

Final draft
12 September 2003

Whither monetary and financial stability? The implications of evolving policy regimes*

Claudio Borio and William White

Bank for International Settlements

* Paper prepared for the Jackson Hole Symposium on “Monetary policy and uncertainty: Adapting to a changing economy” on 28-30 August 2003. The views expressed are those of the authors and do not necessarily reflect those of the BIS.

Table of contents

Introduction.....	1
I. The evolving economic environment: key stylised facts	2
Economic performance indicators.....	2
Lower and more stable inflation	2
Lower short-term output volatility.....	3
Greater prominence of credit and asset price booms and busts	3
Greater incidence of financial crises.....	4
Policy regimes.....	4
The financial regime.....	4
The monetary regime.....	6
II. The evolving economic environment: an interpretation	7
A more “orthodox” interpretation	7
A less “orthodox” interpretation.....	8
The role of the financial regime	9
The role of the monetary regime.....	13
III. Policy implications.....	17
Prudential policy.....	17
Monetary policy.....	20
Conclusion.....	23
Annex: Financial structure and the transmission mechanism.....	25
References	27

“Yes, we have won the war, but not without difficulty; but now we are going to have to win the peace...”

Georges Clémenceau

“Details proliferate; structure abides”

Charles Kindleberger

Introduction¹

Like a good novel, each phase in economic history has its villains, heroes and defining moments. Often, it is only with hindsight that we can identify them. There is little doubt now that the great villain during much of the postwar period has been inflation. The breakdown of Bretton Woods ushered in an unprecedented phase for the world economy. At no other time in modern history had the world seen prices of goods and services rising so fast for so long in so many countries. The heroes have been those central bankers that, after a protracted war, finally succeeded in restoring price stability. The defining moment, perhaps, was the end of the 1970s, when monetary policy in the leading economy of the globe, the United States, purposefully sought to break the enemy’s back, thereby fostering a more favourable environment for similar battles elsewhere.

At the same time, since the 1980s a new concern, financial instability, has risen to the top of national and international policy agendas. It is as if one villain had gradually left the stage only to be replaced by another. Episodes of financial instability with serious macroeconomic costs have occurred with greater frequency than in the past, in industrial and emerging markets alike. The costs of banking crises in terms of GDP forgone have been estimated to attain, not infrequently, double digits. For those that expected price stability to yield financial stability as a *by-product*, these events have represented a significant blow. Why has the full “peace dividend” of the war against inflation ostensibly failed to materialise?

In this essay we explore the nature of this apparent paradox. We argue that to resolve it, one needs to look closely at the radical changes that have taken place in the financial environment. The basic thesis is that the evolving nature of policy regimes in the financial and monetary spheres has altered in subtle ways the challenges facing the central banking community. The conjunction of liberalised financial markets with credible price-stability-oriented policies can result in significant changes in the dynamics of the economy. Reaping the full benefits of the new environment while minimising its potential costs calls for closer cooperation between monetary and prudential authorities.

Why should this be so? The story can be told in many ways, but a useful way of thinking about the issue is to consider what might be called the “*elasticity*” of an economic system under different regimes (Borio and Lowe (2002a)). This notion seeks to capture a system’s inherent potential to allow financial imbalances to build up over time, with endogenous forces failing to rein them in, until the imbalances eventually unwind, possibly resulting in financial instability. The notion focuses on the upswing, when the seeds of the problems are sown, rather than on the downswing, when the problems materialise. This elasticity can be thought of as measuring the vulnerability of an economy to boom and bust cycles. The elasticity of an economy depends on the *conjunction* of arrangements in the monetary and financial spheres and corresponding policy regimes. The thesis is that the conjunction of a liberalised financial system with monetary policy reaction functions that respond solely to *near-term* inflation pressures, and not to the build-up of financial imbalances, may unwittingly raise the elasticity of the economy beyond desirable levels.² Hence the need to put adequate, mutually reinforcing anchors in place in the two spheres.

¹ We would like to dedicate this essay to the memory of Charles Kindleberger, a one-time BIS member of staff, whose writings and teaching have deeply influenced the thinking on financial instability of more than one generation. Many of the ideas outlined in this essay have been presented in previous BIS research or presentations by BIS staff. The views expressed, however, are those of the authors and not necessarily those of the institution. We would like to thank Angeliika Donaubaier and Maurizio Luisi for excellent research assistance, and Palle Andersen, Svein Andresen, Andy Filardo, Gabriele Galati and Kostas Tsatsaronis for very helpful comments. All remaining errors are our own responsibility.

² This notion of “elasticity” is thus related to, but broader than, the family of notions used to characterise the potential of monetary arrangements to generate endogenous increases in the supply of money or credit, going as far back as to authors such as Wicksell (1898) or Hayek (1933). Loosely speaking, and as explained more precisely below, the term “financial imbalance” refers to overextension in balance sheets during booms resulting from the interaction of the behaviour of asset

The rest of the paper elaborates on this argument. In Section I we describe the salient features of the evolving economic landscape, focusing on a few indicators of performance and on the changes in policy regimes. In Section II we put forward an interpretation of economic developments along the lines just suggested. The intention is not to provide a full assessment and test of the basic thesis. Rather, less ambitiously, it is simply to argue that the interpretation is reasonable and deserves further study. This also serves to highlight the genuine “paradigm” uncertainty that surrounds the interpretation of economic developments and that may, in turn, contribute to explaining them. Next, in Section III we draw the implications of the analysis for both prudential and monetary policies. While the focus of this essay is primarily on monetary policy, it is important to consider the potential effectiveness and limitations of prudential policy too, since these help to determine the desirability of addressing financial imbalances through monetary levers. Finally, in the conclusions we highlight the main message and the issues that deserve further attention.

I. The evolving economic environment: key stylised facts

For the purposes of this study, the evolution of the economic environment over the last 30 years or so can be captured with the help of a few indicators of economic performance and two stylised representations of policy regimes. The indicators of economic performance include inflation, short-term output variability, asset price booms and busts and episodes of widespread financial distress. The key changes in policy regimes include financial liberalisation and the establishment of a credible commitment to price stability. Consider each in turn.

Economic performance indicators³

Lower and more stable inflation

Probably the most startling macroeconomic feature of the last 20 years or so has been the decline in inflation from its peaks in the late 1970s. Since at least the early 1990s, much of the world appears to have entered a period of relatively low and more stable inflation (Graph I.1). This has naturally led to a decline in nominal interest rates. Obvious cross-country differences aside, this has been a global phenomenon.

Graph I.1

The disinflation process has been so strong that recently a number of countries have been experiencing a phenomenon that would have been unthinkable in the 1970s and early 1980s, namely sustained declines in the overall price level.⁴ In Asia, prices have been declining for some time in Japan, China and Hong Kong SAR. Inflation rates are barely positive in other parts of East Asia. Elsewhere in the industrial world, while the overall price level has been rising, it has not been uncommon for sectoral price indices to be falling, especially outside the service sector. Moreover, once the typical upward biases in price indices are taken into account, the incidence of “effective” declines in the overall price level is considerably higher (Table I.1).

Table I.1

prices and external financing, an overextension that tends to undermine the sustainability of the economic expansion and to exacerbate the downturn. Part of the essay is devoted to finding simple empirical proxies for such financial imbalances.

³ This section draws, in particular, on Borio et al (2003).

⁴ For a historical perspective on the inflation and deflation process, see Borio and Filardo (2003).

Lower inflation has gone hand in hand with more stable inflation. For one, the volatility of the inflation rate has declined. This has confirmed the well known positive relationship between the level and variance (or standard deviation) of inflation. In addition, and more subtly, as evidenced by unit root tests,⁵ there are indications that inflation has become more mean-reverting, in the sense that changes in inflation have become less persistent. It is as if the inflation rate had become better anchored than in the past (see below).

Lower short-term output volatility

Alongside lower and more stable inflation, short-term output volatility appears to have decreased in large parts of the world. Measured either by the size of output gaps or the variability in growth rates, output fluctuations have tended to become more moderate since at least the mid-1980s in many industrialised countries (Graph I.2).⁶ Across them, the duration of business and growth cycles has lengthened somewhat. And the average depth and height of troughs and peaks respectively have been lower than in the past.

Graph I.2

This moderation has been particularly apparent in the United States. Its economy experienced the longest expansion on record in the 1990s, following another comparatively long upswing in the 1980s and a comparatively mild recession in 1990-91. So far, the most recent recession has also been rather shallow by historical standards.

Not all countries, however, have shared this positive experience. In particular, output volatility appears to have been greater in several economies that have gone through serious episodes of widespread financial distress (same graph). In the industrial world, the main examples have been Japan and some of the Nordic countries; elsewhere, the experience of several countries in East Asia is a case in point. In all of these cases, the crises had been preceded by a long period of rapid and rather steady growth (Graph I.3), and hence comparatively low volatility.

Graph I.3

Greater prominence of credit and asset price booms and busts

Since the mid-1980s, many countries have seen larger medium-term fluctuations in asset prices. This is illustrated for a selected sample of countries in Graph I.4, drawing on the evolution of equity as well as commercial and residential property prices.⁷ Their behaviour is captured by an aggregate asset price index, which weighs the various asset prices by rough estimates of their shares in private sector wealth.

Graph I.4

Abstracting from some cross-country differences, the graphs illustrate that since the 1970s two major cycles have taken place and a third is under way, in sympathy with real economic activity.

⁵ For specific evidence, see Borio et al (2003) and Borio and Filardo (2003).

⁶ See Dalsgaard et al (2002) and Blanchard and Simon (2001).

⁷ For more detailed documentation, see Borio et al (1994) and Borio and Lowe (2002a).

They correspond to the early to mid-1970s, the mid-1980s to the early or mid-1990s, and the second half of the 1990s to the present. Japan did not take part in the latest upswing following the bust in asset prices at the turn of the 1990s and the subsequent “lost decade”. The data indicate that, if anything, the size and amplitude of the cycles may be growing.

These cycles have typically coexisted with similar fluctuations in credit. Since the 1980s, the ratio of credit to GDP has risen markedly in most countries. In addition, the evolution of this ratio has tended to exhibit a generally positive correlation with medium-term swings in asset prices, as further confirmed by more detailed econometric evidence.⁸ This correlation is especially strong during booms and appears to have become tighter following financial liberalisations.

Greater incidence of financial crises

Since the 1980s the world has also seen an increase in the frequency and severity of episodes of serious financial distress.⁹ These have typically been associated with the bust phase of asset price and credit cycles, as the financial imbalances built up in good times unwound in a disruptive manner. The unwinding of financial imbalances has contributed to economic downturns or economic weakness in both industrialised and emerging market countries. Starting in the late 1980s, examples include the banking crises in Nordic countries, Japan, some Latin American countries and East Asia.¹⁰ The resulting costs for the real economy have been especially high when such banking crises have coincided with currency crises.¹¹ Moreover, even when actual failures of financial institutions have been limited or non-existent, in some cases the unwinding of the imbalances has contributed to strains on the financial system and the real economy. The experiences of the United States, the United Kingdom and Australia in the early 1990s stand out in this respect.

In addition to greater incidence of “traditional” banking crises, the period also saw certain novel episodes of financial distress with potentially damaging consequences for the real economy, operating largely through capital markets alone. This has been most evident in the United States, where non-bank intermediation has developed furthest. On these occasions, market liquidity evaporated and certain market segments froze. If sufficiently prolonged, such episodes can lead to the drying-up of access to market funding. On a small scale, examples include the dislocations to the commercial paper and the high-yield bond markets associated with the failures of Penn Central in 1980 and Drexel Burnham Lambert in 1990. But the most significant illustration relates to the broader financial strains linked to the near failure of LTCM in the autumn of 1998. At the time, concerns about withdrawal from risk-taking and a broader credit crunch were so acute as to contribute to a loosening of monetary policy by the Fed.¹²

Policy regimes

What about the accompanying changes in policy regimes?

The financial regime

The most remarkable development in the financial sphere since the 1970s has been ***financial liberalisation***, both within and across national borders. Industrial countries typically began partial

⁸ See, in particular, Borio et al (1994) and, more recently, Hofmann (2001).

⁹ The incidence and severity of banking crises is documented in a historical perspective in Bordo et al (2001).

¹⁰ See Kaminsky and Reinhart (1999) for a more systematic approach documenting the pattern of financial imbalances leading to currency and banking crises in 20 countries in Europe, Asia and Latin America since 1980. Note that there is still some controversy over whether these crises, most notably those in East Asia, reflected primarily a deterioration in fundamentals (eg Corsetti et al (1999)) or were predominantly driven by self-fulfilling creditor runs (eg Radelet and Sachs (1998)). These issues are discussed in more detail in eg Corsetti (1998) and Borio (2003). The alternative hypotheses would have implications for predictability, an issue discussed below.

¹¹ For the costs of financial crises in terms of output forgone, see Hoggarth and Saporta (2001), who also review previous estimates and discuss in detail the methodological difficulties involved.

¹² See CGFS (1999) and Ferguson (2003) for an elaboration on these points.

liberalisations in the mid-1970s, and then pushed such reforms considerably further in the 1980s and 1990s. By the early 1990s, liberalisation efforts were virtually complete. Developing countries generally followed somewhat later, but made substantial progress in freeing their relatively repressed financial systems in the 1990s. By then, to use Padoa-Schioppa and Saccomanni's (1994) phrase, for all intents and purposes the shift from a government-led to a market-led international financial system had been accomplished.¹³

True, the scope, timing and speed of the financial liberalisation process varied greatly across countries, depending on initial conditions and country-specific factors. But, supported by the ascendancy of free market philosophy and technological change, its key features were common to all. These are summarised, impressionistically and judgmentally, in Table I.2.

Table I.2

Financial arrangements in the late 1970s restricted considerably the free play of market forces. At the time, significant constraints still existed in many countries on the geographical and functional operation of financial enterprises. On the liability side of balance sheets, these constraints sometimes coexisted with ceilings on deposit rates and/or official tolerance of cartel-type agreements. On the asset side, quantitative and, to a lesser extent, interest rate controls were often in place, reflecting primarily interventionist approaches to the implementation of monetary policy and remnants of credit allocation policies.

By the early 1990s, many of these constraints had been removed or else undermined by market developments. The process had proceeded more speedily and furthest with respect to quantitative, interest rate and price restrictions, including on cross-border and cross-currency transactions. Those on location and business lines had also been substantially reduced, but not as far.¹⁴ As in the United States, for instance, they had to wait a bit longer.

The main result of the liberalisation process was a major rise in competitive pressures and hence easier access to external funding. Even the residual constraints that did remain did not greatly restrain competition. Not infrequently, they simply affected the way in which competitive forces would manifest themselves. For example, in France, where banks owned and managed the rapidly growing mutual funds, greater competition resulted in a reduction in margins rather than disintermediation per se. In the United States, where it took time to dismantle Glass-Steagall Act barriers to the commingling of commercial and investment banking, competition between the two corresponding types of institution was channelled through the instrument of choice (loans vs securities), greatly spurring the growth of open capital markets and disintermediation.

In addition, liberalisation, underpinned by advances in information technologies and intellectual breakthroughs, led to a much richer spectrum of tradable instruments. In particular, the rapid development of derivatives markets facilitated the unbundling of risk into its constituent components (Graph I.5). Alongside the spectacular expansion of over-the-counter (OTC) markets, a growing number of countries equipped themselves with exchanges for the trading of standardised products. For example, while in 1980 only the United States and the Netherlands had exchanges for futures and options, by 1991 only a very small number of industrial countries had neither. Increasingly, OTC derivatives were tailored to the needs of investors, borrowers and intermediaries. More recently, the rapid expansion of credit derivatives after their inception has been equally remarkable.

Graph I.5

¹³ The process of financial liberalisation in industrial countries is overviewed concisely in BIS (1992) and, in much more detail, in OECD (1992). Kaminsky and Schmukler (2001), inter alia, document an uneven, but ultimately substantial, trend towards deregulation of financial institutions and markets in developing countries as well.

¹⁴ Borio and Filosa (1994) provide a description and analysis of the cross-country experience with the liberalisation of restrictions on business lines.

The monetary regime

In the monetary sphere, the defining change has been the increased focus of central banks on a ***firm commitment to price stability***.¹⁵ By the late 1990s, the signs indicated that the process had reached full maturity, in the sense that the credibility of the central banks' anti-inflationary commitment had been established. While, again, significant differences are apparent across countries, from a global perspective it is possible to identify one defining moment and one set of institutional arrangements subsequently introduced to "hard-wire" the shift in focus.

The defining moment corresponds to the late 1970s. It was then that the Federal Reserve, under Volcker's leadership, decided to bring inflation down, even at potentially considerable short-term costs for the real economy. The turn was underscored by the shift in operating procedures that implied a greater willingness to accept volatility in short-term interest rates. The move had far-reaching global implications, as it created a monetary environment more conducive to fighting inflation elsewhere too. This is obvious for those countries that relied on bilateral exchange commitments vis-à-vis the US dollar. But, more importantly, it also applied in subtle ways to those of the other main world currencies, to the extent that the monetary authorities there could not be indifferent to the resulting US dollar appreciation and their markets could not remain immune to the level of real interest rates influenced by US policy.¹⁶

Operationally, the strategies that central banks followed over time were closely conditioned by developments in the financial sphere (Graph I.6). On the one hand, financial liberalisation and innovation undermined the reliability of the statistical relationships between monetary aggregates and output. As a result, by the late 1990s only two industrial countries still formally assigned an important role to those variables in their policy frameworks, namely Germany and Switzerland. The ECB subsequently took over the Bundesbank's heritage. On the other hand, exchange rate commitments became increasingly hard to maintain in a world of free capital movements. Thus, initially among countries with a history of comparatively high inflation, the authorities gradually adopted structured inflation targeting regimes, including specific numerical objectives for inflation, as a way of implementing their anti-inflation focus.¹⁷ Starting with countries such as New Zealand, Canada, the United Kingdom and Sweden, the trend subsequently extended much more widely, including many emerging market economies. Among these, the adoption of the new framework not infrequently took place in the aftermath of the collapse of regimes characterised by tighter exchange rate commitments.¹⁸ The experiences of Brazil and several East Asian countries following financial crises are obvious examples.

Graph I.6

Institutionally, the stronger intellectual, political and social consensus to fight inflation crystallised in the trend towards endowing central banks with a greater degree of autonomy or "independence" to pursue mandates more clearly focused on price stability.¹⁹ The aim was to make central banks less vulnerable to possible external pressures to test the limits of monetary policy in pursuit of transient employment or output gains. In particular, political pressures found fertile ground in a context where the short-run costs of a policy tightening were all too obvious but the long-term gains less apparent. The intellectual

¹⁵ For a broad-sweep cross-country examination of the evolution of monetary policy in the postwar period, see BIS (1997), Cottarelli and Giannini (1997) and White (2002).

¹⁶ Some of these mechanisms are well described in McKinnon (1993).

¹⁷ See eg Bermanke et al (1999a) and Schaechter et al (2000). Bermanke et al (1999a) also provide evidence that these explicit inflation targets have been followed by sustained disinflations in a number of cases. While inflation targets do not appear to have reduced the costs of such disinflations, they may help to bolster low inflation expectations once the disinflation has been achieved.

¹⁸ See Ho and McCauley (2003) for a discussion of the shift to inflation targeting in emerging market countries, with particular attention paid to the continuing role played by the exchange rate in such frameworks.

¹⁹ A literature has developed showing, empirically and analytically, a link between central bank independence and inflation performance; see Cukierman (1992) and Berger et al (2001) for surveys.

basis for the shift was the recognition, reinforced in the high-inflation period, of the absence of a long-run trade-off between inflation and unemployment.²⁰

These initiatives have clearly borne fruit. In particular, as inflation has become low and more stable, inflation expectations appear to have become better anchored around explicit or implicit inflation objectives. This is the message derived from an analysis of survey evidence or the behaviour of yield curves.²¹ The evidence strongly suggests that central banks have successfully established the credibility of their anti-inflation credentials.

II. The evolving economic environment: an interpretation

It is, of course, one thing to lay out stylised facts, and quite another to tie them together in a more or less coherent view of the world. Many interpretations are possible and indeed plausible. And, as of now, we simply lack a sufficiently long record of events, or indeed a sufficiently developed body of analysis, to adjudicate between them. At the same time, the differences between interpretations can be fundamental and go well beyond what could be captured by differences in a few parameters of generally agreed models. As a result, as we will show next, the implications of such paradigm uncertainty can be more far-reaching and raise subtler challenges for policy.

