Surviving the Slowdown

Monitoring the European Central Bank 4

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MECB Statement of Purpose

Since 1999 Europe has had a new central bank. It has formulated and announced its monetary strategy, explained its implementation in interest rate decisions, built a track record, and engaged in extensive discussion of its monetary policy choices. As a network of policy-oriented academic economists, CEPR continues to contribute to this debate. *Monitoring the European Central Bank* (*MECB*) brings together a group of economists internationally known for their work on macroeconomics and monetary policy. Assessing the European economy and the responses of the ECB, each year's *MECB* authors produce a full annual report in the spring, and an update in the autumn. *MECB* seeks to influence not just public officials but also a wider audience, including the European Parliament, the media, and business.

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Foreword

As the European Central Bank enters its fourth year, it is essential that we continue to analyse and assess its performance. The CEPR *Monitoring the European Central Bank* team has an independent pan-European perspective and brings the solid research of distinguished economists to bear on the issues facing the Bank, while retaining the incisive edge of a more policy-oriented outlook.

In 2001 the ECB faced a sharp deterioration in the economic outlook, both globally and in the euro area. The fourth *MECB* report describes the challenge for monetary policy and assesses the ECB response. Interest rates fell much less in the euro area than in the United States. It is often argued that the ECB cut interest rates both too little and too late. Does this stand up to serious scrutiny? Or should we infer instead that the Fed responded too vigorously, or that the extent of the problem was simply larger in the United States? The principal conclusion of the report is that the problem was larger in the United States. There is some evidence that the ECB was slow to cut interest rates, but by late 2001 it had made up lost ground. A Fed-in-Frankfurt would not have cut interest rates more, but might have cut them earlier.

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RICHARD PORTES
28 February 2002

Executive Summary

OECD countries faced a simultaneous slowdown in 2001. Primarily, this reflected common shocks – higher oil prices in 2000, the end of the dotcom bubble, and the terrorist attacks of 11 September 2001. Four things made the slowdown special, raising challenges for monetary policy.

First, since all countries experienced simultaneous slowdown, no country was available as external locomotive of growth to help out the others. Second, overinvestment in the dotcom bubble left an overhang of capital, making new investment potentially unresponsive to interest rate cuts in the short run. Third, the end of the first inflationless boom for decades raised the remote possibility that subsequent interest rate reductions might hit the zero lower bound before any danger of deflation had been completely averted. Fourth, uncertainty was increased, at least temporarily, by the events of September 11.

In response, the Fed cut interest rates aggressively. The ECB was slower to start cutting rates, and in total cut only a third as much as the Fed during 2001. Did the Fed cut too much or the ECB too little? Or were both responses entirely appropriate reflections of transatlantic circumstances that had differences as well as commonalities?

The appropriate monetary judgements depend on the actual and prospective stance of fiscal policy. The UK was enjoying a fiscal expansion that happened then to support demand at the right time. In the United States the expectation of a tax cut may have played a similar role. Both countries were also underpinned by the operation of automatic fiscal stabilizers. In contrast, within the euro zone there was talk that some countries, notably Germany, might have to curtail the automatic stabilizers to keep actual deficits within the limit in the Stability Pact. In itself this *raised* the burden on monetary policy in the euro zone and makes the transatlantic asymmetry yet more striking.

Greater uncertainty about the transmission mechanism may have been a reason to use policy more cautiously, but this applies as much to the United States as the euro zone. Moreover, by raising the possibility of a really bad outcome, it provided a reason for policy-makers to take out some expansionary insurance until uncertainty diminished again.

ECB credibility may not have been fully established. Our own judgement is that having successfully negotiated a difficult period of adverse supply shocks until 2001, the ECB has already demonstrated its commitment to price stability.

Those calling for the ECB to acknowledge more actively a concern about output in the short run must recognize that for half its life to date the ECB has allowed inflation to exceed 2.5%, the upper bound of the target range. Any simple charge of a deflationary bias in monetary policy is not justified.

As credibility grows, the ECB can in principle engage in some output stabilization without undermining its clear commitment to price stability. And this is precisely what its past interest rate decisions already reveal. We encourage, therefore, the ECB to claim the proper credit rather than to continue to portray its decisions solely through the lens of the pursuit of price stability.

This is consistent with the ECB mandate. Over a suitable time horizon, the primacy of price stability is undisputed. Subject to this, however, the mandate makes the ECB responsible for other short-term concerns. In fact, it is irresponsible to claim that these should not influence policy decisions.

