

The search for the elusive twin goals of monetary and financial stability

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“If we will only allow that, as we progress, we remain unsure, we will leave opportunities for alternatives. We will not become enthusiastic for the fact, the knowledge, the absolute truth of the day...In order to make progress, one must leave the door of the unknown ajar ”

Richard Feynman

Introduction¹

Looking back, economic historians will probably consider the early 1980s as a defining moment. It was then that central bankers started in earnest their successful fight against the Great Inflation of the postwar era. Since then, another concern, financial instability, has been gaining ground and risen to the top of national and international policy agendas.

There is much that we have learnt since that defining moment about how to make progress on these two fronts. Price stability, in the form of low and stable across much of the world, has been achieved and there is a broad consensus about how to preserve it. While financial stability has remained more elusive, by now we all know that one key to success is strengthening the financial infrastructure. Ever since the Asian crisis, the international community has made major efforts to develop the outline of a comprehensive approach to achieving this goal, articulated through a number of codes and standards. The Basel-based community, not least through the Basel Committee on Banking Supervision, has played a prominent role here. Likewise, countries have made major efforts to implement those codes and standards.²

In my remarks today, I would like to explore not what is known, but what is still largely unknown; to ask questions that might help us push out the envelope of our understanding. In Richard Feynman's words, I would like to “leave the door of the unknown ajar”. The issue I would like to address is the relationship between monetary and financial stability; the policy question is how to achieve the two simultaneously. Clearly, strengthening the financial infrastructure is a necessary condition for the achievement of this goal. It is not, however, sufficient, nor was it ever intended to be. From this perspective, you may think of my remarks as exploring the “missing pillar” of the international financial architecture, more broadly defined to encompass the realm of liquidity creation.

So posed, the question is a much more ambitious one. For, as I shall argue, even though some countries have been more successful than others, on balance the simultaneous attainment of monetary and financial stability has remained rather elusive in modern history. And if we just look at the last twenty years or so, while monetary stability has finally been secured through most of the globe, lasting financial stability has remained harder to attain. Indeed, since the 1980s financial instability has emerged as a major policy concern, forcing its way to the top of the international agenda. One battlefield opened up just as another was victoriously being closed.

My main conjecture is that we may be closer to achieving lasting monetary and financial stability than ever before. The opportunity is there for the taking. But doing so may call for some refinements to current monetary and prudential frameworks.

This conjecture is based on the hypothesis that changes in the financial and monetary regimes worldwide have been subtly altering the dynamics of the economy. On the one hand, financial liberalisation may have made it *more likely* that financial factors in general, and booms and busts in credit and asset prices in particular, act as drivers of economic fluctuations. On the other hand, the establishment of a regime yielding low and stable inflation, underpinned by central bank credibility, may have made it *less likely* that signs of unsustainable expansion show up first in rising inflation and *more likely* that they emerge first as excessive increases in credit and asset prices. The bottom line is

¹ This article largely reproduces the inaugural keynote address delivered at the 6th Money and Finance Conference, “Money and finance in the Indian economy”, IGIDR, Mumbai 25-27 March 2004. This lecture draws extensively, in particular, on Borio and Lowe (2002a) and Borio and White (2004). All errors are my sole responsibility. The views expressed are my own and do not necessarily reflect those of the Bank for International Settlements.

² In his lecture two years ago, William White from the BIS developed this important theme (see also White (1998) and (2000)).

that the current environment may be more vulnerable to the occasional build up of financial imbalances, by which I mean overextensions in (private sector) balance sheets that herald economic weakness and disinflation down the road, as they unwind. This unwinding can in turn raise the risk of financial strains and possibly broader financial instability. The unwinding may occur either because inflation eventually does emerge and the central bank is forced to tighten, or because the boom falters under its own weight.

In previous work, some of my colleagues and I have referred to the property of the economy that makes the emergence of financial imbalances more likely as increased “elasticity” or, in another context, increased “procyclicality”.

The main policy implication of this analysis is the need for closer co-operation between prudential and monetary authorities. For prudential authorities, the task would be to strengthen the macroprudential orientation of current arrangements. This would mean shifting the focus somewhat from individual institutions and towards the system as a whole while at the same time recognising explicitly in the calibration of their policy instruments the endogenous interaction between the financial system and real economy. This would set the technical basis for using prudential instruments to increase cushions during booms so as to run them down, up to a point, in the downswings. For monetary authorities, the task would be to lengthen the policy horizon beyond the one-to-two years typical of some inflation targeting regimes while at the same time paying more attention to the balance of risks. These modifications would set the technical basis for using monetary policy as a kind of insurance device, leaning against the financial imbalances as they build up even if near-term inflationary pressures remain benign. Through these mutually reinforcing policies, the two sets of authorities could limit the unwelcome consequences of the subsequent unwinding of the imbalances on financial stability, output and inflation, with each authority still focusing on its main objective. This could contribute to the achievement of monetary and financial stability on a lasting basis.

The main concern is that this issue may fall through the cracks. Prudential authorities may be reluctant to address problems that, from their perspective, appear to have exclusively a macroeconomic origin, and be tempted to leave it exclusively to the monetary authorities. Monetary authorities may feel that as long as near-term inflation appears under control, addressing the build up of imbalances is a task that should be left exclusively to their prudential counterparts, in so far as the imbalances raise threats to financial stability.

In the rest of my remarks I will elaborate on this conjecture, drawing extensively on research carried out with my colleagues at the BIS³. I will first consider in more detail the role of changes in the financial and monetary regimes. I will then provide some empirical support for the basic hypothesis. I will do so by sketching a broad-brush historical overview of the elusive search for monetary and financial stability across regimes before taking a closer look at the more recent experience. I will finally turn to the policy implications.

I The basic hypothesis

The role of the financial regime

What, then, is the role of changes in the financial regime? The key here is the remarkable process of **financial liberalisation**, both within and across national borders, that the world has witnessed over the last twenty years or so. Industrial countries typically began partial 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.

³ Correspondingly and deliberately, the reference list consists almost exclusively of BIS research, so as to highlight this work. Those papers include comprehensive bibliographies.

