crisis itself) have had significant short term, and potentially lasting, impacts on the competitive position of various financial institutions. Non-bank investment vehicles (finance companies, managed funds etc) have suffered outflows, partly due to nervous investors being attracted to Government guaranteed deposits, but also reflecting the desire to avoid further losses on risky investments in such a bear market environment. Hedge funds (and others) using trading strategies based on taking short positions have found their business models undermined by bans on short selling.

(i)	Provide/expand official facilities (repos, discount window, lender of last resort) for institutions to borrow against the security of assets in the A_2 category, thereby avoiding forced sales at depressed prices.
(ii)	Official purchases of assets in the A_1 or A_2 categories at "non-fire-sale" prices.
(iii)	Introduce securities lending arrangements enabling institutions to lend A_2 assets in exchange for A_1 assets which can be sold to meet temporary liquidity needs
(iv)	Purchases of A_3 assets at "fair" prices to be subsequently managed by some official entity, removing toxic assets and creating a "good" bank.
(v)	Subsidise/partner with private sector purchasers of A_3 assets to remove toxic assets and create a "good" bank
(vi)	Provide asset value insurance over A_3 assets, protecting the institution against the effects of extreme reductions in their realizable value
(vii)	Provide assistance to borrowers/issuers of securities (sub-prime mortgagees, car producers) in the A_3 category which increases the fair/market value of those assets.
(viii)	Provide credit guarantees on new commercial loans made by financial institutions (although this is primarily focused on expanding economic activity)
(ix)	Encourage development of exchange traded markets for securities and derivatives to improve valuation and reduce counterparty risk (although this does little to resolve problems associated with existing positions in heterogeneous, non-standard, securities and derivatives)
(x)	Use monetary policy to lower interest rates and increase the market value of fixed rate securities (and net wealth increases for those institutions with positive duration gap – assets of longer duration than liabilities)
(xi)	Require shareholders to contribute more equity capital
(xii)	Provide Government funding by way of preference share capital or hybrid securities
(xiii)	Provide Government funding by way of equity capital (partial or full nationalization)
(xiv)	Guarantee deposits up to some level, and possibly other debt securities newly and/or previously issued by the institution (for a fee).
(xv)	Allow institutions to adopt accounting techniques which disguise the possible decline in equity value
(xvi)	Freeze, for some period, redemptions by depositors and other liability holders ("bank holidays")
(xvii)	Impose "haircuts" on depositors/creditors (partial, possibly reversible subject to institution solvency, conversion of claim to an equity stake)
(xviii)	Arrange a merger with a stronger institution (which ideally places a high value on the franchise acquired), by paying compensation for the negative NPV nature of the transaction
(xix)	Impose restrictions on short-selling to prevent negative equity price movements weakening confidence in the institution
(xx)	Operate a policy of forbearance, in the hope that the institution will recover
(xxi)	Allow failure of the institution

TABLE 2: Financial Crisis – Regulatory Responses

In choosing amongst this portfolio of possible policy actions, a number of criteria are relevant. First, and perhaps foremost, is the effectiveness of the action in resolving the underlying problem(s). In this regard, determining whether the fundamental issue is one of default risk or of liquidity disruption is important, and there have been divergent views on this. Second, because most of these actions involve potential wealth transfers (between taxpayers and stakeholders of the financial institutions, with the direction depending on the prices involved in the transactions), an analysis of the desirability and fairness of those transfers is required.[5] Third, some actions may be politically more palatable or feasible than others (perhaps because their cost to the taxpayer may be less obvious). Fourth, what conditions (implicit fees in addition to explicit fees) should be imposed on institutions receiving assistance from these actions. (Examples include undertakings to lend, developing beneficial work-out arrangements for particular borrowers such as sub-prime mortgagees, restrictions on dividend policy, restrictions on executive remuneration, voting rights).

Fifth, there is a degree of substitutability between many of these actions, such that implementing some may make others redundant. For example, in theory at least, government provided insurance of bank asset portfolio values should make guarantees of bank liabilities redundant, and are an alternative to purchasing "toxic" assets to establish a "bad bank" (bridge bank, asset management company) structure separate from the residual "good bank". Sixth, it is important to understand the likely impact of these actions on the competitive position (both short term, and potentially lasting) of various financial institutions. Seventh, consideration should be given to relative ease of exit from the positions established by these actions when the crisis situation has diminished.