At low inflation rates, real shocks are larger relative to nominal shocks. This has two implications. First, even for the purpose of forecasting future inflation, the real economy contains more information than when inflation rates are high initially and nominal uncertainty is larger. ECB decisions, and the way in which these decisions are communicated, should properly reflect the role of the real economy.

Second, and related, the growth of nominal money as a leading indicator of future inflation is only reliable when money growth and inflation are high. But that is a world that the ECB aims to avoid permanently. The first pillar of the monetary strategy is now flawed beyond repair – both as a matter of theory and empirically.

Adjustments to the definition of money during 2001 successfully cut the average rate of money growth to the reference value of 4.5%, but did nothing to improve the correlation of money growth with actual ECB decisions. For example, after September 11 money demand shot up following a flight to safety and the ECB promptly and correctly cut interest rates despite faster money growth. For most of 2001 changes in money demand induced a strong *perverse* correlation between the false monetary signal and the correct interest rate action. Volunteering to give money a special role in inflation forecasting undermines ECB credibility unnecessarily.

Facing a common shock, should the major countries have pursued a more coordinated response? The conventional wisdom is that the pursuit of appropriate domestic policies is usually sufficient. International spillovers between the United States and Europe are insufficient to establish a clear case for more coordination, which anyway is hard to sustain.

This conclusion is appropriate if exchange rates and other asset prices are determined purely by the fundamentals. When multiple equilibria are possible and misalignment can persist, the gains to coordination are much larger. Sterilized intervention may then play a role in redressing misalignment, if decisively adopted and pursued.

Although we share the view that the dollar is overvalued and the euro somewhat undervalued, it is hard to be sure that significant misalignment yet exists. Since the ECB has already participated in activities coordinated with other leading central banks, however, notably in the aftermath of September 11, the ECB should clarify which circumstances are grounds for future coordination and which are not.

With these considerations in mind, what can be said empirically about the actual interest rate decisions of the ECB in relation to those undertaken by the Fed during 2001? We have three tools with which to make an assessment.

Estimating VARs prior to 2001, we use estimated coefficients to see if central banks' reaction to shocks in 2001 was abnormal by their own historical standards. By this test, both the Fed and the ECB behaved in ways consistent with their own past behaviour. The test has only modest power: quite a wide range of behaviour in 2001 is statistically consistent with earlier behaviour.

A similar conclusion is obtained from an **examination of long and short interest rates**. Both in the United States and the euro area there is nothing in the path of long rates in 2001 to indicate expectations of a change in the implicit monetary policy rules for setting short rates.

Our most interesting evidence relates to **estimated Taylor rules**. First, aggressive interest rate cuts by the Fed in 2001 were consistent with the Fed's own past behaviour. What was special was the size of the shock, not the reaction conditional on that shock.

Second, judged by its own past behaviour, the ECB *was* slow to cut interest rates in the first half of 2001, *but* by October had largely made up the lost ground. Higher oil prices and higher food prices were adverse supply shocks. Eurozone inflation peaked at 3.4% in May 2001. It appears that the ECB was not prepared to cut rates until inflation was seen to be falling, *despite* signals that output growth was slowing. By late 2001, ECB interest rates were consistent with previous ECB behaviour.

Third, how would a Fed-in-Frankfurt have behaved? Giving the ECB the Taylor rule estimated for the Fed would have led to

a path of euro interest rates almost identical to that generated by the previous ECB Taylor rule. Interest rates would have come down earlier in 2001, as in a mechanistic application of the ECB's own Taylor rule, but by the autumn would have been only a little lower than those the ECB was by then setting.

US interest rates were cut much further because the United States faced a much bigger shock, not because the Fed and the ECB reacted very differently to the same circumstances. This is entirely plausible. Although European stockmarkets have followed US stockmarkets up and down, US exposure to overinvestment in the dotcom sector was much larger.

None of this evidence sheds light on the optimality of ECB monetary policy. ECB objectives are not identical to Fed objectives, nor are the constraints the same. The euro area may require greater monetary activism because wage and price flexibility is lower and fiscal policy more constrained. A comprehensive assessment of such differences is beyond the scope of this report.

What we can say is that we find little support for the popular argument that, because the Fed cut much more than the ECB, the ECB *therefore* cut interest rates by too little during 2001. With hindsight, they could have cut a few months earlier because the slowdown was safely established even before September 11. In real time, however, when inflation was 3.3% and still rising, the ECB would have had many critics if it had loosened monetary policy.

