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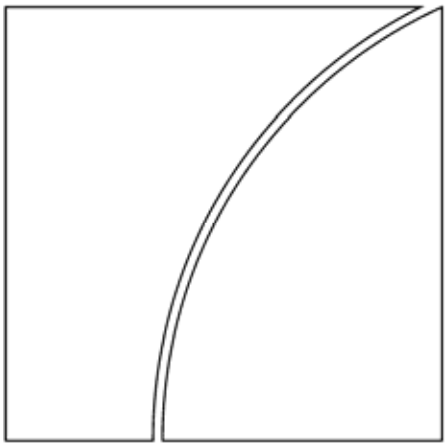

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Globalisation and the determinants of domestic inflation

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Monetary and Economic Department

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Abstract

The remarkable stability of low domestic inflation in many countries requires explanation. In this paper, a number of competing hypotheses are evaluated on a stand-alone basis, and all are found to be inadequate. This includes the view that this outcome has been solely the result of more effective disinflationary monetary policies. However, a combination of these hypotheses (including a significant role for increased global competition) seems to provide a plausible explanation, not only for continuing low inflation, but also its coexistence with rapid growth and low real interest rates. Unfortunately, the analysis also leads to the conclusion that rising inflation, unwinding financial imbalances, or both, could easily follow the welcome stability seen to date.

JEL Classification Numbers: E31, E52, E58, F02, F41
Keywords: inflation, monetary policy, globalisation, Phillips curve.

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The remarkable stability of low domestic inflation in many countries requires explanation. In this paper, a number of competing hypotheses are evaluated on a stand-alone basis, and all are found to be inadequate. This includes the view that this outcome has been solely the result of more effective disinflationary monetary policies. However, a combination of these hypotheses (including a significant role for increased global competition) seems to provide a plausible explanation, not only for continuing low inflation but also its coexistence with rapid growth and low real interest rates. Unfortunately, the analysis also leads to the conclusion that rising inflation, unwinding financial imbalances, or both, could easily follow the welcome stability seen to date.

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Introduction[1]

Economic forecasts are often widely off the mark, particularly at cyclical turning points.[2] This would seem to indicate that macroeconomics is not yet a perfected science. Moreover, recent structural changes in the real, financial and monetary spheres should in principle have made forecasting even more difficult. On the real side, a combination of deregulation, technological advances and globalisation have revolutionised production processes. On the financial side, a whole host of new instruments, new players and new attitudes have been equally revolutionary. And on the monetary side, an increasing number of central banks are now committed to controlling inflation and are communicating their objectives and intentions in quite different ways from those used prior to their being such a commitment. At the worst, the implication might be that we could for a considerable period live in a fundamentally uncertain world, where probabilities are effectively impossible to calculate, rather than a world that is simply risky.[3] At best, we have to recognise that the forecasting business may be even more challenging than in the past.

These general comments about macroeconomics apply with equal force to explaining and forecasting inflation. The Great Inflation of the 1970s took most commentators completely by surprise, as did the subsequent pace of disinflation and the ensuing economic recovery. Indeed, there was for a long time a great unwillingness to confront the inflation problem, on the grounds that inflation expectations (then at high levels) were very sticky, and that the short-run Phillips curve was very flat. This combination, in effect, implied that the costs of reducing inflation would be very high, and led many to conclude that it would make more sense simply to learn to live with it. In the event, both of these assumptions proved wrong. As inflation expectations ratcheted ever upwards, it became clear that living with inflation meant accepting ever higher rates with ever higher costs. And once robust disinflationary policies were put in place, it also became clear that expectations could ratchet down as well as up, and that short-run sacrifice ratios were not as great as feared.[4] This experience of past errors should not be forgotten today when it is once again being suggested that inflation expectations are sticky (now at low levels) and also that the short-term Phillips curve has become increasingly flat.

To make the same point rather differently, producing an accurate inflation forecast using traditional "gap" methodologies requires that at least five separate questions be answered correctly. What is the best way to measure excess capacity in the domestic economy? Subject to the chosen methodology, how does one determine the trend rate of growth of productivity? Are global influences limited to the prices of tradeable goods alone, or are there other influences on wages and productivity as well? Are wages driven primarily by forward-looking expectations, or by backward-looking price developments with implications for real wages and catch-up processes? And if expectations are dominant, are they driven by the targets established by the monetary policy regime, or by measured, or even perceived,

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[1] This paper was prepared for the Banque de France Symposium held in Paris on 7-8 March 2008. The views expressed are those of the author and not necessarily those of the Bank for International Settlements (BIS). The author benefited greatly from comments and other material provided by David Archer, Claudio Borio, Dietrich Domanski, Andy Filardo, Már Gudmundsson and others at the BIS. Thanks also to Philippe Hainaut for statistical support.

[2] Andersen (1997).

[3] A distinction, of course, first made by Knight (1921). For a similar degree of scepticism about our capacity to understand and predict, using empirical methodologies, see Hayek (1975) and Summers (1991).

[4] Ball (1994) and Andersen (1992).

inflation?[5] The answer to each of these questions is highly contentious, and errors with respect to each are as likely to interact cumulatively as they are to offset each other. Finally, it bears mentioning that all of the major structural changes noted above should also affect the inflation process, contributing still further to our lack of understanding.

Against such a background, this paper undoubtedly will promise more than it will deliver. Nevertheless, three issues can be considered. In section 1, a brief overview is given of some of the facts about inflation that need to be explained. While some observations are made about the rise and fall of inflation in the 1970s and 1980s respectively, the real focus is on the surprising persistence of low global inflation in recent years. In this section, an overview is also given of the current empirical literature on the role of global explanatory variables in the domestic inflation process; and some possible shortcomings of this empirical methodology. In section 2, a number of hypotheses explaining the behaviour of domestic inflation are independently evaluated, in particular micro economic arguments concerning how globalisation might plausibly affect domestic inflation. While all these competing hypotheses are found individually wanting, taken as complements ("all of the above") they do seem to point to a plausible explanation for recent developments pertaining to inflation. Indeed, they also offer clues to the broader puzzle of how low inflation, rapid global growth and persistently low real interest rates have been able to coexist over the last few years. Finally, a third section looks at inflationary prospects and other exposures looking forward. The conclusion drawn is that a horse race seems to be under way, between "flow" forces raising inflationary pressures and "stock" forces that could potentially lead to outright deflation.

No attention is paid in this paper to the implications of all of this for monetary and other policies. Suffice it to say here that the difficulties now facing policymakers – to maintain simultaneously real growth, price stability and financial stability – seem as great today, if not greater, than at any other time in the post-War period.[6]

Facts about inflation

Before turning to explanations, it pays to be clear about what needs to be explained. Having risen in the 1970s, both the level and the variability of inflation have fallen almost everywhere. Moreover, there is a growing body of evidence that the inflation process has changed in significant ways in recent years. Much of this evidence was referred to in the thirty papers prepared by central bank economists for the BIS Autumn Economists' Meeting in October 2005. The papers were then summarised by Galati and Melick (2006).

Chart 1 indicates that inflation has come down to low levels in both the industrial countries (ICs) and emerging market economies (EMEs). It is notable, however, that this downward trend emerged in the ICs in the early 1980s whereas it began only a decade later in the EMEs. In both sets of countries, once the trend had been set in train, it was commonly associated with an overprediction of future inflation on the part of professional forecasters. In the ICs, the pattern of inflation seems to have been broadly driven by the business cycle, with the peaks in the mid-1970s and late 1970s affected as well by oil price increases. While this indicates that "gaps" have historically had an influence on the inflation level, it should be

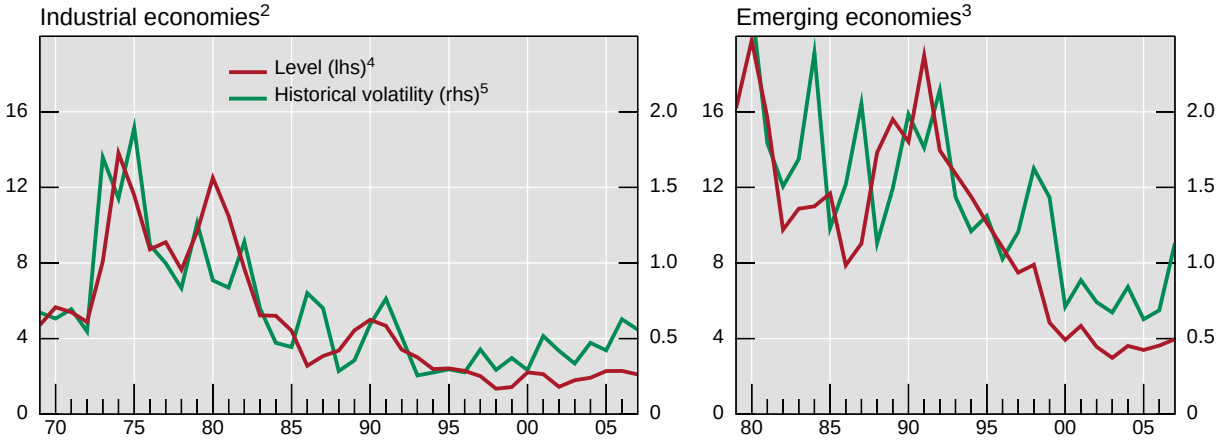
[5] The possibility that measured and perceived inflation might be different has recently been getting increased attention, particularly in Europe. So too has the possible gap between perceived inflation (which would certainly include food, energy and shelter costs) and core inflation (which generally does not). For a full discussion of such issues, see IFC (2006).

[6] On how "imbalances" and potential inflationary pressures have been building up, see White (2006, a).

noted that identifying and using such gaps in real time (indeed, for policy purposes a forecast is required for a year or two in advance) is significantly harder than doing so after the event.[7] The volatility of inflation has also trended downwards, with its cyclical movements broadly matching those in the level of inflation itself. As for the inflation process, the overview paper prepared for the BIS conference mentioned above identified five stylised facts.

Chart 1

Global inflation[1]



[1] Annual changes in consumer prices. [2] Weighted averages based on 2000 GDP and PPP exchange rates. [3] Medians of the sample. [4] In per cent. [5] Standard deviation of monthly inflation rates within the year.