With policy responses having been made "on the run" there is much analysis and evaluation required against these criteria to ensure better future crisis response policies.

What immediate lessons can be drawn from these crisis responses and their effects about perceived failings in extant regulation? A few examples include:

(1) Central Bank liquidity support schemes need to be carefully designed such that potential users do not run the risk of being viewed as having high default risk, and thus are unwilling users.

[5] The European Central Bank has provided guidance on pricing of guarantees, recapitalizations, and asset support schemes (ECB, 2008a, 2008b, 2009).

(2) Financial regulators require explicit legislative powers which enable rapid resolution of failing financial institutions.

(3) Deposit Insurance with low levels of coverage will not prevent systemic crises.

(4) Government threats of caveat emptor for creditors of large systemically important financial institutions are not credible.

(5) Prudential regulation has not adequately incorporated liquidity risk considerations.

(6) International collaboration requires further enhancement for both the regulation of multinational financial institutions and their resolution when in difficulty.

It is to be expected that these lessons would be reflected in thinking about future changes to regulation.

4. Financial Regulation Post-Crisis

There have been a range of official and unofficial reports produced over the past year setting out principles and suggestions for possible reform of financial regulation. These include the de Larosière Report (European Commission, 2009), the Turner Report (FSA, 2009), the Volcker Report (G30, 2009), the February 2009 declaration of G20 Prime Ministers (G20, 2009), the Financial Stability Forum report (FSF, 2009), an IMF report (IMF, 2009), and the private sector reports of the International Institute of Finance (IIF, 2008) and the Geneva Report by a group of prominent economists (Geneva, 2009). Numerous other individuals and organizations have also produced recommendations and suggestions. Drawing on those reports and analysis of perceived failures in the extant system, a number of changes in the financial sector and in policy approaches can be anticipated.[6]

Notably, while most of these reports envisage increased (or improved) government regulation and supervision, consistent with media speculation about a crisis-induced shift in conventional wisdom along the government versus markets spectrum, there is little evidence of a rethinking of the basic approach to regulation. The Geneva Report is the only one of those listed above to address the rationale for regulation, and does not deviate from the traditional capitalist "market failure"

[6] Demigurc-Kunt and Serven (2009) caution against abandoning some of the "sacred cows" of financial regulation, noting that "[t]he challenge of financial sector policies is to align private incentives with public interest without taxing or subsidizing private risk-taking".

perspective – identifying inadequate competition, imperfect information, and externalities as the rationales for government intervention – rather than suggesting a role in the financial sector for government per se. And while a number of Governments have acquired significant ownership stakes in financial firms as a result of the crisis, there is little evidence of a desire for this to be a long-lasting state of affairs.

Crisis Response Planning

As the "on-the-run" development of policy responses to the unfolding of the crisis illustrates, financial regulators and governments around the globe were caught largely unprepared for dealing with a financial crisis. While there had been substantial attention paid to prudential regulation over the past decade, and production of regular financial stability reports by Central Banks had become commonplace, plans for dealing with a crisis were less well established. Information deficiencies, absence of authoritative early warning systems, inadequate legal crisis response powers for regulators, coordination difficulties between regulatory bodies both within national boundaries and internationally, are factors contributing to this problem. With growing acceptance of the view that financial institutions and markets are inherently unstable due to their role of liquidity creation (reflecting theoretical insights such as in Diamond and Dybvig, 1983; Allen and Gale, 2007; Brunnermeier and Pedersen, 2009), and evidence that financial crises are relatively common (Reinhart and Rogoff, 2008), the importance of crisis planning is increasingly accepted. As well as leading to enhanced roles for international bodies such as the IMF and the Financial Stability Forum in identifying and advising on risks, cross border agreement on how national regulators will deal with troubled multinational financial institutions in a time of crisis is required.

Monetary and Macro-Prudential Policy

It is likely that Central Banks will be tasked with focusing also on asset price inflation as a policy goal, rather than the previous, failed, approach of attempting to ensure a "soft landing" from the bursting of speculative bubbles. Also, to have greater effects on financial markets, new instruments of policy beyond short-term interest rate targets will be needed. "Macro-prudential" policy, in which attention is paid to the aggregate implications of financial firm risk taking for financial stability rather than the traditional (micro) prudential approach focusing on the solvency of individual

institutions, is on the agenda. Variable capital requirements for prudentially regulated institutions, reflecting economic and financial conditions, are a likely policy tool. Other policy instruments, such as variable maximum loan to valuation ratios for mortgage loans and controls on margining requirements and "haircuts" for collateralized lending, have also been suggested.