There is no question that a liberalised financial system is essential to reach a better trade-off between economic efficiency and stability. Repressive financial arrangements had 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.

At the same time, a liberalised financial environment can more easily accommodate, and reinforce, fluctuations in economic activity. It can do so by lending strength to the procyclical⁴ forces inherent in financial arrangements and in their two-way interaction with the real economy.

The financial system is inherently procyclical (Borio et al (2001)). Perceptions of value and risk move procyclically. And so does the willingness to take on risk. Aside from obvious minor lead and lag relationships, asset prices and credit spreads move 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 (eg, Amato and Furfine (2003)). Internal bank risk ratings are considerably procyclical (Lowe (2002)). 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. It can also allow the economy to take better advantage of growth opportunities. And as long as the system retains sufficient cushions, it can continue to act as a shock absorber in the face of unforeseen unwelcome developments. This elasticity is the oil that lubricates the system.

The concern is not with this “physiological” procyclicality, but with those occasional “pathological” episodes of excessive procyclicality that lie at the root of some of the more costly cases of financial distress. On these occasions, the procyclical processes can go too far and the system is unable to build sufficient cushions in good times so as to act as an effective shock-absorber in bad times. 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. 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.

But why should the financial system be prone to behave, occasionally, in an excessively procyclical way? I think that the reason has to do with two “gaps” (Borio (2003) and Knight (2003)). There is a “risk perceptions gap”. Economic agents are better able to measure the cross-sectional dimension of risk than the time dimension of risk, especially of system-wide risk. In fact, a careful look at the literature on market discipline indicates that much of the extant literature on the effectiveness of market discipline is of a cross-sectional nature (eg, Flannery (1998)). There is also an “incentives gap”. That is, actions that are rational from the perspective of individual economic units can result in undesirable collective outcomes. Familiar notions like prisoners’ dilemma, herding and coordination

⁴ 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.

failures are key. For instance, is it 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 fail to retrench in slump only because, if everyone did the same, the slump would be worse? Short horizons are at the heart of some of these distortions. And short horizons can themselves be grounded on the contractual mechanisms designed to overcome “asymmetric information” obstacles, which may thus have unintended consequences. The frequent monitoring of performance based on short-term benchmarks is one such example.

Three implications follow. First, in a liberalised environment risk perceptions and time-varying risk tolerance become more important factors driving the economy.⁵ Second, markets typically 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. Finally, the Achilles heel of market discipline may not be so much indiscriminate reactions to idiosyncratic shocks, as highlighted in the analysis of contagion. Rather, it may be failing to prevent *generalised* overextension.

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

The likelihood of such episodes of excessive procyclicality is especially high during the transition towards a liberalised environment. For the lasting legacy of financial repression are bloated cost structures and a limited capacity to assess, price and manage risks, both on the part of market participants and official authorities.

The role of the monetary regime

What about the role of the monetary regime? Here the argument is necessarily more speculative, as the establishment of low and stable inflation underpinned by central bank credibility is of more recent vintage, with only a handful of countries reaching this stage already in the 1980s. More generally, 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.

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, as it often has, the source of monetary accommodation is easily identifiable.

What might be harder to imagine is how monetary accommodation could take place if the authorities pursued a vigilant anti-inflation policy. I would argue, however, that this can in fact happen. The argument is quite simple: 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.

More specifically, one can identify at least three specific reasons for this.

First, long expansions of the type that encourages the build up of financial imbalances would most likely develop following favourable developments on the supply side. Improvements in productivity 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.

⁵ For some recent attempts to measure time varying risk aversion, see Tsatsaronis (2000) and Tarashev et al (2003).

Second, for a given aggregate demand, unsustainable asset price increases could themselves play a role in dampening inflation. 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. 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, 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 be 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 could 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. Indeed, because of the demand-depressing effect of the unwinding, the real risk to which large financial imbalances would point is economic weakness. And with inflation initially low, deflation could be a greater risk than inflation.

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 (eg, Gerlach and Smets (1999)). 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. 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 (Smets (1998)). 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)).⁶ Conquering inflation can contribute to changes in the dynamics of the system that could mask the risks arising in the economy.⁷

⁶ For an analysis consistent with this paradox, based on the absence of common knowledge, see Amato and Shin (2003).

⁷ Just as with financial liberalisation, the likelihood of the build-up of financial imbalances is especially high during the transition from a high to a low inflation environment, for a different reason from the one highlighted in the main text. This is

II. The evidence

Having laid out the basic hypothesis in some detail, let me now turn to the empirical evidence. I will first look at the historical record and argue that it is broadly consistent with the stylised interpretation of the relationship between monetary and financial stability across monetary and financial regimes just outlined (Borio and Crockett (2000), Borio and Lowe (2002a)). I will then turn to the experience since the 1970s, and examine the empirical evidence more closely and formally.

A historical perspective: monetary and financial stability across regimes

Table II.1 summarises the relationship between monetary and financial stability since the Gold Standard regime.

Under the classical Gold Standard a liberalised financial regime coexisted with monetary arrangements that resulted in a good measure of price stability over longer horizons (eg, Borio and Filardo (2004)). One can think of convertibility into gold as acting as the single anchor for monetary and financial stability. Monetary stability was defined in terms of maintenance of convertibility. In turn, the convertibility constraint would typically give way at times of financial instability, when deposits could no longer be turned into gold at par. Few, if any, constraints existed on banks' balance sheets and cross-border financial transactions. And the current framework of prudential regulation was non-existent or in its infancy in a number of countries. The convertibility constraint was highly visible and explicit. It was not sufficient, however, to prevent waves of financial instability in the wake of excessive credit expansion (Goodhart and Delargy (1999), Bordo et al (2001)).

In the inter-war years, still against the background of liberalised financial markets, the progressive emergence of fiat standards clouded the tight link between monetary and financial stability and loosened the constraints on credit expansion. Monetary stability became increasingly identified with price stability per se. The acceptance of a currency was increasingly based on the power of the State to tax. With the domestic currency acting as the basis for the measurement of value and with convertibility of deposits into currency being assured, financial instability was de-coupled from convertibility into gold. At the same time, the emerging regime made credit more endogenous. With initially little change in arrangements in the financial sphere, the system became more vulnerable to financial cycles. Financial imbalances built up either in the wake of the re-establishment of monetary stability, as in some continental European countries, or against the background of low and stable inflation, as in the United States.