Sources: IMF; CEIC; national data; BIS calculations.

First, shocks to inflation (treated as a time series) are less persistent than previously. Upward shocks to prices thus have increasingly transitory effects on inflation. It is estimated that in the G10 countries between 1970 and 1989 more than 80% of the price increases in the previous six months persisted into the next six months. After the 1990s, this ratio dropped to less than 50% in the US and fell sharply as well in Canada, Japan and the United Kingdom.[8] More anecdotal evidence suggests a similar if more recent trend in many EMEs.

Second, and closely related, the pass-through of energy and food price increases, as well as exchange rate changes, appears to have fallen sharply in recent years for many countries. Perhaps the best documented of these changes has to do with exchange rate pass-through, as summarised in **Chart 2**[9] which is based on econometric investigations using IC data (as noted in Annex 1). For EMEs the evidence is less compelling. Nevertheless, it is surely remarkable that, in the case of the Brazilian and Argentine devaluations of 1998 and 2000 respectively, inflation stayed so muted after the event. In both countries, the earlier fierce resistance to depreciation was premised on the belief that it would quickly lead to hyperinflation as in the past. In both cases, this stunningly failed to happen.

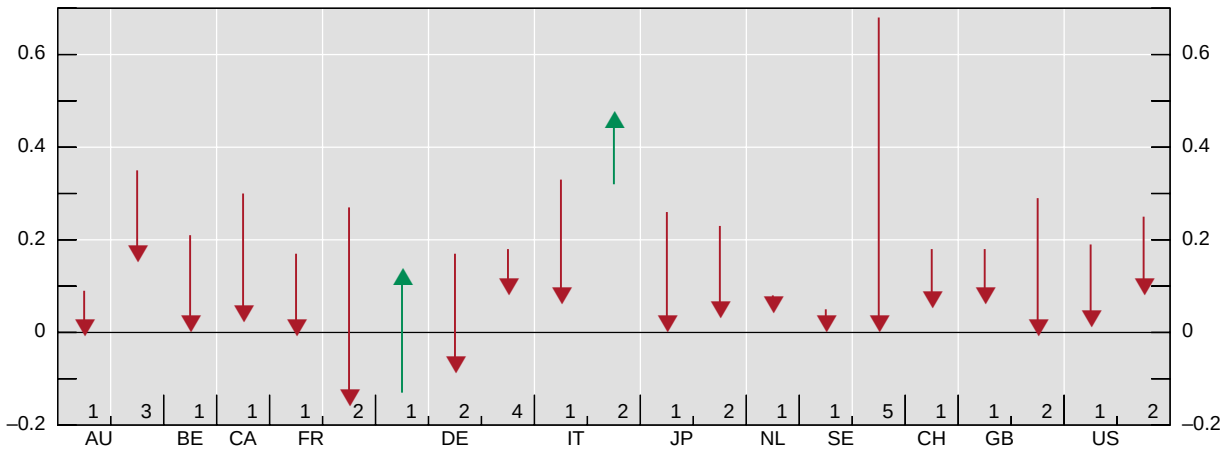
[7] The output gap in 1975 for the G10 was estimated at the time to be around 10% of GDP. More recent estimates would put this figure at less than 3%. See BIS (2005), p 70.

[8] See BIS (2006), p 16.

[9] See also Sekine (2006).

Chart 2

Changes in foreign exchange pass-through to consumer prices[1]



AU = Australia; BE = Belgium; CA = Canada; CH = Switzerland; DE = Germany; FR = France; GB = the United Kingdom; IT = Italy; JP = Japan; NL = the Netherlands; SE = Sweden; US = the United States.

[1] The arrows indicate a change in the exchange rate pass-through from the first sample to the second sample from each of the following studies; 1 = Gagnon-Ihrig (2004); 2 = BIS (2005); 3 = Heath et al (2004); 4 = Hofmann et al (2004); 5 = Adolfson and Soderstrom (2003). All these references are provided in Galati and Melick (2006).

Third, these developments might be explained by the fact that inflation expectations now seem to have shifted down to a much lower level than seen earlier and are much more stable around that lower level. Consider, for example, expected inflation as measured by the survey of household expectations in the United States (see **Chart 3** (LHS)), which is much lower than in the 1980s. Moreover, broadly similar trends emerge from corporate surveys (centre panel), and from market based measures of inflation expectations (RHS). Expectations in the United States now appear much better anchored than before, as indicated by the various panels of **Chart 4**. Perhaps most notably, the Survey of Professional Forecasts (centre panel) shows that the 10-year-ahead expectation of inflation has been essentially constant at 2½% since 1998. In Europe, the five-year-ahead expectation of inflation based on the ECB survey of professional forecasters has also stayed very stable at just below 2% over the past few years.

Fourth, and perhaps more contentiously, it is concluded in a paper prepared by Borio and Filardo (2007) that the slope of the short-run Phillips curve has fallen in many countries, as indicated in **Chart 5**. It is commonly believed that this implies more stable inflation in the face of excess demand, but also that there would be a higher sacrifice ratio should disinflation be required.[10] In fact this second conclusion must be qualified in that it very much depends on the data period being sampled. In fact, most of the data have been drawn from a period where excess demand seemed to be in evidence but inflation did not rise. If this was rather a product of positive and persistent supply shocks, a topic investigated below, then needed disinflation might actually be easier to achieve, assuming of course that these shocks persisted.[11]

[10] See Mishkin (2007).

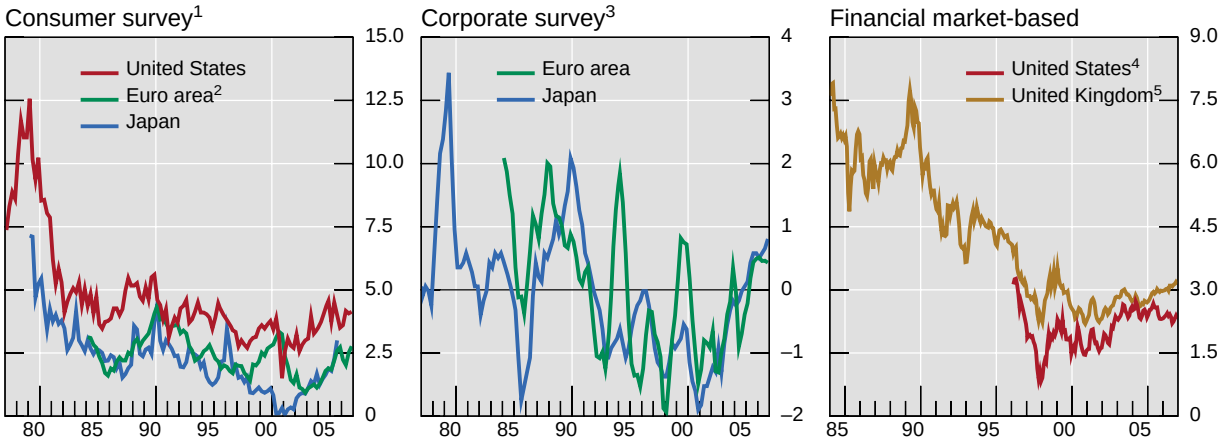
[11] It is also possible that this flatter slope may only apply to small deviations of inflation from its target. This leaves open the possibility that the conventionally-estimated Phillips curves are non-linear. For example, see Filardo (1998).

Fifth, and perhaps most controversial, the Borio and Filardo (2007) paper also concludes that measures of "global slack" are of increasing importance in driving domestic inflation in a number of countries. Indeed, they often dominate domestic measures when introduced into inflation equations simultaneously. Providing some support to the Borio and Filardo conclusion is work by Ciccarelli and Mojon (2005), who look at 22 OECD countries and find that the average inflation rate explains 70% of the variance in national inflation rates over the period 1960 to 2003. Moreover, they find that the global inflation rate moves largely in response to global real variables over short horizons and global monetary variables at longer horizons. However, they do not test directly the hypothesis that global slack increasingly dominates domestic slack as a driver of inflation. Also supportive, Pain et al (2006) find that import prices (presumably driven by foreign slack) have played a growing role in explaining domestic inflation in OECD economies in recent years. Again, however, there is no direct comparison of the relative importance of domestic and global drivers, nor do they investigate the possibility that channels of international transmission other than import prices could be important.

In contrast, a number of empirical studies do not support the Borio-Filardo results. Ball (2006) asserts very strongly that globalisation has played no role in the disinflationary process in the United States. Ihrig et al (2007) estimate standard Phillips curves for 11 industrial countries and use them to test several predictions arising from the globalisation and inflation hypothesis. They generally conclude, "Our results provide little support for that hypothesis". Looking in particular at the effects of foreign gaps on domestic inflation, they also fail to find any significant relationships.

Chart 3

Indicators of inflation expectations

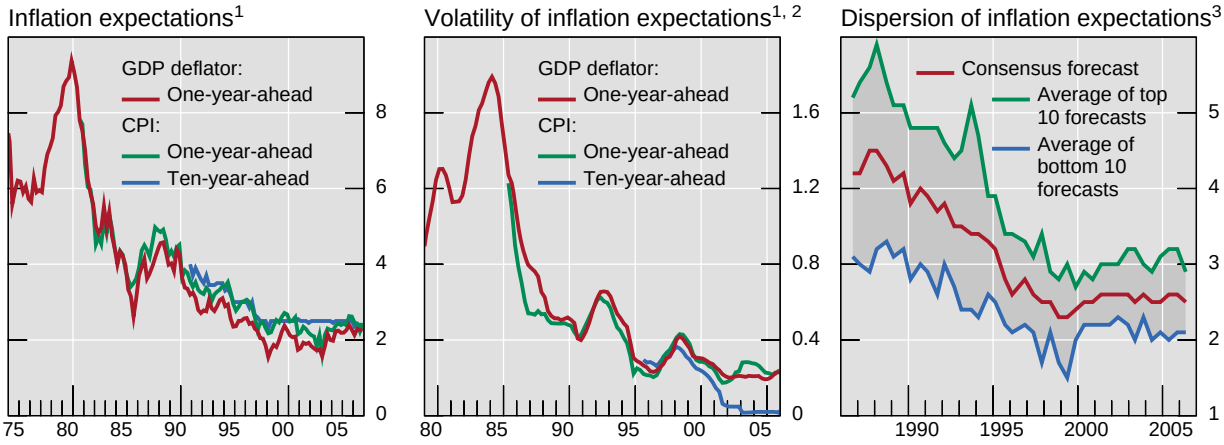


[1] Expected change in consumer prices, in per cent. [2] Figures are normalised by mean and variance of actual HICP inflation rate. [3] Expected change in output prices; an increase indicates higher inflation expectations; normalised data, measured as the difference between the indicator and its average, expressed in points of standard deviation. [4] Difference between 10-year nominal and index-linked yield on government bonds. [5] Implied inflation expectations at the 10-year maturity derived from zero-coupon yield curves of nominal and index-linked government bonds.