Accounting and Valuation

Macro-prudential policy may also include changes to allowable provisioning for losses, involving building up of loss reserves in good times and consequent smoothing of reported profits. Combined with concerns about the impact of mark to market (or model) accounting requirements on financial institutions in this period of market disruption, recently agreed international accounting standards are subject to scrutiny. Relevant issues include the appropriateness of marking to market requirements for "not-for-sale" assets, creation of "valuation reserves" for hard-to-value assets, and dynamic loan-loss provisioning.

Depositor Protection

Deposit insurance arrangements will be subject to review following the crisis-induced introduction of blanket guarantees and/or increases in deposit insurance coverage levels. The crisis experience has illustrated the ineffectiveness of deposit insurance set at low levels of coverage in preventing "runs". The crisis response has also undermined the argument that Governments will not provide implicit insurance for all depositors. Finding ways to remove perceptions of implicit guarantees (or offsetting their moral hazard and competitive balance implications) is a major task, although a potential solution may exist in the way that blanket guarantees have evolved in some countries. Specifically, provision of an "opt-in" facility for large depositors at any bank to buy government provided insurance as a fee charged to their account, would provide robustness to a *caveat emptor* approach to treatment of large depositors electing not to take out such insurance. Automatic deposit insurance for "small" deposits below some cap is bound to remain the norm. While determining the appropriate size of cap is an issue, the availability of an option to insure amounts above the cap would make this a less pressing problem.

Restricting Bank Activities

The desirability of a "safety haven" for unsophisticated investors is generally accepted, but recent events have reinforced the perception of "too big/too important to fail" considerations extending perceived protection to a vastly expanded range of financial products and institutions. Paradoxically, investment banking activities are being increasingly linked with traditional banking, worsening this problem. While holding company structures can notionally separate different types of activities, the potential for allowing failure of one part of the structure (such as the investment banking arm) while maintaining confidence in the rest (including commercial banking) seems limited.

It is becoming increasingly common for commentators to make a distinction between the "utility" business of banking (providing basic savings, loan and transactions services) and other trading-related activities (the "casino" business of investment banking), the risks of which may be harder to identify and which can threaten the stability of the "utility business". There is the possibility of prudential regulation being structured to provide incentives for some form of structural separation of these activities. While it may be argued that this would inhibit financial sector efficiency, the evidence for the existence of significant economies of scale or scope in large financial institutions, sufficient to offset the distortions arising from implicit guarantees, is weak.

Remuneration Policies

Many commentators have argued that a root cause of the financial crisis was unsuitable remuneration policies which gave adverse incentives for excessive risk taking and/or inadequate due diligence. Since the outcomes of many financial decisions take lengthy periods to be realised, the use of remuneration structures which reward short term performance (and are inadequately adjusted for risk and asymmetric in treatment of profits and losses), are clearly inappropriate. Regulatory control of remuneration structures is impossible, but linking regulatory imposts (such as capital requirements) to remuneration structure design features may be a way of inhibiting use of unsuitable structures.

Governance

Governance failings in financial institutions, particularly involving oversight and appropriate control of risk management and remuneration policies, has been widely

seen as a key contributor to the crisis. While improved governance is generally seen as critical, there is limited guidance available on what role supervisors and regulators can play in achieving this, other than monitoring quality of appointments, board structures, and processes.

Capital Requirements and Basel II

The recently introduced Basel II capital accord is already undergoing review. Although some of the regulatory failings exposed by the sub prime crisis can be traced to inadequacies in the original Basel accord (such as allowing banks to provide 364 day liquidity facilities to their SIVs and conduits without capital requirement implications), there are many new banking practices not well covered by the accord. Indeed, the foundations of the new accord have been severely shaken. Bank internal risk models have not performed well – raising questions about the merits of relying on them for determination of capital requirements as done in the advanced approach of Basel II. Similarly, the credibility of ratings agencies has suffered, also raising questions about the fundamental role of ratings in determining capital requirements under the standardized approach of Basel II. Value at Risk techniques which explicitly underpin capital requirements for market risk have been shown to have significant weaknesses due to instability of asset return correlation structures.

There is growing support for use of some "simple" non-risk weighted capital requirement as an adjunct to the Basel II requirements.

