

# Change and Constancy in the Financial System: Implications for Financial Distress and Policy<sup>1</sup>

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## 1. Introduction

Over the past three decades, the financial system has been going through a historical phase of major structural change. And far from slowing down, the pace of change seems to be accelerating. The joint influence of financial liberalisation, breakthroughs in financial know-how and advances in information technology has ushered in an era of extraordinary innovation – an era that may well go down in history as another ‘financial revolution’. Heavily controlled, segmented and ‘sleepy’ domestic financial systems have given way to a lightly regulated, open and vibrant global financial system.

This revolution has been for the good. Financial liberalisation and innovation are critical for a better allocation of resources and long-term growth; the serious costs of financial repression around the world have been abundantly documented. And these forces can justifiably take some of the credit for the so-called ‘Great Moderation’, the current extended phase of low output volatility and low inflation across much of the world.

At the same time, this revolution, as for all its predecessors, has not been without costs. Like rare storms interrupting long periods of tranquillity, episodes of financial distress, sometimes with serious macroeconomic costs, have emerged (Bordo *et al* 2001; Hoggarth and Saporta 2001). The past decade has indeed been a period of tranquillity. Not least, despite a world-wide boom and bust in equity prices in the late 1990s–early 2000s, the financial system has proved robust and remarkably resilient. However, the continuation of this phase should not be taken for granted.

The key policy challenge is to maximise the benefits of financial liberalisation and innovation while minimising their potential costs. What does this mean for the authorities with responsibilities for financial stability? By analogy with risk management practices at the level of individual institutions, heuristically the task can be thought of as limiting the expected output costs of financial distress, as determined by the likelihood of their occurrence multiplied by the loss given their

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1. This paper was drafted before the market turbulence in August that followed strains in the US sub-prime market as described in BIS (2007b). It was not updated to take those events explicitly into account. I would like to thank Philippe Hainaut for excellent statistical assistance and Bill White, Frank Packer and Kostas Tsatsaronis for their comments. The views expressed are my own and do not necessarily reflect those of the Bank for International Settlements.

occurrence. And it means doing so in such a way as to not undermine the benefits of liberalisation and innovation for economic growth.

This is clearly a tall order. In particular, it requires a lot of judgment about trade-offs that are very hard to specify, given the state of our understanding of the behaviour of the financial system and of its interaction with the macroeconomy. This judgment is particularly hard to make at a time when the financial system is undergoing such profound structural change.

Against this background, the objective of this paper is twofold. First, it is to explore how the financial revolution under way might be altering the dynamics of financial distress.<sup>2</sup> The main focus here is on the past decade, although clearly the period largely saw the strengthening of trends that had started much earlier, and on advanced industrialised countries, where these trends have been more visible. Second, it is to identify the key challenges for policy-makers with responsibilities for financial stability and to suggest broad guidelines for policy action.

This objective is both ambitious and limited at the same time. It is ambitious because some of the issues raised are quite controversial. It is limited because the paper does not seek to make an overall judgment on whether the changes in the financial system have, on balance, increased or reduced the expected losses associated with financial distress.

One basic thesis underlies the paper. Undoubtedly, the major structural changes experienced by the financial system do have implications for the dynamics of financial distress and for the design of policy. However, despite these changes, some fundamental characteristics have not changed. And it is precisely these characteristics – what has not changed – that hold the key to the dynamics of financial instability and hence to the appropriate policy responses to it. These characteristics relate to the basic nature of financial relationships, to risk perceptions and incentives and to powerful feedback mechanisms that operate both within the financial system and between the financial system and the macroeconomy. They jointly imply that the primary cause of financial instability has always been, and will continue to be, overextension in risk-taking and balance sheets; that is, the occasional build-up of financial imbalances that at some point unwind, inflicting damage on the economy.

This view has implications for policy. The objective would be to anchor the policy response on the more enduring characteristics of the dynamics of financial instability while at the same time tailoring it to the changing profile of the financial

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2. Of course, the term ‘financial distress’ is ambiguous. Roughly speaking, what is meant here are situations in which financial institutions fail or nearly fail and/or markets seize up, leading to broader systemic disruptions with potential material costs for the real economy. The definition is intended to capture banking crises (such as those in the Nordic countries, Japan and Asia in the late 1980s and in the 1990s) as well as episodes of serious market strains, such as those surrounding the Long Term Capital Management (LTCM) failure in 1998. It would exclude large fluctuations in asset prices and/or major retrenchment of spending by households and corporations to rebuild balance sheets unless accompanied by the other symptoms. Admittedly, however, these phenomena could, by themselves, have serious macroeconomic implications and tend to be driven by similar factors to those that underlie the dynamics of financial distress. Their policy implications would be similar.

system. Using an analogy with policy towards road safety, it could be argued that policy has so far largely focused quite effectively on improving the state of the roads and introducing buffers (guard-rails, car bumpers and safety belts). More attention, however, could usefully be devoted to the design and implementation of speed limits.

The rest of the paper is organised as follows. Section 2 describes what has changed in the financial system and seeks to draw out the implications for the dynamics of financial distress. Section 3 highlights what has not changed and seeks to identify the comparatively more invariant characteristics of distress. Section 4 explores the policy response in terms of improvements in the state of the roads, the introduction of buffers and the role of speed limits. The conclusion summarises the key points and assesses the prospects for policy action.

## 2. Change in the Financial System

What, then, has changed in the financial system and what are the implications for financial distress?

### 2.1 What has changed

The changes that have taken place in the financial system are well known and can be summarised in various ways. However, for my purposes, I will highlight five such changes and three key corollaries of these.

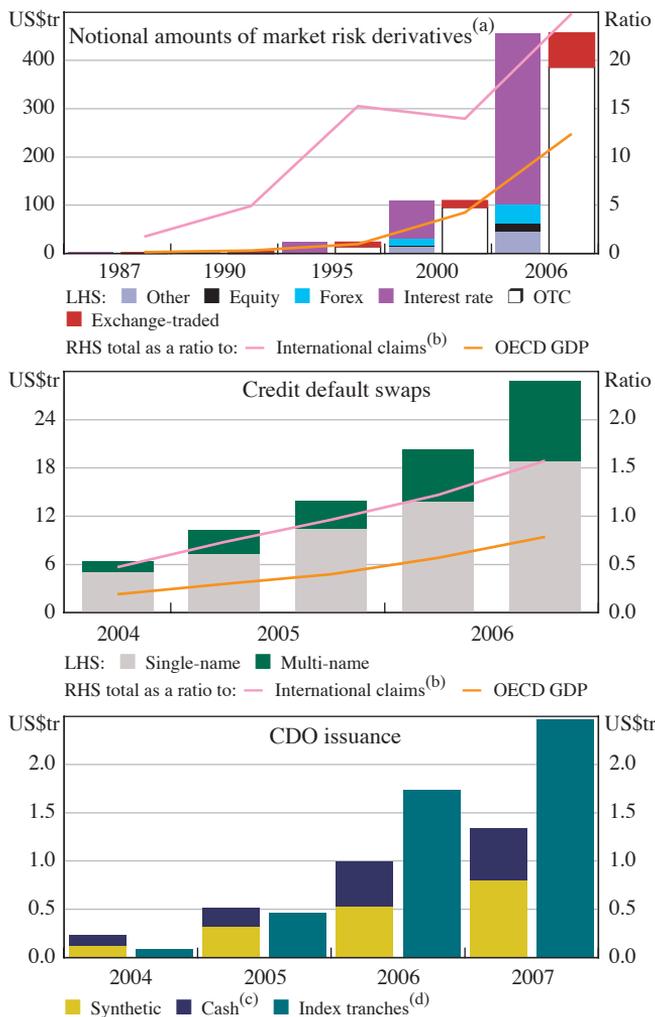
First, we have witnessed what might be called the *atomisation of risk* (Knight 2007).<sup>3</sup> Major advances in financial know-how and information technology have permitted the unbundling and re-bundling of the pay-offs and hence of the risks associated with primitive financial products and securities. This has opened up unprecedented opportunities to create new financial instruments. Derivative products and various forms of structured finance are the primary examples (Figure 1). The first, now apparently so distant, wave of innovation dealt with market risks. It permitted, for instance, the separation of the exchange rate and interest rate risks in a traditional loan or security through derivative instruments, such as exchange rate and interest rate swaps. The more recent, and arguably further-reaching, wave has addressed credit risk. It has been reflected, in particular, in the exponential growth of credit derivatives, such as credit default swaps (CDSs) and varieties of collateralised debt obligations (CDOs) (Figure 1).<sup>4</sup>

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3. References in this paper are largely to BIS work. A more complete set of references is included in the individual studies mentioned.