Sources: European Commission; University of Michigan; central banks; Datastream; national data; BIS calculations.

Chart 4

Indicators of US inflation expectations



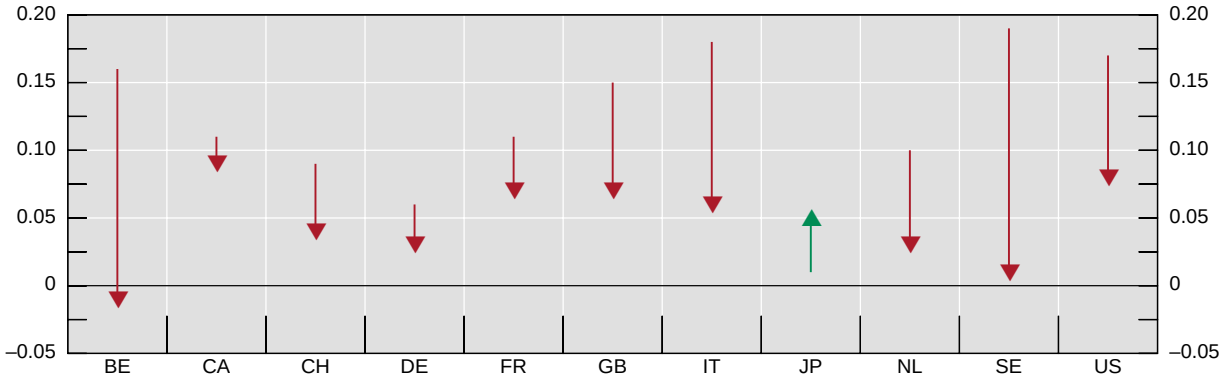
[1] Expected change in consumer prices, in per cent; based on the Philadelphia Fed's Survey of Professional Forecasters. [2] Standard deviation of inflation rates using a 20-quarter moving window. [3] Based on Blue Chip forecasts for CPI, approximately 6 to 11 years ahead.

Sources: Federal Reserve Bank of Philadelphia; Blue Chip Financial Forecasts and D'Amico and Orphanides (2006).

One overriding problem with all such empirical work is that of assembling decent data for global aggregates, a task already daunting enough at the domestic level. Another is specifying the model to be tested in such a way as to avoid inadvertently biasing the conclusions. Woodford (2007) agrees that global gaps could affect domestic inflation but that policy makers need not explicitly take this into account if import prices reliably reflect global slack conditions. Yet, this conditional statement effectively assumes away the richness of the global links proposed in the Borio-Filardo paper. Such difficulties imply that, in addition to empirical studies of the sort referred to here, competing hypotheses might also be evaluated in less rigorous but potentially still compelling ways.[12] This task is turned to below.

Chart 5

Flattening Phillips curves[1]



BE = Belgium; CA = Canada; CH = Switzerland; DE = Germany; FR = France; GB = United Kingdom; IT = Italy; JP = Japan; NL = the Netherlands; SE = Sweden; US = United States.

[1] The arrows indicate a change in the estimate of the sensitivity of inflation to the domestic output gap between 1980–92 and 1993–2005; the estimated equation is $\Delta\pi_t = c + \gamma GAP_t + \varepsilon_t$.

Source: BIS calculations.

[12] This approach is in the spirit of McCloskey (1985).

Competing or complementary explanations?

In this section, four separate explanations for the fall in inflation and its subsequent maintenance at low levels are investigated for their plausibility. Two of these hypotheses point to domestic causes: more effective disinflationary policies by domestic central banks, and increased domestic deregulation and competition. Two other hypotheses have a more international flavour: a global savings "glut", and the effects of the increased globalisation of markets for both products and factor inputs. For the advanced industrial countries, empirical evidence suggests that the largest part of the decline in the level and variability of inflation can be explained by a single statistical factor.[13] Unfortunately, it is concluded here that none of the individual hypotheses considered in this paper is fully satisfactory in economic terms. In each case, acceptance of the hypothesis reveals other puzzles or contradictions that cannot be easily accepted.

In contrast, it is concluded that treating these domestic and international explanations as complements provides a more satisfactory explanation of what has been going on. This more eclectic approach also provides some insight into how low global inflation, high global growth and low real interest rates could coexist for such an extended period of time.

This complementary approach also helps address the problem that the assumption of "competing" hypotheses, while analytically useful, fails to capture the possibility that they are in practice "not mutually exclusive". Consider, for example, that globalisation raises the economic and social costs of measures designed to protect individual industries and workers. In this way, globalisation could encourage domestic deregulation.[14] Another example was suggested recently by Rogoff (2006), who noted that that globalisation could alter the behaviour of domestic monetary policymakers.[15] In particular, through making wages and prices more flexible, thus reducing the stimulative effect of monetary shocks on the real economy, globalisation might help instil more monetary discipline.[16] Finally, positive supply shocks could well enhance the credibility of central bankers, especially if continuing low prices were assumed by an undiscriminating public to be the results of good monetary policies.

(a) More effective domestic monetary policy?

How plausible is it that more effective central bank policies have been responsible for both the downturn in inflation in the early 1980s and continuing low inflation in recent years? The basic argument would be that central banks in the ICs learned in the 1970s that there could be no "living with inflation". They resolved to bring it down, and keep it down, and they have succeeded. Moreover, with the dead weight losses due to inflation reduced, and with inflation expectations firmly anchored, economic growth rates have risen and the amplitude of cycles

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[13] See BIS (2006), p 17. The table has been updated and gives essentially the same results.

[14] Of course, globalisation also increases the risks faced by individual industries and workers, which could increase the benefits of regulation measures.

[15] This possibility is also extensively discussed in BIS (2006), Chapter IV.

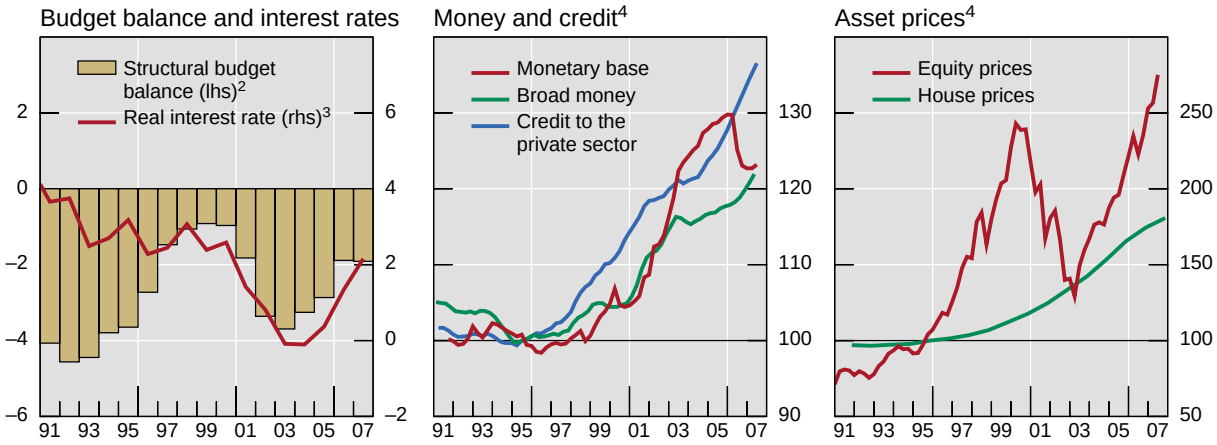
[16] While providing a simple and academically respectable theory of global disinflation, the underlying assumption concerning the incentive for central bankers to inflate might appear implausible, especially to central bankers. Nevertheless, there could be some similarities between what central bankers seem to have done in practice and the time-inconsistency temptation highlighted by Kydland and Prescott (and for which they won the Nobel Prize). A stronger counterargument to the Rogoff hypothesis is, as described in Chart 5, that globalisation appears to have made prices less flexible, not more; that is, the short-run Phillips curve seems to have become flatter, not steeper. Perhaps even more important, as will be discussed below, global monetary policies appear to have become looser in recent years, rather than more disciplined.

in the ICs has fallen.[17] Moreover, observing the improved performance of the ICs, a growing number of EMEs resolved to go down the same path and, albeit with some delay, they too have succeeded.

As will be discussed below, there seems little doubt that the downturn in inflation in many countries owed a great deal to central bank policies. Nevertheless, two puzzles remain. The first one is that the dramatic decline in inflation was shared by a diverse set of economies with different institutional setups, different degrees of economic and financial development, different monetary policies, different degrees of central bank independence and, perhaps above all, different attitudes to exchange rate movements. Indeed, a number of countries had their exchange rates effectively pegged to the dollar, which, assuming the absence of capital controls, would imply that there were significant limits to their capacity to conduct an independent monetary policy at all. Global trends in the face of all this diversity naturally lead one to search for a more unified global explanation.

Chart 6

Budget balance, interest rates, money, credit and asset prices[1]



[1] Main OECD countries; weighted averages based on 2000 GDP and PPP exchange rates. [2] General government; as a percentage of potential GDP. [3] Short-term interest rates deflated by consumer prices; in per cent. [4] Relative to nominal GDP; 1995 = 100.

Sources: OECD; national data.