A more “orthodox” interpretation

The more orthodox, and probably prevailing, interpretation would be very reassuring. It would stress the link between the reduction in inflation and the greater moderation in business cycles so far in many countries.²² It would tend to discount the apparent larger medium-term swings in asset prices and the episodes of financial instability that have occurred even in the absence of obvious inflation. It would attribute these episodes mainly to temporary difficulties in learning to live in a new, less forgiving, environment and to country-specific deficiencies in the financial infrastructure. Drawing primarily on the experience of those countries where financial volatility has been less costly, it might even infer that greater volatility in the financial sphere could be the very mechanism that delivers less volatility in the real economy. It would stress how the growth of techniques for the management and transfer of risk, not least through derivative instruments, allow for a better distribution of risk across the economy, by edging the financial system closer to the ideal of “complete markets”. It would highlight how greater borrowing opportunities associated with liberalisation can allow agents to smooth expenditure decisions through time. Through various mechanisms, the financial system would thus have become more effective in insulating the real economy from less welcome adjustments to unforeseen and adverse developments (“shocks”). Such a view, therefore, would highlight resilience. And it would probably emphasise continuity rather than change in the macroeconomic processes at work. Thus, the monetary policy lessons learnt during the period of high inflation and the fight against it would apply, with possibly minor modification, to the current environment.

There is, indeed, a considerable element of truth in this interpretation.

First, there is little doubt that low and stable inflation has laid the basis for better long-term economic performance.²³ One might argue about how far the costs of inflation vary with its level and hence also

²⁰ This view was initially articulated by Friedman (1968) and Phelps (1968). It became much better accepted after the high-inflation period that followed (Friedman (1977)).

²¹ See eg Vickers (1999) and Perrier and Amano (2000). Bernanke et al (1999a) provide evidence that inflation targeting regimes may help to bolster low inflation expectations once the disinflation has been achieved.

²² There is a considerable amount of research trying to understand the factors behind the comparatively low volatility of output in some of the industrialised countries over the last decade or so, mostly dealing with the US experience. Answers so far have focused primarily on a more favourable environment, in the form of positive or smaller exogenous shocks (eg Stock and Watson (2002) and Ahmed et al (2002)), structural changes such as better inventory management (eg Kahn et al (2002)), better monetary policy (eg Clarida et al (2000)) and lower inflation (Blanchard and Simon (2001)). Lower inflation and better monetary policy have been stressed especially in the context of cross-country studies.

²³ The formal empirical evidence is at least clear for inflation above moderate levels. See, in particular, Fischer (1981), Barro (1995) and Feldstein (1997).

quibble about what the most appropriate inflation objectives might be. But by now there is a broad and well established consensus, honed by painful experience, that inflation undermines economic growth.²⁴ The channels are well known. Inflation misallocates resources by encouraging confusion between absolute and relative prices, and its effects may be especially treacherous if money illusion is present. Inflation can interact with the tax code to bias decisions against capital accumulation. And economies that are inflation-prone, in the sense of being vulnerable to bouts of inflation following adverse initial “shocks”, force a monetary response aimed at ensuring that the economy does not overheat, inducing unwelcome stop-and-go policies. Indeed, in the postwar period the most common cause of the death of expansions was monetary tightening aimed at quelling inflationary pressures.

Second, it is well known that an inflationary environment can be conducive to financial instability.²⁵ Inflation encourages investments in inflation hedges, such as real estate, and can hence promote unsustainable asset price increases that subsequently unwind ruinously. Especially by interacting with the tax code, it can encourage excessive indebtedness. And efforts to bring inflation under control through interest rate increases can expose financial vulnerabilities previously masked by rising prices. Among industrial countries, the secondary banking crisis in the early 1970s in the United Kingdom and the savings and loan crisis in the mid-1980s in the United States are examples of the genre. But several examples can be found, too, among emerging market countries.

Third, there is equally little doubt that transitional difficulties have also contributed to the episodes of instability that we have seen. For one, initial conditions mattered. In some cases direct controls had resulted in portfolio configurations ill-suited to the new economic landscape, as in the US savings and loan industry. More generally, by sheltering institutions from competition, a repressed financial environment had fostered bloated cost structures and had left institutions ill-equipped to operate, as well as assess, manage and price risks, in a more competitive marketplace. Prudential authorities, too, faced similar learning difficulties.²⁶ In addition, the very transition from high to low inflation, even in a rapidly expanding economy, may have been a source of difficulties. One may legitimately wonder, for instance, whether part of the overly exuberant equity valuation of the 1990s may not have been the result of mistaking nominal for real interest rate declines, just as some of the very low valuation in the 1970s may have reflected the mirror-image problem.²⁷

Finally, there is no question that significant improvements in risk management and, more broadly, the development of a sounder credit culture have taken place during the 1990s. Likewise, through derivative instruments and other techniques, in some countries banks have been able to distribute risk more widely through the financial system.

A less “orthodox” interpretation²⁸

Arguably, however, the changes brought about by the combination of financial liberalisation and, more recently, the establishment of a credible anti-inflation commitment run deeper. They may have been modifying in subtle but more fundamental ways the dynamics of the economy. Taken together, they may thus raise more fundamental challenges to current paradigms and policies.

In a nutshell, the changes in the financial and monetary regime may have potentially increased the scope for financial imbalances to grow during expansionary phases owing to a relaxation of financial and monetary constraints. In other words, *in the absence of compensating policy changes*, they may have raised the “elasticity” of the economic system, making it more vulnerable to boom and bust cycles. In those expansions in which the imbalances did develop, they would both reflect and contribute to distortions in the real economy, thereby undermining the sustainability of the expansion.

²⁴ Inflation may also be strongly disliked for other reasons too, not least the arbitrary redistribution of income that it can produce, often at the expense of the less well-off and more vulnerable segments in society. And on the psychological costs of inflation, see Shiller (1996).

²⁵ For an elaboration on this view, see Bordo (2000) and Bordo et al (2000).

²⁶ For a discussion of these issues, see Andersen and White (1996), BIS (1992, 1996), White (1998a) and Borio and Tsatsaronis (1999).

²⁷ On these issues, see Modigliani and Cohn (1979) and McCauley et al (1999).

²⁸ These aspects were first developed in Borio and Crockett (2000).

By the same token, they could sow the seeds of headwinds and financial stress during the subsequent downswing.

Several implications follow from this interpretation. First, financial factors should have become more important drivers of business fluctuations. And properly deciphered, they should also contain useful leading information about the evolution of the economy. Second, while business fluctuations should still continue to come in all shapes and sizes, on balance expansions could last longer. By the same token, contractions could also take longer to be shaken off and/or be deeper, especially if accompanied by episodes of widespread financial strains. Finally, the changes in the economic environment would put a premium on policies designed to strengthen the anchors in place in both the financial and monetary spheres.

In order to develop this argument, we proceed in two steps. We first assess the implications of changes in the financial regime. In and of themselves, as long as monetary policy remains accommodative, these can result in business fluctuations where episodes of financial distress figure more prominently than in the previous repressed financial environment. We then explore the additional implications of the recently emerging monetary regime characterised by low and stable inflation, a credible anti-inflation commitment and policy rules focused on keeping in check near-term inflation pressures. This is necessarily the more speculative and forward-looking aspect of the analysis, given how recent this new environment is. Even so, history may also hold useful clues. We argue that even in this environment financial strains can emerge and that monetary policy may unwittingly allow the build-up of imbalances.

The role of the financial regime

A liberalised financial environment can more easily accommodate, and reinforce, fluctuations in economic activity. It can do so by lending strength to the powerful procyclical²⁹ forces inherent in financial arrangements and in their two-way interaction with the real economy.

The financial system is inherently procyclical.³⁰ Perceptions of value and risk move highly procyclically. And so does the willingness to take on risk. Aside from obvious minor lead and lag relationships, asset prices and credit spreads move highly procyclically. There is a growing body of evidence indicating that, despite their intended design, the ratings of rating agencies exhibit significant sensitivity to the cycle.³¹ Internal bank risk ratings are considerably procyclical.³² And accounting measures of expected losses, such as bank provisions, and profits, too, move procyclically. Because the availability and pricing of external funding are intimately related to perceptions of value and risk, as well as to the willingness to take on risk, they move in sympathy with economic activity as well. Thus, for instance, the ratio of credit to GDP tends to move procyclically.

The inherent procyclicality of the financial system tends to interact with the real economy in ways that can amplify economic fluctuations. During booms, self-reinforcing processes can develop, characterised by rising asset prices, loosening external financing constraints, further capital deepening, rising productivity and profits. These processes operate in reverse during contractions.

Clearly, these behavioural patterns are part of the physiology of a properly functioning economy. The elasticity of external funding during booms tends to reflect a genuine improvement in the outlook. And it can also allow the economy to take better advantage of growth opportunities. It is the oil that lubricates the system.

²⁹ In what follows, to avoid confusion, a variable is said to behave procyclically if its co-movement with economic activity is such as to tend to amplify it. For instance, if credit spreads fall during expansions and rise during contractions, they are said to move procyclically.

³⁰ Borio et al (2001) provide a detailed documentation and analysis of these issues. See also Berger and Udell (2003) for a complementary explanation of banks' procyclical lending practices. Altman et al (2002) focus on evidence of, and reasons for, procyclicality in loss-given-defaults in bond markets.

³¹ See, in particular, Amato and Furfine (2003) and references therein. A classic, if somewhat overlooked, analysis of procyclicality in risk assessments in bond markets and ratings is the one by Hickman (1957).

³² Lowe (2002) considers this in some detail. Allen and Saunders (2003) review credit risk modelling from the perspective of procyclicality.

Nevertheless, on occasions these processes can go too far. When this occurs, masked by benign conditions, financial imbalances and associated distortions in the real economy build up during the boom phase. Fostered by genuine uncertainty in interpreting available evidence, cyclical developments are mistaken for more fundamental improvements in long-run growth prospects.³³ The built-in stabilising mechanisms in the economy are not sufficient to prevent it from becoming overstretched. This sows the seeds of potentially damaging headwinds down the road, as the economy, having grown at an unsustainable pace, finally slows down and the procyclical forces go into reverse. Some of the headwinds arise from the demand side, as households and firms struggle to restructure their balance sheets, caught between declining profits and incomes, falling asset prices and levels of indebtedness that prove excessive. Others stem primarily from the supply side, as financial markets and institutions become more cautious in extending finance. In extreme cases, broader financial crises can arise and exacerbate the downturn further.

It is easy to see how a liberalised financial environment can raise the elasticity of the financial system and make overextension more likely. Such an environment multiplies the potential sources of funding. Heightened competitive pressures increase incentives to take on risks and, by reducing quasi-rents, also narrow the scope for absorbing losses, especially when they interact with comparatively rigid cost structures.³⁴ And competitive pressures might also tend to increase the value of any subsidies associated with explicit or implicit safety nets in place.³⁵ After all, *ceteris paribus*, as option theory makes clear, guarantees become more valuable once the environment becomes riskier.³⁶

Experience is generally consistent with the view that in a liberalised financial environment the risk of episodes of financial instability with material macroeconomic costs is higher than in a more tightly controlled system. The incidence of banking crises was much more limited during the postwar phase, in which the financial system was more repressed, in both industrial and emerging markets alike. And the fact that banking crises were a recurrent feature of the global economic landscape before the financial system became more heavily regulated in the 1930s suggests that the phenomenon does not purely reflect transitional learning difficulties. Such banking crises have tended to be closely linked to the business cycle, generally occurring close to peaks or during contractions.³⁷ And they tend to be preceded by economic booms in which credit and asset prices increase especially rapidly.³⁸ As the quote from Kindleberger (1996) hints, it is what is common, rather than idiosyncratic, about the crises that holds the more informative clues about the processes at work.

Recent work has indicated more systematically that “excessive” growth in asset prices and credit contains useful leading information about systemic banking stress. For instance, Borio and Lowe (2002a) have found that it is possible to predict such episodes fairly well based exclusively on two

³³ The role played by this type of uncertainty is discussed in more detail in Borio et al (2001).

³⁴ These processes have been extensively discussed in the literature. See, for instance, Keeley (1990) for the relationship between competition, franchise values and risk in the context of deregulation in the United States. Recent theoretical work highlighting the link between greater competition and greater risk-taking includes Hellman et al (2000), Allen and Gale (2000a) and Repullo (2002); Carletti and Hartmann (2002) review the theoretical literature and empirical evidence.

³⁵ Safety nets are defined here to encompass those mechanisms aimed at containing the disruptive consequences of financial distress once it arises, thereby also instilling confidence in the financial system. Typical elements of safety nets include emergency liquidity assistance, deposit protection schemes and exit policies. For a recent analysis of the evolution of safety nets, see White (2003).

³⁶ See Merton (1977) for the classic reference to the calculation of the value of the implicit guarantees based on the isomorphism between the implicit guarantees and options.

³⁷ The timing of the crises, however, seems to have changed somewhat. Before the 1930s, banking crises tended to occur close to peaks in the business cycle (Gorton (1988)); since then, they appear to take place somewhat later. This may reflect, at least in part, the extension of safety nets. Safety nets delay or suppress the emergence of liquidity problems early on in the cycle but cannot prevent insolvency and, if ill-structured, may actually contribute to it. On the broader question of the evolving characteristics of safety nets in modern financial systems, see White (2003).

³⁸ On the pre-World War II experience, see Allen et al (1938), Goodhart and De Lary (1999) and Bordo et al (2001), who consider the cross-country experience, Kent and D'Arcy (2001) for Australia, Gerdrup (2003) for Norway and Eichengreen and Mitchener (2003) for the United States and elsewhere in the lead-up to the Great Depression. For the postwar period, the role of credit booms in preparing the ground for banking crises has recently been stressed by, among others, Gavin and Hausmann (1996), Gourinchas et al (2001) and Eichengreen and Arteta (2000). In a series of recent papers, Allen and Gale (1999) and (2000b) have formalised some of the potential destabilising interaction between credit and asset prices based on information asymmetries. Of course, two classic strands of work in this area are by Kindleberger (1996) and Minsky (1982).

indicators. These measure the deviations from trend or “gaps” in two key variables, namely the ratio of (private sector) credit to GDP and inflation-adjusted equity prices.³⁹ The corresponding trends are calculated recursively, using information available only up to the time when the predictions are made. In order to reduce the statistical noise, the authors require critical thresholds for the two variables to be exceeded simultaneously. They also find that the predictive performance of the indicators improves as the horizon is extended from one to three years and that the predictive ability and critical thresholds are broadly similar for industrial and emerging market countries⁴⁰ (Borio and Lowe (2002b)).

Drawing on Borio and Lowe (2003), Tables II.1 and II.2 extend the previous results to the consideration of quarterly, as opposed to annual, data, to longer forward horizons and to the analysis of the information content for output itself. To underline the relevance of these phenomena for industrial countries too, emerging markets are omitted. The forecast sample is 1974 Q1–1999 Q4, covers 20 countries and includes 15 episodes of banking distress. A number of observations are worth highlighting.

The shift to quarterly data does not significantly affect the predictive performance of the indicators, as long as the trend is smoothed sufficiently (Table II.1). Taken in isolation, both the credit gap and the equity gap can predict between over 70 and 80% of the episodes of banking distress. Combining the indicators results in hardly any loss in the percentage of episodes predicted but cuts the noise substantially, by a factor of between 5 and 10. Specifically, if the horizon covers the third, fourth and fifth years ahead, a credit gap of 4% together with an equity gap of 60% predict almost 75% of the crises with a noise-to-signal ratio of only 0.02. The “cry wolf” problem is not that serious, as such bad signals are issued only 1% of the time. Moreover, they tend to relate to episodes in which the indicator switches on a bit too early and stays on until a crisis does occur. While not shown, the indicators can also be calibrated to predict episodes of distress with a shorter lead, with little change in the main results.

Table II.1

The information content of credit and equity prices is clearly additional to that of the output gap (same table). The output gap indicator is noisier: in order to predict a similar number of crises, its noise-to-signal ratio has to be considerably higher. This is true regardless of whether the trend is smoothed to the extent normally done in macroeconomic applications or if it is smoothed further, as with the other series.⁴¹

The indicators capture all the episodes with clear macroeconomic significance. Notably, these include the banking crises in the Nordic countries and Japan as well as the serious financial strains experienced in the early 1990s in the United States, United Kingdom and Australia. As expected, because of its different nature, the crisis of the savings and loan industry is missed.

Finally, and not surprisingly, the indicators contain useful leading information about output performance as well (Table II.2). For example, the unconditional probability of observing an (ex ante) output gap of less than minus 1% in any one year is almost 40%. It rises to 64% and 71%, respectively, in the third and fourth year following the quarter in which the credit and equity price gaps exceed simultaneously the corresponding critical thresholds used to predict banking stress. And if an

³⁹ This work takes its cue from other literature seeking to construct indicators of financial crises, notably Kaminsky and Reinhart (1999). For a recent review with specific reference to banking crises, see Bell and Pain (2000).

⁴⁰ The main difference is that, in the case of emerging market countries, the real exchange rate gap, which captures a cumulative real appreciation of the currency, has additional information content. This is consistent with the greater role that the exchange rate and foreign sources of credit expansion play in these countries.

⁴¹ The basic result does not change if the indicators are calibrated to capture crises with a shorter lead time, although the smoothed trend series (λ equal to 400000) appears to perform better than the traditional one (λ equal to 1600).

output gap of at least 2% is added to the composite indicator, making it even more selective, that probability increases further to 100%.⁴²

Table II.2

This evidence also suggests several broader reflections about the role of the financial regime and the behaviour of markets.

First, the episodes of financial instability with larger macroeconomic costs tend to arise not so much from the idiosyncratic failure of individual institutions spreading, through various contagion mechanisms, to the financial system more broadly; rather, they derive from common exposures to the same risk factor. Business fluctuations, and their interaction with debt and asset prices, are the archetypical example. For this reason, widespread banking stress tends to reflect, and in turn exacerbate, overall fluctuations in GDP.

Second, if we look at the genesis of the crises more closely, we will find another salient feature. Indicators of risk perceptions tend to decline during the upswing and, in some cases, to be lowest close to the peak of the boom. But this is precisely the point where, with hindsight at least, we can tell that risk was greatest. During the upswing, asset prices are buoyant, risk spreads narrow and provisions decline. They clearly behave as if risk fell in booms and rose in recessions. And yet there is a sense in which risk rises in booms, as imbalances build up, and materialises in recessions, as they unwind. The length of the horizon plays a key role here.

Third, this behaviour arguably reflects a confluence of two factors. For one thing, it points to a varying ability to measure the different dimensions of risk. Economic agents seem to be better equipped to measure the *cross-sectional* than the *time* dimension of risk. In particular, they find it especially difficult to measure how the absolute level of systematic (system-wide) risk evolves over time.⁴³ It is no coincidence, for instance, that rating agencies pay particular attention to the relative, rather than absolute, riskiness of borrowers or instruments. Nor, indeed, that much of the extant literature on the effectiveness of market discipline is of a cross-sectional nature.⁴⁴ For another thing, such market behaviour also hints at limitations regarding the incentives to take on risk. The key problem is the wedge between individual rationality and desirable aggregate outcomes. Familiar notions here include the “prisoner’s dilemma”, “coordination failures” and “herding”. For instance, would it be reasonable to expect a bank manager to trade off a sure loss of market share in a boom against the distant hope of regaining it in a future potential slump? Or to adopt less procyclical measures of risk on the grounds that a crisis might be less likely if others adopted them as well? The bottom line is that the Achilles heel of markets may not be so much indiscriminate reactions to idiosyncratic problems but, rather, failing to prevent the build-up of generalised overextension.

Finally, what does all this imply for the notion that markets are becoming increasingly “complete”? Perhaps that it is best to distinguish the ability of the financial system to allocate or diversify risk at a point in time from that of doing so intertemporally.⁴⁵ The new instruments that have grown so fast in recent years have clearly allowed the greater dispersion of risk across the system at a point in time. As such, they have no doubt made it more resilient to exogenous “shocks”. But beyond this, a fuller grasp of how system-wide risk evolves over time requires a deeper understanding of how the financial and real sides of the economy interact so as to change the trajectory of the risk profile of the overall economy. In this sense, the evolution of non-diversifiable risk is endogenous with respect to financial arrangements (see below).

⁴² This composite indicator is selective indeed, as there are only nine occurrences in the overall sample where these thresholds are exceeded. Making the indicator less restrictive does not alter the basic results. Note also that the probability of the output gap falling short of minus 2% is still almost 80% in the fourth year.

⁴³ This point is stressed in Borio and Crockett (2000) and analysed in some detail in Borio et al (2001). More recently, Goodhart and Danielsson (2001) have stressed it as well.

⁴⁴ See, in particular, the well known survey by Flannery (1998).

⁴⁵ See also Allen and Gale (2000a).

On balance, we read this evidence as broadly consistent with the view that financial liberalisation has indeed increased the elasticity of the economy. This should by no means be read to imply that liberalisation is not desirable. On the contrary, repressive financial arrangements resulted in serious misallocation of resources and inefficiencies. Moreover, by making it easier to raise “seigniorage” revenue through the inflation tax, the various constraints on financial institutions’ portfolios and cross-border flows actually attenuated the incentive of governments to fight inflation. Rather, the point is simply that in order to maximise the benefits from financial liberalisation while minimising its potential costs, it is important to put in place the necessary safeguards.⁴⁶

The role of the monetary regime

What about the role of the monetary regime?