4. Leverage refers here to the sensitivity of the value of an instrument to a change in underlying risk factors. Embedded leverage is achieved not through explicit borrowing but through the structuring of the instrument itself. This in turn implies that large exposures can be taken with limited need to borrow or fund positions, at least initially. For a discussion of concepts of leverage, see CRMPG (1999) and McGuire, Remolona and Tsatsaronis (2005).

**Figure 1: Rapid Growth of Derivatives Markets**

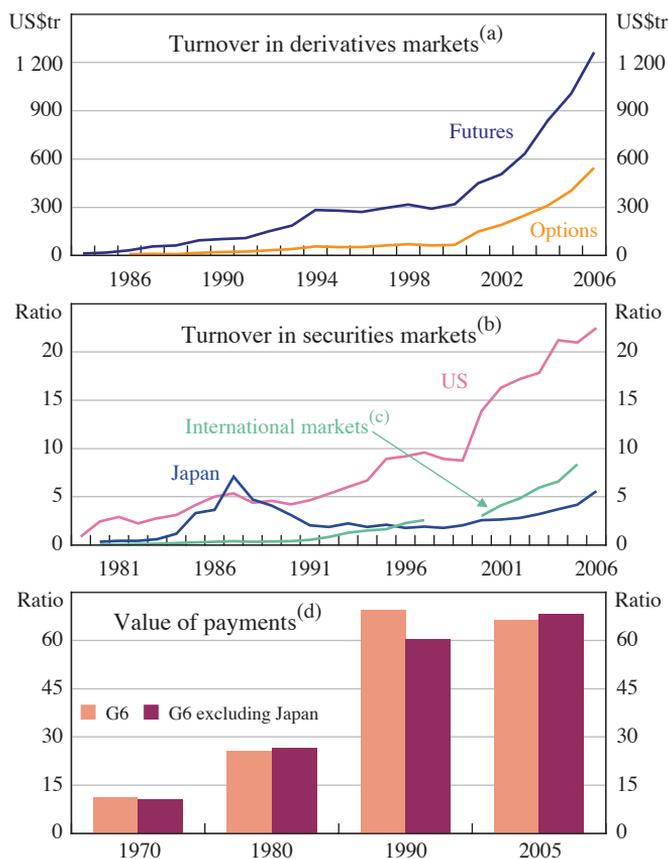


Notes: OTC is over-the-counter. A CDO is a collateralised debt obligation.  
 (a) Break in series between 1995 and 2000.  
 (b) Of BIS reporting banks; cross-border and local foreign currency claims.  
 (c) Sum of cash tranche sizes by pricing date; includes only cash and hybrid structures. Hybrid portfolios consisting mainly of structured finance products different from cash CDOs are excluded.  
 (d) Covers about 80 per cent of index trade volume, according to CreditFlux Data+.

Sources: BIS; CreditFlux Data+; IMF; International Swaps and Derivatives Association, Inc; national data

Second, in a closely related development, we have witnessed the *marketisation of finance*. What can be measured, can be priced; and what can be priced, if sufficiently standardised, can also be traded. Thus, the atomisation of risk has led to a quantum leap in the range of instruments that are traded in markets. It has also facilitated a shift in the business model of traditional intermediaries, such as banks, away from relationship lending towards ‘originate-to-distribute’ strategies, in response to a mixture of regulatory and market incentives. As a result, according to various measures, the size of the markets for instruments that can, at least in principle, be traded in secondary markets has grown in relation to that of less easily tradable

**Figure 2: Surge in Transactions and Payments**



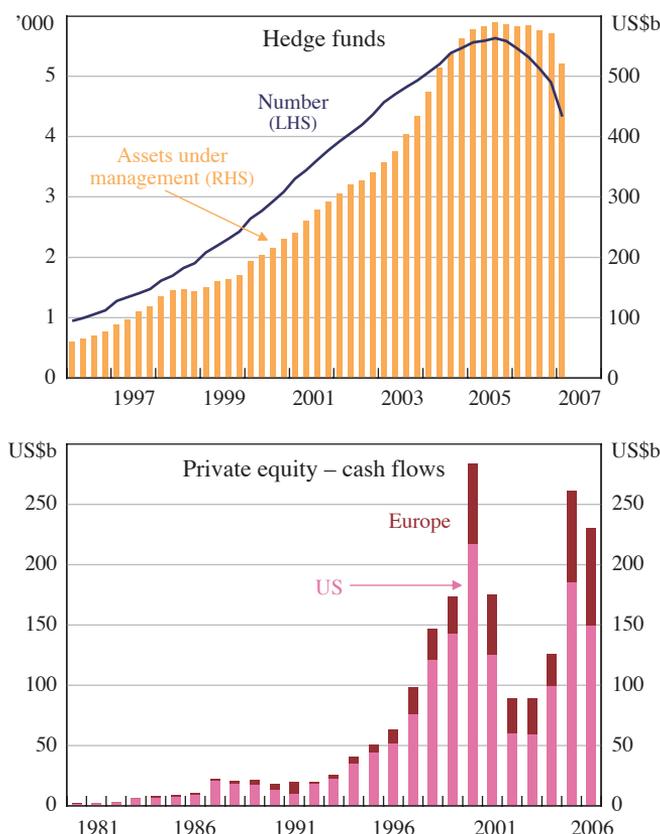
- Notes: (a) Financial instruments traded on organised exchanges; notional amounts.  
 (b) Estimates of the annual value of secondary transactions in equities and bonds, as a ratio to GDP.  
 (c) Total transactions settled through Euroclear and Clearstream (Cedel prior to 2000) as a ratio to GDP in the G10 economies.  
 (d) Payments through the main interbank funds transfer systems in operation in the years shown; ratio of the annual value of funds transferred to GDP. G6 = weighted average of France, Germany, Italy, Japan, the UK and the US, based on 2000 GDP and PPP exchange rates.

Sources: BIS; Cedel; Clearstream; Euroclear; national data

instruments such as loans. Likewise, the volume of transactions has grown enormously in relation to GDP (BIS 1994; Figure 2).