The major financial instability that characterised the Great Depression was the catalyst for the introduction of the strict regulation of commercial banking, including through a variety of liquidity, maturity matching and solvency requirements (Allen et al (1938), Giannini (2001)). A separate anchor was thus put in place in the financial sphere. This anchor, however, went hand in hand with the establishment or major strengthening of safety nets; explicit deposit insurance in the United States is the best-known example. Inadvertently, by weakening financial discipline, ceteris paribus, safety nets added to the potential for the build up of imbalances.

The Bretton Woods regime quickly developed into a fiat standard coupled with financial repression. The de jure convertibility constraint for official transactions gave way to a de facto dollar standard. At the same time, a complex web of regulations of a monetary nature (e.g. ceilings on loan growth and interest rates) was superimposed, and largely superseded, previous prudential arrangements. This web of controls heavily constrained balance sheets as well as cross-border and foreign exchange transactions. By typically favouring government over private sector financing, these restrictions limited the scope for financial cycles. Central banks' common tendency to focus on bank credit played a reinforcing role (Borio and Lowe (2004)). For a while, the system did deliver monetary and financial stability, but at increasing costs in terms of resource allocation. And starting in the late 1960s-early

because of the possible existence of money illusion, often strengthened by institutional arrangements that are slow to adjust to lower inflation (eg, actuarial discount rates, etc.). The classic reference here is Modigliani and Cohn (1979), who note the obverse phenomenon: how rising inflation led to undervaluation of equities in the 1970s (see also McCauley et al (1999)). For instance, arguably, the repeated episodes of search for yield we are observing these days result in part from the pursuit of unrealistic nominal target rates of return, still based on an environment of higher inflation.

1970s, greater willingness to use money to finance deteriorating fiscal positions and increasingly ambitious macroeconomic policies led to runaway inflation. Monetary stability was lost and the Great Inflation era was ushered in.

Eventually, the costs of financial repression led governments to deregulate the financial system, loosening the exogenous constraints on private sector credit expansion; initially, this took place in the context of a monetary regime that was not credibly ensuring price stability, but over time, it coexisted to varying degrees with the successful fight against inflation. This is the period that goes roughly from the 1980s to the early to mid 1990s. Financial instability re-emerges, often coexisting with inflation. The authorities begin to strengthen prudential safeguards.

The subsequent phase takes us to the present day, in which credible anti-inflation monetary regimes coexist with a liberalised financial environment. In the monetary sphere, after a protracted battle in the 1980s inflation has been conquered. And institutional arrangements have been put in place to consolidate these gains. At the same time, financial liberalisation has gathered pace, nationally and internationally, and is largely complete. Financial cycles appear, if anything, to have grown in amplitude and financial instability is still a major policy concern. Efforts to upgrade prudential safeguards have intensified and broadened geographically.

This brief review highlights four points.

First, arguably no regime in history has simultaneously achieved sustained monetary and financial stability. The search for appropriate anchors in the monetary and financial sphere has proved elusive.

Second, financial and monetary stability are inextricably intertwined. To address the policy issues satisfactorily, a consensus is needed between monetary and prudential authorities regarding the genesis of, and possible remedies for, financial instability.

Third, the configuration of monetary and financial regimes has come to resemble in some significant respects that prevailing in the pre World War I period (Borio and Filardo (2004)). This was the last time when liberalised financial markets coincided with a monetary regime seen as guaranteeing a good measure of monetary stability. In the early decades of the 20th century, this was the Gold Standard; nowadays, it is a monetary framework that, while based on fiat money, is structured so as to secure the control of inflation.

Finally, there are, however, some significant differences with respect to that period; the concept of “elasticity” can help us to understand them. In the financial sphere, prudential regulation now reduces the system’s elasticity, by constraining over-extension in balance sheets. At the same time, safety nets can work in the opposite direction, by increasing moral hazard. In the monetary sphere, the external convertibility constraint imposed under the Gold Standard has been replaced by the reaction function of the monetary authorities that is essentially discretionary.⁸ Which of the two regimes is more elastic? The answer presumably depends on the specifics of the arrangements and policy strategies.

A closer look: specific empirical findings

Drilling through the broad picture, four pieces of evidence can be seen as consistent with the basic hypothesis about the relationship between monetary and financial stability put forward in this lecture. First, cycles in credit and asset prices have become more prominent since the early 1980s. Second, measures of “financial imbalances” have useful predicting content for subsequent widespread banking distress. Third, those same measures also contain useful information about subsequent output and inflation performance. Finally, a closer look at the empirical record confirms that “financial imbalances” can easily build up in the context of comparatively low and stable, or even declining, inflation. Let me address each point in turn.

⁸ In fact, in some respects the resemblance may be closer with the first phase of the inter-war period. This phase had either seen successful efforts to re-establish monetary stability by returning to the gold standard, as in a number of central European economies, or experimentation in how to conduct monetary policy in a context of price stability but weakened exogenous constraints on credit expansion, as in the United States.

More prominent booms and busts in credit and asset prices

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 II.1, based on the evolution of equity as well as commercial and residential property prices. 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 (Borio et al (1994)).

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. 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 (Borio et al (1994)). Importantly, the same formal empirical work indicates that this correlation appears to have become tighter following financial liberalisations. More recent studies suggest that the correlation is especially close with real estate prices, as might be expected (Hofmann (2001), Davis and Zhu (2004)).

Financial imbalances herald financial instability

A look at the empirical record indicates that financial imbalances, in the form of unusually strong and sustained credit and asset price expansion, have preceded most of the episodes of serious financial instability and strong financial “headwinds” that have become more common since the 1980s, in industrial and emerging market economies alike. This retraces a pattern that was quite familiar under the Gold Standard (Kindleberger (2000), Goodhart and Delargy (1999)).