It is hard to imagine that financial imbalances could build up without some form of monetary accommodation. When financial instability arises in an inflationary climate, the source of monetary accommodation is easily identifiable. The secondary banking crisis in the United Kingdom in the early 1970s is an obvious example. At the time, financial deregulation (the dismantling of Competition and Credit Control) and an easy monetary stance combined to produce higher inflation together with a credit and commercial real estate boom that ended in tears. And the several banking crises experienced in emerging market countries in an inflationary environment provide further supportive evidence.

What might be harder to imagine is how monetary accommodation could take place if the authorities pursued a vigilant anti-inflation policy. We would argue, however, that this can in fact happen. As historical evidence suggests, it is quite possible for financial imbalances to develop even in an environment of stable and low inflation. In today’s fiat money regimes the only exogenous *monetary* constraint on the otherwise endogenous credit expansion is the reaction function of the central bank. Therefore, if that reaction function responds exclusively to short-run inflation pressures, it may unwittingly accommodate the build-up of the imbalances. Consider these arguments in more detail.

It is possible to refer to examples of low inflation coexisting with the build-up of financial imbalances as harbingers of subsequent banking crises accompanied by serious economic weakness. Most recently, the experiences of Japan and some East Asian countries, notably Korea, immediately spring to mind (Graph II.1). In fact, experiences of this kind were quite common in the interwar years or before World War I, when the environment was one of comparative price stability. For instance, the case of the United States in the 1920s and that of Australia in the 1880s are just two examples out of many (same graph).

Graph II.1

In fact, even confining the analysis to the period since the 1970s, the relationship between inflation and the build-up of financial imbalances is not quite the one that classical monetarists might have expected (Graph II.2).⁴⁷ The evidence from both industrial and emerging market countries indicates that while, on average, inflation falls with a lag after a banking crisis, it does not pick up systematically in the years prior to it. The short-lived inflation spike after the crises reflects primarily the sharp currency depreciations that accompany twin crises. Indeed, and more revealingly, the evidence also indicates that, if anything, lending and equity price booms tend to develop against the background of disinflation. Thus, *judged on the basis of the performance of inflation*, during these booms a central bank could hardly be accused of following an easy monetary stance.

⁴⁶ On this, see Crockett (2001a). Andersen and White (1996) review some of the literature of the impact of liberalisation on economic performance. See Prasad et al (2003) for a more recent survey, focusing primarily on emerging market countries and on capital account liberalisation.

⁴⁷ See, in particular, Schwartz (1995) as well as Bordo et al (2000) and the references therein.

Graph II.2

On reflection, the reasons for the possible coexistence of economic booms, the build-up of imbalances and muted inflation pressures are not that hard to find. Several mechanisms come to mind.

First, long expansions of this type would most likely develop following favourable developments on the supply side. Improvements in productivity⁴⁸ or, especially in emerging market countries, the establishment of credible policy frameworks are obvious examples. These developments would naturally tend to attenuate price pressures. They would do so directly, by cutting production costs, and indirectly, by encouraging additional capital accumulation and the appreciation of the currency, as financial capital chased perceived higher returns.

Second, for a given aggregate demand, unsustainable asset price increases could themselves play a role in dampening inflation.⁴⁹ For one, they could artificially boost accounting profits, allowing firms to follow more aggressive pricing strategies. Just think of the impact of lower contributions to pension funds and of financial gains on firms' investments. During the boom of the 1980s, for instance, Japanese companies derived a sizeable share of earnings from their now notorious "Zaitech" (or financial engineering) activities; and during the more generalised equity boom of the 1990s, pension fund surpluses played a major role.⁵⁰ Likewise, large financial gains by employees could also partly substitute for higher wage claims. And unsustainable asset price increases would also tend to increase tax revenue and hence strengthen fiscal positions,⁵¹ crowding in capital accumulation and hence productivity gains.

Finally, the very success in establishing an environment of low and stable inflation, underpinned by greater central bank credibility, could further dampen the inflationary process. If so, underlying excess demand pressures would tend to take more time to show up in overt inflation. In part, this could result from fixed ("menu") adjustment costs, which would lead to stickier wages and prices. Above all, however, with inflation expectations better anchored around inflation objectives, supported by the authorities' commitment to keep inflation in check, agents would be less likely to adjust wages and prices upwards. And the belief that inflation was no longer a threat could itself contribute to the build-up of imbalances, by removing the prospects of a recession induced by a monetary tightening to bring inflation under control.

The bottom line is that, given unusually muted near-term inflation pressures during much of the expansionary phase, policy rates might fail to rise sufficiently promptly to help restrain the build-up of financial imbalances.

Several additional points are worth highlighting.

First, from this perspective, developing financial imbalances, if they appear to be fairly large, could provide critical additional, and hence complementary, information about the likely future evolution of the economy. This information would not be available from traditional indicators of inflation pressures, since those indicators generally focus on the current and near-term degree of pressure on resources rather than on the pressures that might develop further out in the future, as financial imbalances unwind.⁵² Indeed, because of the demand-depressing effect of the unwinding, the real risk to which

⁴⁸ The salient role of advances in productivity in the recent US boom has been amply documented (eg Oliner and Sichel (2002)). On Japan, see Yamaguchi (1999). For further analysis of these issues, see Borio et al (2003) and references therein.

⁴⁹ An offsetting effect of higher asset prices operates through housing costs, which are affected by higher residential property prices. The extent to which this is the case crucially depends on how housing costs are included in the consumer price index. Goodhart (2001) analyses this important but rather neglected issue in some detail.

⁵⁰ Moreover, to the extent that companies increase their investments in other companies, this in effect amounts to double leverage and makes them more vulnerable to a reduction in the stream of income ultimately linked to the given capital stock. Equity investments in pension funds, for instance, are equivalent to cross-shareholdings. Draghi et al (2003), for instance, have recently stressed this.

⁵¹ For an empirical analysis, see Eschenbach and Schuknecht (2002).

⁵² Other variables, too, might contain useful information. For example, Gertler and Lown (2000) find that in addition to moving contemporaneously with economic activity, the spread between low- and high-quality corporate bonds has good leading indicator properties at one-year horizons for output fluctuations since the mid-1980s. One might expect this to have been

large financial imbalances would point is economic weakness. And with inflation initially low, deflation would be a greater risk than inflation.

Some evidence suggesting that the information content of financial imbalances is indeed additional to that of more traditional measures of slack is shown in Tables II.2 and II.3, based on Borio and Lowe (2003). In particular, as already noted, conditioning on the financial variables exceeding the critical thresholds used for banking distress foreshadows future weakness in the economy better than conditioning on past values of output gaps alone (Table II.2).⁵³ Similarly, the results also appear to indicate that the imbalances herald disinflationary, rather than inflationary, pressures down the road (Table II.3). The relationship, however, is not as strong as that for output weakness and is less monotonic.

Table II.3

Second, during expansions of the type described here, applying more traditional paradigms to the interpretation of developments could lead policymakers astray. Interpreting rapid monetary and credit expansion as a sign of upward pressures on the price level down the road would be inappropriate. Likewise, a misleading approach would be to calibrate estimates of potential output, and hence of the sustainability of the expansion, by cross-checking them with actual inflation performance. It is not uncommon, for instance, to take stable or falling inflation as an indication that slack may be larger than could be surmised from more direct estimates.⁵⁴ This can be justified within the traditional models used to describe the economy. In particular, given the considerable uncertainty surrounding estimates of potential output and long-term productivity at times of possible structural breaks, it would make sense to pay more attention to actual inflation, which is measured with less error.⁵⁵ However, from the perspective of the paradigm stressed here, such a procedure would tend to bias upwards the estimates of potential.

Third, the credibility of the central bank's anti-inflation commitment can be a double-edged sword. On the one hand, the credibility reinforces other structural factors that may put a lid on inflationary pressures. On the other, by helping to anchor longer-term inflation expectations around the central bank's inflation objectives, that credibility makes it more likely that unsustainable booms could take longer to show up in overt inflation. This "paradox of credibility" means that the central bank can be a victim of its own success (Borio and Lowe (2002a)).⁵⁶ Conquering inflation can contribute to changes in the dynamics of the system that could mask the risks arising in the economy.

Fourth, evidence of low short-term output volatility is not necessarily inconsistent with the picture described here. Indeed, fluctuations where financial imbalances play a larger role would typically be characterised by a prolonged and sustained upswing, as this would encourage their build-up. If the

true also in the recent slowdown that started in the autumn of 2000, given the previous increase in the spread. To the extent that it is not a tightening of monetary policy that largely brings about such slowdowns, one would also expect the information content of the term spread to have correspondingly diminished. While the analysis of Gertler and Lown looks at comparatively short horizons ahead, one could imagine lengthening the horizon and exploring the information content of a narrowing of credit spreads for subsequent financial strains and economic weakness. For example, the major narrowing of sovereign credit spreads in the build-up to the Asian crisis has been amply documented (eg Cline and Barnes (1997), Eichengreen and Mody (2000) and Kamin and von Kleist (1999)).

⁵³ The performance of the output gap could be improved, although the conclusions would not be qualitatively altered, if the output series was smoothed further, utilising a lambda equal to 400000, rather than the conventional value of 1600, for the quarterly series. This suggests that it is the slow cumulative movements that matter, and that mean reversion forces are significant. See Borio and Lowe (2003).

⁵⁴ Econometrically, this is the approach that exploits the theoretical Phillips curve relationship to derive more precise statistical estimates of the output gap; see eg Kuttner (1994), Gerlach and Smets (1999) and Gruen et al (2002).

⁵⁵ See, for instance, Smets (1998) for a formalisation of this point.

⁵⁶ Elements of this view can also be found elsewhere, notably in Goodfriend (2000). See also Amato and Shin (2003), who show that in a model without common knowledge the public signal (assumed credible) provided by the central bank about the state of the economy (eg inflation outlook) could excessively condition private beliefs, thereby distorting the information that actual inflation would convey about the true underlying state of the economy (eg excess demand). In fact, the paradox can be thought of as yet another example of the Lucas critique.

data are predominantly drawn from such periods, short-term output volatility can easily be lower compared with a sequence of more traditional cycles.

Fifth, it may be instructive to compare the “paradigm” implicit in the above analysis with that currently prevailing in the academic profession. For one, the two differ in terms of the interpretation of the business cycle. The prevailing paradigm sees business fluctuations as primarily the result of sequences of comparatively short-lived shocks, with the economy rapidly returning to equilibrium; the one articulated here stresses endogenous cumulative processes and self-sustaining fluctuations. As such, it harkens back to a much older tradition in business cycle theory.⁵⁷ Non-linearities are of the essence. Similarly, the two views stress different sources of “distortions” in the functioning of the economy and hence of welfare costs. The prevailing paradigm focuses on distortions arising from misalignments in relative prices of goods and services at a point in time, associated, for instance, with sticky prices. These distortions would disappear if prices were stable.⁵⁸ By contrast, the one developed here emphasises distortions impinging on intertemporal consumption/investment decisions, which would manifest themselves in financial imbalances in the corporate and household sectors.

Sixth, where the analysis here differs far less from current intellectual perspectives is with respect to the transmission mechanism of monetary policy. In particular, the analysis is fully in line with approaches that stress financial frictions and wedges between internal and external financial funding.⁵⁹ At the same time, by comparison with more established views, it pays greater attention to the impact of policy on perceptions of, and attitudes towards, risk (Borio et al (2001)). Some suggestive evidence of the relationship between monetary policy and changing attitudes towards risk is shown in Graph II.3. The graph plots an index of global liquidity conditions (the inverse of inflation-adjusted overnight rates for the main industrialised countries) and a measure of risk aversion, derived from the cross-sectional pattern of ex post returns on various asset classes and their historical volatilities (see the graph for details).⁶⁰ The graph suggests that between 1992 and 2000 easier monetary conditions boosted investors’ risk appetite, and vice versa. Since then, however, mainly in the wake of the stock market bust, risk attitudes appear to have been less responsive, pointing to significant headwinds.

Graph II.3

Finally, the claim is not so much that the “enduring core” of business cycles⁶¹ or the transmission mechanism has changed. Rather, it is simply that the interaction between changes in the financial and

⁵⁷ This tradition takes root in work by Pigou (1929), Fischer (1932) and the Austrian tradition (eg von Mises (1912), Hayek (1933) and Schumpeter (1939)) among others. Within this tradition, Minsky (1982) and Kindleberger (1996) took the potential destabilising role of finance further. More recently, Zarnowitz (1999) has been a key advocate. Statistically, elements thereof have inspired the leading indicator exercises of the NBER, in the footprints of Burns and Mitchell (1946). This tradition contrasts with the now common Frischian view of business cycles, which focuses on exogenous shocks (Frisch (1933)). See Laidler (2003) for a discussion of some of these issues and Filardo (2003a) for a more modern rendering. Empirical attempts to adjudicate between the two types of approach include Stock and Watson (1993), Hamilton (1989), Filardo and Gordon (1999) and Filardo (2003a,b).

⁵⁸ In this sense, and as a first approximation, inflation could even be said to be a “sufficient statistic” for those distortions. Here “distortions” should be interpreted as departures from economic efficiency, normally measured as departures from an equilibrium in which prices are fully flexible. The most popular example is the family of so-called New Keynesian models; see eg Woodford (2002) and Clarida et al (1999).

⁵⁹ There is by now a well developed, and rapidly growing, literature exploring the amplifying role of financial factors, seen as a mechanism that increases the persistence of financial shocks and the potency of monetary policy, drawing on the asymmetric information literature (eg Gertler (1988), Bernanke and Gertler (1995), Bernanke et al (1999b) and Kiyotaki and Moore (1997)). Bernanke and Gertler (1995) and Bernanke et al (1999b) also review the corresponding empirical evidence. See also the Annex for some cross-country suggestive evidence on these mechanisms.

⁶⁰ The derivation of the indicator is further explained in Tsatsaronis (2000). Other measures of risk aversion may also be constructed, for instance by comparing risk-neutral and statistical probability distributions based on option prices (Tarashev et al (2003) and Scheicher (2003)). Similarly, using a different approach, Fornari (2003) finds that measures of changing risk aversion have considerable predictive information content for economic activity, especially with respect to turning points. In general, this is an under-researched area that deserves further attention. Greenspan (1999, 2002a) has repeatedly stressed the need to understand better what determines the investors’ changing willingness to take on risks.

⁶¹ The phrase is from Zarnowitz (1999).

monetary regime may have altered the cumulative significance of financial factors and certain aspects of the dynamics of the economy.

Looking back at the experience in recent years, it is possible to detect the signs of dynamics of the kind emphasised here. The experiences in Japan, some countries in East Asia and, in several respects, recent developments in the United States and hence in the global economy share a common characteristic: investment-led booms that were reinforced by financial developments and that did not end up with rapidly rising inflation.⁶² These tended to coincide with periods during which sustainable growth prospects were considerably overestimated.⁶³ In those cases where financial imbalances grew sufficiently large and unwound in a disruptive way, financial strains emerged, helping to put further downward pressure on prices. And in contrast to much of the postwar experience, the global slowdown that began in the autumn of 2000 was not fundamentally triggered by a tightening of monetary policy to restrain inflation pressures. Rather, it was mainly the result of the spontaneous reversal of the previous investment boom and of the collapse of equity prices, which had reached unsustainable heights. Interestingly, although the subsequent recession in the United States was comparatively mild, the global slowdown has been rather strong by past standards. If output is measured in PPP terms, the slowdown among the G7 ranks close to those associated with the oil price shocks of the 1970s (Graph II.4). Likewise, despite the substantial policy stimulus, the recovery has proved more hesitant than initially anticipated, possibly pointing to deeper headwinds.

Graph II.4

III. Policy implications

According to this analysis, the key policy challenge would be to put in place mutually supportive safeguards in the financial and monetary spheres to ensure the necessary degree of monetary and financial stability.⁶⁴ Nowadays it is generally accepted that close cooperation between monetary and supervisory authorities is a must when managing crises. What is less appreciated, however, is the importance of cooperation between the two sets of authorities at the level of prevention. To grasp its importance, we next explore the potential role of prudential and monetary policies in turn.

Prudential policy

The way the story has been told so far highlights the link between financial instability and poor macroeconomic performance. It is only natural, therefore, to think of prudential policy as the first line of defence. This is the typical answer that those concerned with macroeconomic stability would immediately give. Ensuring that the financial system is sound would at least limit the risk that financial strains would seriously exacerbate economic weakness.

Indeed, with financial instability rising to the top of national and international policy agendas, great efforts have been made since at least the mid-1980s to upgrade prudential safeguards.⁶⁵ And these

⁶² There is, of course, considerable debate over the reasons for the tendency to overpredict inflation in the second half of the 1990s, as several factors may have been at play (eg BIS (2001a, b) and, more recently, BIS (2003)).

⁶³ Long-term growth prospects have typically been adjusted markedly downwards in the wake of the disruptive unwinding of imbalances. For example, between April 1997 and April 2001, the consensus long-term (10-year) growth forecast for four East Asian countries experiencing financial crises in 1997 (Indonesia, Korea, Malaysia and Thailand) was reduced from just over 7% to 5.5%, reflecting a slowdown in productivity growth. See also Borio et al (2003) for a discussion of these issues and corresponding references.

⁶⁴ On these broad issues, see, in particular, Crockett (2001b) and Borio and Crockett (2000).

⁶⁵ These have been described in various BIS publications and need no recalling here. For a concise, if now not fully up-to-date, review, see BIS (1997), which also traces the parallel evolution of policy steps in the prudential and monetary policy fields, against the background of the changing financial environment.

have been embedded into a broader strategy of strengthening the financial infrastructure of economies. Elements receiving attention have ranged widely, including the setup of safety nets, payment and settlement systems, accounting and corporate governance arrangements and legal frameworks. Over time, prudential regulation and supervision have become a core element of the so-called new “international financial architecture”, built largely through the development and implementation of international standards in various areas.⁶⁶

These necessary and important steps have been making a vital contribution to strengthening financial systems, in industrial and emerging markets alike. Moreover, a welcome trend has been to structure the policy response so as to work as far as possible with, as opposed to against, the grain of market forces. In sharp contrast to the financial repression era, by seeking to enlist the disciplinary market mechanisms, these steps have promoted a better balance between financial stability and an efficient allocation of resources. Examples abound. Attempts to narrow the scope of safety nets, enhance transparency and disclosure, and mould safeguards so as to rely more on financial institutions’ own risk management systems are obvious cases in point. Through these policies, the authorities have helped to reinforce, spread and hard-wire the significant improvements in risk management that have taken place since liberalisation and to hone a credit culture. Arguably, the resilience exhibited by the financial system so far in the current slowdown owes significantly to such efforts.⁶⁷

The question, however, is whether steps of this kind would *by themselves* be sufficient to reduce the elasticity of the economy to desirable levels. In other words, can they deliver the appropriate degree of financial stability or, more precisely, avoid the unwelcome macroeconomic costs associated with the imperfect functioning of financial arrangements? There are at least three reasons to believe that this may not be so.

The first reason is that putting adequate defences in place would arguably call for a strengthening of the “macroprudential orientation” of current frameworks.⁶⁸ Doing so, however, is by no means straightforward in practice and involves somewhat of a cultural change among regulatory and supervisory authorities.

In a nutshell, a “macroprudential” orientation would stress the system-wide perspective of risk in terms of objectives and the way of achieving them. It would be less concerned with the failure of individual institutions per se and more with the macroeconomic costs of financial distress as the ultimate metric to choose policies. And it would fully recognise how financial distress of this type tends to arise from common exposures and the mutual interaction between the financial and real economy, with the evolution of risk being in part endogenous with respect to the collective behaviour of financial players. Consequently, it would also pay greater attention to the procyclical mechanisms in financial arrangements that tend to amplify the business cycle and make the financial system more sensitive to downturns. A core element of a macroprudential framework would be to ensure that defences, or protective cushions, are built up in booms in order to run them down in downswings. This would make institutions stronger to weather deteriorating economic conditions, when access to external funding becomes more costly and constrained. And by leaning against the wind, it might also reduce the amplitude of the financial cycle, thereby limiting the risk of financial distress in the first place.

While encouraging steps have been taken in recent years to strengthen the macroprudential perspective, there is still a long road ahead.⁶⁹ A number of policy options have been identified, ranging

⁶⁶ The Financial Stability Forum website (www.fsforum.org) is an excellent source of information on this. See also White (1998b) and (2000).

⁶⁷ For a detailed discussion, see BIS (2003), Chapter 7 of the Annual Report.

⁶⁸ For a more in-depth analysis, see Borio (2003) and Tsatsaronis (2003). Crockett (2000) highlights the importance of marrying the macro- and microprudential dimensions of the frameworks and Crockett (2001a) elaborates on the role for market discipline in such a framework. More recently, Padoa-Schioppa (2002) has also stressed the importance of the macroprudential dimension.