Third, we have witnessed a *new configuration of players* in the financial system along three dimensions. There has been a blurring of distinctions among different types of financial intermediary. The atomisation of risk, the marketisation of finance and the tendency for financial intermediaries to combine different types of business have made it harder to draw clear distinctions between previously distinct forms of intermediation. This has been true for quite some time for commercial and investment banking. In recent years it has also been evident in the case of retail banking and insurance, as the two industries have eagerly competed for the savings of an ageing, richer and more self-reliant retail investor alongside, or as part of a blossoming asset management sector (for example, CGFS 2007). There has been greater consolidation, both within and across business segments. In particular, a set of so-called large complex financial institutions (LCFIs) have strengthened their role at the core of the financial system, both with respect to traditional on-balance sheet intermediation and the functioning of markets (G10 2001). And there has been

**Figure 3: The Rise of Hedge Funds and Private Equity**

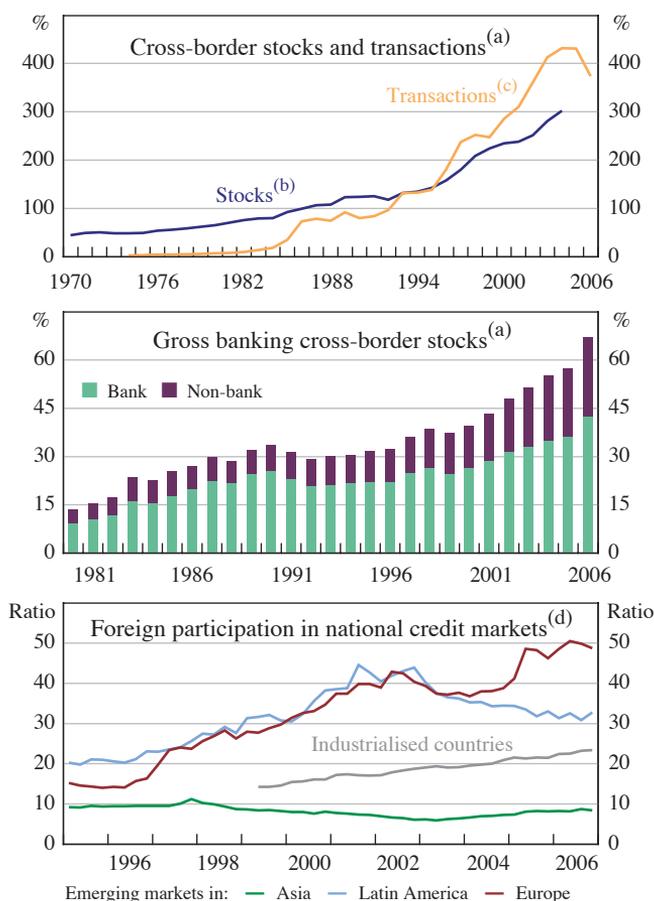


Sources: BIS; Hedge Fund Research, Inc.; Thomson Financial

a rapid growth of new financial players. In recent years, hedge funds and private equity firms have received particular attention (Figure 3). Hedge funds have become a particularly attractive outlet for the savings of retail and institutional investors, dominate trading in a broad spectrum of financial markets and now represent a major source of income and profits for commercial and investment banks (Banque de France 2007). Private equity firms have been fuelling a major wave of leveraged mergers and acquisitions that, at least in terms of the size of the deals, is dwarfing that of the 1980s.

Fourth, we have witnessed the *globalisation of finance* (Figure 4). Cross-border financial linkages have greatly expanded. Financial intermediaries have extended

**Figure 4: Finance Goes Global**



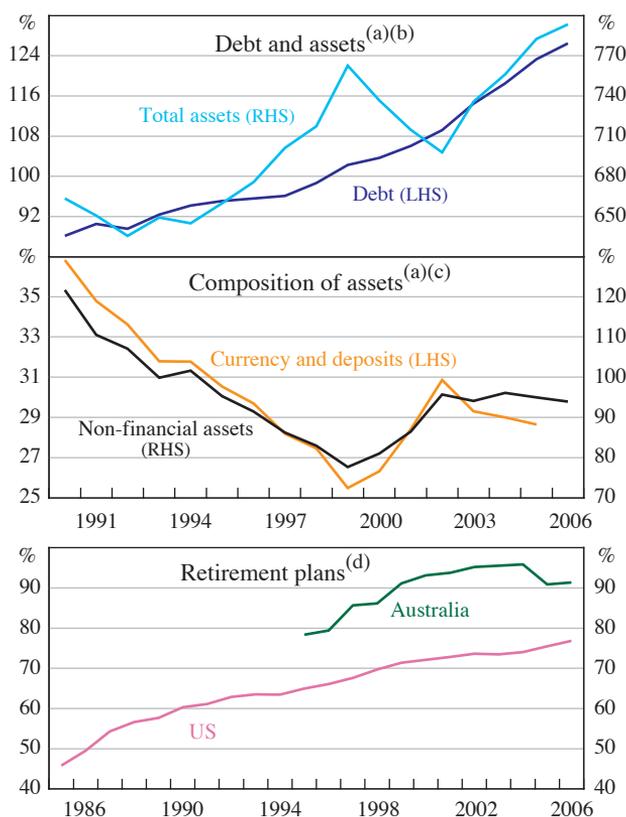
- Notes: (a) As a per cent of GDP.  
 (b) Sum of external assets and liabilities for 22 industrialised countries.  
 (c) Gross purchases and sales of bonds and equities between residents and non-residents; G7 countries excluding the UK.  
 (d) By residence of borrower. Foreign credit (sum of cross-border credit and local credit in local currency by foreign banks) as a share of total lending to non-bank borrowers.

Sources: BIS; IMF; Lane and Milesi-Ferretti (available at <<http://www.imf.org/external/pubs/cat/longres.cfm?sk=18942>>); national data

their international operations, through both the cross-border provision of services and the location of offices abroad (CGFS 2004; BIS 2007a). In addition, cross-border portfolio investments have become increasingly popular. As a result, the stock of international assets and liabilities has grown sharply in relation to GDP.

Finally, we have witnessed a *transfer of risk to the household sector* (BIS 2005; IMF 2005; Ferguson *et al* 2007). Of course, there is a sense in which the household sector has always been the final repository of all risk. But households have now become more directly responsible for the management of financial risks than before, with fewer layers in between (Figure 5). The most visible manifestation of the shift is that a larger proportion of household assets are now held in the form of instruments more vulnerable to market risk, not least as the share of deposits has fallen. The share of home ownership has tended to rise and balance sheets have

**Figure 5: Financial Risk has Shifted to the Household Sector**



Notes: (a) Weighted average of France, Germany, Italy, Japan, the UK and the US, based on 2000 GDP and PPP exchange rates.

(b) As a per cent of disposable income.

(c) As a per cent of financial assets.

(d) Defined contribution, as a per cent of total.

Sources: BIS; OECD; national data

grown significantly, including an increase in both debt and assets in relation to current incomes. A number of factors have combined to produce this result. One longer-term, structural factor has been the shift away from defined benefit towards defined contribution pension schemes (CGFS 2007). Another has been government policies aimed at raising the share of owner-occupied housing, together with a weakening of financial constraints associated with financial innovation and greater competition in the financial sector especially in mortgage markets (CGFS 2006). Yet another, more conjunctural, factor has been the nature of the global economic expansion since the slowdown of 2001, characterised by subdued corporate demand but buoyant household demand, especially on the back of rising residential property markets (BIS 2007a).

A number of corollaries of these structural changes deserve highlighting.

First, the above changes have led to a *growing complementarity between markets and intermediaries* (BIS 2003; Borio 2003a), which ironically have often been seen as alternative forms of arranging financial relationships. Intermediaries such as banks have become increasingly reliant on markets as a source of income and for their risk management, through their hedging operations. Markets in turn have become increasingly dependent on intermediaries for the provision of market-making services and of funding liquidity (such as through credit lines), which underpins their smooth functioning. Correspondingly, given the nature of the instruments traded, counterparty risk – the unwanted stepchild of innovation – has risen in prominence. And the same capital base can ultimately support the operation of both intermediaries and markets.