This observation has been confirmed by more formal statistical work. With Phil Lowe, for instance, we have shown that it is possible to “predict” fairly well episodes of major banking distress based on very simple proxies of “financial imbalances” (Borio and Lowe (2002a), (2002b), (2004)). The proxies are based on two key variables. The first is a measure of ***misalignment in some key asset price***, which can be taken as an indicator of the likelihood and size of a reversal. The second is some measure of the private sector ***leverage*** (here private sector credit in relation to GDP), which can be taken as an indicator of the likely damage caused to the economy by the reversal in asset prices. Both of these elements measure deviations from the “normal” range of historical experience, or “gaps”, defined in terms of deviations that exceed certain critical thresholds.

Given the limited time available, let me just highlight a few points about this empirical evidence, summarised in Tables II.2 to II.4.

First, the gap variables are constructed based exclusively on information available at the time when the predictions are made; technically, the trends are calculated recursively based on ex ante information only. This is important to make sure that they can be useful for policy.

Second, they are calibrated based on developments during the boom only. Thus, they can be thought of as helping to distinguish sustainable from unsustainable economic expansions. This is reinforced by the fact that the proxy for financial imbalances contains information well beyond that contained in traditional output gaps (same tables).

Third, it is the requirement that the thresholds be exceeded simultaneously by the indicators of price misalignment and leverage that helps to improve the accuracy of the prediction. It does so by eliminating a lot of “noise”, namely by not predicting too many crises. This underscores the point that what matters are financial imbalances, not asset price misalignments per se.

Fourth, the financial imbalance proxies contain information that extends beyond short horizons, with the accuracy of the predictions improving as the horizon is lengthened. On annual data, we have shown that this is the case if one extends the horizon from one to three years ahead (Tables II.2 and II.3)). More recently, based on quarterly data for industrial countries, we have shown that this is also the case if the forecasting horizon is three to five years ahead. This highlights the significant time that the build up and unwinding of imbalances can take and that the information content goes beyond the typical horizons used for monetary policy.

Finally, the financial imbalance indicators capture most the episodes with clear macroeconomic significance during our sample. In industrial countries, 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. In emerging market countries, they include most of banking crises that occurred in Latin America and Asia since the late 1980s.

Financial imbalances herald output weakness and disinflation

Not surprisingly, given the close association of banking distress with output weakness, recent empirical evidence suggests that financial imbalance proxies also help to predict weak economic activity and disinflationary pressures. And as with banking distress, they do so beyond traditional horizons employed for monetary policy.

The evidence, so far available only for industrial countries, is summarised in Tables II.5 and II.6, and is drawn from recent work with Phil Lowe (Borio and Lowe (2004)). It is based on probit regressions, which predict the probability of negative output gaps below 1% and year-on-year declines in inflation over a horizon of between two to four years ahead. The financial imbalance proxies are the same as those calibrated to predict banking distress in the previous analysis. Without going into details, four findings stand out.

First, the information content of the composite indicator is particularly strong with respect to the output gap, and is additional to that contained in lagged values of the output gap itself (Table II.5). The unconditional probability of observing such economic slack in the sample is 40%, but it increases to 66% and to 75% respectively in the third and fourth year following the quarter in which the financial imbalance proxy flashes red. On their own, high output gaps have little predictive power about the future. This is consistent with the evidence that suggests that booms do not simply die of old age (eg, Filardo and Gordon (1998)). But if one adds the composite financial imbalance indicator to the positive output gap, then the probability of economic weakness increases further to 99% and 100%, respectively.

Second, the indicator also contains information about inflations which is additional to that of the output gap, with a clear time pattern as the horizon is lengthened. The predictive performance, however, is not quite as good as that with respect to output (Table II.6). The findings suggest some slight upward pressure on inflation one year ahead, turning into downward pressure by the fourth year, as imbalances unwind. For instance, the unconditional probability of observing a decline in inflation in any given year is 50%. If the financial imbalance proxy is combined with a positive output gap in excess of 2%, this raises it to over 90% in the fourth year ahead compared with 60% for predictions based on the output gap alone.

Finally, the same tables suggests that, based on the same criteria, the performance of money is on balance inferior to that of credit aggregates. This is especially the case with respect to predictions of output weakness; there is less to choose between the two as regards inflation. The finding is consistent with the close association of credit with asset prices discussed above and the importance of leverage to capture the possible costs of the reversal of asset price booms. It suggests that for the type of phenomena considered here monetary aggregates alone are unlikely to be an adequate substitute for private sector credit.

Financial imbalances do build up in low inflation environments

What about the role of inflation per se in encouraging the build up of financial imbalances and sowing the seeds of subsequent financial distress? It is of course possible to find examples of imbalances built in an inflationary environment. For instance, in industrial countries a clear example is the credit and commercial real estate boom that preceded the secondary banking crisis in the mid 1970s in the UK, following the lifting of credit constraints. The inflation-hedge demand for real estate and tax provisions that encourage leverage as inflation increases are well-known mechanisms that can explain the positive association between inflation and financial imbalances.

At the same time, it is equally possible to find examples of low and stable 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.2). 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 several (same graph).

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 (eg, Schwartz (1995) and Bordo et al (2000)) (Graph II.3). 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.

More generally, looking back at the experience in recent years, it is possible to detect increasingly common signs of an intensified interaction between credit and asset prices in an environment of stable and low inflation. 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 (Borio et al (2003)). These tended to coincide with periods during which sustainable growth prospects were overestimated. 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. Likewise, the current boom in China shares several of the same characteristics.

III. The policy options

If one accepts the broad thrust of the basic hypothesis outlined in this lecture, what are the policy implications? Let me sketch the implications for prudential and monetary policy in turn.

Prudential policy

Given the prominent role that financial instability plays in the basic thesis, it is only natural 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, the well-known efforts to strengthen the financial infrastructure in the context of the broader strategy to improve the international financial architecture are a way of addressing this issue head-on. 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 (Borio and Tsatsaronis (2004)), 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 in the recent slowdown owes significantly to such efforts (BIS (2003)).