Until it has a longer track record of success, a clearer admission of its multi-dimensional mandate, and spends less time explaining away uninformative or perverse monetary indicators, it will be hard for the ECB to change interest rates much in advance of events, even though monetary policy takes time to work its magic.

1

Introduction

This is the fourth annual CEPR report on *Monitoring the European Central Bank (MECB)*. Previous reports have dealt with the macroeconomic framework for monetary policy in the euro zone, the institutional structure and communications strategy of the ECB and market reaction as the ECB gradually acquires a track record.

The fourth year of its life has posed the toughest challenges to date for the ECB. Introduction of the euro currency, no easy feat, was accomplished smoothly and efficiently. Whether the ECB should have a greater role in banking supervision continues to be a contentious issue. However, it is on its monetary policy judgements that the reputation of the ECB properly rests. In a year of sharply deteriorating macroeconomic conditions we had no hesitation in making the monetary response to the slowdown the focus of this year's report.

By the time this report is published, four months after our initial draft was written, a vigorous recovery may be under way. Let's hope that it is. Signs of imminent economic recovery are still weak, however, especially in the euro zone. Slow growth rates are likely to be a significant policy issue for some time to come.

Whatever the outturn, there is little doubt that late 2001 saw the slowest growth in the euro zone since the ECB was established. During 2001 growth forecasts by the OECD, IMF and other institutions were steadily revised downwards, sometimes at a rapid rate (see Table 1.1). The events on and after September 11 accelerated what was happening anyway.

2001 was a year in which policy-makers had to respond to new challenges. There was a widespread change in sentiment about future output growth, accompanied by a sharp reduction in fears about inflation. These significant changes in the macroeconomic environment offer a good test of the underlying soundness of the policy framework. How well did the ECB survive the stress test?

Table 1.1 Changes in IMF forecasts of GDP growth

	Forecast for the year (%)		
Date at which forecast made	**2000**	**2001**	**2002**
December 2001			
USA	4.1	1.0	0.7
euro zone	3.4	1.5	1.2
Japan	2.2	– 0.4	– 1.0
October 2000			
USA	4.1	1.3	2.2
euro zone	3.5	1.8	2.2
Japan	1.5	– 0.5	0.2
May 2000			
USA	5.0	1.5	2.5
euro zone	3.4	2.4	2.8
Japan	1.7	0.6	1.5
October 2000			
USA	4.9	3.2	
euro zone	3.5	3.1	
Japan	1.9	3.4	

Source: IMF, *World Economic Outlook*, various issues

To address this question, Chapter 2 documents the current state of the world economy, examines the causes of the widespread slowdown, and identifies four features of the current slowdown not present in previous slowdowns of the last few decades. First, the *simultaneous* slowdown removed any locomotive of growth to provide external assistance. Second, overinvestment in the hi-tech bubble left an overhang of capital that makes new investment potentially unresponsive to interest rate cuts in the short run. Third, the end of the first inflationless boom for decades raised the remote possibility that subsequent interest rate reductions might hit the zero lower bound before any danger of deflation had been completely averted. Fourth, uncertainty was increased, at least temporarily, by the events of 11 September 2001 and its aftermath.

Chapter 3 discusses the consequent challenges for monetary policy. First, we note that the ECB has a mandate not merely to achieve price stability but also, where possible, to support the euro zone economy as well. The ECB currently has plenty of scope to do so, and should explain more clearly that this can be done without jeopardizing price stability.

Second, since different countries in the euro zone faced similar shocks with global origins, the single monetary policy is not merely an appropriate and effective policy response, it is an opportunity to show off EMU to advantage. Without EMU, its individual member states would have engaged in overexpansionary monetary policies that exported unemployment to partner countries, generating exchange rate instability and arousing speculative interest with the potential to lead to destabilizing capital flows.

Third, the current slowdown has taken place against a background of inflation that is already low by historical standards. Not only is there not unlimited room for interest rate cuts, the relative size of nominal and real shocks is different from that found over the last few decades. This requires paying more attention to the real economy and less to nominal indicators.

Fourth, and related, the monetary pillar of the ECB's monetary strategy has become even more of a liability, despite attempts to plaster over the cracks. At high rates of nominal money growth, money is a good predictor of inflation. At low rates of money growth, fluctuations in money demand and the effect of other real shocks make the monetary signal much less helpful.