⁶⁹ In this context, a pertinent question is whether the New Basel Capital Accord, by making minimum capital requirements on a given portfolio a function of its perceived riskiness, could contribute to the procyclicality of the financial system. Probably the best answer is that its net effect is unclear at this stage. Admittedly, minimum capital requirements are likely to be more procyclical, as suggested by some empirical evidence (eg Segoviano and Lowe (2002), Jordan et al (2002) and Catarineu-Rabell et al (2002)). At the same time, a number of factors could mitigate or more than compensate for this mechanical effect. For one, the New Accord will result in major improvements in risk management, so that problems could be identified and corrected earlier. In addition, Pillars 2 (supervisory review) and 3 (disclosure) can underpin this shift. For instance,

from discretionary or rule-based changes in prudential instruments such as capital, provisions, and loan-to-value ratios. But each of them has raised tough questions about ease of implementation and effectiveness. For example, supervisors feel that they do not yet have adequate tools to assess how system-wide risk evolves over time.⁷⁰ Countercyclical adjustments to prudential instruments, be these discretionary or rule-based, may be thought to be too intrusive and inconsistent with the current trend towards relying increasingly on firms' internal risk management systems.⁷¹ These systems hardly incorporate cyclical considerations and, to the extent that they do, may even exacerbate procyclical forces, partly because of the short horizons used and the tendency simply to extrapolate current conditions. In some cases, remedies would require the cooperation of other authorities, such as those in charge of taxation or accounting, with quite different perspectives; the heated debate about the role of forward-looking provisioning is one such example. And, culturally, prudential authorities still remain rather reluctant to address financial instability through the instruments at their disposal if the origin is somehow seen to lie with broader macroeconomic developments, regardless of what the contribution of financial factors might be. Such a response tends to be seen as beyond their remit and comparative advantage.

The second reason is that the mechanisms that generate financial instability with macroeconomic costs can operate just as much through open capital markets as they do through financial institutions. Markets, too, are strongly procyclical and are just as capable of seriously constraining the availability of external funding. Similarly, they can freeze under stress, as liquidity evaporates.⁷² A narrow focus on financial institutions, notably banks, would not be sufficient to address these potential shortcomings. Moreover, if countercyclical constraints were to be applied to banks, regulatory arbitrage would simply encourage market funding to step in. As a result, risks could migrate elsewhere.

The final reason is that the costs of financial overextension for the macroeconomy can be serious even if they fall short of materialising in a full-blown financial crisis. Indeed, even if the financial sector was still capable and willing to provide external funding, the real constraint might be on the demand side. For, after a long period of overextension, corporates and households could come under pressure to rebuild their balance sheets and cut spending.⁷³

Thus, there are limits to what prudential instruments can do. Some of them are of a political economy nature, reflecting interpretation of mandates and public expectations. Others are rooted in intellectual perspectives. But others still relate more closely to inherent limitations of the instruments themselves. The raw material on which they operate is based on perceptions of risk and value that may be less than fully adequate. In turn, these perceptions are intimately linked to the availability of liquidity, which allows them to be translated into purchasing power or hard funding.⁷⁴ But prudential authorities have only limited influence on the liquidity generated in an economy. This brings us to the importance of monetary policy.

supervisors could induce higher than minimum requirements during booms, not least by relying more on stress testing. And markets could become less tolerant of banks whose (disclosed) internal ratings fluctuated suspiciously strongly during the cycle. Of course, quite apart from these considerations, one should never lose sight of the fact that the positive contribution of the Capital Accord to financial stability goes well beyond its impact on procyclicality. For further analysis of these issues, see BIS (2001c, 2002), Lowe (2002), Borio (2003) and Greenspan (2002b).

⁷⁰ At the same time, the need to strengthen macroprudential surveillance has been fully recognised

⁷¹ Various potential countercyclical prudential instruments are discussed in detail in Borio et al (2001), Borio and Lowe (2001), Fernández de Lis et al (2001), Carmichael and Esho (2003), Gordy (2002) and Borio (2003). The relationship between accounting and supervisory tools is critical here and not yet fully appreciated (Borio and Lowe (2001), Crockett (2002) and Borio (2003)).

⁷² Borio (2000) draws a detailed parallel between the genesis and dynamics of banking and financial market stress, arguing that similar forces and processes are at work.

⁷³ Koo (2003), for instance, argues quite strongly that the main headwinds in Japan arise from the demand, rather than the supply, side, highlighting the weak demand for credit.

⁷⁴ Indeed, as argued in Borio and Crockett (2000), liquidity may be best defined as the ability to realise value. Perceived value can be as transparently intangible as the future earning stream from capital or labour, or as deceptively tangible as a piece of property or financial asset. And value can be realised either through the sale of the asset or by obtaining external finance against it. Credit creation is a core element of liquidity creation. The theoretical analysis by Kiyotaki and Moore (2001) is probably the one that comes closest to formalising some of these notions and incorporating them in a model of business fluctuations.

Monetary policy

From this perspective, the role of monetary policy would be to anchor the liquidity creation process and hence the availability of external finance; credit extension plays a key role here. The anchoring would help to reduce the elasticity of the economy, thereby providing critical support to prudential policy. The authorities could implement it by being prepared to lean against the build-up of financial imbalances by tightening policy, when necessary, even if near-term inflation pressures were not apparent.⁷⁵

The motivation for such a policy would be twofold. It would seek to limit the downside risks for the macroeconomy further down the road. And, by the same token, it would take out some insurance against the risk of monetary policy losing effectiveness. As experience indicates, economic weakness associated with balance sheet adjustments following the build-up of imbalances is arguably less amenable to a monetary policy cure. If imbalances are generalised, headwinds could be considerable, arising from both the demand for, and the supply of, external finance. If they are unevenly distributed across sectors, the short-term policy stimulus may become more lopsided than usual, and potentially achieve short-run success but at the risk of contributing to sectoral financial imbalances of its own (see below). And if the worst scenario materialises, central banks may need to push policy rates to zero and resort to less conventional measures, whose efficacy is less certain.

Nevertheless, even if the *prima facie* case for a preventive tightening is accepted, a number of significant implementation problems remain.⁷⁶ These have led many observers and policymakers to eschew such a course of action.

First, it has been argued that financial imbalances cannot be identified with a sufficient degree of comfort. The burden of proof is simply too high. And by the time they might be identified, it would be too late. Given the lags involved in the transmission mechanism, the economy could easily find itself labouring under the joint effect of the unwinding of the imbalances and of the policy tightening.

Second, it has been stressed that it is very difficult to calibrate the tightening. The response of imbalances may be very hard to predict, not least since they tend to be associated with speculative activities and hence grounded in investor psychology. On the one hand, a mild tightening might even boost the imbalances further if it is taken as a sign that the central bank will guarantee non-inflationary sustainable growth.⁷⁷ On the other hand, if market participants perceive expected returns to be particularly high, their response could be very muted. If so, a strong tightening might be needed, shifting the brunt of the adjustment to the more interest rate sensitive sectors. The policy could thus trigger the very recession it was supposed to avert.

⁷⁵ Several other authors have reached conclusions similar to those put forward here based on specific models and simulations, although the precise rationale can differ. Kent and Lowe (1997 or 1998) do so in a model in which deviations of asset prices from fundamentals ("bubbles") are partly responsive to monetary policy. Cecchetti et al (2000, 2003) argue for such a policy response by looking at a broad set of rules in comparatively standard models allowing for the presence of exogenous bubbles (but see below Bernanke and Gertler (1999)). Blanchard (2000) stresses the compositional aggregate demand effects of the bubble and, in particular, the risk of over-investment. Dopor (2002) and Gilchrist and Leahy (2002) show that in micro-founded models with distortions of the type discussed here inflation is not a sufficient statistic for departures from economic efficiency, so that stabilising inflation would not be optimal. Depending on the specific distortion assumed, a response to asset prices over and above their implications for inflation stabilisation may thus be appropriate. By contrast, Bordo and Jeanne (2002) reach similar conclusions in a simple model without an asset price bubble but allowing for the possibility of collateral-induced credit crunches and for the endogeneity of credit and asset prices with respect to monetary policy, in close parallel with the arguments put forward here. Lorenzoni (2003) models rather similar processes, but stresses the importance of regulatory, as opposed to monetary policy, responses. For a sympathetic view, see eg Mussa (2003).

⁷⁶ Bernanke and Gertler (1999, 2001) have formalised this point in a fairly standard empirical model of the US economy, where a close relationship exists between output gaps and inflation, augmented by exogenous "near rational" bubbles, on the basis of an objective function based on the variability of inflation and output. (The model includes a financial accelerator mechanism but also assumes that while the bubble component affects the cost of capital, entrepreneurs' investment decisions are still based on fundamentals only.) The results suggest that central bankers that stabilise the forecast of inflation (and possibly also respond to output gaps) are generally better off avoiding any additional response to equity prices *per se*. Of course, even in this model, strictly speaking, fully optimal policy would include a response to the bubble, insofar as this is a state variable (Filardo (1999, 2001)). Bernanke and Gertler's conclusions are based on the evaluation of a set of "reasonable" simple policy rules and on the view that the bubble component is too hard to identify in practice. For a debate on this, see also Cecchetti et al (2000, 2003). For broadly similar views, see Meltzer (2003), Mishkin (2003), Goodfriend (2003), Svensson (2002), Greenspan (1999, 2002a) and Bernanke (2002) and, for an earlier analysis, CEPR/BIS (1998).

⁷⁷ See, in particular, Yamaguchi (1999) and, on a similar note, Greenspan (2002b).

Finally, it has been noted that the political economy constraints are daunting. A central bank tightening even as near-term inflation pressures remained subdued or non-existent would be regarded as going beyond its remit.⁷⁸ Its action would probably be seen as aborting a sustainable expansion and fully justified increases in wealth. Nor could the central bank, ex post, prove that its action was appropriate. The actual loss in wealth would be all too apparent, but the counterfactual, even larger, loss would remain invisible.

These objections are powerful and well grounded. At the same time, they do not seem sufficient to rule out a tightening of monetary policy altogether.⁷⁹

The objections concerning identification sound especially convincing when couched in terms of “bubbles”; they appear less daunting, however, once the focus is more fruitfully placed on financial imbalances. That is, the more relevant question is whether it is possible to identify the set of conditions that are harbingers of future serious strains for the real economy. The forward-looking indicators presented in this paper and in related work are just one step in that direction. Given that this type of work is in its infancy, the scope for further progress is encouraging. Nor do the measurement difficulties appear to be qualitatively different from those associated with more traditional concepts, such as economic slack or potential output.⁸⁰

Likewise, the objection regarding calibration draws part of its appeal from references to “bubbles” as opposed to broader financial imbalances. The objective of a tightening is not to attempt a kind of surgical removal of the “bubble”, which would leave the real economy untouched. This is clearly unrealistic. From the perspective developed in this essay, financial imbalances are seen as inextricably linked to the real economy. They contribute to, and reflect, underlying disequilibria that undermine sustainable growth. In the absence of overt inflation pressures, they are symptoms of a “disguised overheating”. The objective of the tightening is precisely to slow the economy down in the near term in order to avoid a more costly contraction further down the road. From this perspective, the conditions for the effectiveness of policy, or the mechanisms through which it operates, are not that different from those associated with a traditional tightening to quell inflationary pressures. Moreover, if the authorities are seen to be reacting to the imbalances, the agents may be more responsive to the tightening. Indeed, communicating a reaction function of this type ex ante might even diminish the likelihood of imbalances developing in the first place, much as the credibility of the anti-inflation commitment nowadays tends to anchor inflation expectations. By contrast, being seen to react asymmetrically, by easing only when imbalances unwind, might inadvertently contribute to their build up. In a way, such a policy could also be thought of as being subject to a “time inconsistency” problem: a sequence of accommodating responses to current conditions that seem compelling in the short run might not be the most appropriate when its cumulative effect is taken into account.

Finally, while serious, political economy constraints are not immovable. They depend crucially on perceptions of trade-offs between policy choices and hence on views about the workings of the economy and the role of policy. Such views change over time, in the light of evolving circumstances. It was, for instance, the recognition of the absence of a long-run trade-off between inflation and unemployment during the global inflationary phase that laid the basis for the adoption of the current mandates and policy rules. Likewise, a view of economic processes that stressed the role of financial imbalances could help promote the necessary intellectual and political consensus for action.⁸¹ Indeed, several central banks have recently been moving in this direction.⁸²

⁷⁸ See, again, Yamaguchi (1999).

⁷⁹ A fuller analysis of these issues is provided in Borio and Lowe (2002a). Kindleberger himself (1995, 1996), while not ruling out the use of monetary policy in this context, seemed to be rather pessimistic about its effectiveness in practice.

⁸⁰ See, for instance, Orphanides and Williams (2003).

⁸¹ On these issues, see Borio and Lowe (2002a) and White (2002).

⁸² In terms of actual decisions, however, the central bank that came closest to drawing on this rationale was the Bank of England, in November 2002 (Bank of England (2002)). At the time, one of the considerations given for *refraining from* lowering interest rates despite circumstances that might otherwise have justified this was concern about fuelling further the boom in housing prices, with possibly negative consequences for output and inflation further in the future as the imbalances unwound.

Having said this, a number of complications should not be overlooked. It is rare for imbalances to occur simultaneously in all sectors. And asset prices normally follow different dynamics, an aspect downplayed by focusing exclusively on equity prices in the indicators shown above. Real estate prices are equally, if not more, important, owing to the large component of wealth tied up in property and to their extensive use as collateral. For instance, Table III.1 indicates that historically there has been an average lag of about a couple of years between major peaks in equity and housing prices, but that this lag appears to be responsive to policy rates. Thus, the unusually buoyant behaviour of housing prices in the current slowdown may well be related to the substantial monetary easing undertaken by central banks thanks to the absence of inflationary pressures.⁸³ But this response, in turn, has encouraged a further rise in indebtedness in the household sector in a number of countries, raising the risk of contributing to balance sheet overextension there, especially if housing prices were to soften (Graph III.1). In other words, further stimulus has not come free of charge and has raised questions about the sustainability of the recovery. Moreover, it has arguably set a ceiling on the strength of any subsequent growth, since a return of interest rates to more normal levels would weigh on household finances. These complications highlight the uncomfortable dilemmas raised by business cycles in which financial imbalances play a salient role. They also put a premium on pre-emptive action.

Tables III.1

Graph III.1

How far would current policy frameworks need to be modified in order to accommodate the occasional pre-emptive tightening of policy in view of evidence of developing financial imbalances? The answer is “probably not much”.⁸⁴

There is no real need to change the *ultimate objectives*, typically couched in terms of inflation and output.⁸⁵ While the costs can be more immediately understood in terms of output, the unwinding of imbalances could also have a potentially significant impact on inflation, raising the risk of an undershooting as the imbalances unwind, and possibly even deflation.⁸⁶ From a macroeconomic perspective, financial instability is relevant only to the extent that it has undesirable consequences for the real economy. Moreover, as argued, the processes at work can have serious costs even if they fall short of materialising in full-blown financial crises.

At the same time, operationally the shift in perspective has somewhat different implications for specific monetary frameworks. The reconciliation is easier where the central bank is not pinned down to any numerical objective for inflation over an explicit short-term horizon. At least for communication purposes, in strict inflation targeting regimes with up to two-year horizons the justification of policy actions in response to imbalances may not be straightforward. To be sure, it should be well understood by now that inflation targeting is by no means oblivious to output fluctuations. This objective is implicitly incorporated into the framework through features such as the length of the horizon and the width of the target band. But it may be hard to rationalise a tightening in the absence of obvious inflation pressures, especially if the outcome is likely to be inflation below target over the usual horizon, even if the risk is in fact a larger shortfall down the road.

Arguably, at least two modifications would be called for in this case. First, policy decisions should be articulated on the basis of *longer horizons*. While the precise timing of the unwinding of imbalances is

⁸³ For a further discussion, see BIS (2003), Deep and Domanski (2002) and Sutton (2002).

⁸⁴ These issues are highlighted in Borio and Lowe (2002a) and elaborated further in Borio et al (2003).

⁸⁵ While possibly giving rise to some complications in communicating with the public at large, it is clear that even for inflation targeting central banks output fluctuations are a consideration (so called “flexible inflation targeting”). These affect the gradualism with which targets are pursued (width of the band, length of the horizon, etc). On this, see eg Svensson (1999) and King (1996).

⁸⁶ On this, see Borio and Filardo (2003).

rather unpredictable, the processes involved tend to be drawn-out ones.⁸⁷ For example, the notion of ensuring price stability on a “sustainable” basis or over the medium term might be useful in capturing the prospect of future downward pressure on prices linked with the unwinding.⁸⁸ The second modification would be to assign **greater weight to the balance of risks** in the outlook, as opposed to central scenarios or most likely outcomes. This would highlight the role of monetary policy actions in providing insurance against costly outcomes.⁸⁹ Central banks are already used to thinking in these terms. But the nature of the problem would put a premium on considerations of this kind. In fact, the two modifications are closely related. Given the uncertainties involved, the extension of the horizon cannot be done mechanically. Simply extending a point forecast would make little difference or even sense. Rather, the longer horizon would more naturally be used as a device to better assess and communicate the balance of risks facing the economy.

Beyond this, the precise implementation would depend on the specifics of the arrangements. These could range from monitoring ranges for the variables of particular interest, such as credit and asset prices, to less formalised ways of assessing developments. For instance, the monetary analysis component of the ECB strategy would be an obvious vehicle for incorporating concerns about financial imbalances, especially now that it has been modified to give less prominence to a specific variable (M3).⁹⁰ Indeed, the ECB has been rather explicit about this possibility in recent statements.

Conclusion

The long and successful war against inflation and the end to the era of financial repression have laid the basis for better long-run economic performance. Many of the expected benefits have already materialised. Some still remain beyond reach. The basic thesis of this essay is that edging further towards the goal of securing simultaneous monetary and financial stability calls for some subtle modifications in current policy frameworks in both the financial and monetary spheres. Their aim would be to ensure that mutually reinforcing anchors are in place, so as to reduce the scope for financial imbalances to develop and threaten the two objectives. Underpinning these modifications is an equally subtle paradigm shift in prevailing views about the dynamics of the economy. Such a shift would take financial factors, and financial imbalances, from the periphery to the core of our understanding of business fluctuations. Having won the war, the central banking community may still have some challenges ahead before finally winning the peace.

Putting in place mutually supportive anchors essentially means two modifications to policy frameworks. On the prudential side, it would imply strengthening further the “macroprudential” orientation of current arrangements. In terms of objectives, this means focusing more on preventing episodes of systemic distress that have costs for the real economy rather than on preventing the failure of individual institutions per se. In terms of strategy, it means thinking further about ways to address the potentially excessive procyclicality of the financial system, which arguably lies behind many of the episodes of financial instability with serious macroeconomic costs. This would include, in particular, exploring means of building up prudential cushions in good times so as to partially run them down in bad times. On the monetary side, it would imply being alert to the possibility that financial imbalances can also build up when inflation is low and stable and standing ready, occasionally, to lean against those imbalances as they develop even if near-term inflation pressures are not apparent. Current frameworks should be capable of accommodating such a monetary policy response. In most cases, a lengthening of the policy horizon and greater attention to the balance of risks in the formulation of policy may be all that is required.

⁸⁷ For views broadly sympathetic with this point, see King (2002), Bean (2003), Bäckström (2002) and Gjedrem (2003). See also Dodge (2003) and Issing (2002a, 2003).

⁸⁸ This notion is put forward in Shiratsuka (2001).

⁸⁹ See the Conclusions of the 66th BIS Annual Report (1996) on this general role for monetary policy. The point is also stressed by Bordo and Jeanne (2002).

⁹⁰ On this, see Issing (2002a, b, 2003), even before the announcement of the results of the review of the strategy.

Just as importantly, such policy modifications put a premium on close cooperation between monetary and prudential authorities.⁹¹ Cooperation is necessary not just when a crisis arises, as is well understood today. More fundamentally, it is important in preventing crises with significant macroeconomic costs and macroeconomic stress more generally. The nexus between monetary and financial stability arguably runs deeper than normally realised. The main risk at present, as we see it, is that the problem could fall through the cracks. Each type of authority, prudential and monetary, may agree on significant elements of the diagnosis, but also feel that it does not have the comparative advantage to take action. This may appear eminently reasonable, or indeed compelling, from each authority's perspective. But the outcome could also fall short of delivering the appropriate policies.

Awareness of these issues has increased in recent years and policymakers have taken some steps in the direction outlined here. But much more analytical and practical work is necessary in order to build the consensus on diagnosis and the degree of comfort in operational solutions that are necessary for further policy initiatives. The difficulties in implementing acceptable solutions should not be underestimated. We need to understand better the economic processes at work so as to reduce the uncertainty surrounding the validity of competing paradigms. We need to grasp better the pros and cons of alternative remedies. We need to find solutions that strike the right balance between intervention and market processes. And, as always, we need to remain alert to the possibility that policy actions may, as in the past, have unintended consequences that can alter the nature of the risks in unforeseen ways and lead economic agents and policymakers astray. As history makes abundantly clear, edging closer to simultaneous monetary and financial stability is a permanent process, not a task with a well defined beginning and an end.

⁹¹ While this paper focuses on monetary and prudential instruments, a broader array of tools could be used, including taxation. On this, see eg Group of Ten (2003) and McCauley et al (1999).