Strengthening the macroprudential orientation

At the same time, putting adequate defences in place would arguably call for going beyond current efforts and strengthen the "macroprudential orientation" of current frameworks (Crockett (2000), Borio

(2003)). What this means is probably best understood by comparing this orientation with its more traditional microprudential counterpart (Borio (2003) and Tsatsaronis (2004)) (Table III.1) The more familiar microprudential dimension focuses on limiting financial distress at individual institutions, calibrates prudential instruments with respect to their individual risk profiles and hence ignores correlations in exposures across them. In addition, it treats risk as fundamentally exogenous. By contrast, its macroprudential counterpart focuses on limiting the risk of system-wide distress with potentially serious consequences for the real economy, calibrates prudential controls with respect to the risk profile of the system as a whole and hence pays close attention to correlations in exposures across individual financial institutions. Naturally, it treats risk as endogenous with respect to the collective behaviour of institutions. The microprudential perspective can best be rationalised in terms of depositor or investor protection; its macroprudential counterpart in terms of limiting systemic risk.

Thus, in a nutshell, a “macroprudential” orientation would stress the system-wide perspective of risk in terms of objectives and the way of achieving them (Borio (2003) and Table III.1)). For the purposes of the discussion here, it would, in particular, highlight the mutual interaction between the financial and real economy. 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.

Several possible options can be envisaged (Borio et al (2001), Borio and Lowe (2002b) and Borio (2003)). One might be to adjust minimum capital requirements or provisioning practices. Another might be to rely on loan-to-value ratios, either adjusting the ratio itself or the way in which, for prudential purposes, valuations are calculated (Tsatsaronis and Zhu (2004)). A better assessment of financial vulnerabilities, going beyond the simple proxies for financial imbalances described here, could form the basis for such policies. In all of these cases, issues concerning the balance between rules and discretion would need to be carefully considered.

While encouraging steps have been taken in recent years to strengthen the macroprudential perspective, there is still a long road ahead. First, 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. Second, the proposed solutions, while feasible, raise technical difficulties. For example, supervisors, still feel that they do not yet have adequate tools to assess how system-wide risk evolves over time. Similarly, 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. 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.⁹ And 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. Indeed, broader questions arise about the proper co-ordination and

⁹ 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 (2003)). 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, 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 (2001, 2002), Lowe (2002), Borio (2003) and Greenspan (2002).

roles of prudential policies, on the one hand, and accounting policies, on the other (Borio and Tsatsaronis (2004)).

A macroprudential orientation may not suffice

Let us imagine for a moment, however, that these cultural and technical obstacles could be overcome. Even then, it could be argued that this might not be sufficient to prevent significant macroeconomic costs from the build up and unwinding of imbalances. There are at least two reasons for this.

First, 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 (Borio (2000) and (2003b); CGFS (1999)). 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.

Second, 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, businesses and households could come under pressure to rebuild their balance sheets and cut spending.

The bottom line is simple: 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.¹⁰ But prudential authorities have only limited influence on the liquidity generated in an economy. This brings us to the importance of monetary policy.

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.

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.

¹⁰ 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.

Nevertheless, even if the *prima facie* case for a preventive tightening is accepted, a number of significant implementation problems remain. 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. 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. 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. 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.

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.

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. Indeed, several central banks have recently been moving in this direction (eg Bank of England (2002) and Stevens (2003)).

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” (Borio and Lowe (2002a), Borio and White (2004)).

There is no real need to change the *ultimate objectives*, typically couched in terms of inflation and output. 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 (Borio and Filardo (2004)). 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 rather unpredictable, the processes involved tend to be drawn-out ones.¹¹ 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 (Okina et al (2001)). 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. 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) (Issing (2003)). Indeed, the ECB has been rather explicit about this possibility in recent statements.

Having said this, the differential behaviour of various asset prices can complicate the picture further. One such asset price is the exchange rate. In particular for small open economies, credit expansion tends to be fuelled by capital inflows and a tightening of monetary policy might encourage those inflows further. Another asset price is that of real estate, which are arguably even more relevant than equity prices, owing to the large component of wealth tied up in property and to their extensive use as collateral. Reductions in interest rates to soften the unwinding of equity markets may risk contributing to the build up of imbalances in real estate markets. The experience in the late 1980s (Borio and Lowe (2004)) and the more recent one (Borio and McGuire (2004)) share some of these characteristics.

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. And they suggest that the relative weight to be placed on monetary and prudential arrangement should vary

¹¹ For views broadly sympathetic with this point, see King (2002), Bean (2003), Bäckström (2002) and Gjedrem (2003). See also Dodge (2003) and Issing (2003).

with circumstances, based on the comparative effectiveness of the instruments. For instance, in highly open small economies, a larger weight on prudential instruments may be justified.

Conclusions

The search for lasting monetary and financial stability has proved rather elusive through history. We are probably closer than ever before to achieving this goal. In this lecture, I have tried to explore the reasons for this elusiveness and sketched a possible way forward. In doing so, following Feynman's advice, I have tried to "keep the door of the unknown ajar". As a result, the informed conjecture and main thesis on which this way forward is based are testing the limits of our current knowledge. What would be the implications if the basic thesis was regarded as sufficiently promising? I would summarise them in "four needs".

First, we need much more analytical work. This work is required to see how the processes outlined in this paper can be incorporated into proper models, with rigorous foundations. Such models could help us better understand the interaction between the financial system and the real economy and hence the appropriate calibration of policy instruments. Developing such models will certainly be very challenging. While a number of building blocks do exist, they have so far not been assembled together into a consistent whole. Technical difficulties are not trivial, as the processes envisaged are fundamentally non-linear.¹² My guess is that success will require blending three lines of enquiry that have been evolving largely independently, dealing respectively with macroeconomic issues, financial crises and risk measurement and management. In the process, it will also call for a rediscovery of the classical intellectual tradition stressing endogenous business cycles (Borio et al (2003), Borio and White (2004), Filardo (2003a)).

Second, we need much more empirical work. This work would be designed to improve our ability to identify financial imbalances in good time, based on a more comprehensive assessment of vulnerabilities (Borio (2003), Borio and Tsatsaronis (2004)). This is likely to bring together measures of the likelihood of distress, such as the indicators described here, with measures of the costs given distress. Macro-stress tests could play a prominent role here. The work should also seek to help us to understand better the relationship across key asset classes, notably equity prices, property prices and, if one may refer to it as an asset price, the exchange rate. Real estate prices, in particular, have been neglected for too long. It should allow us to quantify theoretical models. And it should help us understand in more depth the costs of financial instability. My guess is that these are only partly captured by short-run deviations of output from trend or even output volatility, and that they are much longer lasting, given the potential longer-term misallocation of resources that financial imbalances can generate.