Second, the changes have greatly *increased complexity* in the financial system. This complexity applies to individual financial instruments. As the slicing and dicing of risks has become increasingly sophisticated in an effort to tailor the products to the demand of ultimate users, the role of models to price the corresponding instruments has also grown. Those models in turn have come to rely on estimates of parameters that are increasingly hard to estimate. Think, for example, of the pricing of certain bespoke tranches of CDOs and of their heavy dependence on statistical assumptions about correlations (see, for example, CGFS 2003; Amato and Gyntelberg 2005; Tarashev and Zhu 2006; and Duffie 2007).<sup>5</sup> In addition, greater complexity also applies to the financial system as a whole. Its various segments have become more tightly interconnected and the linkages across them more opaque.

Third, the *size of the financial sector in relation to the real economy has increased significantly*. This is true whether the financial sector is simply measured by the size of gross assets and liabilities to GDP or, more narrowly, in terms of its value added to GDP. This suggests that the stability of the financial system has become more important for the real economy.

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5. Tranching as a means of tailoring instruments to investors' tastes is now being extended to foreign exchange.

## 2.2 Implications for financial distress

The changes just outlined have several implications for the dynamics of financial distress. Some of these are quite straightforward and uncontroversial. Others are more speculative.

One uncontroversial implication is that financial distress is more likely to involve, as a manifestation and as a key transmission channel, the *evaporation of market liquidity* (Borio 2000, 2003a; Persaud 2003).<sup>6</sup> This is a natural consequence of the development of markets and instruments that are actively traded or that are held in the expectation that, were the need to arise, they could be traded. It also reflects the development of risk management strategies that are built on this premise. More than ever before, the smooth functioning of the financial system is predicated on the assumption that the option to trade can be exercised even under testing market conditions. In other words, it is predicated on the assumption of robust market liquidity.

More controversially, it could be argued that the new financial environment, paradoxically, is more, rather than less, reliant on the availability of funding liquidity. Funding liquidity is critical for the orderly execution of trades and hence for market liquidity too.<sup>7</sup> It can become scarce at times of distress, precisely when it is most needed, as market participants cut credit lines and/or raise margin requirements to defend themselves against counterparty risks. Indeed, just like banks, markets are subject to runs (Borio 2000, 2003a). The mechanisms at work are exactly the same – concerns about credit risks, uncertainty about the creditworthiness of other participants and the drying-up of funding liquidity.<sup>8</sup> In other words, the current financial system is particularly ‘funding liquidity hungry’.

The greater relevance of the evaporation of market liquidity and its link to funding liquidity and counterparty risk has been very much in evidence in some of the most recent episodes of financial distress. The failure of LTCM in 1998 is a clear example of how such financial distress can unfold (CGFS 1999). Similar mechanisms had

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6. Market liquidity is more easily recognised than defined. A working definition is that a market is liquid if transactions can take place rapidly and with little impact on price. So defined, market liquidity has several dimensions. Tightness refers to the difference between buy and sell prices, for example the bid-ask spread in a quote-driven market. Depth relates to the size of the transactions that can be absorbed without affecting prices. Immediacy denotes the speed with which orders can be executed, and resiliency the ease with which prices return to ‘normal’ after temporary order imbalances.
  7. The notion of funding (cash) liquidity should be distinguished from that of market liquidity. Funding liquidity can be defined as the ability to realise (‘cash in’) value, either via the sale of an asset or access to external funding. This is what underpins an institution’s capacity to meet its contractual obligations. In modern financial markets, funding liquidity is best thought of as including not only command over cash and deposits, but also over other instruments that can be used to meet margin calls and hence, effectively, settle transactions (most commonly government securities).
  8. Recent academic work has begun to model the interactions between funding liquidity constraints and market liquidity (see, for example, Brunnermeier and Pedersen 2007 and, for a survey, Shim and von Peter 2007). To the best of my knowledge, however, the key role played by counterparty risk has not yet received attention.

already been present in the case of the failure of Drexel Burnham Lambert in 1990, given its critical market-making role in the high-yield securities segment.

A second uncontroversial implication is that financial distress is more likely to have *far-reaching cross-border effects*. This is a natural consequence of the tighter cross-border linkages that have taken shape. Such effects are almost guaranteed if distress involves one of the LCFIs that operate across so many countries and underpin the smooth performance of so many markets. In fact, over 30 years ago, even the failure of a small bank active in foreign exchange transactions, Bankhaus Herstatt, was sufficient to have significant cross-border ramifications – so significant as to act as a catalyst for the establishment of the Basel Committee on Banking Supervision. The knock-on effects of distress at one of the current large global players would obviously score much higher on the Richter scale.

A third uncontroversial implication is that *new players* are now more likely to be at the origin of financial distress and/or to contribute to amplifying it. This is so quite apart from whether, on balance, they make the financial system more or less resilient. The experience of LTCM is a clear example of this possibility. Similarly, one might envisage a scenario in which the failure to refinance a large leveraged deal, or a number of such deals, funded with private equity could generate broader strains, through the materialisation of the inventory risk associated with bridge financing.

A fourth implication is that the increased complexity and opacity within the financial sector may make the dynamics of distress *more unpredictable*. On the one hand, it makes it harder to assess exactly where risk is located and how strains might propagate across the system. On the other hand, the tighter interconnections make it more likely that the strains that do materialise will be more far-reaching than in the past.

A final, more speculative implication is that the transfer of risk to the household sector may have lengthened the time lag between the build-up of embedded risk in the financial system and its overt emergence – the *'longer fuse'* hypothesis. This is because the link is more indirect. True, credit intermediaries and investors through markets have been very active in the financing of the household sector. And the recent signs of market strains in the case of the US sub-prime market attest to the potential losses involved. Even so, the direct exposures appear more manageable than the lumpier ones vis-à-vis the corporate sector, historically a more important source of stress. At the same time, the indirect exposures, through the impact of households' retrenchment on the macroeconomy, can potentially have more serious effects but would inevitably take longer to materialise.<sup>9</sup>

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9. The transfer of risk to the household sector has also raised important concerns regarding households' ability to assess and manage the corresponding risks (see Ferguson *et al* 2007 and Shiller 2007). Delayed recognition of the true extent of the liabilities facing households, given their very long-term nature, could be another factor lengthening the fuse of the emergence of problems. In addition, the transfer of risk to the household sector, together with the rise in prominence of LCFIs, is likely to increase the politicisation of the handling of any financial crisis that might emerge as well as of its consequences (Kapstein 2006).

### 3. Constancy in the Financial System

But much as the financial system has changed, the basic mechanisms that underlie its functioning have remained constant. While the recognition of change adds to our understanding of financial distress, the recognition of what remains constant should represent the core of that understanding.

#### 3.1 What has not changed

From the perspective of the dynamics of financial distress, four constant elements deserve highlighting. The first two relate, respectively, to micro and macro characteristics of the financial system; the last two, to characteristics of human behaviour. Together, they provide a specific perspective on how distress arises and propagates (Borio 2003b).

The first element concerns the *asymmetric information* problems that plague financial relationships. At the core of any financial relationship is the transfer of claims on resources across agents that do not have access to the same information. This is true regardless of whether the main function of the financial system is thought of as shifting current resources from savers to investors or as allocating risks across agents and over time. For instance, borrowers and managers have better information about how they plan to use the funds under their control than do the external financiers that provide them. Counterparties to a trade are very much in the same situation. Conflicts of interest are endemic in the transfer of control over these resources. Financial contracting is designed to address these issues, which arise regardless of whether the transfer occurs through intermediaries or markets. Think, for instance, of the principal-agent problem and potential conflicts of interest that arise in the underwriting of securities or in the off-loading of assets from balance sheets (Duffie 2007; Hellwig 2007).<sup>10</sup>

Indeed, the distinction between intermediaries and markets is in many respects an artificial one. As Hellwig (2007) correctly reminds us, the markets in real life are a far cry from those postulated in an Arrow-Debreu world. The presence of counterparty risk, in effect ruled out in such a world, is probably the clearest symptom of such a difference.<sup>11</sup> Partly as a result, the line between what can and cannot be traded in the market is a fine one indeed, and varies depending on economic conditions. The bottom line is that changes in the financial system may affect the nature and contours of asymmetric information problems. They do not, however, eliminate them.