Annex: Financial structure and the transmission mechanism

As noted in the main text, the economic processes highlighted in the paper stress the interaction between financial and real factors, and hence also the influence of balance sheet and cash flow conditions on real expenditure and capital accumulation decisions. There is vast and still growing literature investigating the empirical validity of this hypothesis. Much of it, however, looks at one country at a time, seeking to exploit cross-sectional or time variation in financial conditions, either in the aggregate or for specific expenditure categories. There is far less work exploiting cross-country variation. This Annex summarises briefly some of the main findings of a systematic study of the impact of financial structure on the transmission mechanism of monetary policy carried out by the BIS together with national central banks in 1995, following a request by the G10 Governors, which does precisely that (BIS (1995)).⁹² Its conclusions are broadly consistent with the basic hypothesis.

The study examines in detail the cross-country differences in financial structure and sectoral balance sheets. It explores the size and composition of balance sheets, intermediated versus non-intermediated finance and contract terms, notably the maturity and adjustability of interest rates on different instruments and, where possible, collateral backing. Based on this, it derives a rough and judgmental ranking about the a priori strength of the impact of monetary policy across countries, measured in terms of the response of demand and output to changes in policy rates. It finally compares these results with those obtained from measures of the impact of policy derived from econometric exercises. One such exercise is based on standardised simulations of the main econometric models of the national central banks themselves; the other, for a smaller set of countries, on simpler structural vector autoregressive representations.

Other things equal, one might expect the impact of policy to be stronger where, inter alia:

- cash flow effects are larger, as influenced by the size of the balance sheets and the speed at and extent to which interest rates on outstanding contracts adjust to changes in policy rates (eg shorter maturities, greater indexation to short-term rates);
- valuation effects are stronger and matter more, as influenced by the share of wealth held in value-sensitive instruments and the use of value-sensitive collateral in loan contracts (eg, share of wealth in the form of equity, greater use of real estate collateral in lending);
- arguably, market finance is comparatively more extensive than intermediated finance, resulting in faster adjustment in interest rates, on average, and less insulation of borrowers, given the more arm's length and "auction-like" nature of the corresponding financial relationships and contracts.

The descriptive part of the study highlighted a number of stylised differences in financial structure. Many of these distinguished Australia, Canada, the United Kingdom and the United States (henceforth "English-speaking" countries for short) from the rest. First, the share of securities in total credit was comparatively high in these countries. Second, most of them were characterised by a relatively high share of adjustable-rate credit, primarily as a result of adjustable-rate mortgages by households. Within the group, the partial exception was the United States, where the adjustability was asymmetric, owing to the possibility of refinance mortgages at very low marginal cost. Outside the group, the main exception was Italy, where the share was also rather high. Third, the share credit backed by real estate collateral appeared to be comparatively high in most English-speaking countries. Elsewhere, it was very high in Sweden and Switzerland, and indications suggested that it was also high in Japan.⁹³

⁹² One motivation was the perception that differences in financial structure had been a factor in explaining the differential ability of countries to resist currency attacks. The complete study is available on request from the BIS. Some of the individual papers are available as Working Papers from the BIS website (numbers 24-27). Borio (1997) provides a summary. More recently, the ECB has carried out a comprehensive study of cross-country differences in the transmission mechanism within the euro area. The focus and methodology, however, have differed somewhat from those of the original BIS study. See Angeloni et al (2003).

⁹³ Not just the share, but also methods of valuation of collateral and acceptable loan-to-value ratios matter for the transmission mechanism. Other things equal, higher loan-to-value ratios and more market-sensitive methods of valuation would tend to increase the effect of monetary policy impulses or the procyclicality of the financial system more generally. Taking into

Fourth, the household sectors in English-speaking countries, as well as Japan and Sweden, had higher debt levels and/or a higher proportion of their wealth in the form of assets, such as equity and real estate, whose valuation is subject to larger fluctuations or is particularly interest rate sensitive. Finally, the adjustment of short-term bank rates to policy rates was faster in English-speaking countries taken as a group than elsewhere, although systematic differences largely disappeared within one year. At one end of the spectrum, adjustment was full and immediate in the United Kingdom; by contrast, it was considerably slower in Germany and France. Based on the available evidence, the distinguishing characteristics did not seem to have changed fundamentally over time.

Drawing on that information, a very rough ranking could be established. It would seem reasonable to expect the impact of monetary policy to be, on balance, stronger in English-speaking countries, particularly in the United Kingdom. At the other end of the spectrum, one would classify most continental European economies. Japan, Sweden and Italy would tend to be closer to the English-speaking group. In the United States, a question mark relates to the asymmetry in interest rate effects.

Interestingly, this rough ranking was broadly consistent with the results of the central bank econometric models.⁹⁴ Graph A.1 provides some further suggestive evidence, based on admittedly rather crude statistical exercises, and focusing on the characteristics of credit contracts. The reductions in economic activity following a standardised temporary tightening appear greater in countries where adjustable-rate credit is more important and where the share of lending backed by real estate collateral is higher. A similar, albeit weaker, relationship is also discernible with respect to the share of debt securities in the total private sector. At a sectoral level, variable rate credit helps to explain differences in the behaviour of consumption.

The above findings hardly amount to conclusive evidence of the significance of financial structure for the transmission mechanism. At the same time, they do indicate that certain often neglected aspects of structure, such as collateral arrangements and the adjustability of interest rates, would merit considerably more attention than they have received hitherto. More generally, those same characteristics could also help to explain the extent to which financial factors might affect the amplitude of business fluctuations.

Graph A.1

account these effects would not alter, and in many respects would tend to strengthen, the conclusions reached in the 1995 BIS study. For a discussion and cross-country information, see Borio et al (2001) and Group of Ten (2003).

⁹⁴ The results from the structural VARs, based on common identifying assumptions, failed to find significant cross-country differences among the G7 countries. The exception was the United Kingdom, where the impact was clearly comparatively stronger. This methodology, however, may have too little power to identify the relevant differences.

References⁹⁵

- Ahmed, S, A Levin and B Wilson (2002): "Recent US macroeconomic stability: good policies, good practices or good luck?", *Board of Governors of the Federal Reserve System International Finance Discussion Papers*, no 730, July.
- Allen, A M, S R L Cope, L J H Dark and H J Witheridge (1938): *Commercial banking legislation and control*, London, Macmillan.
- Allen, F and D Gale (1999): "Bubbles, crises and policy", *Oxford Review of Economic Policy*, vol 15, no 3, pp 9-18.
- (2000a): *Comparing financial systems*, MIT Press, Cambridge, MA.
- (2000b): "Bubbles and crises", *The Economic Journal*, 110, pp 236-256.
- Allen, L and A Saunders (2003): "A survey of cyclical effects in credit risk measurement models", paper presented at the BIS Conference on "Changes in risk through time: measurement and policy options", *BIS Working Papers*, no 126, January.*
- Altman, E I, A Resti and A Sironi (2002): "The link between default and recovery rates: effects on the procyclicality of regulatory capital ratios", paper presented at the BIS Conference on "Changes in risk through time: measurement and policy options", *BIS Working Papers*, no 113, July.*
- Amato, J and C Furfine (2003): "Are credit ratings procyclical?", *BIS Working Papers*, forthcoming.
- Amato, J and H S Shin, (2003): "Public and private information in monetary policy models", paper presented at BIS Conference on "Monetary stability, financial stability and the business cycle", *BIS Working Papers*, forthcoming.
- Andersen, P and W White (1996): "The macroeconomic effects of financial sector reforms: An overview of industrial countries", in OECD (ed), *Macroeconomic Policies and Structural Reform*, Paris, pp 59-98.
- Angeloni, I A Kashyap and B Mojon (2003): *Monetary policy transmission in the euro area*, forthcoming, Cambridge University Press.
- Bäckström, U (2002): "Financial cycles", speech at the Philadelphia Fed Policy Forum on "Crises, Contagion and Coordination: Issues for Policymakers in the Global Economy", Philadelphia, *BIS Review*, no 68, November.*
- Bank for International Settlements (1992): "Structural aspects of financial markets and prudential supervision", *BIS 62nd Annual Report*, Chapter VIII, June, pp 191-212.
- (1995): "Financial structure and the monetary policy transmission mechanism", *BIS Conference Papers*, CB 394, March.
- (1996): "Domestic asset markets and financial institutions in industrial countries", *BIS 66th Annual Report*, Chapter V, June, pp 72-92.
- (1997): "The evolution of central banking", *BIS 71st Annual Report*, Chapter VIII, June, pp 140-160.*
- (2001a): "Empirical studies of structural changes and inflation", *BIS Papers*, no 3, August.*
- (2001b): "Modelling aspects of the inflation process and the monetary transmission mechanism in emerging market countries", *BIS Papers*, no 8, November.*
- (2001c): "Cycles and the financial system", *BIS 71st Annual Report*, Chapter VII, June, pp 123-141.*

⁹⁵ References listed with an * are available online on the BIS website (www.bis.org).

- (2002): “The interaction between the financial sector and the real economy”, *BIS 72nd Annual Report*, Chapter VII, June, pp 122-140.*
- (2003): “The financial sector”, *BIS 73rd Annual Report*, Chapter VII, June, pp 120-141.*
- Bank of England (2002): *Minutes of Monetary Policy Committee Meeting*, 6 and 7 November.
- Barro, R (1995): “Inflation and economic growth”, *Bank of England Quarterly Bulletin*, 35, May, pp 166-176
- Bean, C (2003): “Asset prices, financial imbalances and monetary policy: Are inflation targets enough?”, paper presented at the BIS Conference on “Monetary stability, financial stability and the business cycle”, *BIS Working Papers*, forthcoming.
- Bell, J and D Pain (2000): “Leading indicator models of banking crises – a critical review”, *Financial Stability Review*, Bank of England, Issue 9, Article 3, December, pp 113-129.
- Berger, H, J de Haan and S Eijffinger (2001): “Central bank independence: an update of theory and evidence”, *Journal of Economic Surveys*, vol 15, no 1, pp 3-40.
- Berger, A N and G F Udell (2003): “The institutional memory hypothesis and the procyclicality of bank lending behaviour”, paper presented at the BIS Conference on “Changes in risk through time: measurement and policy options”, *BIS Working Papers*, no 125, January.*
- Bernanke, B (2002): *Asset-price “bubbles” and monetary policy*, speech before the New York Chapter of the National Association for Business Economics, 15 October.
- Bernanke, B and M Gertler (1995): “Inside the black box: the credit channel of monetary policy”, *Journal of Economic Perspectives*, 9(4), pp 27-48.
- (1999): “Monetary policy and asset price volatility”, in *New Challenges for Monetary Policy*, A symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 26-29 August.
- (2001): “Should central banks respond to movements in asset prices?”, *American Economic Review*, vol 91, no 2, May, pp 253-57.
- Bernanke, B, T Laubach, F Mishkin and A Posen (1999a): *Inflation targeting: lessons from the international experience*, Princeton, NJ, Princeton University Press.
- Bernanke, B, M Gertler and S Gilchrist (1999b): “The financial accelerator in a quantitative business cycle framework”, in J Taylor and M Woodford (eds), *Handbook of Macroeconomics*, Amsterdam.
- Bingham, T R G (1985): *Banking and monetary policy*, Trends in banking structure and regulation in OECD countries, OECD.
- Blanchard, O (2000): “Bubbles, liquidity traps and monetary policy. Comments on Jinushi et al and on Bernanke”, in A S Posen and R Mikitani (eds), *Japan’s financial crisis and its parallels to US experience*, *Institute for International Economics Special Report 13*, September.
- Blanchard, O and J Simon (2001): “The long and large decline in US output volatility”, *MIT Department of Economics Working Paper*, no 01-29, April.
- Bordo, M (2000): “Sound money and sound financial policy”, *Journal of Financial Services Research*, vol 18, December.
- Bordo, M, M Dueker and D Wheelock (2000): “Aggregate price shocks and financial instability: an historical analysis”, *NBER Working Paper*, 7652.
- Bordo, M, B Eichengreen, D Klingebiel and M S Martinez-Peria (2001): “Financial crises: lessons from the last 120 years”, *Economic Policy*, April.
- Bordo, M and O Jeanne (2002): “Boom-busts in asset prices, economic instability, and monetary policy”, *NBER Working Paper*, no 8966, May.
- Borio, C (1997): “Credit characteristics and the monetary policy transmission mechanism in fourteen industrial countries”, in Alders (ed), *Monetary Policy in a Converging Europe*, Kluwer, Amsterdam.
- (2000): “Market liquidity and stress: selected issues and policy implications”, *BIS Quarterly Review*, November, pp 38-48.*

- (2003): “Towards a macro-prudential framework for financial supervision and regulation?”, *CEifo Economic Studies*, vol 49, no 2/2003, Summer, pp 181-215, (also available as *BIS Working Papers*, no 128).*
- Borio, C and A Crockett (2000): “In search of anchors for financial and monetary stability”, *Greek Economic Review*, 20(20), Autumn, pp 1-14.
- Borio, C, B English and A Filardo (2003): “A tale of two perspectives: old or new challenges for monetary policy?”, *BIS Working Papers*, no 127, February.*
- Borio, C and A Filardo (2003): “Back to the future? Assessing the threat of deflation”, paper prepared for a Conference on “Macroeconomics of Low Inflation and the Prospects for Global Deflation” sponsored by the Lowe Institute of Political Economy, 25-26 April, *BIS Working Papers*, forthcoming.
- Borio, C and R Filosa (1994): “The changing borders of banking: trends and implications”, *BIS Economic Papers*, no 43, December.
- Borio, C, C Furfine and P Lowe (2001): “Procyclicality of the financial system and financial stability: issues and policy options”, in *Marrying the macro- and micro-prudential dimensions of financial stability*, *BIS Papers*, no 1, March, pp 1-57.*
- Borio, C, N Kennedy and S Prowse (1994): “Exploring aggregate asset price fluctuations across countries: measurement, determinants and monetary policy implications”, *BIS Economic Papers*, no 40, April.
- Borio, C and P Lowe (2001): “To provision or not to provision”, *BIS Quarterly Review*, June, pp 36-48.*
- (2002a): “Asset prices, financial and monetary stability: exploring the nexus”, paper presented at the BIS Conference on “Changes in risk through time: measurement and policy options”, *BIS Working Papers*, no 114, July.*
- (2002b): “Assessing the risk of banking crises”, *BIS Quarterly Review*, December, pp 43-54.*
- (2003): “Should credit come in from the wilderness?”, Paper prepared for ECB Workshop on “Asset prices and monetary policy” in December 2003, *BIS Working Papers*, forthcoming.
- Borio, C and K Tsatsaronis (1999): “Restructuring in the global banking industry”, *BIS Quarterly Review*, Chapter V, August, pp 35-47.*
- Bröker, G (1989): *Competition in Banking*, Trends in banking structure and regulation in OECD countries OECD, 1989.
- Burns, A and W Mitchell (1946): *Measuring business cycles*, NBER, New York.
- Carletti, E and P Hartmann (2002): “Competition and stability: What’s special about banking?”, in *Monetary History, Exchange Rates and Financial Markets: Essays in Honor of Charles Goodhart*, vol 2, P Mizen (ed), Northampton, Massachusetts; Edward Elgar.
- Carmichael, J and N Esho (2003): “Asset price bubbles and prudential regulation”, in W Hunter, G Kaufman and M Pomerleano (eds), *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*, MIT press, January, Chapter 34, pp 481-502.
- Catarineu-Rabell, E, P Jackson and D P Tsomocos (2002): *Procyclicality and the new Basel Accord – banks’ choice of loan rating system*, London, May, mimeo.
- Cecchetti, S, H Genberg, J Lipsky and S Wadhvani (2000): “Asset prices and monetary policy”, Report prepared for the conference *Central banks and asset prices*, organised by the International Centre for Monetary and Banking Studies, Geneva, May.
- Cecchetti, S, H Genberg and S Wadhvani (2003): “Asset prices in a flexible inflation targeting framework”, in W Hunter, G Kaufman and M Pomerleano (eds), *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*, MIT press, January, Chapter 30, pp 427-44.
- CEPR/BIS (1998): “Asset prices and monetary policy: four views”, August.
- Clarida, R, J Gali and M Gertler (1999): “The science of monetary policy: a new Keynesian perspective”, *Journal of Economic Literature*, vol 37, no 4, December, pp 1661-1707.
- (2000): “Monetary policy rules and macroeconomic stability: evidence and some theory”, *Quarterly Journal of Economics*, vol CXV, issue 1, February, pp 147-80.

- Cline, W R and K J S Barnes (1997): "Spreads and risk in emerging markets lending", Institute of International Finance, *IIF Research Papers*, 97(1).
- Committee on the Global Financial System (1999): "A review of financial market events in autumn 1998", *CGFS Report*, no 12, October.*
- Corsetti, G (1998): "Interpreting the Asian financial crises: open issues in theory and policy", *Asian Development Review*, Vol 16, no 2, pp 18-63.
- Corsetti, G, P Pesenti and N Roubini (1999): "What caused the Asian currency and financial crisis?", *Japan and the World Economy*, vol 11(3), October, pp 305-73.
- Cottarelli, C and C Giannini (1997): "Credibility without rules? Monetary frameworks in the post-Bretton Woods era", *IMF Occasional Papers*, No 154, December, Washington DC.
- Crockett, A (2000): "Marrying the micro- and macro-prudential dimensions of financial stability", *BIS Speeches*, 21 September.*
- (2001a): "Market discipline and financial stability", *BIS Speeches*, 23 May.* Reprinted in the Bank of England's Financial Stability Review, Issue 10, Article 6, June, pp 166-73.
- (2001b): "Monetary policy and financial stability", *BIS Speeches*, 13 February.*
- (2002): "Financial reporting: from shadows to limelight", Keynote speech at the joint BIS/Bocconi University Centennial conference on *Risk and stability in the financial system: what roles for regulators, management and market discipline?*, Milan, June.*
- Cukierman, A (1992) *Central bank strategy, credibility and independence: Theory and evidence*, MIT Press, Cambridge, MA.
- Dalsgaard, T, J Elmeskov and C-Y Park (2002): "Ongoing changes in the business cycle – evidence and causes", *OECD Economic Department Working Papers*, no 315, January.
- Deep, A and D Domanski (2002): "Housing markets and economic growth: lessons from the US refinancing boom", *BIS Quarterly Review*, September, pp 37-45.*
- Dodge, D (2003): "A coherent monetary policy framework and asset prices", remarks presented to researchers at the Bank of Canada and elsewhere in regard to the potential role of asset prices in the conduct of monetary policy, February.
- Draghi, M, F Giavazzi and R Merton (2003): "Transparency, risk management and international financial fragility", *NBER Working Paper*, 9806, June.
- Dupor, B (2002): *Nominal price versus asset price stabilisation*, Wharton School, August, mimeo.
- Eichengreen, B and C Arteta (2000): "Banking crises in emerging markets: presumptions and evidence", *Center for International and Development Economics Research Working Paper*, C00-115, August.
- Eichengreen, B and K Mitchener (2003): "The Great Depression as a credit boom gone wrong", paper presented at BIS Conference on "Monetary stability, financial stability and the business cycle", *BIS Working Papers*, forthcoming.
- Eichengreen, B and A Mody (2000): "What explains changing spreads on emerging-market debt? Fundamentals or market sentiment?", in S Edwards (ed), *Capital Flows and the Emerging Economies*, University of Chicago Press.
- Eschenbach, F and L Schuknecht (2002): "The fiscal costs of financial instability revisited", *ECB Working Paper*, no 191, November.
- Feldstein, M (1997): "The costs and benefits of going from low inflation to price stability", in *Reducing Inflation: Motivation and Strategy*, C Romer and D Romer (eds), University of Chicago Press, Chicago.
- Ferguson, R (2003): "Should financial stability be an explicit central bank objective?", presentation at the policy panel of BIS Conference on "Monetary stability, financial stability and the business cycle", *BIS Papers*, forthcoming.
- Fernández de Lis, S, J Martínez Pagés and S Saurina (2001): "Credit growth, problem loans and credit risk provisioning in Spain", in *Marrying the macro- and microprudential dimensions of financial stability*, *BIS Papers*, no 1, March.*

- Filardo, A (1999): "Asset prices and monetary policy", *Federal Reserve Bank of Kansas City Economic Review*, 3rd Quarter.
- (2001): "Should monetary policy respond to asset price bubbles? Some experimental results", in G Kaufman (ed), *Asset Price Bubbles: Implications for Monetary and Regulatory Policies*, Amsterdam: Elsevier Science.
- (2003a): "The enduring core of business cycles", paper prepared for a conference honouring the contributions of Victor Zarnowitz to the study of business cycles – theory, history, indicators and forecasting at the Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI) in Essen, Germany on 27-28 June, *BIS Working Papers*, forthcoming.
- (2003b): "The 2001 US recession: What did recession prediction models tell us?", paper prepared for a book honouring Geoffrey H Moore, *BIS Working Papers*, forthcoming.
- Filardo, A and S Gordon (1999): "Business cycle turning point: two empirical business cycle model approaches", in Philip Rothman (ed), *Nonlinear Time Series Analysis of Economic and Financial Data*, Kluwer Academic Publishers, Boston.
- Fischer, S (1981): "Towards an understanding of the costs of inflation: II", *Carnegie Rochester Conference Series on Public Policy*, vol 15, Autumn, pp 5-142.
- Fisher, I (1932): *Booms and depressions*, New York, Adelphi Co.
- Flannery, M (1998): "Using market information in prudential bank supervision: a review of the US empirical evidence", *Journal of Money, Credit and Banking*, part I, August, pp 273-305.
- Fornari, F (2003): "The predictive power of financial second moments for business cycle developments", *BIS Working Papers*, forthcoming.
- Friedman, M (1968): "The role of monetary policy", *American Economic Review*, vol 57, no 1, March, pp 1-17.
- (1977): "Nobel Lecture: Inflation and unemployment", *Journal of Political Economy*, vol 85, no 3, pp 451-72.
- Frisch, R (1933): "Propagation problems and impulse problems in dynamic economies", *Economic Essays in Honor of Gustav Cassel*, George Allen and Unwin, London.
- Gavin, M and R Hausmann (1996): "The roots of banking crises: The macroeconomic context", in R Hausmann and L Rojas-Suarez (eds), *Banking Crises in Latin America*, Baltimore, Johns Hopkins University Press, pp 27-63.
- Gerdrup, K (2003): "Three episodes of financial fragility in Norway since the 1890s", *BIS Working Papers*, forthcoming.
- Gerlach, S and F Smets (1999): "Output gaps and monetary policy in the EMU area", *European Economic Review*, Vol 43, pp 801-12.
- Gertler, M (1988): "Financial structure and aggregate economic activity", *Journal of Money, Credit and Banking*, vol 20, August, pp 559-88.
- Gertler, M and C S Lown (2000): "The information in the high yield bond spread for the business cycle: evidence and some implications", *NBER Working Paper Series*, no 7549.
- Gilchrist, S and J Leahy (2002): "Monetary policy and asset prices", *Journal of Monetary Economics*, 49 (1), pp 75-97.
- Gjedrem, S (2003): "Financial stability, asset prices and monetary policy", speech at the Centre for Monetary Economics/Norwegian School of Management, *BIS Review*, no 25, June.*
- Goodfriend, M (2000): "Financial stability, deflation and monetary policy", paper presented at the Ninth International Conference at the Institute of Economic Studies, Bank of Japan, July.
- (2003): "Interest rate policy should not react directly to asset prices", in W Hunter, G Kaufman and M Pomerleano (eds), *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*, MIT press, January, Chapter 31, pp 445-58.
- Goodhart, C (2001): "What weight should be given to asset prices in the measurement of inflation?", *The Economic Journal*, 111, June, pp 335-56.