The second puzzle is even more intriguing. While the original disinflationary shock in the ICs in the 1980s was associated with relatively tight monetary conditions, in recent years the stance of monetary policy has been extraordinarily accommodative almost everywhere. **Chart 6** provides some illustrative figures for the ICs. As seen on the left panel, real policy rates trended downwards from the early 1990s, with an inflection point around 1997.[18] The more recent increases in policy rates have been significant but still leave real rates in the ICs below most estimates of the potential rate of growth. The middle panel shows a similar pattern of rapid growth in the ICs for both money and credit. Finally, on the right-hand side, some figures are provided to illustrate the broad consistency between movements in asset prices and the underlying movements in the financial aggregates.[19] Complementing these

[17] For a fuller description of this "orthodox" interpretation of recent history, see Borio and White (2004).

[18] This further easing in real rates occurred more or less at the same time as perceptions of potential growth in the United States (the New Era) were being revised upwards. From a Wicksellian perspective, this would imply that the gap between the financial rate (falling) and the natural rate (rising) was widening even more.

[19] As will be discussed further below, the movements in the monetary and credit aggregates reflect not only the stance of monetary policy over the period, but also financial innovations which seem to have increased substantially the "elasticity" of the financial system.

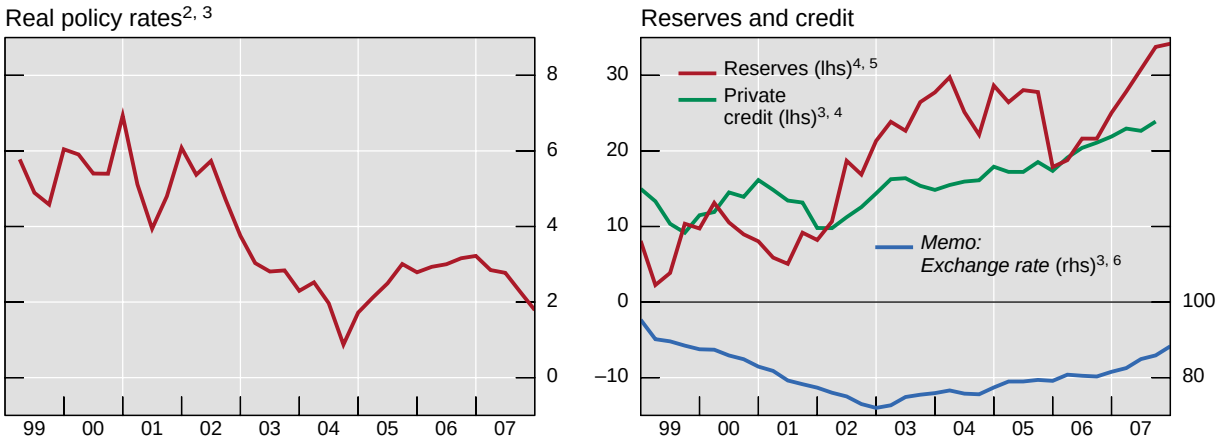
observations, it can be noted that there is evidence for recent years that policy rates in a number of OECD countries have been significantly below the levels that might seem suggested by Taylor-type rules.[20]

Turning to EMEs, a similar pattern presents itself. **Chart 7** shows (LHS) the recent behaviour of real policy rates, while the right hand side indicates how rapidly credit to the private sector has been growing. More disaggregated data in fact show that credit growth has exceeded 20% per annum in every major region in the developing world in recent years. Behind this growth lurks the defensive attitude of most EMEs towards their own exchange rate vis-à-vis the exchange rates of the ICs and particularly the dollar. Relatively accommodative policies in the ICs led to general downward pressure on their currencies and upward pressures on the currencies of the EMEs. Clearly, since 2001 the United States has been at one end of this spectrum and China has been at the other. However, confronted with such upward pressures, most EME countries chose to resist them with some combination of easier monetary policies and overt intervention in the foreign exchange markets. This accounts for the explosion of foreign exchange reserves also noted in Chart 7 (RHS, lower panel). While there has been a growing willingness since around 2003 to allow their exchange rates to rise against the dollar, the exchange rate in many EME countries remains well below where it was in 1998. Moreover, the degree of depreciation would be materially greater if measured in effective terms.

Milton Friedman once said, “Inflation is always and everywhere a monetary phenomenon”. One need not agree totally with this view to still perceive a disconnect between what central banks have actually done in recent years and the inflation outcome. Given the now conventional assumption that monetary stimulus manifests itself as inflation in around two years, it is hard to see how the global convergence of inflation around low levels could be solely the by-product of more effective monetary policy. This strongly suggests that some other influences were also at work, and that central banks had in fact to use their policy instruments in an unusually aggressive way to successfully prevent an undershooting of their inflation objectives.

Chart 7

Policy rates and liquidity in emerging market economies[1]



[1] Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Taiwan (China), Thailand, Turkey and Venezuela. [2] Deflated by consumer prices. [3] Weighted average using 2000 PPP and GDP exchange rates. [4] Annual changes, in per cent. [5] In US dollar terms. [6] Against the US dollar; 1998 = 100; an increase indicates an appreciation.

Sources: National data; BIS calculations.

[20] See BIS (2005), OECD (2007b), and Taylor (2007).

(b) Increased domestic deregulation, competition and productivity?

In many industrial countries, there has been an ongoing process of product deregulation and privatisation (eg utilities and telecommunications) As well, advances in productivity, especially in the retail and wholesale trade areas, have been widespread, as has been the increasing monopsonistic power of "assemblers" who actually sell the products to the clients. Companies like Wal-Mart, Tesco and General Motors, each subject to intense competitive pressures, have all been insisting increasingly that suppliers provide higher quality at lower prices. Such pressures provide incentives for productivity increases all the way down the value chain, and improvements in technology allow producers to respond to those incentives.

In many ICs, labour markets have also begun to function more effectively.[21] In Europe, steps to deregulate the labour market lowered estimates of the natural rate of unemployment by almost one full percentage point between 2000 and 2004.[22] Many industrial countries, though certainly not all, have reduced unemployment benefits and have scaled back employment protection laws, resulting in higher expected losses given job separation. These changes are, moreover, consistent with the evidence of lower union density, more decentralised collective bargaining, greater reliance on temporary workers and lower administrative costs when firing workers. In Japan and Germany, where domestic wage growth has been particularly weak, certain cultural shifts seem to have abetted the effects of domestic regulatory changes. In Japan, reliance on part-time workers has skyrocketed. And in Germany, workers have also begun to cooperate much more flexibly with the individual companies that hire them, against a backdrop of increased reliance by companies on both part-time workers and workers provided through agencies.

But again, certain puzzles present themselves. These reforms and changes have been highly idiosyncratic, and have occurred at different times in different countries.[23] Perhaps most notably, domestic changes of the sort described have been much less in evidence in EMEs than in the ICs. Moreover, they seem unlikely to have been of sufficient magnitude to explain the phenomenon of sharply lower inflation worldwide. Consider, for example, that in Europe the general sentiment remains that the process of deregulation of domestic product and factor markets still has a long way to go. And finally, to return to a point made above, to what extent is it really possible to separate domestic reforms and changes in behaviour from the international environment that might have encouraged them?

(c) A global saving glut?

It has been suggested that the massive US current account deficit is simply a by-product of an increase in the global saving rate, largely a by-product of an increased saving rate in Asia.[24] A corollary to this argument might have been that this saving glut also contributed to lower global inflation by reducing global demand (ex ante) relative to global supply (ex ante).

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[21] Ihrig and Marquez (2003) conclude, "we find that productivity advancements were the main structural factor reducing inflation in the United States. For foreign countries persistent labour market slack was the main factor exerting downward pressure on inflation. This persistence stemmed in part from structural reforms that lowered the NAIRU while the unemployment rate was declining".

[22] ECB (2005). See also OECD (2007b) which indicates a similar result for the OECD countries as a whole. It should be noted, however, that to the extent estimates of the NAIRU are inferred from the actual behaviour of inflation they reflect all the shocks affecting the inflation process, not just domestic structural reforms.

[23] For a wide-ranging survey of what has been done, and what still needs to be done, in the individual OECD countries, see OECD (2007a).

[24] Capital outflows associated with these savings went primarily into US dollar denominated assets. Prior to 2001, this pushed up the dollar, which contributed to the trade surplus through substitution effects. As well,

As with the other hypotheses, there is certainly an element of truth in this demand shortfall argument. However, IMF statistics seem to indicate that the underlying driver was less a rise in the aggregate saving rate than a fall in the rate of investment in many countries after periods of very rapid growth. There was a virtual collapse of corporate investment in Germany after the expansion fuelled by German reunification. The same outcome materialised in Japan after the "Bubble period" of the 1980s. It is notable that in both countries, investment levels have only recently begun to recover significantly. In Southeast Asia, investment levels fell sharply after the Asian crisis and, with the clear exception of China, have not yet recovered fully. Finally, as a proportion of GDP, corporate investment in the United Stated has stayed very weak since the end of the technology/media/communications-fuelled expansion at the end of the 1990s. These lingering effects on corporate investment were evident in spite of a generally rising share of corporate profits in total factor incomes and, as noted above, exceptionally easy financing conditions.

The puzzle associated with this hypothesis is that a global saving glut might have been expected to lower global growth overall. Yet, IMF statistics for global growth indicate that the last four years at least have seen the fastest growth in the post-War period. Moreover, it is also puzzling that those countries presumed to be the cause of the slowdown, particularly in Asia, have in fact generally been the fastest growing. Here again, it seems that the single hypothesis being proposed to explain the global change in inflationary conditions is inadequate.

(d) Increased global competition?