Chapter 4 asks whether a common global slowdown requires a concerted policy solution. We first argue that the commonality of shocks only partly reflected the origin of shocks — in part it reflected more rapid transmission of a US shock to Europe. Closer integration may have raised the cross-country correlation of shocks. We therefore review arguments for and against greater international policy coordination. Recent developments in international macroeconomics identify additional gains from coordination. Since the ECB has already engaged in a few

actions coordinated with other countries, it is important that it now clarifies those circumstances that are grounds for coordination and those that are not.

Chapter 5 discusses interest rate decisions in 2001. We document the rise in uncertainty, and examine what this implies for the optimal policy response. Some arguments provide reasons for caution, but others may provide reasons for more decisive action.

Interest rates fell further and faster in the US than in the euro zone. Did the Fed react too much, or the ECB too little? Or does this pose a false question: perhaps, despite emphasis on the commonality of shocks, the US simply faced a much larger shock?

We use three techniques to shed light on these issues. We estimate VARs, we extract information from the term structure of interest rates, and we estimate Taylor rules for monetary policy. Broadly, we conclude that the much larger reaction of interest rates in the US reflected a response to a much larger problem. A Fed-in-Frankfurt would not have cut interest rates much more in total than the ECB.

There is, however, some evidence that the ECB delayed interest rate cuts until inflation in the euro zone was firmly on a downward path after adverse supply shocks had pushed inflation as high as 3.4%. Expecting the ECB to have acted in advance of this turnround may have been unreasonable. It will need a longer history, more transparent decision-making and a communications strategy less in conflict with perceived motives for decisions, before the markets will confidently accept a policy move in one direction while contemporaneous data are still sliding in the opposite direction.

2

Economic slowdown

Figure 2.1 Conference Board consumer confidence index in the US,

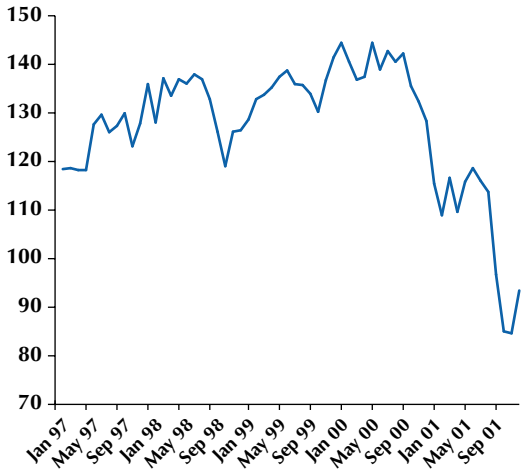
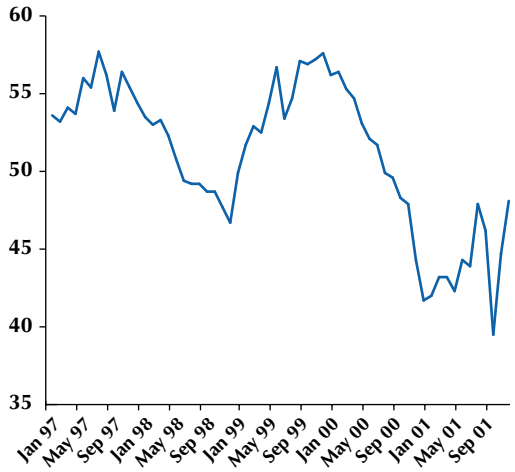


Figure 2.2 NAPMPI Index in the United States



It is now apparent that all the leading economic regions (Europe, Japan and the United States) have experienced a significant slowdown in economic activity since mid-2000. This is the first time since the mid-1970s that none of the major economies has been capable of acting as an engine of growth for the world economy. In this chapter, we review these developments, discuss the reasons for the slowdown and highlight why it differs from previous slowdowns.

2.1 The extent of the slowdown

The United States

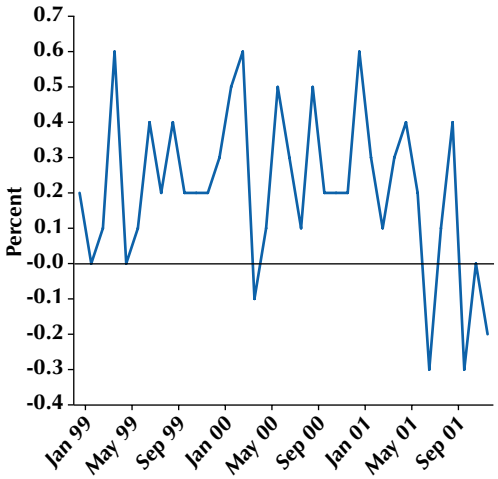
Japan has been sick for a decade. Of the other major economies, the US was the first to exhibit signs of economic weakness. These signs began to emerge in the autumn of 2000 and gathered pace thereafter. The NBER Business Cycle Dating Committee has identified March 2001 as the month in which the US entered a recession for the first time in a decade. Only at the beginning of the year 2002, ten months later, have we seen some of the leading indicators of economic activity bottoming out.