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10. In this context, a recent form of potential conflict of interest concerns rating agencies, which act as both advisers to issuers and raters for structured finance products, such as CDOs; see for example CGFS (2005). More generally, agencies have now become very active vendors of credit risk measurement products.

11. Strictly speaking, since 'states of the world' are a complete description of outcomes, the failure of a counterparty to fulfill his/her obligation could be included as one of these outcomes. But the more substantive point is that such a contingency would not result in a revision of trading plans since it would be insured away in complete markets.

The second element concerns the powerful *positive feedback mechanisms* that operate within the financial system in the aggregate as well as between the financial system, on the one hand, and the real economy, on the other. A well-known example within the financial sector is the potential self-reinforcing process that links profitability, revealed risk appetite, asset prices, short-term volatility and market liquidity. For instance, higher profits induce greater risk-taking, which tends to raise asset prices and, given its well-documented directional nature,<sup>12</sup> reduce short-term volatility as well as improve market liquidity. Another well-known example is the similar self-reinforcing process that links the availability and terms on external financing, asset prices and output.<sup>13</sup> The familiar financial accelerator mechanism highlighted in the economic literature is but one such illustration (see Bernanke, Gertler and Gilchrist 1999).<sup>14</sup>

This observation points to a special characteristic of the financial sector relative to other sectors of the economy (Borio and Crockett 2000). In other sectors, increases in supply tend to reduce the corresponding prices. For example, as more cars are produced, their price will tend to fall. The adjustment in the price will naturally equilibrate the market. In the financial sector, this is not necessarily the case, at least in the short run. Given the critical role that the sector plays in the economy and the positive feedback mechanisms at work, increases in the supply of funds (for example, credit) will, up to a point, create their own demand, by making financing terms more attractive, boosting asset prices and hence aggregate demand. In a sense, a greater supply of funding ultimately generates additional demand for itself.

The third element relates to *limitations of risk perceptions*. As extensively argued and documented elsewhere (Borio, Furfine and Lowe 2001), for a number of reasons it seems much harder to measure the time dimension than the cross-sectional dimension of risk, especially how risk for the financial system as a whole evolves over time. In fact, market indicators of risk, such as risk premia, tend to be comparatively low precisely before the peak of the financial cycle, when, in retrospect at least, it turns out that risk was highest. As Greenspan (2005) so aptly put it, ‘... history has not dealt kindly with the aftermath of protracted periods of low risk premiums’.

The fourth element relates to *limitations of incentives*. In particular, actions that are individually rational and compelling may not result in desirable aggregate outcomes. Familiar economic notions such as herding, coordination failures and prisoner’s dilemmas are obvious examples of the genre. For instance, is it rational for a bank manager to trade off a sure loss of market share in a lending boom by being cautious against the distant hope of regaining it in a future potential slump? Or is it reasonable to expect a risk manager not to retrench at times of market distress

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12. For equity markets, see Schwert (1989); for bond markets, see Borio and McCauley (1996).

13. These processes are inherently non-linear, and, together with non-linearities in the pay-offs of individual instruments and trading strategies (for example, carry trades, the provision of insurance, etc), can generate the impression of calm even as underlying vulnerabilities build up (Knight 2007). See also Rajan (2005) on the issue of tail risk.

14. See also Adrian and Shin (2007) for a recent formalisation of some of these mechanisms along somewhat different lines.

simply because, if everyone did the same, a vicious circle of deepening financial stress could be avoided? More generally, it is not uncommon to hear market participants note that risks are indeed under-priced in markets but that, for them, leaving the market would be more costly than staying in.<sup>15</sup>

With these two types of limitations, short horizons play a key role. It is easier to extrapolate current conditions if the forecasting horizon is short. As plenty of empirical evidence confirms, mean reversion in expectations is a property of longer horizons (Frankel and Froot 1990). Similarly, longer horizons could at least reinforce some of the reputational effects that might limit the influence of limitations of incentives. In turn, short horizons can reflect rational contract terms aimed at addressing some of the principal-agent problems endemic in finance noted above, with possibly unintended consequences in the aggregate (Rajan 1994, 2005). The tendency to monitor and judge performance on a frequent basis is one such example.<sup>16</sup>

### 3.2 Implications for financial distress

The four elements just outlined underpin what is the most classic source of financial distress – overextension in risk-taking and balance sheets in good times, masked by the veneer of a vibrant economy. This overextension generates financial vulnerabilities that are seriously exposed only once the economic environment becomes less benign, in turn contributing to its further deterioration. The risk that builds up in good times simply materialises in adversity. The build-up and unwinding of financial imbalances is what can be termed the potential ‘excessive procyclicality’ of the financial system (Borio *et al* 2001; Goodhart 2004). The term, in fact, is nothing but a more modern way of denoting those processes that, nuances aside, long-standing observers of financial instability such as Kindleberger and Minsky had already extensively and colourfully discussed in their writings (Minsky 1982; Kindleberger 1996).

To be sure, given the presence of positive feedback mechanisms, the financial system has a number of natural procyclical elements. This is part of its physiology. Excessive procyclicality refers to the pathological manifestation of the same processes. It refers to those episodes in which, given the limitations of risk perceptions and incentives, the processes go too far, sowing the seeds of subsequent financial instability *with*

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15. As Charles Prince, Citigroup’s Chief Executive Officer, vividly put it: ‘... as long as the music is playing, you’ve got to get up and dance’ (‘Citi Bullish on Buy-Out Boom’, *Financial Times*, 10 July 2007, p 15).

16. It is, of course, often exceedingly hard in practice to distinguish between the roles of incentives and risk limitations. The search for yield which has been under way in markets in recent years provides some telling examples (BIS 2007a). It has been known for some time, for instance, that ratings of structured products can be misleading if taken as sufficient statistics for the corresponding credit risk by simply extrapolating from those of corporate bonds. Specifically, even if the expected (average) loss associated with them may be the same, the unexpected loss (tail of the distribution) can be considerably higher (for example, CGFS 2005). After all, this is precisely one reason why the yields on them tend to be higher. It is hard to tell, however, to what extent investments in these products reflect conscious attempts to seek higher yields in full recognition of the higher risks or, possibly, an underestimation of those risks.

*potentially serious macroeconomic costs*. The financial system turns into a shock amplifier.<sup>17</sup> Such episodes have tended to be irregular and infrequent, not occurring every business cycle. By their very nature, the build-up of financial imbalances takes considerable time and requires a conjunction of favourable circumstances.

Analytically, a key implication of this view is that any model of financial instability should have three key properties (Borio 2003b). It should be dynamic, not static. It should incorporate in a meaningful way the interactions between the real economy and the financial system. And it should pay close attention to the endogenous nature of the processes through which financial imbalances build up and unwind. The exogenous shock, if any, that finally triggers distress is the least interesting part of the story. Financial instability is not like a meteorite strike from outer space; it is more like the result of the sudden release of the pressures that build up owing to the shifts in the tectonic plates of the planet.<sup>18</sup>

## 4. Policy

This view of financial instability also has significant implications for policy. For one, it suggests that thinking of the challenge simply in terms of ensuring that the financial system is resilient to *exogenous* shocks, while useful, is not the complete story. For the characteristics of the financial system may also help to *generate* those shocks, not just passively absorb or amplify them. More specifically, if the problem is one of overextension in good times then at least part of the answer is to find ways of keeping that overextension in check. As always, prevention is better than cure. The challenge, therefore, is to design a policy response that addresses this constant feature of financial instability while at the same time tailoring it to the evolving profile of the system.