Globalisation is defined here as a worldwide process of more intensive cross-border movements of goods, services, factors of production (labour and capital) and financial instruments. **Chart 8** provides some evidence in this regard. The process of globalisation seems to have accelerated since the early 1990s, reflecting a number of underlying factors: the declining use of capital controls, falling communication costs due in part to advances in technology, and policy liberalisation in both ICs and EMEs. Looking forward, this trend seems likely to continue, though its pace is hard to predict. Some of the underlying factors encouraging globalisation might be expected to persist almost indefinitely, whereas the sudden liberalisation of previously state-controlled economies might have had front-loaded (if massive) effects that would be expected to diminish with time. However, as long as the process of globalisation continues, the implication would be a concomitant increase in competition that might be expected to put downward pressure on prices and underlying factor costs.[25]

For many years, corporations have been complaining that they have lost "pricing power". Since at the same time corporate profits have been rising to ever higher levels, this could imply that underlying factor costs have been under even more pressure. In the following paragraphs, consideration is given in turn to two issues: the extent to which prices determined internationally seem to affect domestic prices; and how a vastly expanded global workforce might affect wages and working practices in the IC countries in a variety of ways. With respect to "proving" the influence of increased global competition through each of these channels, a logical problem must be highlighted. In each case, the threat of things happening

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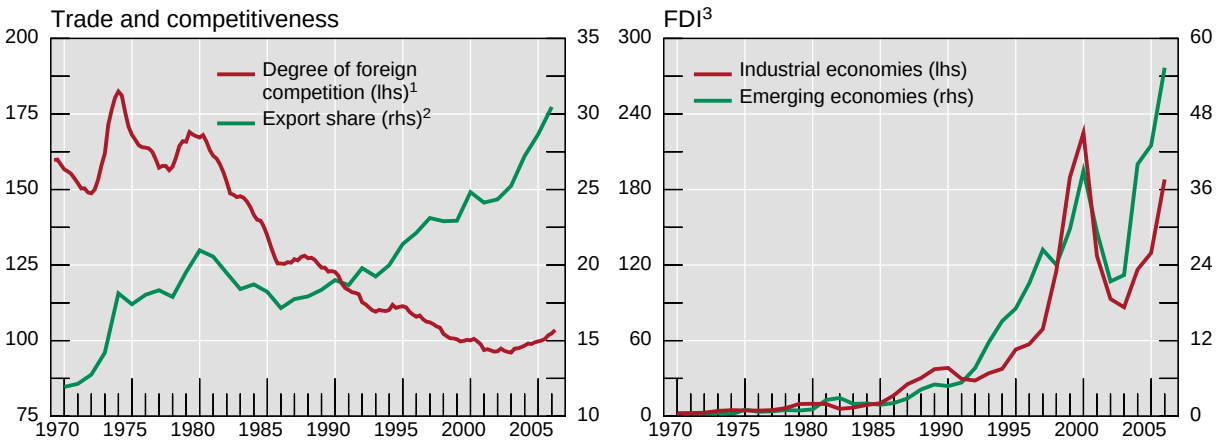
these inflows led to lower US interest rates which also contributed to the trade deficit through absorption effects.

[25] Binyamini and Razin (2007) also demonstrate how each of the globalisation channels referred to in the text might be expected to have separate effects that would lower the slope of the short-run Phillips curve.

(contestability) might be enough to affect domestic developments even in the absence of such developments themselves.[26]

Chart 8

Indicators of globalisation



[1] Export prices/GDP deflator in G10 economies; 2000 = 100. Weighted average based on 2000 GDP and PPP exchange rates. [2] World exports/GDP. [3] Sum of gross foreign direct investment inflows and outflows in 10 billions of US dollars.

Sources: IMF, *World Economic Outlook*; OECD; United Nations; national data.

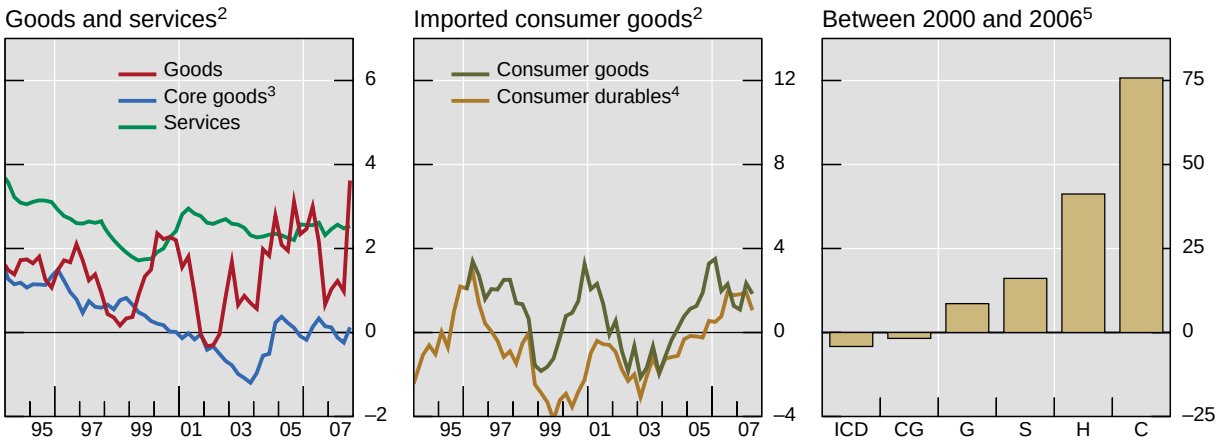
Large movements in relative prices over the last number of years support the view that global forces are having a material impact on some prices at least. Consider (**Chart 9**, LHS) how much the prices of core goods (largely tradable) and services (largely domestic) have diverged in the major industrial countries. Indeed, the price of imported consumer durables fell almost continuously after 1997, reflecting strong increases in exports from Asia in particular, and has only recently begun to recover (centre panel). Note that the growing role of imports in most economies would in itself seem to point in the direction of a bigger impact on the aggregate domestic CPI.[27] In contrast, commodity prices have risen strongly in recent years (RHS), coincident with booming demand in EMEs. These shifts in relative prices contrast sharply with developments in the late 1970s, when oil prices last rose strongly; at that time, all prices in the ICs were increasing sharply and more or less at the same rate.

[26] A good example, reflecting my Canadian roots, is the price of Canadian beef. Although there is essentially no trade in cattle between Canada and the US, the price of Canadian beef is the Omaha price (adjusted for transportation costs) times the US$/Can$ exchange rate.

[27] See Razin and Lougani (2007), who show that domestic inflation and international liberalisation of trade are significantly negatively correlated in large OECD economies with floating exchange rates.

Chart 9

Trends in relative prices[1]



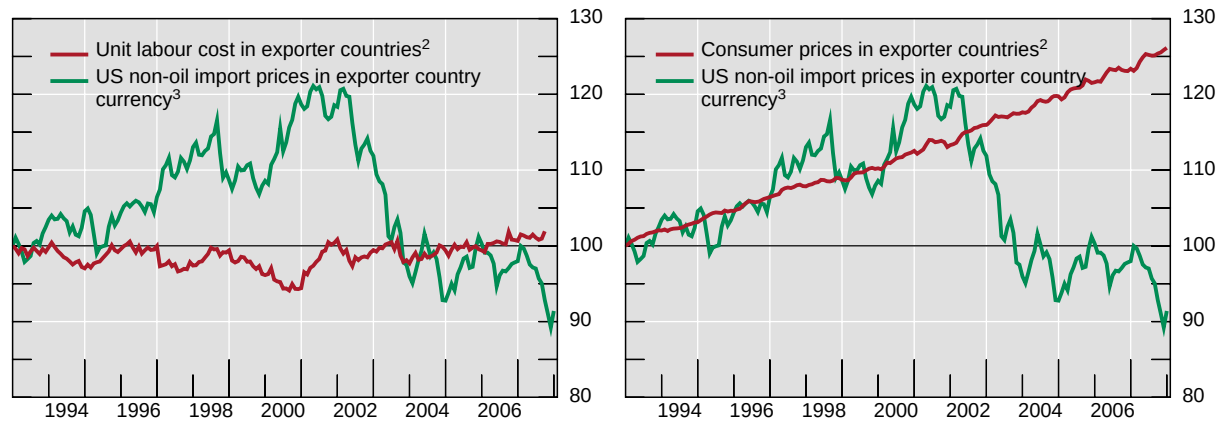
[1] Weighted averages of the United States, the euro area and Japan, based on 2000 GDP and PPP exchange rates; changes, in per cent. [2] Over four quarters. [3] Goods excluding food and energy. [4] United States and Japan. [5] ICD = imported consumer durables; CG = core goods; G = goods; S = services; H = houses; C = commodities.

Sources: Datastream; HWWI; national data.

In principle, more global competition should lower profit margins and lead to the law of one price prevailing everywhere. As a corollary, we might expect the pass-through from cost increases to rise to one over the longer run. Yet, as implied by the previous discussion about exchange rate pass-through, the global economy is not only far from this situation but also appears to be moving even further away from it; short-term pass-through has in fact been falling. What seems to be the case is that exporters increasingly prefer to control the price in local currency, and are in a position either to change their margins or to force local distributors to do so. **Chart 10** provides a good illustration of what has been going on in the United States. As the US dollar rose through to 2001, foreign exporters kept their dollar prices constant but improved their margins substantially. Subsequently, as the dollar has fallen, they have been able to maintain US dollar prices by allowing their margins to shrink again. In this latter period, they have also been aided by still more rapid declines in unit production costs, a subject to which this paper now turns. Whether there might not be a sudden shift upward in pass-through, as profit levels do eventually become unacceptably low, is considered in the next section.

Chart 10

Exporters' unit labour cost, consumer prices and US import prices[1]

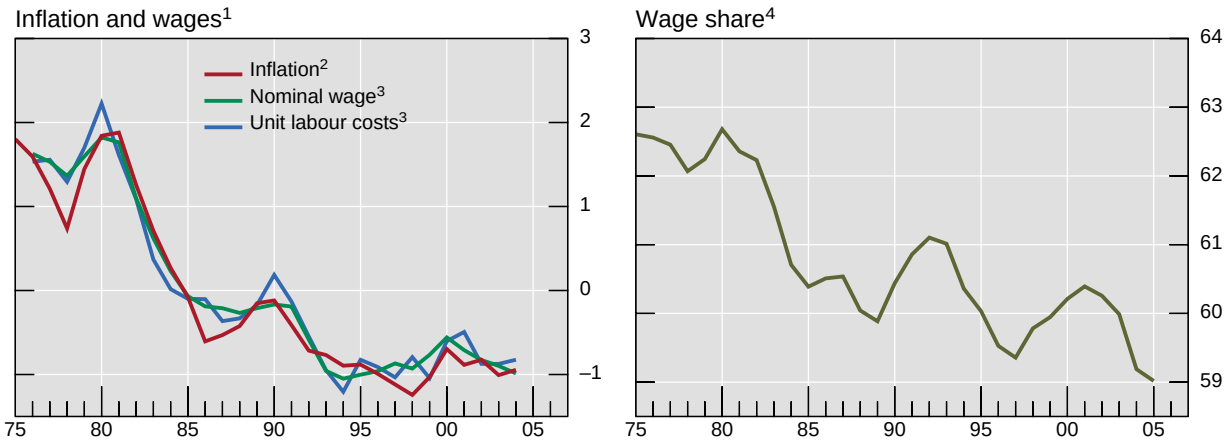


[1] End-1992 = 100. [2] Weighted average of Canada, euro area and Japan based on 1999–2001 average imports into the United States. [3] Using exchange rate index with weights of Canada, euro area and Japan based on 1999–2001 average imports into the United States.