Since mid-2000, business orders, non-residential construction, consumer durables and housing purchases, factory orders and inventory investments all displayed slower growth or actual falls in levels. Moreover, confidence indicators have been weak. Consumer sentiment, already weakened by the year-long slowdown and falling employment, plunged after September 11 (Figure 2.1) until December 2001 where the index showed a small rebound. The Purchasing Managers' new order index, an indicator of business spending, is below 50. Despite rising in the last two months, its level still indicates a contraction in manufacturing activities (Figure 2.2).

At the same time, coincident and lagging indicators – such as employment, GDP, sales and personal income – continue to show significant declines or marked sign of weakness. US unemployment rose to 5.8% in December 2001. Capacity utilization, having fallen consistently in the last few months, is now eight percentage points below its level a year ago. Industrial production has fallen for 15 months in a row and GDP fell in the third quarter of 2001, reducing annual growth to 0.5%.

During this time there has been little threat of inflation. Consumer price inflation has oscillated in the last six months, but three negative values were recorded. Producer prices fell substantially in 2001, reflecting big declines in the price of energy and food. Even excluding these items, in December the producer price index fell by 0.7%. Inflation expectations for 2002 are low (1.5%, according to a survey by *The Economist*).

Figure 2.3 CPI monthly inflation rate in the United States



Source: Bureau of Labor Statistics

The euro zone

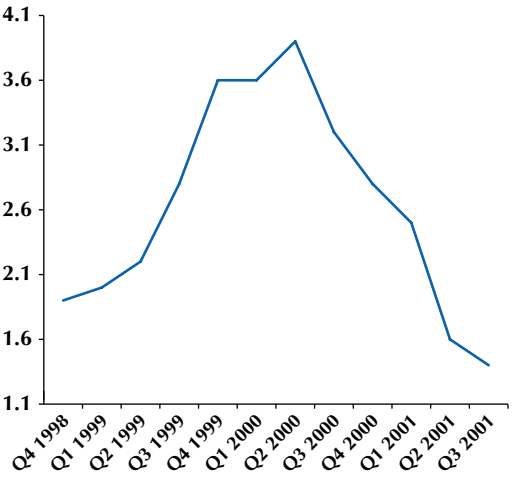
Despite initial optimism that the euro zone had escaped most of the US downturn, evidence has steadily accumulated that the euro zone also slowed significantly in 2001. Output growth fell steadily during the year. Compared with the same quarter in the previous year, growth was down to 1.3% by the third quarter of 2001, under half its rate of just over a year earlier. (See Figure 2.4)

This average decline masks large regional disparities. Ireland and Spain apart, output growth rate has been minimal in most euro zone countries during the last two years. Furthermore, it is now clear that the cyclical component of output is expected to fall below the trend in many countries in 2002 as shown in Table 2.1.

Industrial production declined in the first two quarters of 2001. At an annualized rate, it fell by 1.7% in August 2001, the slump primarily reflecting a fall in consumer durables and construction. Capacity utilization has fallen sharply since its peak in the final quarter of 2000: by the third quarter of 2001 it was two full percentage points below its peak level. Weaker consumer demand added to the general slowdown of industrial activities since the start of 2001. Sales slumped, growing only by 1.0% in the first two quarters of 2001. Purchases of new cars and other consumer durables fell in seven of the first nine months of 2001.

Although broad aggregates such as real GDP, retail sales and employment in the euro zone have not actually fallen, they are scarcely growing. Leading indicators and confidence measures have yet to indicate a strong recovery in the months ahead (see Figure 2.5). In fact, consumer and business sentiment in the euro zone were still falling as late as December 2001. The consumer measure fell in 10 of the last 15 months, and the industrial measure of new orders from order books, falling since March 2001, has been in free fall since July.