Goodhart, C and J Danielsson (2001): "The inter-temporal nature of risk", 23rd SUERF Colloquium on "Technology and finance: challenges for financial markets, business strategies and policy makers", Brussels, October.

Goodhart, C and P De Lary (1999): "Financial crises: plus ça change, plus c'est la même chose", *LSE Financial Markets Group Special Paper*, no 108.

Gordy, M (2002): "Procyclicality in Basel II: Can we cure disease without killing the patient?", keynote address at Credit Risk Summit USA, New York, October.

Gorton, G (1988): "Banking panics and business cycles", *Oxford Economic Papers*, 40, pp 751-81.

Gourinchas, P, R Valdes and O Landerretche (2001): "Lending booms: Latin America and the world", *NBER Working Paper* 8249.

Greenspan, A (1999): "The Federal Reserve's Semiannual Report on Monetary Policy", testimony before the Committee on Banking and Financial Services, United States House of Representatives, July.

——— (2002a): "Economic volatility", in *Rethinking Stabilization Policy*, A symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 29-31 August.

——— (2002b): "Cyclicality and banking regulation", remarks given at the conference on bank structure and competition, Federal Reserve Bank of Chicago, 10 May.

Group of Ten (2003): "Turbulence in asset markets: The role of micro policies"; *Report of the Contact Group on Asset Prices*, January.*

Gruen, D, T Robinson and A Stone (2002): "Output gaps in real time: are they reliable enough to use for monetary policy?", paper presented at the BIS Autumn 2002 Central Bank Economists' Meeting, 14-15 October.

Hamilton, J D (1989): "A new approach to the economic analysis of nonstationary time series and the business cycle", *Econometrica*, March.

Hayek, F A (1933): *Monetary theory and the trade cycle*, Clifton, New Jersey: Augustus M Kelly reprint 1966.

Hellmann, T, K Murdock and J Stiglitz (2000): "Liberalization, moral hazard in banking and prudential regulation: Are capital requirements enough?", *American Economic Review*, vol 90, March, pp 147-165.

Hickman, B (1957): "Corporate bonds: Quality and investment performance", *Occasional Paper* 59, National Bureau of Economic Research, Inc.

Ho, C and R McCauley (2003): "Living with flexible exchange rates: issues and recent experience in inflation targeting emerging market economies", *BIS Working Papers*, no 130, February.*

Hofmann, B (2001): "The determinants of bank credit to the private sector in industrialised countries", *BIS Working Papers*, no 108, December.*

Hoggarth, G and V Saporta (2001): "Costs of banking system instability: some empirical evidence", *Bank of England Financial Stability Review*, Issue 10, Article 5, June.

Hoyt, H (1933): *One Hundred Years of Land Values in Chicago*, The University of Chicago Press, Chicago, Illinois.

Issing, O (2002a): "The euro after four years: is there a risk of deflation?", *16th European Financial Convention*, London, 2 December.

——— (2002b): "Monetary policy in a changing economic environment", in *Rethinking Stabilization Policy*, a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 29-31 August.

——— (2003): "Monetary and financial stability: Is there a trade-off?", presentation at the policy panel of the BIS Conference on "Monetary stability, financial stability and the business cycle", *BIS Papers*, forthcoming.

- Jordan, J, J Peek and E Rosengren (2002): "Credit risk modeling and the cyclicity of capital", paper presented at the BIS Conference on "Changes in risk through time: measurement and policy options", *BIS Working Papers*, forthcoming.
- Kahn, J, M McConnell, and G Perez-Quirós (2002): "On the causes of the increased stability of the US economy", Federal Reserve Bank of New York *Economic Policy Review*, May, pp 183-202.
- Kamin S B and K von Kleist (1999): "The evolution and determinants of emerging markets credit spreads in the 1990s", *BIS Working Papers*, no 68, May.*
- Kaminsky, G and C Reinhart (1999): "The twin crises: the causes of banking and balance-of-payments problems", *American Economic Review*, vol 89, No 3, June, pp 473-500.
- Kaminsky, G and S Schmukler (2001): "On booms and crashes: financial liberalization and stock market cycles", *George Washington University working paper*, mimeo, October.
- Keeley, M C (1990): "Deposit insurance, risk and market power in banking", *American Economic Review*, 80, pp 1183-1200.
- Kent, C and P D'Arcy (2001): "Cyclical prudence - credit cycles in Australia", in *Marrying the macro- and microprudential dimensions of financial stability*, *BIS Papers*, no 1, March, pp 58-90.*
- Kent, C and P Lowe (1997): "Asset-price bubbles and monetary policy", Reserve Bank of Australia, *Research Discussion Paper*, no 9709.
- (1998): "Property-price cycles and monetary policy", *BIS Conference Papers*, vol 5, March, pp 239-63.
- Kindleberger, C (1995): "Asset inflation and monetary policy", *BNL Quarterly Review*, 192, pp 17-37.
- (1996): *Manias, panics and crashes*, Cambridge University Press, Cambridge, 3rd edition.
- King, M (1996): "How should central banks reduce inflation? - Conceptual issues", a symposium by the Federal Reserve Bank of Kansas City in *Achieving Price Stability*, Jackson Hole, Wyoming, 29-31 August.
- (2002): "The inflation target ten years on", speech presented at the London School of Economics, 19 November.
- Kiyotaki, N and J Moore (1997): "Credit cycles", *Journal of Political Economy*, 105(2), pp 211-48.
- (2001): "Liquidity, business cycles and monetary policy", *Clarendon Lectures*, Lecture 2, 21 November.
- Koo, R C (2003) *Balance sheet recession: Japan's struggle with uncharted economics and its global implications*, John Wiley and Sons (Asia) Pte Ltd.
- Kuttner, K N (1994): "Estimating potential output as a latent variable", *Journal of Business and Economic Statistics*, vol 12(3), July, pp 361-368.
- Laidler, D (2003): "The price level, relative prices, and economic stability: aspects of the inter-war debate", paper presented at the BIS Conference on "Monetary stability, financial stability and the business cycle", *BIS Working Papers*, forthcoming.
- Lorenzoni, G (2003): "The costs of credit booms", paper presented at the Joint Conference on "Liquidity concepts and financial instabilities", Eltville, June.
- Lowe, P (2002): "Credit risk measurement and procyclicality", paper presented at the Conference on "Banking supervision at the crossroads" on the occasion of the 50th Anniversary of the Dutch Act on the Supervision of Credit Systems, *BIS Working Papers*, no 116, August.*
- McCauley, R, J S Ruud and F Iacono (1999): *Dodging Bullets: Changing US Corporate Capital Structures in the 1980s and 1990s*, MIT Press, Cambridge, Massachusetts.
- McKinnon, R (1993): "The rules of the game: International money in historical perspective", *Journal of Economic Literature*, March, pp 1-44.
- Meltzer, A H (2003): "Rational and nonrational bubbles", in W Hunter, G Kaufman and M Pomerleano (eds), *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*, MIT press, January, Chapter 3, pp 23-34.

- Merton, R C (1977): "An analytic derivation of the cost of deposit insurance and loan guarantees", *Journal of Banking and Finance*, 1, pp 512-20.
- Minsky, H (1982): "Can 'it' happen again? Essays on Instability and Finance", Armonk: M E Sharpe.
- Mishkin, F S (2003): "U.S. stock market crashes and their aftermath: implications for monetary policy", in W Hunter, G Kaufman and M Pomerleano (eds), *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*, MIT press, January, Chapter 6, pp 53-80.
- Modigliani, F and R A Cohn (1979): "Inflation, rational valuation and the market", *Financial Analysts Journal*, 35, pp 24-44.
- Mussa, M (2003): "Remarks on achieving monetary and financial stability", presentation at the policy panel of the BIS Conference on "Monetary stability, financial stability and the business cycle", *BIS Papers*, forthcoming.
- Oliner, S and D Sichel (2002): "Information technology and productivity: Where are we now and where are we going?", Federal Reserve Board, *Finance and Economics Discussion Papers*, no 2002-29, May.
- Organisation for Economic Co-operation and Development (1992): *Banks under stress*, Paris.
- Orphanides, A and J C Williams (2003): "Robust monetary policy rules with unknown natural rates", *Brookings Papers on Economic Activity*, pp 63-118.
- Padoa-Schioppa, T (2002): "Central banks and financial stability", paper presented at the second biennial ECB conference *The Transformation of the European Financial System*, Frankfurt, 24-25 October.
- Padoa-Schioppa, T and F Saccomanni (1994): "Managing a market-led global financial system", in *Managing the World Economy: Fifty Years After Bretton Woods*, Washington, IIE, pp 235-68.
- Perrier, P and R Amano (2000): "Credibility and monetary policy", *Bank of Canada Review*, Spring, pp 11-17.
- Phelps, E (1968): "Money, wage dynamics and unemployment equilibrium", *Journal of Political Economy*, 76 (4), Part 2, pp 678-711.
- Pigou, A (1929): *Industrial fluctuations*, 2nd rev, ed, London: Macmillan.
- Prasad, E, K Rogoff, S J Wei and M A Kose (2003): "Effects of financial globalization on developing countries: Some empirical evidence", International Monetary Fund, 17 March.
- Radelet, S and J Sachs (1998): "The East Asian financial crisis: diagnosis, remedies, prospects", *Brookings Papers on Economic Activity*, 28 (1), pp 1-74.
- Repullo, R (2002): "Capital requirements, market power and risk-taking in banking", paper presented at the BCBS/CEPR/JFI Joint Workshop on "Basel II: An assessment", Basel, 17-18 May.*
- Scarpetta, S, A Bassanini, D Pilat and P Schreyer (2000): "Economic growth in the OECD area: recent trends at the aggregate and sectoral level", *OECD Economics Department Working Papers*, no 248, June.
- Schaechter, A, M Stone and M Zelmer (2000): "Adopting inflation targeting: practical issues for emerging market countries", *IMF Occasional Paper*, no 202, December, Washington DC.
- Scheicher, M (2003): "What drives investor risk aversion? Daily evidence from the German equity market", *BIS Quarterly Review*, June, pp 67-74.*
- Schumpeter, J (1939): *Business cycles: a theoretical, historical and statistical analysis of the capitalist process*, 2 vols, McGraw-Hill Book Co, Inc.
- Schwartz, A (1995): "Why financial stability depends on price stability", *Economic Affairs*, Autumn, pp 21-25.
- Segoviano, M A and P Lowe (2002): "Internal ratings, the business cycle and capital requirements: some evidence from an emerging market economy", paper presented at the Federal Reserve Bank of Boston Conference on "The impact of economic slowdowns on financial institutions and their regulators", *BIS Working Papers*, no 117, August.*
- Shiller, R J (1996): "Why do people dislike inflation?", *NBER Working Paper*, no 5539, April.

- Shiratsuka, S (2001): "Asset prices, financial stability, and monetary policy: based on Japan's experience of the asset price bubble", *BIS Papers*, no 1, March, pp 261-284.*
- Smets, F (1998): "Output gap uncertainty: Does it matter for the Taylor rule?", *BIS Working Papers*, no 60, November.*
- Stock, J and M Watson (1993): "A procedure for predicting recessions with leading indicators: Econometric issues and recent experience", in J H Stock and M W Watson (eds), *Business Cycles, Indicators and Forecasting*, The University of Chicago Press, Chicago, Fall.
- (2002): "Has the business cycle changed and why?", *forthcoming NBER Macroeconomics Annual*, April, mimeo.
- Sutton, G (2002): "Explaining changes in house prices", *BIS Quarterly Review*, September, pp 46-55.
- Svensson, L (1999): "Price stability as a target for monetary policy: defining and maintaining price stability", *NBER Working Paper*, No 7276, August.
- (2002): "Monetary policy and real stabilization", in *Rethinking Stabilisation Policy*, a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 29-31 August.
- Tarashev, N, K Tsatsaronis and D Karampatos (2003): "Investors' attitude towards risk: What can we learn from options?", *BIS Quarterly Review*, June, pp 57-66.*
- Tsatsaronis, K (2000): "An indicator of investors' attitude towards risk", *BIS Quarter Review*, February, pp 12-13.*
- (2003): "Systemic financial risk and macroprudential supervision", paper presented at the Bocconi University Centennial conference on "Risk and stability in the financial system: what roles for regulators, management and market discipline?", *BIS Papers*, forthcoming.
- Vickers, J (1999): "Price stability in the UK", *Glasgow Trades House Lecture*, Strathclyde University, 26 May.
- von Mises, L (1912): "The theory of money and credit", *Foundation for Economic Education 1971*, reprint, New York.
- White, W R (1998a): "The coming transformation of continental European banking?", *BIS Working Papers*, no 54, June.*
- (1998b): "Promoting international financial stability: The role of the BIS", in *Regulatory and Supervisory Challenges in a New Era of Global Finance*, Forum on Debt and Development (FONDAD).
- (2000): "What have we learned from recent financial crises and policy responses?", *BIS Working Papers*, no 84, January.*
- (2002): "Changing views on how best to conduct monetary policy", *BIS Speeches*, 18 October.*
- (2003) "Are changes in financial structure extending safety nets?", paper presented at the Bank of Canada's Festschrift in honour of Charles Freedman", Ottawa, 20 June, *BIS Working Papers*, forthcoming.
- Wicksell, K (1936): *Interest and prices*, London, Macmillan (original German version published in 1898).
- Woodford, M (2002): "Inflation stabilization and welfare", *Contributions to Macroeconomics*, 2(1), Article 1.
- Yamaguchi, Y (1999): "Asset prices and monetary policy: Japan's experience", in *New Challenges for Monetary Policy*, a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 26-29 August.
- Zarnowitz, V (1999): "Theory and history behind business cycles: are the 1990s the onset of a golden age?", *NBER Working Paper*, 7010, March.

Table I.1
Frequency of “effective” declines in the price level¹

	1960–69	1970–79	1980–89	1990–99	2000–01	2002
Headline inflation	13.7	3.0	7.5	11.8	22.1	28.9
GDP deflator ²	8.7	2.0	5.3	15.4	32.2	34.7
Core inflation ³	3.5	1.6	3.4	14.7	31.3	17.9
Services less housing ⁴	4.0	1.3	2.2	12.2	28.6	16.1
Wholesale inflation ⁵	27.6	7.6	23.1	35.2	25.0	57.3

¹ 1960 Q1–2002 Q4, the frequency of “effective” declines is defined as the percentage of quarters with yearly inflation less than 1% for each type of price index from Argentina, Belgium, Brazil, Canada, Chile, China, Colombia, France, Germany, Hong Kong SAR, Indonesia, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, Peru, Singapore, Sweden, Switzerland, Taiwan (China), Thailand, Venezuela, the United Kingdom and the United States. ² Excluding Argentina, Chile, China, Colombia, Peru, Singapore and Venezuela. ³ Excluding the countries in footnote 2 and Brazil, Hong Kong SAR, Indonesia, Malaysia and Taiwan (China). ⁴ Excluding the countries in footnote 2 and Hong Kong SAR, Malaysia, Taiwan (China) and Thailand. ⁵ Excluding China and Hong Kong SAR.

Source: National data and BIS calculations.

Table I.2
Financial liberalisation: constraints on credit institutions' balance sheets and on capital flows

Countries	1980					1985					1991				
	Interest rates ¹		Quantities ²		Capital flows ³	Interest rates ¹		Quantities ²		Capital flows ³	Interest rates ¹		Quantities ²		Capital flows ³
	Loans	Deposits	Loans	Investments		Loans	Deposits	Loans	Investments		Loans	Deposits	Loans	Investments	
United States		•••					••					•			
Japan	•	•••	•••	•	•••	•	•••	•••		••		•			
Germany															
France		•••	•••	•	••		••	•••		••		•			
United Kingdom	•		•			•									
Italy			•••	•••	•••			••	••	•••				•	
Canada															
Australia	••	••	•	••	•••	••			•	•					
Belgium		•			•		•			•		•			
Denmark		•	••		••				•	•					
Finland	••	••			••	•	••								
Netherlands			•••		•			•••					•		
New Zealand	•••	•••	•••	•••	•••					•••					
Norway	•••	•••	•••		•••					•					
Spain	•	••		•••	•••		•		•••	••				•	
Sweden	•••	•••	•••	•••	•••										
Switzerland	•	•				•	•								

The number of "•" signs indicates relative importance. The judgment is largely impressionistic based on available information.

¹ Includes, for instance, ceilings on interest rates (including a prohibition on paying interest on certain deposits) as well as cartel agreements. ² Includes, for instance, various types of constraints on the expansion of credit, including through moral suasion, and other portfolio restrictions, such as minimum investment requirements on certain categories of securities. ³ Includes various types of restriction on capital flows and foreign exchange transactions.

Sources: Bingham (1985); Bröker (1989); OECD (1992); various national sources.

Table II.1
Indicators of banking stress

Horizon (years) ¹	Single indicators (gaps) ²								Joint indicators (gaps) ²			
	Credit gaps ³ (4)		Equity price gaps ⁴ (60)		Output gap ⁵ (1)		Smoothed output gap ⁶ (2)		Credit (4) and asset price (60)		Credit (4), asset price (40) and output gap ⁵ (1.5)	
	Noise/signal	% crises predicted	Noise/signal	% crises predicted	Noise/signal	% crises predicted	Noise/signal	% crises predicted	Noise/signal	% crises predicted	Noise/signal	% crises predicted
3	.22	80	.24	47	.46	53	.37	60	.06	47	0.05	0.27
4	.21	80	.15	67	.39	60	.32	67	.02	73	0.02	0.47
5	.19	80	.12	73	.30	73	.28	73	.02	73	0.01	0.60

¹ A signal is correct if a crisis takes place in any one of the years included in the horizon ahead. Year 3 means the year starting 12 quarters ahead; year 4 means either year 3 or year 4; etc. Noise is identified as mistaken predictions within the same horizon. Given the data frequency and difficulties in assigning crises to a specific date, banking stress is arbitrarily assigned to the last quarter in any given year. ² A gap is measured as a percentage points from an ex ante, recursively calculated Hodrick-Prescott trend; the size of the threshold is shown in brackets. ³ Credit is measured as the ratio of private sector credit to GDP (and lambda = 400000). ⁴ Real equity price index (and lambda = 400000). ⁵ GDP (and lambda = 1600). ⁶ GDP (and lambda = 400000).

Source: Based on Borio and Lowe (2003).