Liquidity Management and Requirements

Shortcomings in liquidity risk management have been fundamental to the evolution of the crisis, because of the use of funding structures and asset holdings based on assumptions that capital markets could be readily accessed without significant price disruptions. Falls in the market price of assets financed by collateralized borrowings can lead to margin calls requiring liquidation of other assets or sales into a declining market. Unwillingness of investors to roll over short term paper which is funding longer term assets, also creates significant liquidity problems. More generally, liquidity management via adequate holdings of realizable liquid assets has long been replaced by primary reliance on "liability management" involving borrowings in short term wholesale (interbank) markets to meet liquidity needs. The crisis exposed risks

associated with this style of liquidity management due to freezing-up of those markets.

Greater attention is already being paid to liquidity risk within the Basel II framework, with the possibility that minimum capital requirements may be adjusted for individual institutions which depart significantly from acceptable "norms" of liquidity risk management.

System Liquidity Management and Support Arrangements

The expanded range of private sector securities accepted as collateral in repos by Central Banks has increased the liquidity of such assets. The use of securities lending by Central Banks (whereby government securities are lent to the private sector in exchange for private sector securities) is also another innovation likely to continue. Term lending and longer dated repos have also been used.

The terms and conditions applying to accounts at Central Banks is also an issue warranting attention, with the interest rate paid on credit balances relative to target cash rates a potential policy instrument not generally used to date.

Scope of Regulation

To what extent the "shadow banking sector" will be subject to regulation is controversial. But it is certain that it will be subject to greater reporting requirements to ensure that in future policy makers and market participants will have better information on which to base decisions. Balancing the requirements between protecting commercially valuable private information and generating socially valuable aggregate information is challenging – but enforced information disclosure to regulatory authorities by systemically important institutions is almost certain. Such institutions are also likely to face prudential oversight.

Similarly there is likely to be greater regulation of financial products and services, including of investment advice.

The Allocation of Regulatory Responsibilities

Coordination failures between regulatory agencies within countries, and different levels of effectiveness, have been a characteristic of the crisis. There is a wide variety of regulatory structures internationally with various responsibilities allocated between various permutations of Central Banks, Prudential Regulators, Market Regulators, and

Deposit Insurers. While there is no unique regulatory structure, the need for close coordination when products, institutions, and risks span differential regulatory domains suggests that there will be considerable attention paid to this topic in coming years.

International Collaboration

High on the agenda of regulatory initiatives is the need to improve arrangements for international collaboration and cooperation. National regulators are faced with the problem of dealing with multinational banks. Colleges of Supervisors for large multinational institutions will be further developed. Improved arrangements for resolution of internationally operating institutions are required as are agreements on international sharing of deposit insurance liabilities when such institutions fail. A likelihood that host countries will want to play a greater role in supervising the activities of multinational institutions in their country, and ensure that such institutions are adequately capitalized locally, is likely to lead to greater use of international subsidiaries rather than branches.

Over the Counter Markets

Greater public information is generally available when financial claims are traded in organized exchanges rather than over-the counter markets involving bilateral trades where only the participants are aware of prices and quantities. Reporting requirements for OTC trades can rectify that, but it may be expected that organized exchanges will experience growth. Also on the agenda is the development of Central Clearing Counterparty systems for derivative products, particularly Credit Default Swaps, together with interest in encouraging greater standardization of products.

A further rationale for the growth of organized exchanges arises from the inherent faults in the business models of a variety of unlisted investment vehicles. Unlisted managed funds, particularly property and mortgage trusts, claim to offer investors liquidity, via redemption facilities, but hold illiquid assets which can lead to a need to freeze redemptions when substantial outflows occur. Similarly, investors in finance company debentures and a range of other investments rely on the issuer/manager determination of exit prices prior to maturity. Not only do investors face the risk of unfavourable pricing in those circumstances, but there is no mechanism for aggregation and expression of public information about the value of

the underlying assets – as occurs (albeit imperfectly) when securities are traded on an organized exchange.

At the same time, organized exchanges appear to be subject to excessive short term trading and potentially destabilizing speculation, reflecting the dramatically reduced trading costs due to modern technology. While it is desirable for valuable private information about economic fundamentals to be incorporated into asset prices by the actions of traders, modern asset markets have, arguably, become much like casinos. Much trading appears to be based on perceptions of likely short term changes in market psychology or mood or on profit opportunities arising from liquidity needs forcing other participants to unwind current positions (such as short selling based on perceptions that price points leading to margin calls will be reached).