Third, we need educational efforts to communicate clearly how the policies outlined here are consistent with existing mandates and hence to build the required support for them. In the case of prudential authorities, educational efforts are necessary to explain to the public how a stronger macroprudential focus is also conducive to stronger financial soundness of individual institutions (Borio (2003)). In the case of monetary authorities, they are essential to explain to the public how a policy response to the build up of financial imbalances even if near-term inflation appears under control is consistent with the pursuit of inflation objectives; indeed, it is better conducive to sustainable price stability (Borio and Lowe (2004)). This is especially difficult in the context of inflation targeting regimes, given the rhetoric employed until recently. But even in less restrictive regimes, there is a risk that the authorities may incorrectly be seen as pursuing policies that go beyond their mandate.

Finally, we need a much more intense dialogue between prudential and monetary authorities. The goals they pursue are arguably much more tightly linked than they may appear at first sight. Their attainment calls for closer co-operation, based on a common understanding of the problems and a common strategy to address them. Ultimately, this dialogue is probably the most solid foundation on

¹² See, eg Filardo (2003b) for a discussion of these issues and an attempt to address them in a very simple reduced-form model.

which to build for the future. It is the best way to ensure that the quest for lasting monetary and financial stability will turn out to be less elusive than in the past.

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Table II.1
The empirical record: the broad picture

	Regime		Stability	
	Financial	Monetary	Financial	Monetary
Gold standard	liberalised	credible	no	yes
Bretton Woods-70	repressed	non-credible	yes	no
1980s-early 90s	liberalisation	non-credible (generally)	no	no (generally)
Mid 1900s-present	liberalised	credible	no	yes

Table II.2
Composite indicators of banking distress, industrial countries

Horizon (years)	Credit (4) and asset price (40)		Credit (4) and exchange rate (4)		Credit (4) and (asset price (40) or exchange rate (20) ¹)	
	Noise/ signal	% crises predicted	Noise/ signal	% crises predicted	Noise/ signal	% crises predicted
1	0.09	50	0.11	44	0.09	50
2	0.06	56	0.10	44	0.06	56
3	0.04	63	0.10	44	0.04	63

¹ Or higher.

Source: Borio and Lowe (2002b).

Table II.3
Composite indicators of banking distress, emerging market countries

Horizon (years)	Credit (4) and asset price (40)		Credit (4) and exchange rate (5)		Credit (4) and (asset price (40) or exchange rate (13))	
	Noise/ signal	% crises predicted	Noise/ signal	% crises predicted	Noise/ signal	% crises predicted
1	0.23	38	0.15	58	0.16	67
2	0.12	54	0.11	58	0.12	71
3	0.08	58	0.10	58	0.09	75

Source: Borio and Lowe (2002b).

Table II.4
Composite indicators of banking distress, industrial countries

Horizon (years) ²	Combined gaps ¹											
	Money ³ (2) and credit ⁴ (4)		Money (2) and output ⁵ (2)		Money (2) and asset price ⁶ (60)		Credit (4) and output (2)		Credit (4) and asset price (60)		Credit (4), asset price (40) and output (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	.21	60	.21	47	.09	47	.13	53	.06	47	.05	27
3,4	.20	60	.17	53	.07	53	.07	73	.02	73	.02	47
3,4,5	.19	60	.16	53	.06	53	.06	73	.02	73	.01	60

¹ A gap is measured as percentage points from an ex ante, recursively calculated Hodrick-Prescott trend; the size of the threshold is shown in brackets. ² 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 3,4" 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. ³ Money is measured as the ratio of money to GDP (lambda = 400000). The monetary aggregate used is roughly equivalent to M2 or M3 depending on the country. ⁴ Credit is measured as the ratio of private sector credit to GDP (and lambda = 400000). ⁵ GDP (and lambda = 1600). ⁶ Real equity price index (and lambda = 400000).

Source: Borio and Lowe (2003).

Table II.5
Financial imbalances as indicators of the output gap¹

Conditional probabilities of an output gap of less than minus 1% ² (unconditional = 39)							
Single indicators				Composite indicators			
Gaps	Year 2	Year 3	Year 4	Gaps	Year 2	Year 3	Year 4
Output (2)	37 (-.53)	42 (.94)	49** (2.92)	Credit (4) and equity (60)	41 (.50)	66** (5.54)	75** (7.00)
Credit (4)	54** (6.43)	47** (3.36)	37 (-.63)	Credit (4) and output (2)	56* (2.34)	60** (2.74)	53 (1.78)
Equity (60)	35 (-1.25)	53** (4.61)	59** (6.68)	Equity (60) and output (2)	34 (-.69)	63** (3.19)	77** (4.71)
Money (2)	42 (1.42)	42 (1.52)	40 (.53)	Credit (4), equity (60) and output (2)	55 (1.06)	99** (2.91)	1.00 ³ -
				Money (2) and credit (4)	50** (4.11)	44 (1.78)	37 (-.64)
				Money (2) and output (2)	31 (-1.44)	39 (.11)	40 (.19)
				Money (2) and equity (60)	37 (-.41)	61** (4.39)	65** (5.46)

¹ Results of probit regressions in which the variable predicted and the predictors are treated as zero/one dummies depending on whether the corresponding conditions defining the event are met; z-statistics in brackets. The sample is 1974 Q1-1999 Q4. Two and one asteriks correspond to statistical significance at the 1% and 5% levels respectively. ² Ex ante output ($\lambda = 1600$, throughout the table). The prediction relates to the ex ante output gap satisfying the condition (here, less than minus 1) in any one of four successive quarters (year). Thus, if the prediction is made in Q1 of, say, 1980, in the case of year 2 ahead the negative output gap of minus 1 relates to any one of 1982 Q1, Q2, Q3 and Q4, ie any one of 8, 9, 10 or 11 quarters ahead. Thus, the two-year horizon is only approximate. The same applies to the other horizons. ³ Conditional probability calculated by counting the frequency of events; the econometric routine does not converge.