What does this mean in practice? In thinking about possible strategies, an analogy with the design of policies towards road safety can be helpful. A holistic policy does not just involve ensuring that (i) the *state of the roads* is fine and (ii) there are sufficient *buffers* to limit the damage of any accidents that do occur. Importantly, it also involves ensuring that (iii) the speed is not excessive given the design of the system, the characteristics of the cars that travel on it and traffic conditions (the '*speed limits*' question).

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17. For an alternative analytical perspective on the conditions under which the financial system can act as a shock absorber or amplifier, see Allen and Carletti (2007).

18. Seen from this perspective, the changes that the financial system has been experiencing are a double-edged sword. On the one hand, financial innovation has allowed for the possibility of a better distribution of risk, more widely dispersed and held by those that are more willing and better able to manage it. As a result, the financial system could be more resilient than in the past and it would be easier to smooth real spending patterns in the event of external 'shocks'; certainly, the experience since the late 1990s can support this conclusion. On the other hand, the increased ability to obtain external funding and/or to economise on it, via derivative instruments, has also made it easier to hold leveraged positions while growing competitive pressures may have added to the incentive to take on risk. This could accommodate the build-up of financial imbalances more easily than in the past, and hence also be a source of 'shocks' to the system (see below). The jury is still out on this.

On balance, an assessment of the policies implemented to date suggests that a lot of very good work has been done in the first two areas; arguably, however, the third could benefit from more attention. To continue the analogy, the point is not that the maximum speed should be invariant with respect to the state of the roads and the buffers in place. On the contrary, one reason for improving conditions in these two areas is precisely to support higher speeds! Better risk measurement should to some extent allow more risk-taking. Rather, it is that beyond a certain point, higher speeds (in part induced by an increased sense of safety) could undo the good progress made in the other areas.<sup>19</sup>

While the mapping between policy initiatives and the three areas is not perfect, what follows elaborates on this assessment based on the proposed taxonomy. The objective is not to provide a comprehensive evaluation of the policies implemented in recent years. It is simply to add sufficient ‘flesh to the bones’ through some illustrations so as to clarify the main concept. In the process, the analysis also highlights how the calibration of policy action has been tailored to the evolution of the financial system as well as some of the challenges it has faced.

#### 4.1 State of the roads

The policies that best fit the analogy under the heading of ‘improvements in the state of the roads’ are all those that aim at limiting the likelihood of accidents by strengthening the financial infrastructure.

The neatest example is the extensive work done to strengthen *payment and settlement systems*. Over the years, major efforts have been made to improve their architecture and risk characteristics, notably through the introduction of Real-Time Gross Settlement (RTGS) systems, and by promoting the implementation of Delivery-versus-Payment for securities and of Payment-versus-Payment for foreign exchange transactions, such as through CLS Bank (Borio and Van den Bergh 1993; BIS 1994; Borio 1995; Galati 2002). The central bank Committee on Payment and Settlement Systems (CPSS) has been instrumental in these efforts. More recently, the steps taken to improve confirmation and settlement in over-the-counter credit derivatives deserve highlighting, with the official authorities playing a key catalytic role (Geithner 2006). This was another area in which the infrastructure risked lagging behind business imperatives.

Another example includes the major efforts made to develop a set of agreed *international financial reporting standards* (Crockett 2002). As highlighted by the Asian crisis and the high-profile failure of Enron, reliable accounting standards are an important pillar of the financial infrastructure. Substantial progress has been made in this area. At the same time, it has not always been easy to reconcile the perspective of accountants and those of prudential authorities, given the tension between the objectives of providing an ‘unbiased’ picture of the condition of the

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19. The mechanism is analogous to the well-known ‘safety belt’ effect, whereby the introduction of safety belts could induce drivers to be more careless, possibly even leading to more casualties among innocent bystanders (Peltzman 1975).

firms and of instilling prudence into their behaviour. Likewise, ensuring consistency between accounting standards and principles of good risk management has proved to be a challenge (Borio and Tsatsaronis 2006; see also below).

## 4.2 Buffers

The term ‘buffers’ is here intended to apply to all those policies aimed at limiting the risk that a shock, such as a major fall in asset prices or an economic downturn, could lead to financial distress. The corresponding measures can either be *ex ante* or *ex post*.

A natural example of *ex ante* buffers relates to *minimum capital standards*. In fact, nowadays the standards are calibrated precisely to cover all losses up to a given level such that the probability of failure within a particular horizon remains suitably low. Since the late 1980s, prudential authorities have made major, and successful, efforts to strengthen minimum capital standards, helping to improve the degree of capitalisation of the industry. Building on the initial Capital Accord, the work done under Basel II to develop and implement the second generation of bank capital standards, much more sensitive to risk, has represented a landmark in this area (BCBS 2006). Similar efforts are proceeding in the insurance industry. Importantly, in order to take into account the blurring of distinctions between different types of intermediary, much thought has been given to greater convergence across sectors. And the demands of financial globalisation have meant that cross-border issues have figured prominently, generating pressure towards international convergence.

*Ex post* buffers involve the various mechanisms to *manage distress* once it arises, containing the damage and/or nipping it in the bud. The mechanisms are quite varied, depending on the nature of the strains and institutional factors. They involve the authorities acting as, *inter alia*, honest brokers, solvency- and liquidity-support providers, and overall coordinators of orderly wind-downs and restructurings. The well-known challenge in this area is to ensure an orderly resolution of the strains without risking sowing the seeds of future problems by weakening financial discipline (that is, creating moral hazard).<sup>20</sup> In other words, the risk is precisely that the buffers may induce drivers to drive faster in the future.<sup>21</sup>

The changes in the financial system have raised two key challenges for the management of distress.

The *globalisation of finance* has highlighted the complications that arise when the distress has an international dimension. As distress strikes, the perspective of national authorities may well diverge, raising daunting questions regarding the incentives and ability to ensure an orderly resolution (see, for example, Goodhart 2004; BIS 2007a). The difficulties are exacerbated by asymmetries in the size of institutions, as when

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20. Early structured intervention has been proposed to limit moral hazard, but its effectiveness in the case of distress at a core LCFI has yet to be proven.

21. See White (2004) for a perspective on the possible ways in which changes in the financial system may be altering the scope of safety nets.

the institution in distress is systemically important in the host country but not in its home base. Considerable, quiet efforts have been made in recent years to address these issues. Whether they suffice, however, is still moot.

The *marketisation of finance* has meant that, compared with the past, the management of distress is more likely to deal with disturbances involving serious dislocations to market functioning. The case of LTCM discussed above is one such example. One open question regards the effectiveness of emergency liquidity provision. Can the indiscriminate provision to the markets, as opposed to the institutions in distress, be trusted to flow to the 'right' locations? The LTCM case appears to suggest that it can, at least if supported by more targeted intervention, in that case with the central bank acting as honest broker. Whether this experience can be generalised to intervention that excludes targeted steps is unclear. After all, concerns with counterparty risk may persist if the relevant counterparty does not receive support, possibly inducing a more generalised withdrawal from transactions and a drying-up of market liquidity. In addition, is a generalised infusion more or less likely to generate moral hazard compared with a more targeted one? One view is that it is less likely to do so; Bagehot's classic prescription was based on this premise. An alternative view is that such indiscriminate infusions may be too blunt, as they lift all boats, supporting also those that may be taking too much risk but are not yet in overt distress.<sup>22</sup>

### 4.3 Speed limits

What about speed limits? At a minimum, a speed limit would act as a restraint on risk-taking, preventing it from moving too far into the danger zone.<sup>23</sup>

One obvious candidate is *better risk measurement and management* at individual institutions. Clearly this is a must, and much has indeed been done. In particular, in banking, Basel II has been instrumental in encouraging improvements and hardwiring best practice. Think, for instance, of the fact that the implementation of the new framework has been delayed in part because banks did not keep historical records of the default experience on their loans. Moreover, great attention has rightly been paid to encouraging improvements in the management of counterparty risk and the potential evaporation of liquidity in markets (CRMPG 1999; CRMPG II 2005).