Sources: IMF; OECD; national data.

Chart 11

Inflation, wages and wage share



[1] Common factors among OECD countries. Normalised data, measured as the difference between the indicator and its sample average, expressed in points of standard deviation. [2] Changes in consumer prices. [3] Business sector. [4] Total economy. Weighted average of the G10 countries, based on 2000 GDP and PPP exchange rates; as a percentage of value added.

Sources: OECD; national data; BIS calculations.

From **Chart 11** it is clear that the secular decline in inflation in the ICs has been coincident with a period of great restraint in nominal wage growth and that unit labour costs also moderated commensurately. The share of wages in total factor incomes has also been trending downwards for a long period of time,[28] albeit subject to the influence of cyclical factors.[29] Among the EMEs, it is notable that a similar pattern can be seen in China, where wages have in recent years been rising very rapidly, but productivity growth has to date been rising even faster. In addition to the restraining effect on wages in the ICs of cheap labour embodied in exports from EMEs, immigration and the possibility of redirecting investment from ICs to EMEs both could have played a significant role.

It does seem to be the case that the greater contestability of markets for goods by EME producers has forced domestic firms in ICs to cut their costs. One key element of this has been the reduction of wage bills, while another has been to do away with restrictive practices that hamper productivity growth.[30] **Chart 12** provides some evidence that wage shares have actually fallen more in those specific Japanese and US industrial sectors that have faced higher import penetration. The examples of the textile and electronics industries are well known. In many ICs domestic production of such goods has effectively ceased altogether, whereas in others foreign competition has forced a complete reorientation of earlier business strategies.

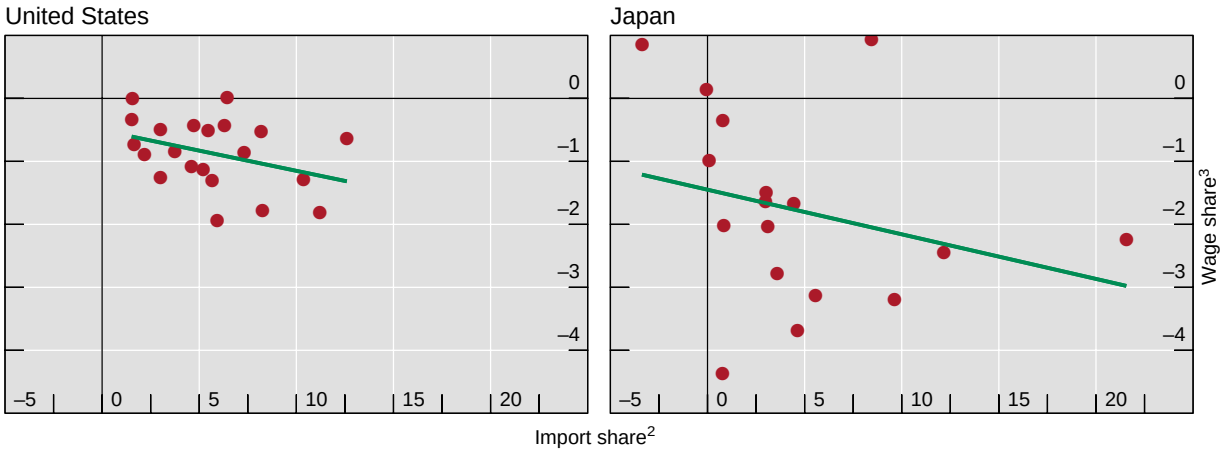
[28] Indeed, for such a long period that it seems implausible to link all of this trend to expansion of the global labour supply, since this is a more recent event. See Ellis and Smith (2007).

[29] Certain stylised facts can be suggested. In a cyclical upswing, wages generally lag productivity gains. They tend to catch up near the cyclical peak and then to keep rising for a while after the peak, before falling off under the influence of the cyclical slowdown.

[30] Chen et al (2004) analyse disaggregated data from the EU manufacturing sector from 1988 and 2000. They find that increased openness does lower prices by increasing productivity and reducing markups.

Chart 12

Import penetration and wages by industry sector[1]



[1] Changes, in percentage points, from 1998 to 2004. Based on 21 manufacturing industries for the United States and 17 for Japan. [2] Imports as a percentage of domestic consumption (output minus exports plus imports). [3] Wage payments as a percentage of sales.

Sources: National data; BIS calculations.

Increased international labour mobility may also have played a role, affecting in particular the wages for low-skilled workers in countries where immigrants are either welcomed or cannot in practice be kept out (**Chart 13**, LHS). In the United States, immigration increased the number of working males by 11% between 1980 and 2000. In Europe, the annual average ratio of immigrants to domestic population essentially doubled after the collapse of the communist regimes in central and eastern Europe, and may also have been influenced by the enlargement of the EU in 2004. As to evidence supporting the views that immigration has had an effect on inflation, there is a developing literature recently surveyed by Nickell (2007, p 15). He concludes that the evidence is rather mixed, but more supportive in the case of the United Kingdom and Spain in recent years. In the latter case he notes:

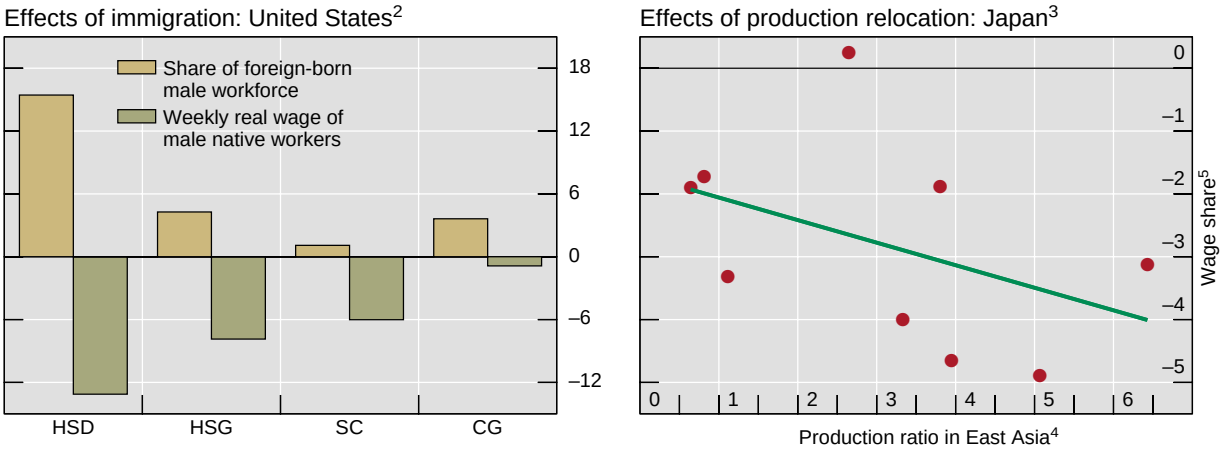
> immigrants have raised effective labour supply and reduced the natural rate of unemployment. This has helped macroeconomic policy to bring down the overall unemployment rate by almost 7 percentage points since 1999 with minimal inflationary consequences.

The increasingly credible threat of the relocation of factories and production facilities (offshoring) to lower-cost foreign jurisdictions may also have had a restraining effect on wages in ICs. In Germany, a number of large firms have negotiated both real wage cuts and changes in working practices in exchange for shelving plans to relocate plants to central and eastern Europe. In Japan, wage shares have been reduced most aggressively in those industrial sectors that have most actively expanded their production potential in Southeast Asia (**Chart 13**, RHS). It is also a fact that the growth rate of international trade in parts and components has significantly outpaced the growth of trade more generally.[31] This indicates the extent to which there has been a growing vertical integration of production processes worldwide. It could as well indicate the growing confidence of assemblers in the quality of foreign labour, thus increasing the credibility of threats to move parts of the production chain abroad.

[31] BIS (2006), p 20.

Chart 13

Globalisation and wages[1]



[1] Changes, in percentage points. [2] From 1990 to 2000. HSD = high school dropouts; HSG = high school graduates; SC = some college; CG = college graduates. [3] From 1994 to 2004. Based on nine manufacturing industries (excluding transportation). [4] Production in East Asia by Japanese manufacturers as a percentage of their total manufacturing production. [5] Wage payments as a percentage of sales.

Sources: G J Borjas, "The labor demand curve is downward sloping: reexamining the impact of immigration on the labor market", *Quarterly Journal of Economics*, vol 118, 2003, pp 1335–74; national data; BIS calculations.

While all of this evidence suggests that globalisation has played a role in influencing domestic inflation in ICs and EMEs as well, one must again be careful not to push a good argument too far. A secular rise in global integration since the 1970s, which accelerated sharply in the 1990s, may have helped push inflation down, but it leaves unexplained what pushed inflation up in the first place. Moreover, secular trends in globalisation cannot explain the sharpness with which inflation receded in the early 1980s in the industrial countries, nor the long delay before inflation began to move down in the EMEs. Rather, these phenomena seem much more likely to have a domestic monetary explanation. As with the other hypotheses, it seems that puzzles remain when we postulate that only one influence has been at work. A more comprehensive explanation seems required.

(e) All of the above?