Source: Borio and Lowe (2003).

Table II.6
Financial imbalances as indicators of inflation¹

Conditional probabilities of a decline² (unconditional = 50)

Single indicators				Composite indicators			
Gaps	Year 2	Year 3	Year 4	Gaps	Year 2	Year 3	Year 4
Output (2)	47 (-.71)	60** (2.64)	58* (2.11)	Credit (4) and equity (60)	41* (-2.08)	53 (.58)	63** (2.69)
Credit (4)	50 (.17)	51 (.27)	54 (1.70)	Credit (4) and output (2)	29** (-2.84)	68* (2.46)	62 (1.53)
Equity (60)	41** (-2.99)	52 (.68)	56* (2.11)	Equity (60) and output (2)	41 (-1.35)	56 (.87)	71** (2.79)
Money (2)	45* (-2.16)	52 (1.02)	54 (1.92)	Credit (4), equity (60) and output (2)	36 (-1.07)	55 (.31)	92* (2.38)
				Money (2) and credit (4)	49 (-.20)	52 (.63)	52 (.92)
				Money (2) and output (2)	46 (-.75)	62* (2.28)	59 (1.56)
				Money (2) and equity (60)	42 (-1.73)	54 (.99)	63** (2.85)
				Money (2), equity (60) and output (2)	47 (-.23)	56 (.50)	74 (1.80)

¹ Results of probit regressions in which the variable predicted and the predictors are treated as zero/one dummies depending on whether the corresponding conditions defining the event are met; z-statistics for the underlying regression coefficients in brackets. The sample is 1974 Q1-1999 Q4. Two and one asteriks correspond to statistical significance at the 1% and 5% levels respectively. ² Inflation is defined as an average year-on-year change over four quarters. Thus, if the prediction is made in Q1 of, say, 1980, in the case of year 2 ahead the decline in inflation relates to the average year-on-year change between 1982 and 1981.

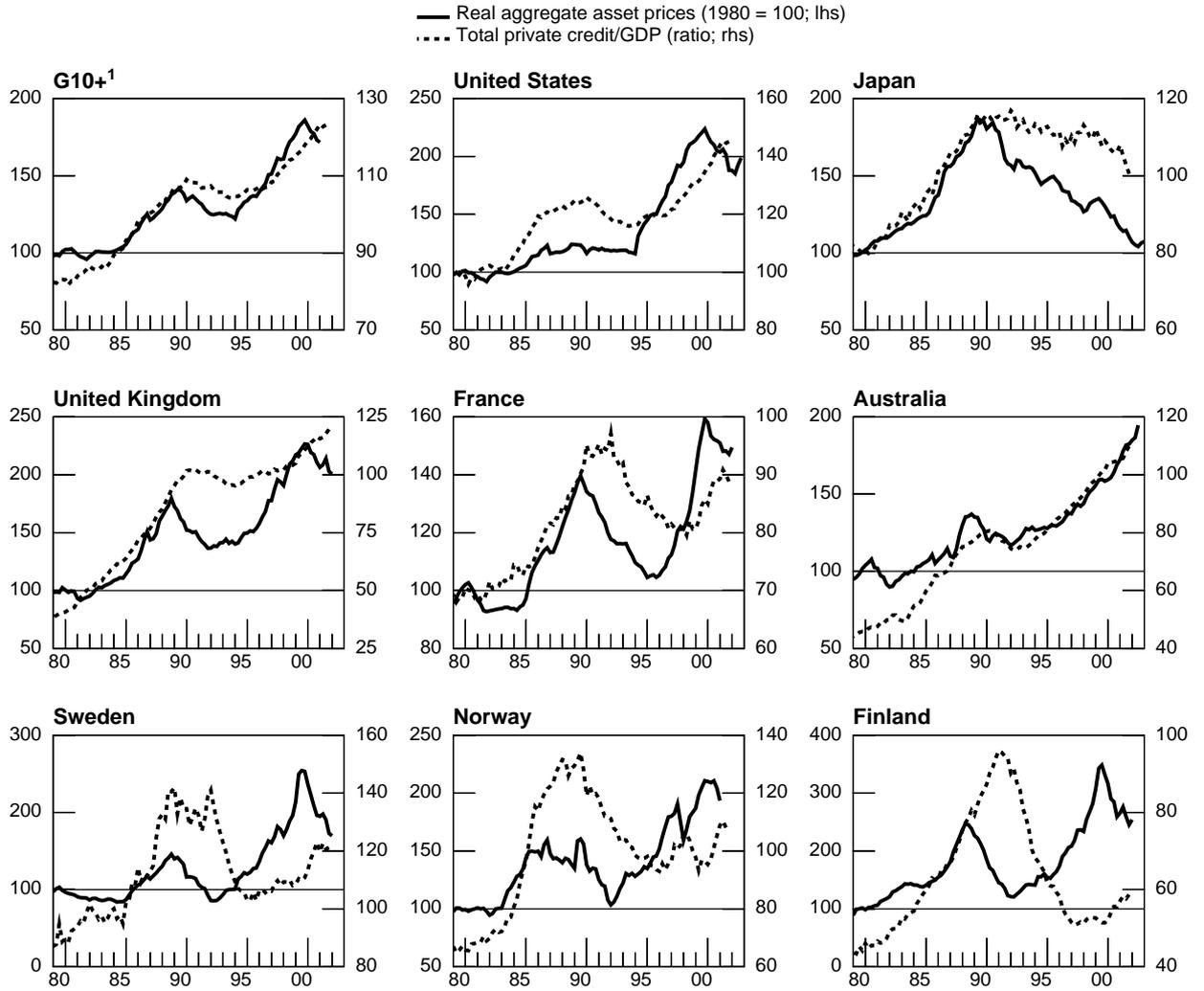
Source: Borio and Lowe (2003).

Table III.1
The macro- and microprudential perspectives compared

	Macroprudential	Microprudential
Proximate objective	limit financial system-wide distress	limit distress of individual institutions
Ultimate objective	avoid output (GDP) costs	consumer (investor/depositor) protection
Model of risk	(in part) endogenous	exogenous
Correlations and common exposures across institutions	important	irrelevant
Calibration of prudential controls	in terms of system-wide distress; top-down	in terms of risks of individual institutions; bottom-up

Graph II.1

Large medium-term swings in asset prices and credit



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.