Figure 2.4 GDP growth rates in the euro zone



Source: Eurostat

Table 2.1 Output gaps (%)

	2000	2001	2002
Eurozone	0.2	–0.5	–1.4
Germany	0.0	–1.1	–2.0
France	0.6	0.4	–0.4
Italy	–1.6	–1.9	–2.7
Spain	0.2	–0.1	–0.8
Ireland	6.0	4.0	0.0

Source: *OECD Economic Outlook*, December 2001

Figure 2.5a Consumer confidence in the euro zone

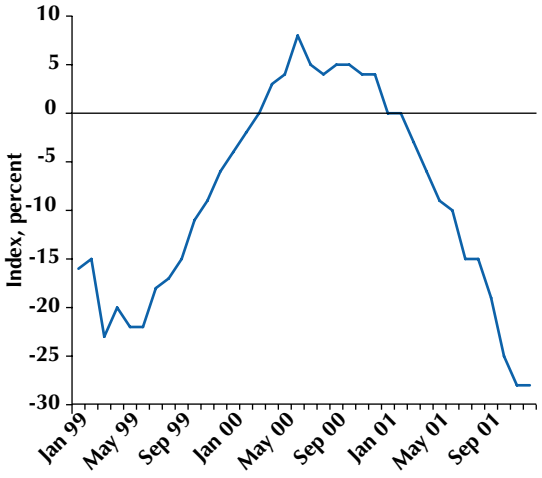
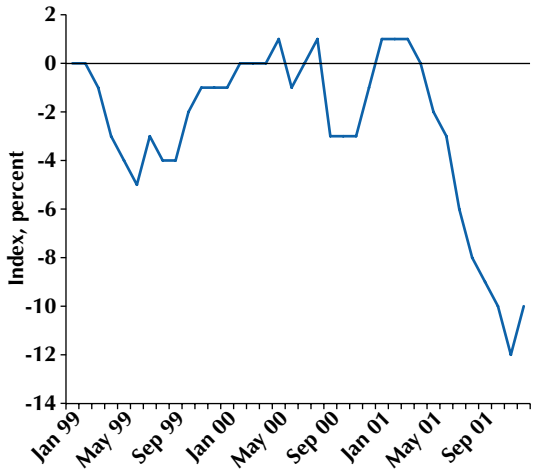
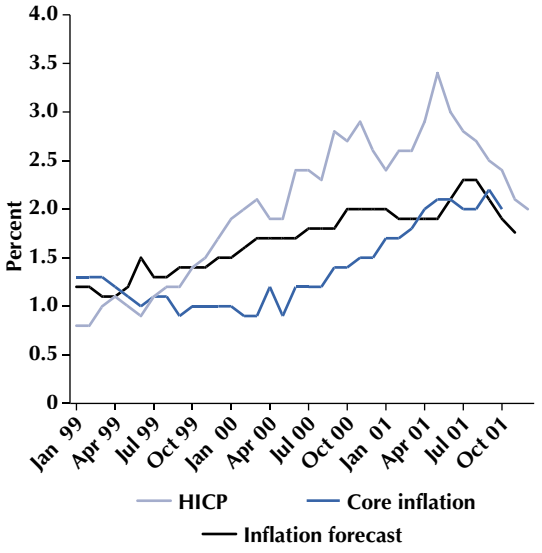


Figure 2.5b Book orders in the euro zone



Source: European Commission

Figure 2.6 HICP, core HICP, and median HICP inflation forecasts in the euro zone



Source: ECB

In thinking about price changes, it is important to recognize that there had been significant adverse supply shocks during 1999–2000. After the sustained rise during this period, energy and raw material price growth abated somewhat in the first half of 2001. Input prices *plummeted*, however, in the the third quarter of 2001, when raw material prices fell by 10.4%. This helped mitigate a rise in unit labour costs, which had been creeping up steadily since mid-2000 as growth of labour productivity slowed.

Industrial prices were growing by 4.5% in the first quarter of 2000 but had cooled significantly by the the third quarter of 2001, when the annualized growth rate of producer prices was only 0.7%. Industrial price inflation is likely to decline in the months to come, both because of the current decline in input prices and because of further slowdown in economic activity.

Consumer prices soared early in 2001 due to higher food prices (the annualized CPI inflation rate peaked at 3.4% in May 2001). Core inflation also rose, peaking at 2.2% in September 2001. By that month, the annualized growth rate of HICP had moderated to 2.4% and, according to the median forecast reported by *The Economist*, was expected to fall below 2% by the end of 2001. Core inflation, necessarily slower to react, peaked at 2.2% in September but is also now in decline (see Figure 2.6). Core inflation was thus expected to be under the 2.0% threshold by the end of 2001.