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22. Moreover, broader and contentious first-order questions arise concerning the longer-lasting implications of adjustments in the *monetary policy stance*, defined as adjustments in policy rates, which may accompany the injection of liquidity. The risk here is misjudging the calibration of the monetary easing and finding it hard to reverse it in a timely manner, with possible untoward longer-term implications for the policy stance (Borio 2003a). The need to take decisions within a very tight time frame and in a state of great uncertainty about the potential consequences of a hands-off approach can easily increase the risk of an over-reaction. For an analysis that stresses the potential moral hazard implications of policy easing, see White (2006a).

23. This notion of speed limits is related to, but is much broader than, the one used by, say, Honohan (1997). In that paper, speed limits refer specifically to limits on (bank) asset/loan growth. Here the term refers to any arrangement that is designed to constrain the build-up of excessive risk in the system (see below).

Stress tests can be quite helpful.<sup>24</sup> This general indirect approach, for instance, has underpinned efforts to address the potential risks raised by hedge funds (BCBS 2000; FSF 2007).

Even so, to the extent that some of the limitations of incentives noted above are not addressed, better risk measurement could act more like a speedometer than a speed limit *per se*. That is, it could be a more accurate gauge of the travelling speed (the amount of risk being taken) rather than a brake slowing it down.<sup>25</sup>

Another obvious candidate is *stronger market discipline*. Again, this is an important area in which much progress has been made. In particular, efforts have focused on encouraging better disclosure of the risk profiles of financial firms. Most recently, here too Basel II has been quite helpful, through Pillar III. Moreover, this is an area in which further improvements could be made, in part using the influence of those that set accounting standards. As extensively argued elsewhere (Borio and Tsatsaronis 2004, 2006), attention has so far concentrated on estimates of expected losses and of the variability in values (such as value-at-risk and, to a lesser extent, stress-test measures). More attention should be given, in particular, to the uncertainty that surrounds point estimates of current values. As marking-to-model becomes more widespread, this type of information is bound to grow in importance, as it is critical to avoid lulling participants, particularly end-users, into a false sense of security. The wide dispersion of valuations of tranches of mortgage-backed securities exposed recently in connection with the strains at some hedge funds have highlighted the relevance of such concerns.

Even so, disclosure is potentially subject to similar limitations to those that affect better risk measurement. In particular, episodes of widespread financial distress suggest that markets are comparatively more effective in exerting discipline on 'outliers' than in limiting generalised overextension. Here, too, a mixture of the limitations of risk perceptions and incentives is arguably at work. The fact that policy-makers' intervention is more likely in the case of generalised distress also plays a role. The problem here is a form of time inconsistency not dissimilar to the one so familiar in the context of monetary policy.

Now, pursuing the analogy, an ideal speed limit would vary with the design of the roads and traffic conditions. This means that it would slow the build-up of vulnerabilities (overextension/financial imbalances) by increasing the resistance to them as they develop (a kind of 'dragging anchor'). By the same token, it would allow the speed to pick up following any strains that do materialise (by 'releasing the drag'). In other words, it would act as a *stabiliser* in both upward and downward

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24. Despite the improvements made, however, stress tests still find it particularly hard to take proper account of liquidity risk and of the interaction between various types of risk (for example, counterparty, market and funding liquidity risks). Ultimately, this results from difficulties in capturing adequately the 'endogenous' dimension of risk, which reflects the implications for asset prices and market functioning of the aggregate behaviour of participants; see for example Borio (2003a) for a detailed discussion.

25. See, for instance, Lowe (2002) for a discussion of the procyclicality of the output of credit risk measurement systems and Borio and Shim (2007) for some elaboration on this point.

phases. Technically, the shadow price of the measures would increase with the build-up of the vulnerabilities and fall as they materialise. This is one distinguishing property of what has elsewhere been referred to as the ‘macroprudential’ approach to financial regulation and supervision (Crockett 2000; Borio 2003b; Knight 2006; White 2006b).

There is, however, an important catch. It is very hard to say what the speed limit should be. For instance, is a boom sustainable or not? Are financial imbalances building-up or is a new sustainable trend in place? And it is very tricky to design the speed limit effectively.

With these reservations firmly in mind, it is still possible to suggest three broad directions for policy that would be consistent with this approach.

The first direction is to give priority to *reliance on built-in stabilisers* over discretionary measures (Borio and Shim 2007). The main reason is that real-time identification of the imbalances is difficult and acting upon it is even more so, given institutional and political economy constraints. The main advantage of built-in stabilisers is that, provided they are related to reasonably robust aspects of the imbalances, they leave less room for policy error. Moreover, once in place, they do not require continuous justification, and hence can act as an effective pre-commitment device. As such, they can relieve pressure on the supervisors not to take action during the boom, given that a tightening of prudential standards would inevitably be seen as going against the manifest view of the markets. Without built-in stabilisers, action could be taken too late, if at all. Finally, the presence of built-in stabilisers can influence private behaviour *ex ante*, encouraging more prudent behaviour. The best analogy here is with built-in stabilisers in fiscal policy.

Several examples spring to mind; all based on reliance on through-the-cycle or stress-test measures. One is statistical loan provisioning, based on loan loss experience over several business cycles (for instance, as introduced by the Bank of Spain). Another is conservative loan-to-valuation ratios, both in terms of size of maximum ratios and the methodology for the valuation of the collateral. Yet another is using inputs based on long-term averages or stress parameters in minimum capital requirements. Think, for instance, of the use of estimates of downturn loss-given-default provided for in Basel II. Similar arrangements can also apply to instruments designed to address market malfunctioning, such as the evaporation of market liquidity under stress. Reliance on through-the-cycle margining practices to address counterparty risk, as noted by Geithner (2006), would be a welcome step.<sup>26</sup>

The second direction is to allow for the possibility of complementing built-in stabilisers with *occasional discretionary measures*. This would serve to reinforce the effect of built-in stabilisers in cases in which it was found appropriate. And it would permit tailoring the policy response to the specific characteristics of the imbalances, which vary in shape and size, such as in terms of the sectors affected. The possible measures range widely, but the basic principle is to tighten the calibration

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26. Another, quite distinct, possibility could be to seek to influence remuneration schedules; see Rajan (2005).

of the various prudential tools or the intensity of the supervisory review if the authorities suspect that imbalances are building up. In banking, Pillar II of Basel II provides the basis for effective action in this context, not least because of the ability of supervisors to make use of the outcomes of stress tests. As described in detail in Borio and Shim (2007), in recent years discretionary measures to address the build-up of financial imbalances have been used more frequently than in the past in many countries.

One prerequisite for effective action along these lines is to be able to measure with sufficient reliability system-wide risk in real time. In recent years, major efforts have been made to improve policy-makers' ability to do so. On the one hand, considerable resources have gone into developing quantitative tools. One set of tools, known as early warning indicators, have sought to provide the basis for assessments of the likelihood of system-wide distress.<sup>27</sup> Another set of tools, known as macro stress tests, have sought to provide estimates of the damage caused to the financial system by large macroeconomic shocks (such as a major recession or a sharp fall in asset prices). On the other hand, more qualitative evaluations of system-wide vulnerabilities are now routinely carried out at the national and international level by central banks, supervisory authorities and international financial institutions. For example, the Committee on the Global Financial System plays such a role at the BIS and its representative in turn participates in similar assessments made by the Financial Stability Forum. These regular monitoring exercises are complemented by tailored studies that evaluate structural vulnerabilities. The Joint Forum (2005) study on the extent of credit risk transfer between banks and insurance companies falls into this category. But despite the improvements made, the results have so far fallen well short of providing a basis for policy decisions that could compare, say, with that which informs monetary policy.