Reflecting these concerns, there may be renewed interest in some variant of the "Tobin Tax", a proposal by Nobel prize-winning economist James Tobin originally suggested for application to foreign exchange markets. The proposal (often described as "throwing sand in the wheels") envisages some small tax rate (eg a stamp duty) on asset transactions which penalizes, and thus inhibits, short term trading, but has little effect on long term position taking.

5. Conclusion

Increased attention is also likely to be given to the inherent agency problems in the financial sector. The sub prime crisis reflects, at least in part, the lack of accountability and wrong incentives for mortgage originators and securitisers who were not exposed to the risk associated with mortgages and structured products created and on-sold.[7] Many investors were sold products with unsuitable risk characteristics by financial product sellers and financial advisers with remuneration structures linked to sales volume, which generated conflicts of interest.

Focusing solely on the sellers of financial products, however, only addresses part of the problem. There is a fundamental disjuncture between the sophistication of financial products created and the competence of both investors and borrowers to fully understand the risk and return (or cost) characteristics. And the lack of financial

[7] While it has transpired that many financial institutions retained some exposures to the financial products they created, complexity of those institutions and resulting agency, governance and communications problems suggest that it is not clear that senior decision makers were aware of the full extent of that risk bearing.

sophistication applies at both retail and wholesale level! Finding mechanisms for inducing (or preventing) the financially unsophisticated from allowing greed to outweigh common sense is indeed challenging. Compulsion, prohibitions, specification of default options, taxes and subsidies, are tactics which warrant attention (and some of which have been used in dealing with retirement financing).

Going forward, the financial system is bound to be a more subdued place for at least a few years. The excesses of financial engineering will not return for a while, although relatively simple financial innovations, such as basic securitization techniques, should eventually recover. But even here, there is the potential for improvements on the basic model, such as use of the "covered bond" approach common in Europe, where the securities issued remain a liability of the bank originating the mortgages. And quickly winding down the role of governments in purchasing private sector securities such as mortgage backed securities (at prices that cannot be assessed as appropriate for the risk involved, given the current absence of a private market) is an important agenda item.

But probably the major dilemma lies in the likelihood of increased concentration and inter-linkages in the financial sector. Major banking groups dominate not just banking, but also funds management, financial advising and planning, and securities businesses. Most of the other participants in the financial sector are dependent upon them for at least some services crucial to their business. Payments services, prime brokerage, and stand by liquidity facilities are some examples.

In these circumstances, as has so recently been demonstrated, the political reality is that Governments are simply not able to adopt a *caveat emptor* posture and allow such institutions to fail. And permitting a relatively small number of such institutions to dominate the entire financial sector brings with it the problems of concentration of power, inadequate competition, and excessive profits.

There is no hard evidence that a concentrated banking sector is more conducive to financial stability. And there is no good evidence as to whether a concentrated banking sector leads to adequate or inadequate competition in financial services. Financial regulation undoubtedly is a major determinant of the shape and structure of the financial system. Finding the appropriate regulatory structure and framework for the financial sector which generates financial stability, adequate

competition, and promotes value adding financial innovation is the challenge that lies ahead.

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Appendix 1: Accounting Treatment of Functionally Equivalent Positions

Consider the example set out in the Table below. The upper section shows the case flows associated with a two period bill being purchased by the institution and financed by a one period repo (sale of the bill and agreement to repurchase at an agreed price in one period). If is assumed, for simplicity and because the focus is on the accounting treatment prior to date 1, that the bill is sold at date 1 after completion of the repo. The lower section shows the cash flows if the institution sells a 1x2 FRA on the same security. Note that apart from the scaling difference (ie the size of the repo relative to the asset value), the transactions involve exactly the same cash flows. But between dates 0 and 1, the repo will enter the accounts as involving both an asset and liability, whereas the FRA is recorded at the much lower net fair value.

Action	**Cash Flows**	
	Date 0	Date 1
Repo financed purchase		
Purchase of 2 period bill	$-1/(1+r_{02})^2$	$+1/(1+r_{12})$
One period repo	$1/(1+r_{01})$	-1
Memo item: net cash flows if repo scaled by $(1+r_{01})/(1+r_{02})^2$	0	$1/(1+r_{12})-(1+r_{01})/(1+r_{02})^2$
Sale of 1x2 FRA	0	$1/(1+r_{12}) - (1+r_{01})/(1+r_{02})^2$