Table II.2
Financial imbalances as leading indicators for output

Signal (gaps) ¹	Probability of the output gap being less than minus 1			
	Conditional: years ahead ²			Unconditional ³
	2	3	4	
Output (2) ⁴	.37	.42	.48	.39
Credit (4) and equity (60)	.41	.64	.71	
Credit, equity and output	.55	.90	1.00	
Credit and output	.55	.59	.53	
Equity and output	.34	.62	.74	
Credit	.50	.45	.38	
Equity	.36	.51	.56	

¹ Size of the gap (percentage points); see Table II.1 for details. ² Probability of observing an (ex ante) output gap less than minus 1 in any one quarter of the given year conditional on the corresponding signal being on. ³ Probability of observing an (ex ante) output gap less than minus 1 in any one quarter in the sample. ⁴ Lambda equal to 1600.

Source: Based on Borio and Lowe (2003).

Table II.3
Financial imbalances as leading indicators for inflation

Signal (gaps) ¹	Probability that inflation falls in the given year			
	Conditional: years ahead ²			Unconditional ³
	2	3	4	
Output (2) ⁴	.59	.57	.52	.50
Credit (4) and equity (60)	.53	.62	.57	
Credit, equity and output	.55	.90	.56	
Credit and output	.67	.61	.40	
Equity and output	.56	.70	.54	
Credit	.50	.53	.52	
Equity	.52	.56	.52	

¹ Size of the gap (percentage points); see Table II.1 for details. ² Probability of observing a decline in the average year-on-year inflation rate relative to the previous year conditional on the corresponding signal being on. ³ Probability of observing such a decline in the inflation rate in the whole sample. ⁴ Lambda equal to 1600.

Source: Based on Borio and Lowe (2003).

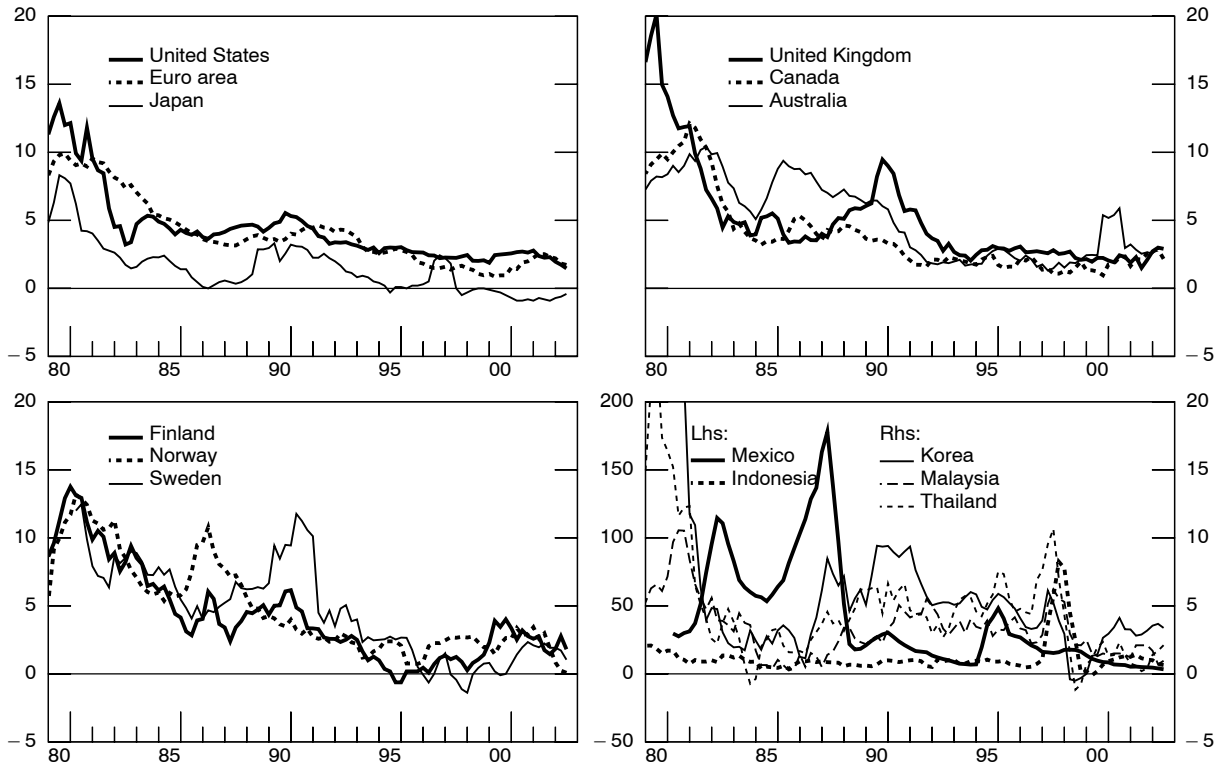
Table III.1
The lag between equity and residential property price peaks

A. Equity price peaks as leading indicators¹			
Housing price peak	Interval (in quarters)²		
	4	8	12
Unconditional probability ²	0.08	0.17	0.25
Conditional probability ³	0.30	0.61	0.70
Equity peak dummy:			
Coefficient ⁴	0.22	0.44	0.45
Standard error	0.05	0.06	0.06
z-statistic	6.84	9.04	8.22
B. Impact of short-term rates on lag length⁵			
Coefficient	Standard error	t-statistic	Impact of 25 bp increase
-5.41	1.63	3.32	Approx one quarter

¹ Calculated from a probit regression of housing price peaks on equity price peaks (inflation-adjusted terms). The sample period is 1970 Q1–1999 Q4; 11 countries are included (Australia, Canada, Denmark, Italy, Japan, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom and the United States). ² Unconditional probability of observing a housing price peak in the corresponding interval, eg within 4, 8 and 12 quarters respectively. ³ Probability of observing a house price peak conditional on observing an equity price peak within the corresponding preceding interval. The results are insensitive to various controls. ⁴ Change in the cumulative density function. ⁵ Derived from a cross-country regression of the lag between equity and housing price peaks on the change in the (nominal) short-term rate in the intervening period. The result is insensitive to output growth in the intervening interval.

Source: Work done by Patrick McGuire as input into the 73rd BIS Annual Report (2003). See in particular BIS (2003), Chapter 6.

Graph I.1
Global disinflation¹

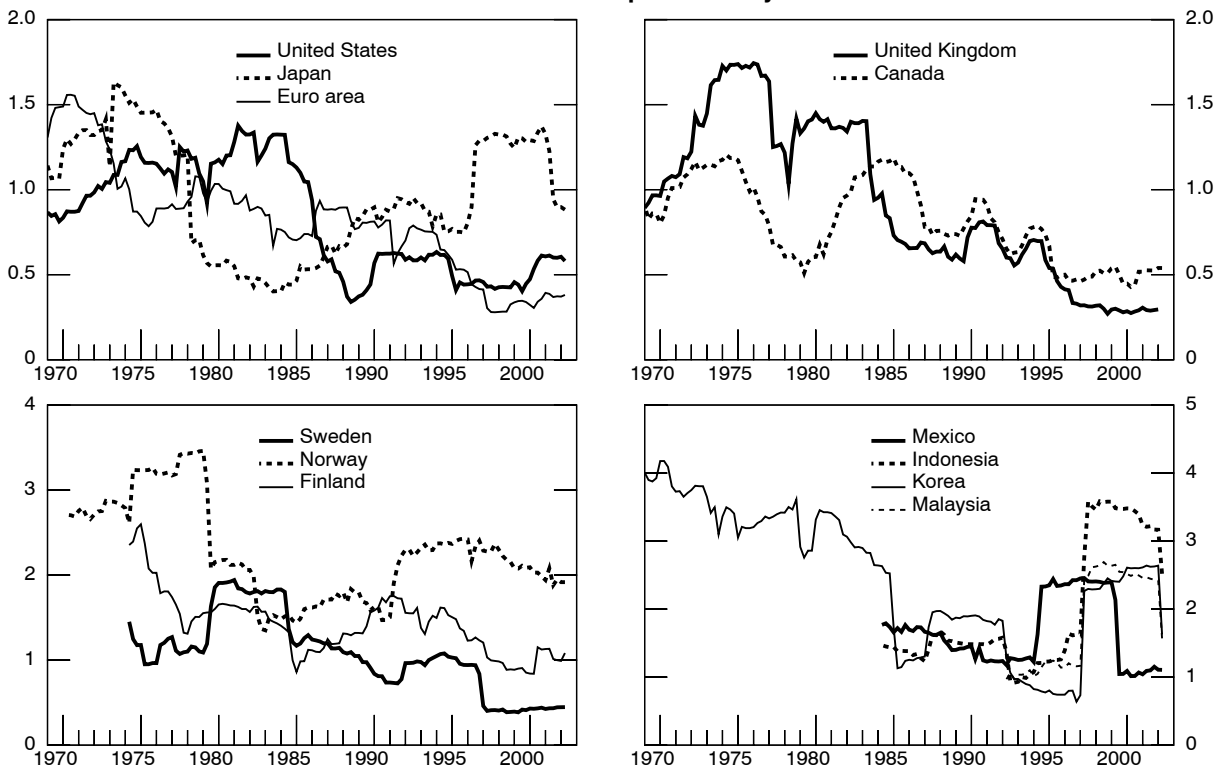


¹ For Indonesia, Malaysia, Thailand and, prior to 1980, Korea, headline inflation; all others, core inflation. Year-on-year percentage changes of quarterly data.

Sources: OECD; national data.

Graph I.2

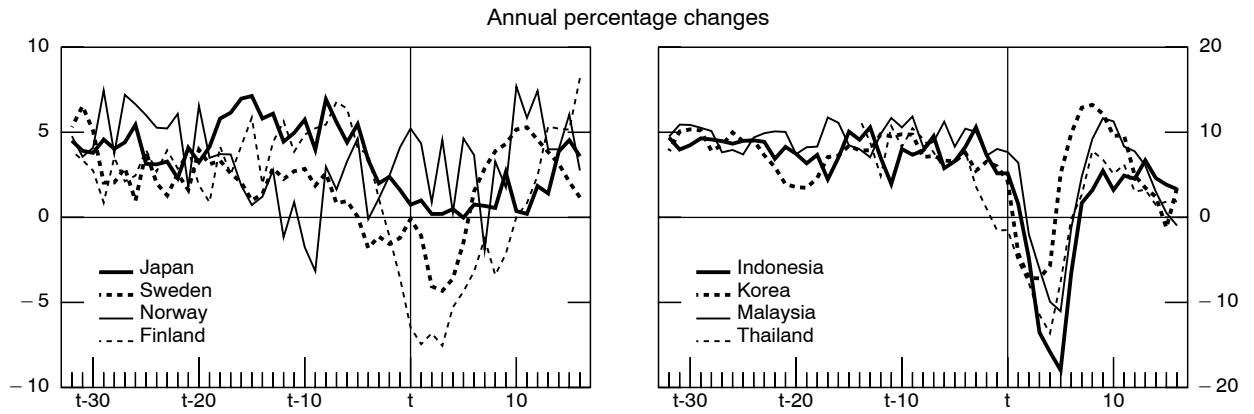
Short-term output volatility¹



¹ Rolling standard deviation of quarterly output growth, using a window of 20 quarters.

Source: National data.

Graph I.3
Output growth and banking crises¹



Note: t = time in quarters.

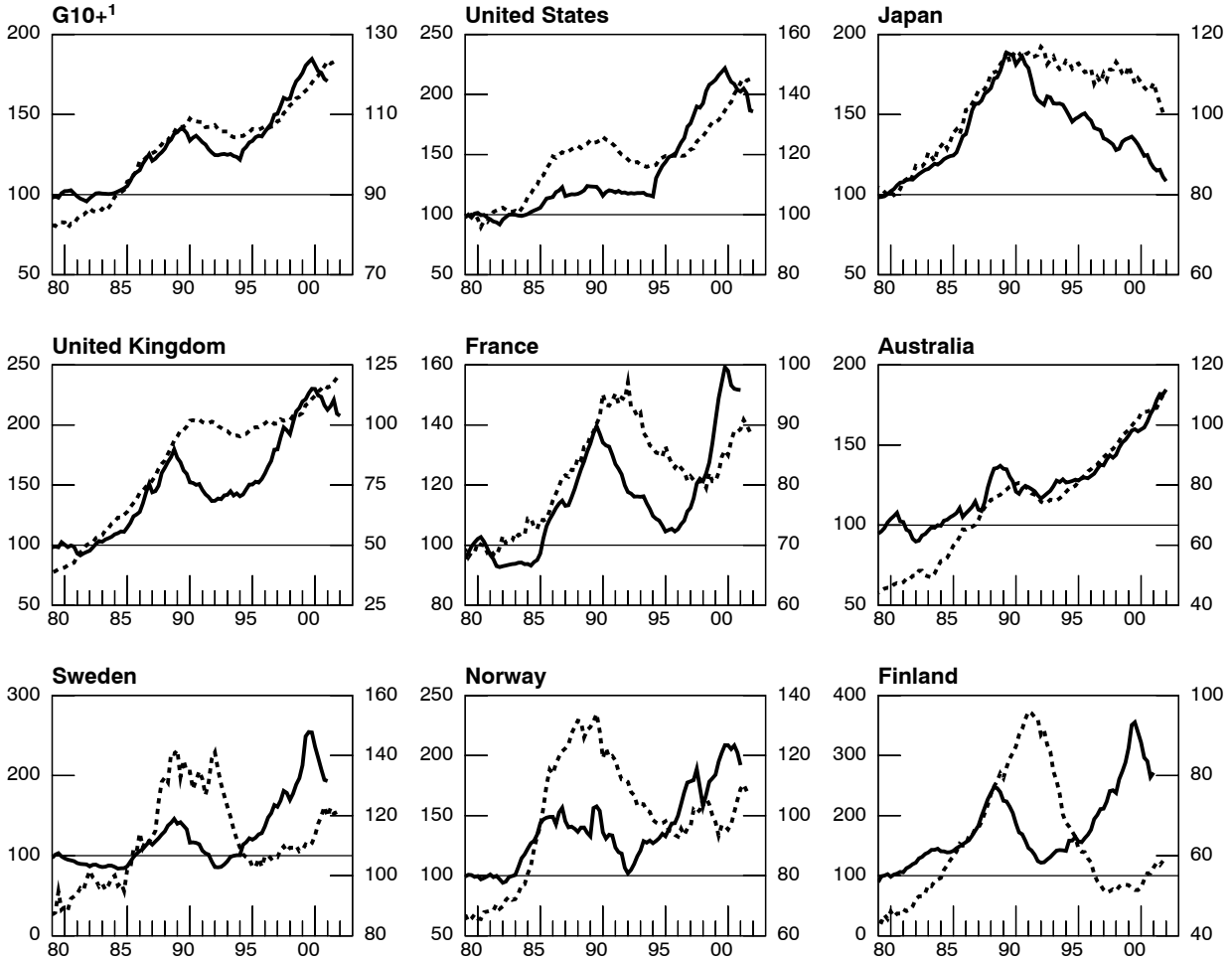
¹ The line for each country corresponds to the date of the respective banking crisis (Japan and Sweden, 1992 Q2; Norway, 1991 Q2; Finland, 1991 Q1; Indonesia and Malaysia, August 1997; Korea, November 1997)

Source: National data.

Graph I.4

Large medium-term swings in asset prices and credit

— Real aggregate asset prices (1980 = 100; lhs)
 Total private credit/GDP (ratio; rhs)



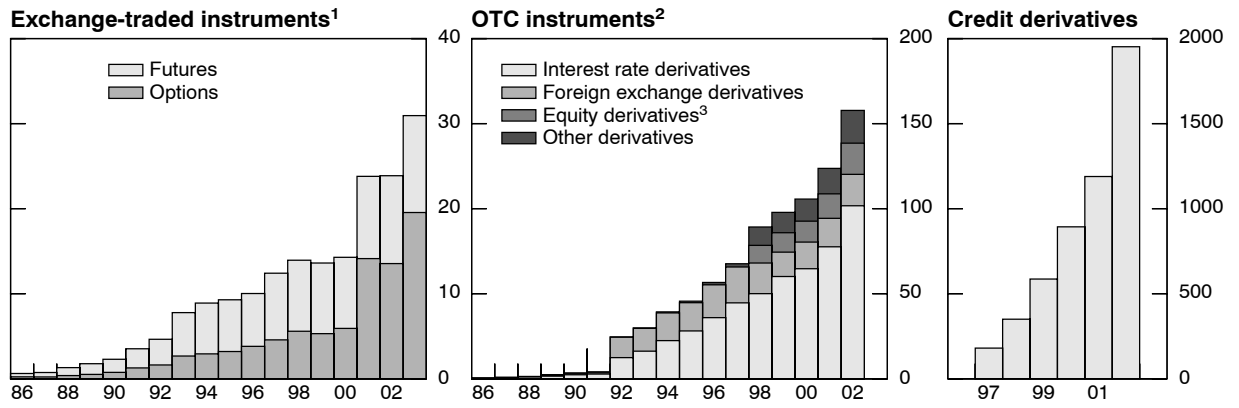
¹ GDP-weighted average of the Group of Ten countries, plus Australia, Denmark, Finland, Norway and Spain; weights based on 2000 GDP and PPP exchange rates.

Sources: Private real estate associations; national data; BIS calculations.

Graph I.5

Rapid growth of derivatives markets

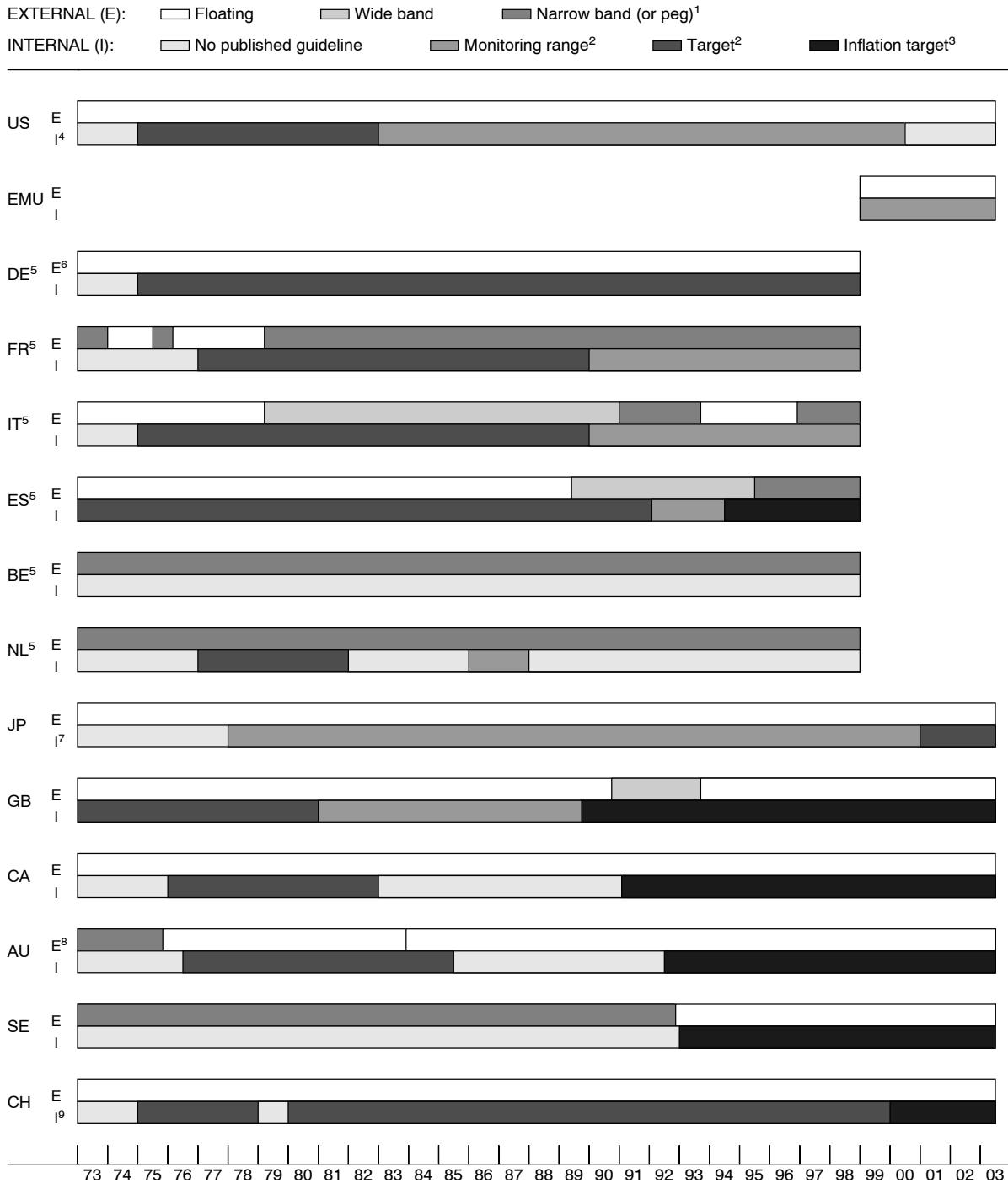
Notional amounts; in trillions of US dollars



¹ Data for 2003 refer to first quarter. ² Data prior to 1992 are not fully comparable. ³ No breakdown available prior to 1998.