Perhaps the key to a better understanding is to recognise that the character of the shocks hitting the global economy has changed over time, and that some forces affecting inflation have been more important at some times than others. Demand side factors, driven largely by domestic monetary policies, seem to have been central to macroeconomic developments in the 1970s and 1980s. Gradually, however, supply side elements, arising from both domestic deregulation and globalisation, have risen in importance. Consider both the early period and the later period in turn, using as the basic analytical framework a global model of the traditional IS/LM sort, with a vertical real output line at full capacity.[32] While the assumption of a global model is evidently extreme, it is supported by the observation above that, for a number of years, some important countries have effectively been following a fixed exchange rate regime.[33]

[32] Some of the limitations of this model are noted below, in particular its static character when the phenomena to be explained are dynamic.

[33] See in particular Reinhart and Rogoff (2004). They show that since 1971 only 4% of all country-year movements in exchange rates seem consistent with the hypothesis of free floating. As well, see Dooley et al (2003, 2004). Note that to accept the latter authors' contention that a Bretton Woods II regime has been in

It seems generally agreed that the rise in inflation in the ICs in the late 1960s and 1970s was a by-product of excessive demand, fuelled in many countries by expansionary monetary policies and a failure to recognise how easily inflation expectations might rise. In effect, the LM function shifted to the right, raising aggregate demand and pushing up inflation. While oil price increases are commonly thought to have arisen from supply side shocks, in fact the sharp increases in prices in the early and late 1970s were in large part discrete upward adjustments to re-establish earlier relative prices that had been eroded by generalised inflation.[34] Inflation was brought down quite rapidly in the early 1980s by a sudden, sharp tightening of monetary policy. In both the expansionary phase and the contractionary phase of policy, real growth and interest rates moved in a fashion consistent with nominal forces being behind the observed outcomes. That is, inflation rose when demand exceeded potential (estimated on the basis of earlier "normal" growth rates) and fell when growth receded. Interest rates also rose as the expansion proceeded, first only in nominal terms (real rates actually fell) but then rose sharply in real terms as well. After inflation did begin to decline in the early 1980s, nominal rates fell as did real rates, but with the latter declining more slowly.

Explaining the more recent phenomenon of continuing low inflation, in spite of rapid real side growth and continuing low interest rates, demands recourse to all of the arguments above. In effect, it is necessary to postulate changes in all three functions of the model to obtain all three of the observed results. For simplicity, assume here that inflationary expectations are fixed although they would most likely be biased downwards during any period of excess supply. Begin by accepting the assumption of disinflationary pressures arising from some combination of increased domestic deregulation and competition, increased global competition and higher productivity. This provides an explanation for a rightward shift in the real output (aggregate supply function). Then consider the "saving glut" hypothesis, or perhaps more accurately the "investment strike" hypothesis. This constitutes a downward shift in the IS curve, leading to a transitional phase of output being below potential, thus accentuating the disinflationary pressures arising from supply side developments. Finally, in response to these developments, one must postulate a rightward shift in the LM function. In effect, more effective (expansionary) monetary polices lower interest rates, inducing an additional expansion of demand, determined by the slope of the IS curve, until in equilibrium aggregate demand and supply are once equal at full employment. This occurs at a higher level of output, with no further pressure on prices, and with the real interest rate at a lower level than previously.

While the assumption of a simple global model has some advantages, the reality of different countries and massive trade imbalances must also be admitted and explained. One significant possibility is that easy monetary conditions have different effects across countries due to significant differences in the character of their financial systems. Consider the United States and the United Kingdom on the one hand, with each having a massive trade deficit, and China with its massive surplus on the other. In the former cases, low interest rates have mostly spurred consumption, whereas in China the effect has been mostly on investment.[35]

The financial systems of the United States and United Kingdom are among the world's most advanced, although recent developments in the United States indicate that not all these "advances" should be welcome. In particular, they have well developed financial markets

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operation is not at all to say that such a regime could be maintained almost indefinitely, as they also contend. See White (2005).

[34] As noted above, over the 1970s and 1980s we did not observe major changes in relative prices like those we have seen more recently.

[35] While the following discussion focuses on the role of the financial system in explaining these differences, other forces were also at work, not least initial endowments of labour and capital.

which allow loans made by financial institutions to be securitised and taken off the balance sheet. In both countries this has increased the willingness of institutions to respond to the increased demand for credit by households generated by low interest rates. In turn, this capacity to borrow has strongly encouraged consumption, which has a very strong import component.[36] In contrast, China's financial system is almost wholly based on banks, with credit to households being only a very small part of their business. For this reason, and of course many others,[37] the household saving rate in China has stayed quite high while the national saving rate has been further augmented by high corporate profits. Low interest rates in China, allied with easy access to credit for those with political connections, have rather resulted in a remarkably high level of investment.[38] While this initially had a high import component as well, this propensity has fallen sharply in recent years. Moreover, it is notable that much of this investment has been in sectors where production is specifically directed to export markets. This combination of circumstances helps explain why China only began to have trade surpluses very recently, and why they have widened so rapidly.[39]

Prospects and potential exposures

If one accepts the "complementary" explanation for continuing low inflation suggested above, and the model behind it, then two potential problems emerge looking forward. One is that inflation might re-emerge on a global scale, since demand and supply seem once more in equilibrium. We are perhaps seeing aspects of this in the recent sharp increases in the prices for food and energy. Moreover, in some emerging market economies, like China, but also in some industrial countries as well, wage pressures already indicate the beginnings of "second round effects" on production costs. Should inflationary expectations also begin to rise, this would constitute a serious challenge for policymakers. Recall the point made above, that we do not really know whether low inflationary expectations to date have been rooted in the credibility of policy regimes or rather just the recent historical experience of low inflation.

A second problem is that various "imbalances", built up over the long period when credit conditions have been very accommodative, could unwind.[40] We are perhaps seeing aspects of this in the current turmoil in financial markets, with significantly tighter credit conditions being increasingly seen as a real threat to growth. Indeed, in a worst case scenario, rising inflation could prompt tighter monetary conditions, or impede easing, so as to aggravate the unwinding of the financial imbalances. In such a case, a dangerous deflation might well be the end game.

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[36] This propensity to import has been further encouraged by the terms of trade gains implicit in the downward shift in the relative price of imported consumer goods, referred to above, and (for a time) by exchange rate appreciation as well.

[37] The saving rate in China has stayed very high for a number of possible reasons. First, there may have been a failure of perceived permanent income to keep up with the reality of sharply higher real growth. Second, it could well be a precautionary response to the effective dismantling of previously existing safety nets. Many Chinese received health, education and other benefits from state owned enterprises which have been either closed down or privatised and restructured. As well, the one child policy in China has evidently reduced the capacity of the family to support parents in their old age.

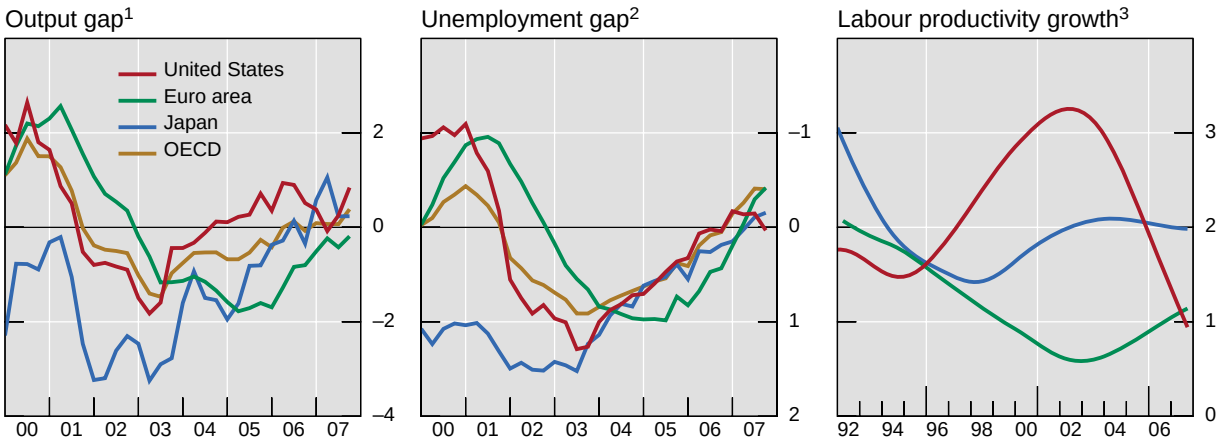
[38] While close to 45% of GNP, it is still substantially exceeded by the national rate of saving, thus accounting for the current account surplus.

[39] To characterise more succintly: it takes a lot of steel to make a steel plant, but steel plants make steel.

[40] See White (2006, b).

Chart 14

Indicators of economic slack and productivity trends



[1] As a percentage of potential output. [2] Unemployment rate minus NAIRU, in percentage points; inverted scale. [3] HP filter applied to year-on-year changes in quarterly productivity.

Sources: OECD; national data.

As for the prospects for inflation, it seems to be the case that global excess capacity has, for a time at least, shrunk considerably; indeed one might reasonably argue that it has disappeared. This is certainly the case for food and energy products. **Chart 14** (LHS and centre panel) provides some indication of this declining gap for the OECD countries. Rising domestic prices in EMEs and rising prices for their manufactured exports indicate that the earlier positive supply shocks they provided to the ICs might also be coming to an end. In some countries, many in Europe but also China[41] and other EMEs, wage pressures are also beginning to be felt. On the one hand, the fact that labour's share of factor incomes has fallen so much implies increased pressure for higher wages and potentially prices. On the other hand, the fact that profit margins are still high might imply that increased wages need not have such inflationary implications.[42] In many EMEs the fact that food is such a large part of the CPI basket implies that the pass-through to inflationary pressures could be especially marked. Riots associated with higher food prices have already been seen in Mexico and Indonesia, where corn and soya beans are food staples, respectively.