Despite growing evidence of worsening international conditions, until euro zone inflation was in clear decline there was a potential conflict between the signal of falling demand and output, and the signal from inflation still affected by previous adverse supply shocks. Once inflation turned around, this policy conflict began to recede.

The rest of the world

Output growth outside the US and the euro zone is expected to reach only 2.4% in 2001, a sharp fall from 4.7% in 2000. The slowdown in the growth of world trade is even more dramatic, from 12.4% in 2000 to 1.0% in 2001 (IMF, *World Economic Outlook*, December 2001).

Japan has succumbed to its third recession in a decade: Japanese GDP is projected to fall by 0.4% in 2001 and 1.0% in 2002 (IMF, *World Economic Outlook*, December 2001). Other East Asian economies are also slowing rapidly.

The UK experienced a measurable slowdown in economic activity. Output growth declined to 0.6% in the third quarter of 2001, 1.5 percentage points less than in the same quarter of 2000. Unemployment rose to 5.1% and investment intentions weakened substantially with deteriorating economic prospects and increased uncertainty (Bank of England, *Inflation Report*,

November 2001). Producer prices have now fallen by 1% and RIPX inflation is now below the medium-run target.

In sum, not only has there been a move towards a slowdown in many parts of the world, but this slowdown was synchronized across countries, the first global downturn in thirty years. As the OECD puts it:

> One of the striking features of the ongoing downturn is its synchronised nature. In 2001, activity is estimated to be decelerating in virtually all OECD countries, and in most non-OECD countries as well. This contrasts with the early 1990s: the slowdown of the US economy in 1990–91 coincided with vigorous growth in what was to become the euro area and in Japan, and the subsequent US recovery paralleled an outright recession in the euro area and a sharp downturn in Japan.
>
> OECD *Economic Outlook*, December 2001

2.2 Explaining the slowdown

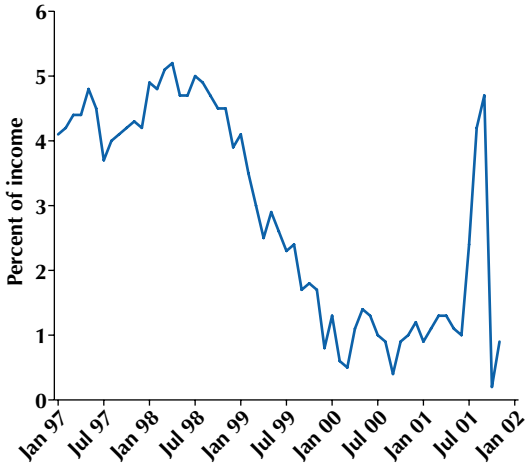
The principal cause of the current slowdown of the world economy was a downward revision to previously optimistic extrapolations about long-run growth in the US. The estimated trend growth of US total factor productivity in early 1999 was an unprecedented rate of 2.5%, a full percentage point above long-run trend growth, and 1.5 percentage points more than the growth rate in the 1980s.

Extrapolating at such a new high rate, people formed estimates of their wealth and permanent income, long before they actuality materialized. US households increased consumption of both non-durable and durable goods, and household saving became negligible. As shown in Figure 2.7, and apart from the spike due to September 11, the personal saving rate of US consumers has been below 1.0% for more than two years.

Even more significantly, firms increased their investment rate in expectation of having to meet higher future demand. Stock markets boomed in anticipation of future profits. The information and communication technology (ICT) sector was believed to be responsible for this unprecedented growth of total factor productivity. Technology stocks soared to record heights, pricing in belief of sustained future growth.

Sustaining higher growth in the longer run remains one of the most elusive quests in economics. By the third quarter of 2000, estimates of trend annual growth in US total factor productivity had been reduced to below 2% and current estimates are back to historical values. Extrapolating at lower growth rates made it evident that ICT stock prices were grossly inflated, that there had been extensive overinvestment in physical capacity in the sector, and that manufacturing in general had accumulated excess inventories. Painful adjustment was needed to bring capacity back in line with realistic projections.