Sources: British Bankers' Association; Futures Industry Association; Swapsmonitor; BIS calculations.

Graph I.6
Evolving monetary anchors



US = United States; EMU = European Monetary Union; DE = Germany; FR = France; IT = Italy; ES = Spain; BE = Belgium-Luxembourg; NL = Netherlands; JP = Japan; GB = United Kingdom; CA = Canada; AU = Australia; SE = Sweden; CH = Switzerland.

¹ The margin of fluctuation in the ERM band was set at $\pm 15\%$ on 2 August 1993; between then and end-1998, a narrow band is assumed since the exchange rate showed little movement vis-à-vis its central rate. The band became redundant with the introduction of the euro.

² The distinction between the two is often not clear-cut and typically the shift is gradual; given a tight exchange rate commitment and no capital controls, announced "target" paths for monetary aggregates are treated as "monitoring ranges" only. ³ As from date of announcement. Supplemented by monitoring ranges for Spain (ALP) and the United Kingdom (M0 and M4). ⁴ Closer targeting of M1 between October 1979 and October 1982; monitoring ranges assumed since the doubling of target ranges. Humphrey-Hawkins legislation expired in 2000. As of the July 2000 Report to the Congress, the Federal Reserve discontinued its practice of publishing money ranges.

⁵ National monetary anchors abandoned at end-1998 with the formation of EMU. ⁶ Treated as a free floater because of its de facto anchor role in the European exchange rate arrangements. ⁷ As of March 2001, targets for the level of current account balances held at the Bank of Japan were adopted. ⁸ From November 1976 to December 1983, variety of crawling pegs. ⁹ In 2000, a broad-based inflation forecasting strategy primarily focused on a numerical target for price stability was adopted.

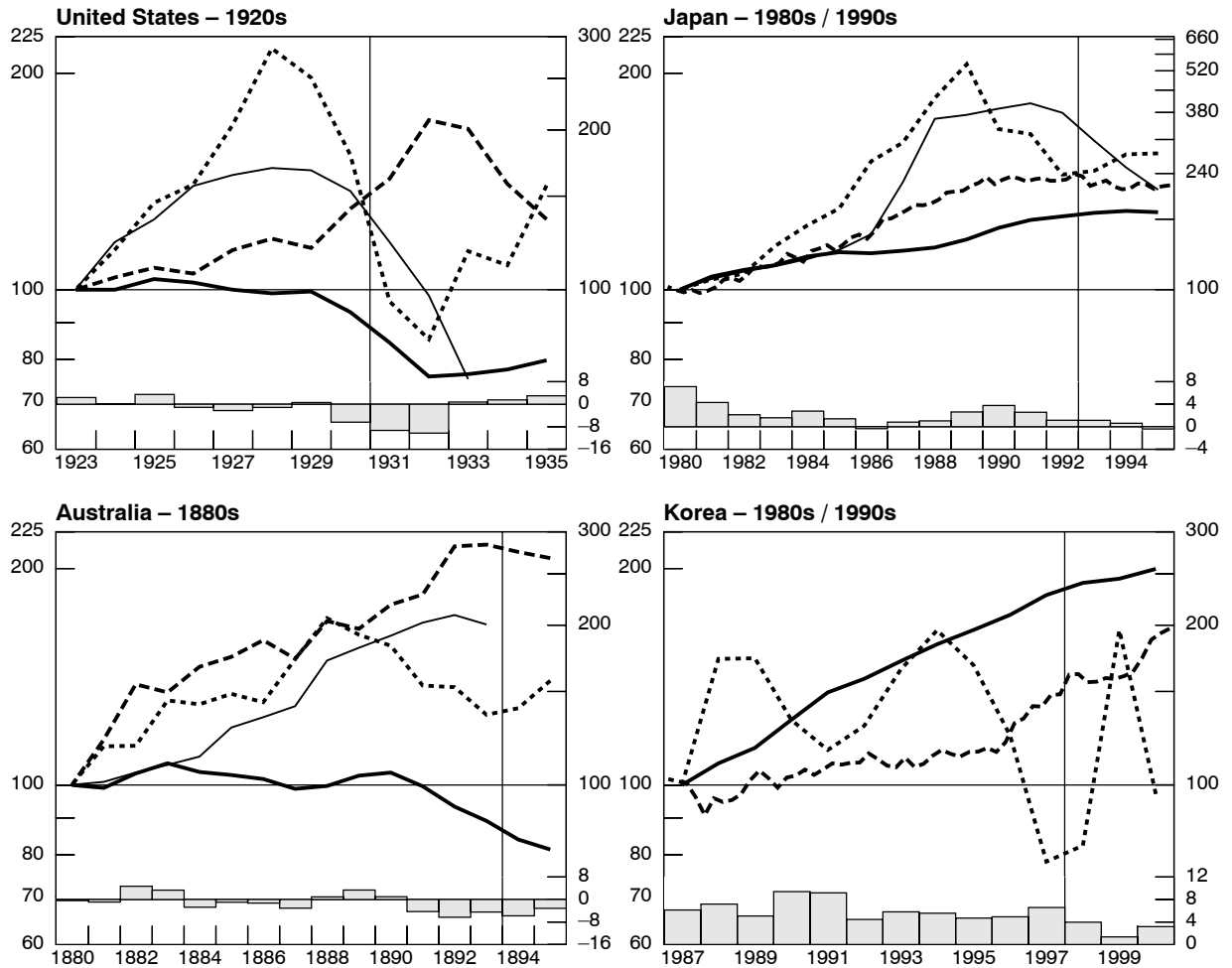
Source: National data.

Graph II.1

Low and stable inflation and financial instability: selected episodes

Upper panel (indices; log scales)¹ :
 — Consumer prices (lhs)² Share prices (rhs)³
 - - - Credit/GDP (lhs) — Property prices (rhs)⁴

Lower panel (in percentages; rhs):
 □ Annual change in consumer prices



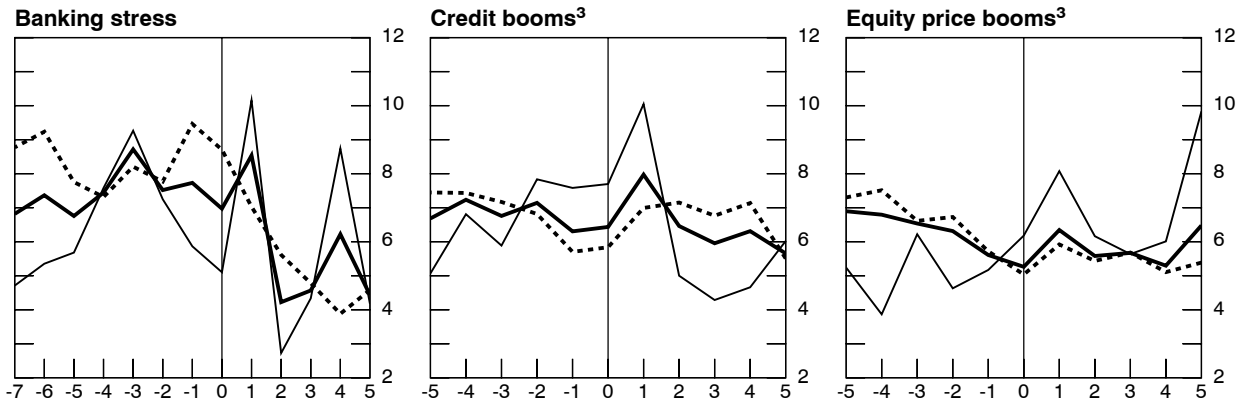
¹ Base year: for the United States, 1923; for Japan, 1980; for Australia, 1880; for Korea, 1987. ² For Australia, GDP deflator. ³ For the United States, S&P 500; for Japan, Nikkei 225; for Australia, All Ordinaries. ⁴ For the United States, Chicago land value; for Japan, Tokyo commercial land prices; for Australia, Melbourne capital value of rateable property.

Sources: For property prices: Tokyo National Land Agency and local governments; Chicago, Hoyt (1933); Melbourne, Kent and D'Arcy (2001); otherwise, B Taylor "Global Financial Data" (database) and national data.

Graph II.2

Inflation around financial imbalances and banking stress¹

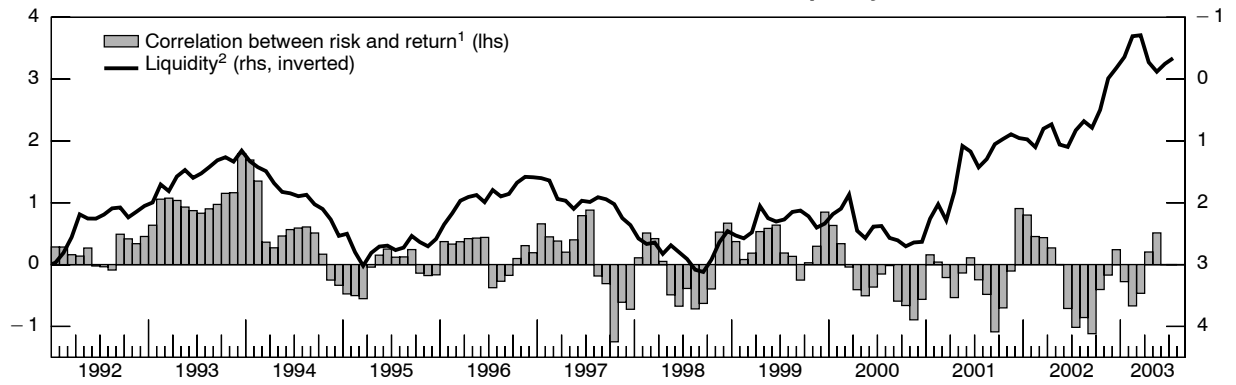
— All countries² Industrial countries — Emerging markets²



¹ Simple arithmetic means of annual percentage changes of consumer prices across all countries in the individual country groups. Based on annual data for all the series. ² Except Latin America. ³ Defined as the year in which the credit/GDP gap (equity price gap) first exceeds 4 (40) percentage points.

Graph II.3

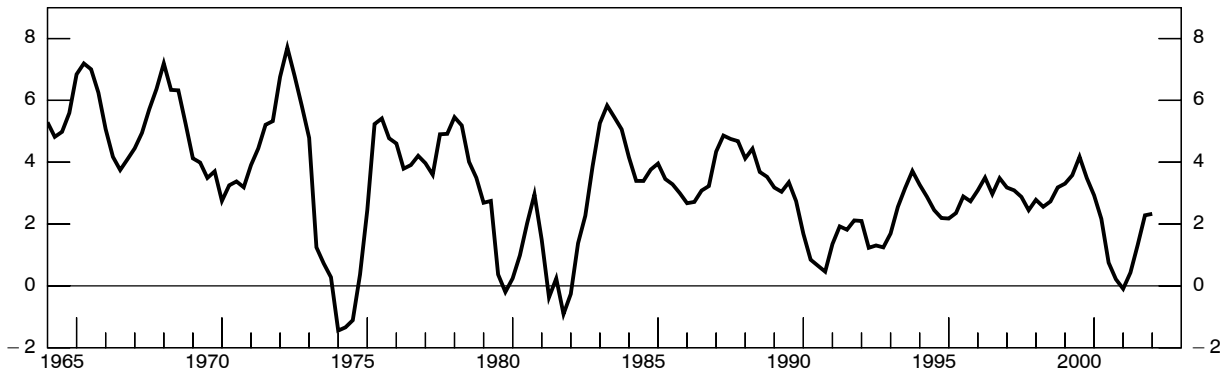
Investors' attitude towards risk and liquidity



¹ Slope coefficient of a cross-sectional regression of realised returns on historical volatility for a number of asset classes. A higher coefficient means that ex post returns tend to be comparatively high for asset classes that are judged to be relatively more risky ex ante, as proxied by their historical volatilities. Higher ex post returns are indicative of higher demand. Thus, a higher coefficient is taken to reflect a higher tolerance for risk. ² GDP-weighted average of overnight real rates in the eurocurrency market for the United States, Japan, Germany, France and the United Kingdom; weights based on 2000 GDP and PPP exchange rates.

Sources: Tsatsaronis (2000), updated based on Datastream and national data; BIS estimates.

Graph II.4
The recent global slowdown in perspective¹
Annual percentage changes



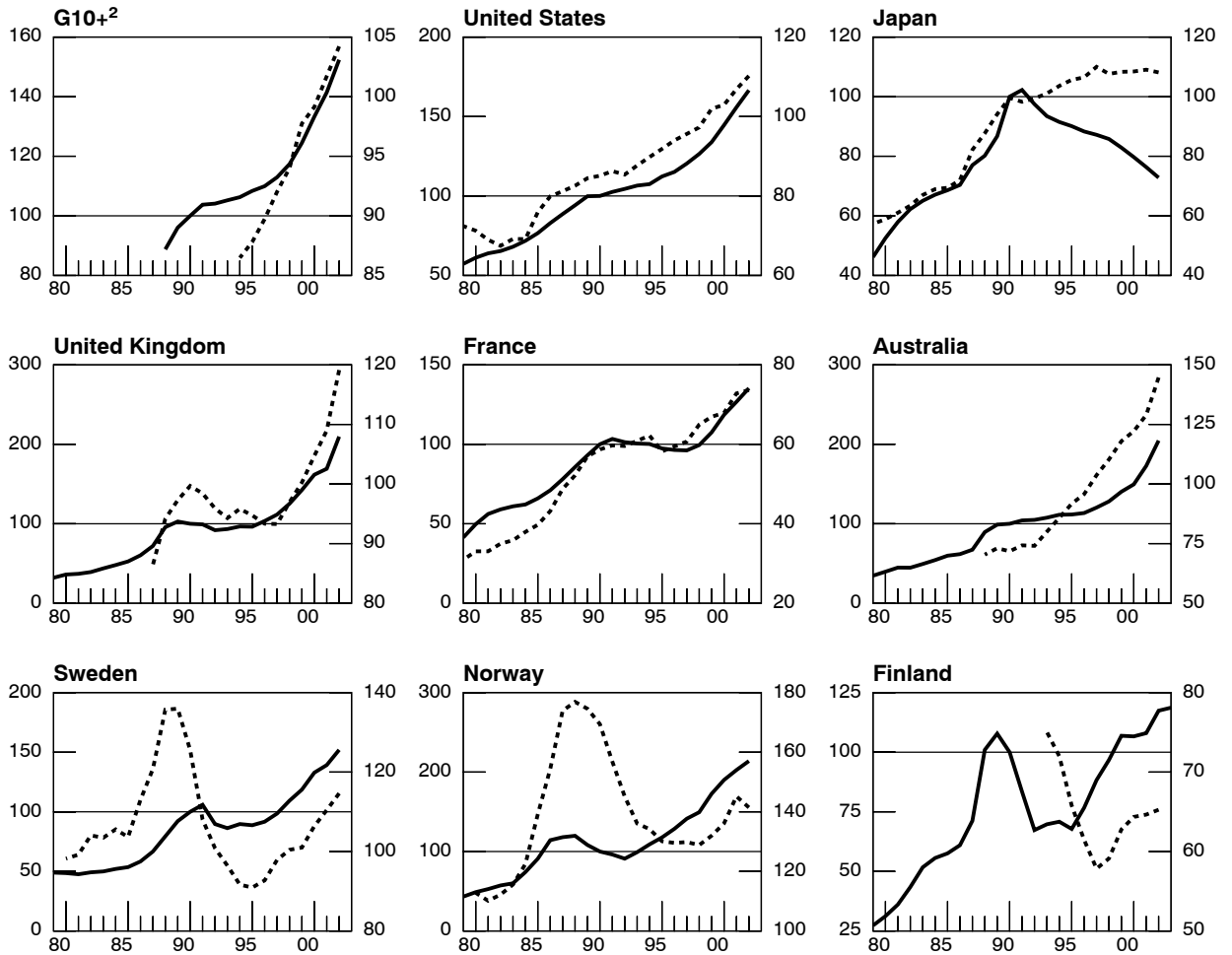
¹ Weighted average of the Group of Seven countries, with the weights based on 2000 GDP and PPP exchange rates.

Sources: National data.

Graph III.1

Household indebtedness and residential property prices

— Residential property prices (1990 = 100; lhs)
 Household debt ratio¹ (rhs)

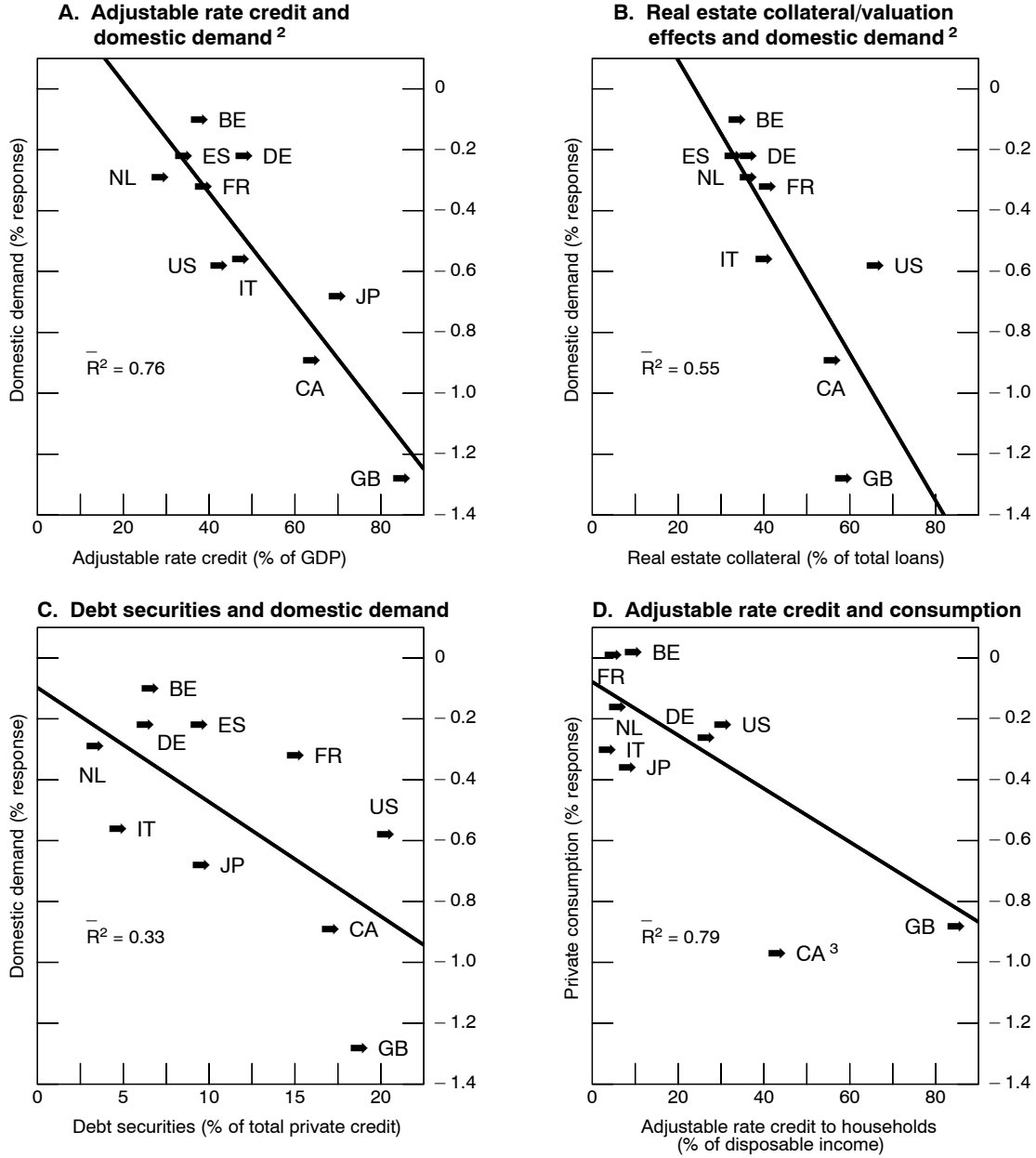


¹ Debt as a percentage of disposable personal income. ² GDP-weighted average of the Group of Ten countries, plus Australia, Denmark, Finland, Norway and Spain; weights based on 2000 GDP and PPP exchange rates.

Sources: Private real estate associations; national data; BIS calculations.

Graph A.1

Financial structure and the transmission mechanism ¹



¹ Percentage point deviations from baseline in domestic demand and private consumption according to the simulations of national central bank models. (100 basis point increase in policy rates maintained for two years). The deviations are measured in the second year following the tightening. For domestic demand, domestic channels only; the results are similar if real GDP or total domestic demand are used. ² Adjustable rate credit (% of GDP) and real estate collateral (% of total loans) jointly "explain" 86% of the cross-country variation in domestic demand. ³ A dummy is added for Canada: consumption also includes residential construction and inventories.