The third direction is to strengthen *cooperation among the relevant authorities* in the development and, where appropriate, implementation of the various policies above. Responsibility for financial stability is quite diffused. It is shared, at a minimum, among prudential authorities, monetary authorities and ministries of finance. In addition, increasingly, the policies pursued by accounting authorities can also have first-order effects.

A few examples may suffice to highlight the tight interconnections between these various policies. Take accounting first. Despite favourable modifications, the international accounting standard for the valuation of financial instruments

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27. Some of this work has also been carried out at the BIS (Borio and Lowe 2002). The key idea behind these real-time indicators is to exploit the basic characteristics of the build-up of financial imbalances. The indicators seek to capture joint excessive asset-price increases and credit growth. The proxies are intended to measure the co-existence of asset-price misalignments with a limited capacity of the system to absorb the asset-price reversal. Misalignments are simply captured by deviations of equity prices and possibly exchange rates from trend; the absorption capacity of the system by similar deviations from trend in the ratio of private sector debt to GDP. In its rating assessments of banking systems and countries, Fitch Ratings has implemented a combination of micro- and macro-prudential indicators, with the macro-prudential component based on this methodology (Fitch Ratings 2005).

(IAS 39) is not easily reconcilable with certain versions of statistical provisioning for loans, traditionally seen by accountants, and indeed securities regulators, as a form of artificial profit smoothing.<sup>28</sup> More generally, as argued in detail elsewhere (Borio and Tsatsaronis 2006), serious thought should be given to the implications of the trend towards fair value accounting for the ‘speed’ of the system and for the design of regulation and disclosure. As regards tax policies, the interaction between taxation and indebtedness or that between taxation and asset booms/busts are well known (G10 2003). Above all, the close nexus with monetary policy should not be underestimated. After all, the availability of, and terms on, funding liquidity are key determinants of the ‘speed’ of the system. To be sure, funding liquidity is partly endogenous, and it naturally behaves procyclically. Procyclicality in perceptions of values and risks, and hence in the ease with which external funding can be obtained, are critical. Even so, monetary authorities retain the ultimate influence on funding liquidity through their setting of monetary policy (Borio 2006).

Support from monetary policy can help overcome one of the limitations of prudential instruments. In a world in which financial technology has greatly increased the scope to avoid prudential restrictions, in which competitive pressures have increased the incentives to do so, and in which so much financial activity is already beyond the reach of supervision, prudential measures (in isolation) may turn out to be a rather blunt tool. By contrast, the monetary policy levers, given their pervasive impact, can be more effective. It goes without saying, of course, that the relative reliance on the two sets of tools would very much depend on various factors, ranging from country-specific institutional characteristics to the precise nature of the financial imbalances and of the broader economic backdrop against which they develop.<sup>29</sup>

## 5. Conclusion

The financial system has been going through a phase of major structural change in recent decades; and far from slowing down, the pace of change seems to be accelerating. The technology for breaking down risk into its elementary components has spawned an extraordinary variety of new instruments and markets. The volume of transactions has surged to unprecedented highs. New players have emerged and gained possession of large parts of the financial territory; others have grown larger and more complex at the heart of the financial system. Functional distinctions between intermediaries have been eroded even as financial intermediaries and markets have become ever more tightly interdependent. Finance has become truly

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28. Alternatively, prudential authorities could make the corresponding adjustment through additional capital charges (Borio and Lowe 2001; Borio and Tsatsaronis 2004). However, this would forego the disciplinary effect that might work through reported earnings, a focus of market attention.

29. The room for manoeuvre of monetary policy could also be seriously constrained. For instance, in a small open economy, a tightening of policy could induce strong capital inflows and put unwelcome upward pressures on the exchange rate. For a more detailed discussion of the coordination between monetary and prudential instruments, including an analysis of actual experience, see Borio and Shim (2007).

global. Households are now more directly responsible for the management of financial risks than ever before. The financial sphere has greatly expanded relative to the 'real' economy.

These profound changes have had implications for the potential dynamics of financial distress. Financial distress is more likely to involve the evaporation of market liquidity and to have far-reaching cross-border effects. New players are more likely to be at its origin and/or to amplify it. The dynamics of distress may have become more unpredictable. And the transfer of risk to the household sector may arguably have lengthened the time lag between the build-up of embedded risk in the financial system and its overt emergence.

But the sea changes we have observed should not blind us to what has remained constant. For it is what has not changed that holds the key to the more durable aspects of financial instability. This paper has argued that the main form of financial instability with potentially serious macroeconomic costs has historically been, and continues to be, overextension in risk-taking and balance sheets in good times, masked by the veneer of a vibrant economy, that is, the occasional build-up of financial imbalances that at some point unwind, inflicting damage on the economy. And behind this form of instability hide four enduring characteristics of financial activity and human behaviour, namely: deep-seated and pervasive (asymmetric) information problems in financial relationships; powerful positive feedback mechanisms within the financial system as well as between the financial system and the real economy; limitations of risk perceptions; and limitations of incentives. The sea changes observed may affect the specific manifestation of these elements and their prominence, but should not be expected to alter them in a fundamental way.

This perspective has implications for policy. The challenge is to design a policy response that addresses the more enduring features of financial instability while at the same time tailoring it to the evolving financial system.

In recent years, major progress has been made in strengthening the financial system; even so, there is scope for improving the balance of the different types of policy initiatives. By analogy with policies aimed at improving safety on the roads, it could be argued that policy has so far largely focused quite effectively on improving the state of the roads and on introducing buffers (guard-rails, car bumpers and safety belts), but that more attention could usefully be devoted to the design and implementation of speed limits. In other words, much has been done to strengthen the payment and settlement system infrastructure and accounting standards ('the state of the roads'). Similar progress has been made in developing minimum capital standards and, with a telling question mark about cross-border arrangements, in articulating crisis management mechanisms ('buffers'). But more could be done in designing policies that would seek to limit overextension in risk-taking and balance sheets ('speed limits'). Admittedly, very good work has been done in encouraging improvements in risk measurement and management and in risk disclosures. Even so, given limitations in risk perceptions and incentives, the effectiveness of these steps may not, in the end, fully match expectations.

Ideally, speed limits would become more binding as the risk of overextension increases. Three guidelines could inform their design. First, as with fiscal policy, built-in stabilisers appear, on balance, superior to discretionary measures. This could be achieved, for instance, by calibrating prudential instruments based on experience over whole business cycles or stress estimates. Second, discretionary measures could be deployed to complement built-in stabilisers if and when it was judged appropriate. This could help to tailor the measures to specific features of the overextension. Third, close cooperation between different authorities with responsibility for, or whose policies impinged on, financial stability would be needed. This would involve prudential and monetary authorities in the first instance, but also those who set accounting standards and the tax authorities.

No doubt, designing and implementing effective speed limits is a daunting task. The analytical, institutional and political economy challenges involved should not be underestimated (Borio and Shim, 2007). Introducing such speed limits is part of what elsewhere has been described as strengthening the macro-prudential orientation of supervisory and regulatory frameworks. Despite the challenges, some progress in this direction has been made in recent years. Continuing to follow this route holds out the prospect of edging closer to securing lasting financial stability.

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