The United States faces some particular problems in this regard. On the supply side, the unemployment rate has until quite recently been at historically low levels, and it appears that the rate of productivity growth has fallen back (Chart 14, RHS) from the higher levels recorded earlier. The effective value of the dollar has also been falling at an accelerating pace, and import prices have started to rise sharply in dollar terms. As discussed earlier, there are some grounds for belief that the low "pass-through" from depreciation seen earlier might rise going forward. Finally, while wage increases have thus far been quite moderate, it is a fact that higher prices for food, energy and shelter (although all commonly excluded from core inflation) have interacted to lower purchasing power for the median worker. At some stage, a degree of pushback would not be unexpected. However, on the demand side, it is also a fact that there are many forces acting to slow the US economy, and this might more than suffice to offset the inflationary pressures just noted.

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[41] In Germany, initial public sector wage demands have been very high. In China, recent legislation governing labour markets will provide sharply better benefits and working conditions, thus raising costs.

[42] It is important to distinguish among sectors. While financial institutions have been very profitable until recently, manufacturing has generally not been.

The US economy seems particularly exposed to the dangers of an economic slowdown due to unwinding "imbalances". Nevertheless, many other economies could also be affected either directly, by similar imbalances, or indirectly through trade and other linkages. Most of the English-speaking countries would find themselves in the first camp, while to varying degrees virtually every other country could find itself in the second.[43] Before turning directly to these exposures, it is worth noting what is meant by imbalances, what their source might be and what evidence there is for such imbalances existing today.

A useful definition of "imbalances" might be a significant and sustained deviation from historical norms in important economic and financial variables; for example, asset prices and household saving rates. The supposed danger would be that these series might mean-revert, with effects on the economy and financial markets that could prove disruptive, perhaps seriously so. In the traditional IS/LM framework discussed above, such concepts play no role because it is a single-period model based on an equilibrium defined solely in flow terms. By definition, stocks and cumulative processes are not considered. In contrast, cumulative processes were at the heart of pre-War business cycle theory, particularly as embodied in the work of those of the Austrian school of thought.[44] The crux of their thinking was that credit growth had the potential to lead to spending misallocations, particularly for capital investment, which would in the end have to be redressed in a disruptive way.

Charts 6 and 7 above indicated clearly how credit has been both cheap and easily available over the last decade at least. Given that the global economy, as modelled above, was operating for an extended period at below full capacity, generalised inflationary pressures were absent. This meant in turn that policy had to be tightened less during upturns and could be eased more vigorously during downturns.[45] Moreover, over the last decade or so, the financial system has itself become much more "complete", implying an increased diversity of credit channels. For all the advantage this brings, it also brings an increased danger that credit will be extended for purposes that in the end prove unproductive, or imply debt levels too great to be serviceable.[46] In sum, over recent years, the fundamental credit factor required to generate imbalances does seem to have been very much in evidence.

Prior to the period of financial turmoil that began in August of last year, there were many financial and economic series in many countries that had deviated significantly from historical norms. Consistent with the premise of this being a credit- (or liquidity-) driven phenomenon, the prices of virtually all illiquid assets were driven to record highs. Consider the associated "conundrum" of low yields on US Treasuries, low spreads on high yield and sovereign bonds, high house and equity prices and record prices at global auction houses for antiques, stamps, fine wines and other collectibles. Moreover, it was also the case that the price of buying liquidity (rather than selling it) also fell significantly. Implied volatility in many markets had fallen to record lows by mid-2007, as the costs of buying insurance against all sorts of extreme events plummeted.[47] While it is true that valid, idiosyncratic arguments can be put

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[43] For a comment on how EMEs might be affected, see White (2007).

[44] See Laidler (1999), Chapter 1, for a description of the contrasting elements of Keynesian and Austrian theory. He concludes (p 49), "it would be difficult in the whole history of economic thought to find coexisting two bodies of doctrine which so grossly contradict one another".

[45] For a description of policy reactions in successive upswings, see Borio and White (2004), and for successive downturns see White (2004).

[46] The most obvious example today would be the subprime mortgage market in the United States. However, the basic argument here would imply that the misallocations extend well beyond that market alone.

[47] One market that deserves special attention is the market for credit default swaps, in which one can buy protection against corporate bankruptcies. As of mid-February 2007, the market was pricing in a cumulative five-year default probability for junk bonds of only 16%, whereas the corresponding percentage failures rose to around 22% and 33% following the recessions of 1981 and 1991 respectively.

forward to help explain developments in each of these markets individually, applying the principle of Occam's razor would seem to have some merit here.

And to these financial imbalances must be added some economic ones. Most notable, the household saving rate has fallen to very low levels in a number of countries as easy access to credit has fostered more borrowing and rising household debt levels. Closely related, the resulting increased demand for housing services has led to a boom in construction which has pushed up that sector's share of GDP well above normal levels.[48] A number of the countries most affected by these phenomena have also been running large current account deficits, as described above. Finally, while corporate balance sheets have generally improved in recent years, many companies that have recently been merged or acquired have been left with very heavy debt loads.

While these credit-driven imbalances might or might not reverse, history indicates that they often do. One possibility is that the reversal begins in the financial markets with a so-called "Minsky moment".[49] Another is that spending spontaneously falters as some catalyst forces borrowers to reassess their exposures to debt and debt service. Where the reversal first manifests itself is less important than the character of the reversal itself. In the same way that real and financial forces interact in the expansionary phase of the credit cycle, they are also likely to interact in the contractionary phase.

For example, as seems to have been the case in recent months in the United States, a sudden loss of confidence in credit markets could lead to a tightening of credit conditions that could reduce spending and lead to an economic slowdown. In turn, this would lead to more credit losses materialising, which could further lower confidence, further inhibit credit growth and so on. And simultaneously, a fall could occur in the prices of previously overvalued assets (like housing), reducing the value of collateral to back loans and, in extremis, increasing the probability and expected costs of bankruptcies in both the real and financial sectors.

History also teaches us that the economic losses associated with downturns of this nature can be very great and the recovery time can be very long.[50] Should nascent inflationary pressures turn to deflationary ones, under the influence of a sharp global slowdown, this would not only enhance the seriousness of the problem (debt deflation issues) but also put constraints on resolving it (the zero lower bound issue). This immediately raises two policy questions; how best to respond to such prospective developments, and how to make reforms to ensure that such difficult situations could be made less likely in the future.[51] Answers to these questions are, unfortunately, beyond the scope of this paper.

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[48] By way of example, residential investment rose to 5.8% of GDP in 2006 in the United States (versus a 30-year average of 4.6%), while comparable numbers for Spain were 9.3% and 5.5% respectively. In the Spanish case, of course, this was partly a response to very significant population growth.

[49] Minsky (1992) postulates that, over time, the quality of lending declines until credit is essentially being extended to pay interest on previous credits. At a moment, impossible to predict ex ante, there is a sudden recognition of the counterparty risk inherent in such behaviour, and liquidity in markets dries up. The important point to note is that, for Minsky, the illiquidity in markets is only a symptom of a much deeper problem.

[50] Consider in recent decades the long period of German stagnation after reunification, the Japanese bubble period and the Southeast Asia crisis. In each case, difficulties in the real economy were aggravated by banking systems that had become dysfunctional. For a fuller analysis, see Reinhart and Rogoff (2008).

[51] However, a number of BIS papers address this latter issue. See Borio (2003, 2007) and White (2006, a).

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Annex 1
Evidence of declining exchange rate pass-through

Changes in long-run pass-through						
	Responses against a 1 percentage point change in the exchange rate[1]					
	in consumer prices			in import prices		
	Gagnon-Ihrig (2004)	BIS (2005)[2]	Others	Campa-Goldberg (2002)[3]	BIS (2005)	Others
Australia	0.09 → 0.01 [1993]		0.35**→ 0.17** [1990][4]	0.69* <+0.09> [1990]		No change: remained one or close to one[4,5]
Belgium	0.21*→ 0.02 [1987]			0.71 <+0.18> [1990]		
Canada	0.30*→ 0.04 [1985]		0.19 → insignificant [1984][6]	0.68* <–0.23> [1990]		No change: remained one[5]
France	0.17*→ 0.01 [1987]	0.27**→ –0.14 [1990]		1.21* <–1.00> [1990]	0.76**→ –0.06 [1990]	
Germany	–0.13 → 0.12** [1981]	0.17**→ –0.03 [1990]	0.18 → 0.10 [1990][7]	0.79* <–0.12> [1990]	0.37**→ 0.28** [1990]	2 → 0.6 [1990][7]
Italy	0.33**→ 0.08 [1987]	0.32**→ 0.46 [1990]		0.62* <–0.65> [1990]	0.56**→ 0.41** [1990]	
Japan	0.26*→ 0.02 [1981]	0.23**→ 0.05 [1990]		1.26* <–0.76> [1990]	0.74**→ 0.36** [1990]	1.28**→ 0.67** [1990][8]
Netherlands	0.08 → 0.06* [1985]		PT of guilder-mark increased after 1993[9]	0.77* <–0.17> [1990]		
Sweden	0.05 → 0.02 [1993]		0.68**→ 0.02 [1995][10]	0.59* <–0.45> [1990]		No change: remained one[5]
Switzerland	0.18 → 0.07 [1985]			0.94* <+0.09> [1990]		
United Kingdom	0.18*→ 0.08 [1981]	0.29*→ 0.01 [1990]		0.47* <+0.11> [1990]	0.68**→ 0.45** [1990]	No change: remained one[5]
United States	0.19 → 0.03 [1981]	0.25**→ 0.10 [1990]		0.41* <+0.10> [1990]	0.48**→ 0.18** [1990]	0.8*→ 0.3* [1997/98][11]

[1] ** and * indicate statistical significance at the 1% and 5% levels, respectively. Years in square brackets refer to the timing of a change in pass-through. They correspond to the starting years of the second samples, when estimations are conducted by split sample periods. Shaded cells indicate a decline in pass-through. [2] Elasticities against import prices. [3] Only significance tests at the 5% level are provided. Figures in < > are changes in pass-through coefficients from the 1977–89 period to the 1977–99 period. [4] Heath et al (2004). PT to CPI is elasticities against import prices. [5] Adolfson (2004). [6] Leung (2003). [7] Hofmann et al (2004). Impulse responses to an exchange rate shock. No confidence interval is provided. [8] Otani et al (2005). [9] Berben (2004). [10] Adolfson and Söderström (2003). [11] Marazzi et al (2005). Results of a 10-year rolling regression. Only 5% confidence intervals are provided.