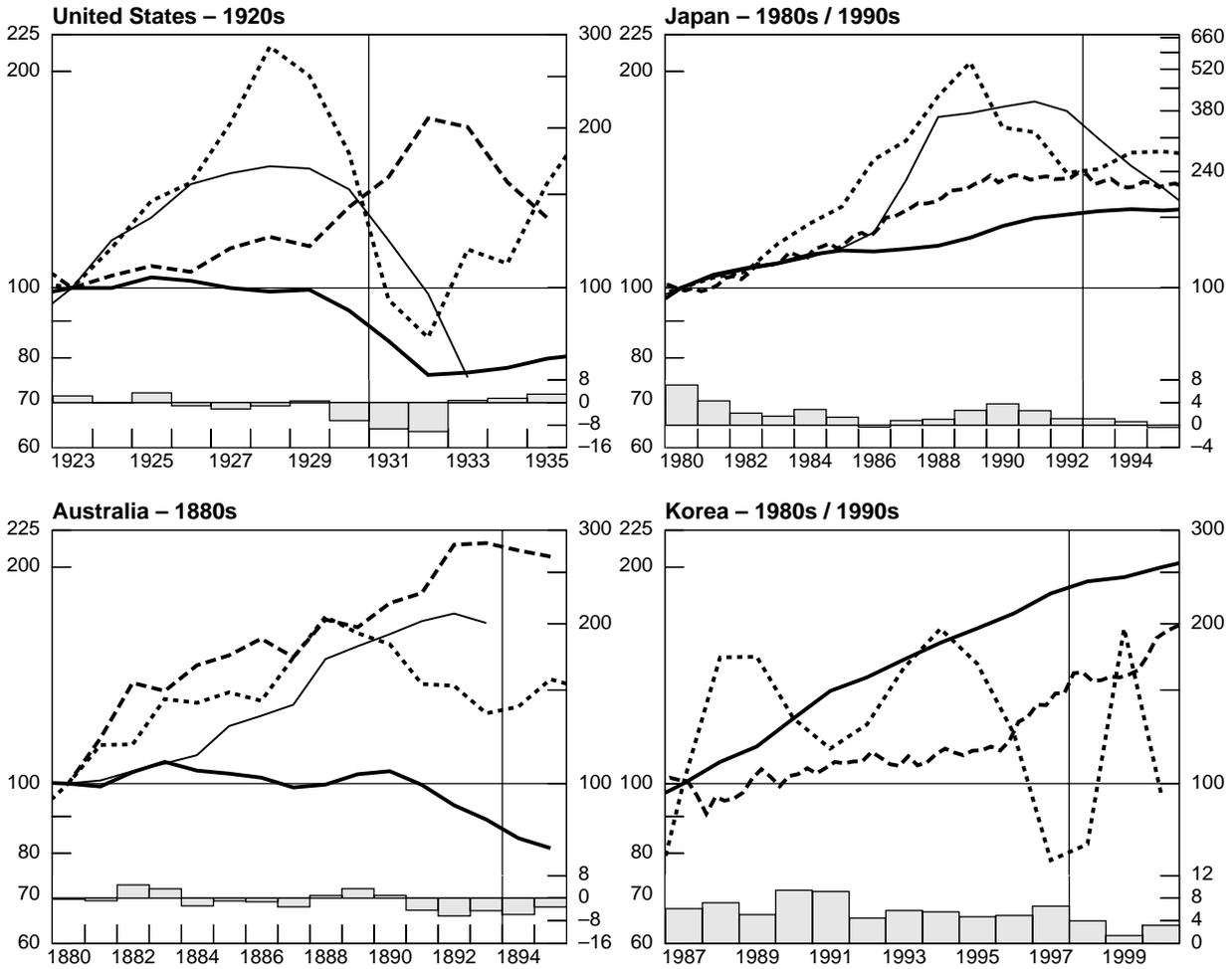
Sources: Private real estate associations; national data; BIS calculations.

Graph II.2

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



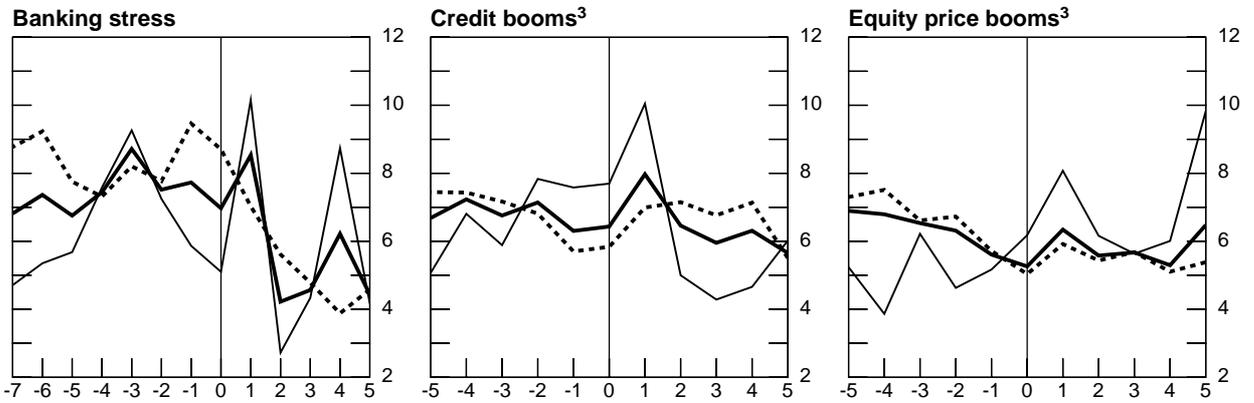
¹ Base year: for the United States, 1923; for Japan, 1980; for Australia, 1880; for Korea, 1987. ² For Australia, GDP deflator. ³ For the United States, S&P 500; for Japan, Nikkei 225; for Australia, All Ordinaries. ⁴ For the United States, Chicago land value; for Japan, Tokyo commercial land prices;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

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.