Figure 2.7 The US saving rate



Source: Bureau of Economic Analysis

Figure 2.8a Inventory investment in the United States

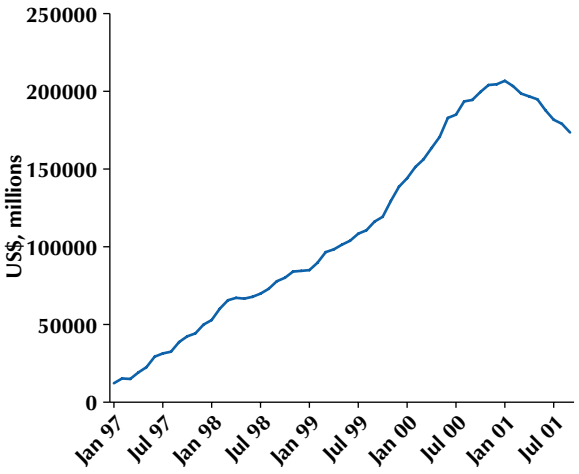
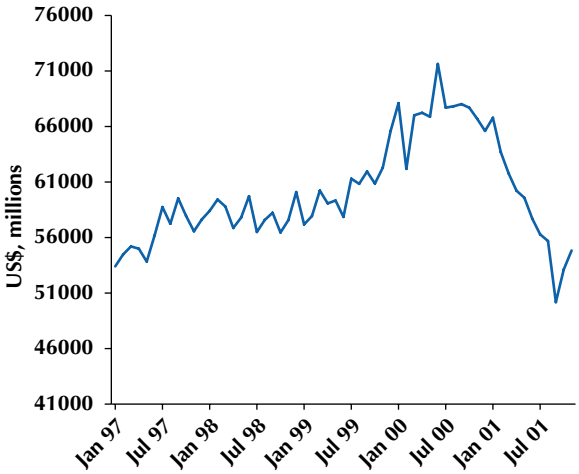
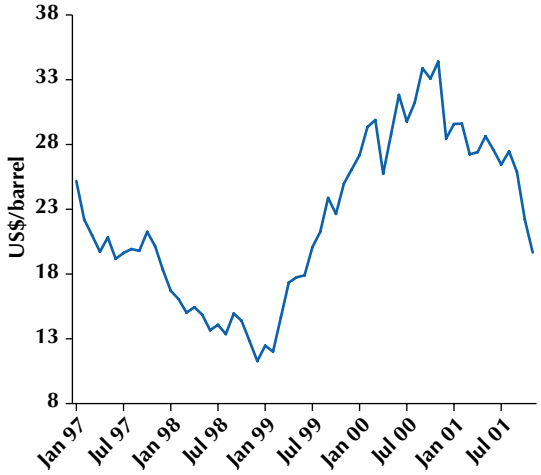


Figure 2.8b New business orders in the United States



Source: Department of the Census, Census Bureau

Figure 2.9 Oil prices



Source: Reprinted with permission from the Dow Jones Energy Service

Excess US inventories are already being rapidly unwound. Two other overhangs will be slower to correct. The first is consumer debt, the consequence of excess borrowing and inadequate saving now that optimism about sustained rapid growth has been shown to be misplaced. The adverse wealth effect due to the fall in stock values has seriously undermined household balance sheets at a time when previous household borrowing had led to high levels of personal debt payments. The consequent decline in consumer confidence, in which the decline in solvency has been compounded by fears about cashflow and liquidity, is likely to translate into a lower consumption demand which will thus be superimposed on the current lower investment demand.

The second is the excess stock of high-tech capital goods, produced in the last few years but no longer required to service booming demand.

In thinking about the challenge for monetary policy, it may be important to distinguish these different overhangs. We have seen excess household debt before, for example at the start of the 1990s. Once households re-evaluate their long-run incomes, saving rates typically rise again. Lower real interest rates are then part of an appropriate and effective policy response.

Excess stocks of high-tech capital may, temporarily, pose a more difficult problem. Innately high depreciation rates, caused by technical obsolescence, make this capital overhang eventually self-correcting. In the meantime, however, the overhang may prove unresponsive to monetary treatment. The short life makes present value calculations unresponsive to interest rate reductions. In principle, monetary policy may have to work a little harder than normal to resolve this particular problem.

As Figure 2.8 confirms, by October 2001 business orders had fallen to their lowest level since 1996 and inventory investment has fallen in 10 of the last 13 months. Furthermore, the bursting of the dotcom bubble has restricted financing for readjustment in the business sector.

The euro zone and East Asia are suppliers of intermediate products to US ICT and manufacturing sectors. Stock markets around the world have also fallen together. The US slowdown has been transmitted to other regions of the developed world creating a synchronic downward movements in several OECD countries.

A second adverse factor contributing to the general slowdown was the large increase in oil prices in 1999 and early 2000. Oil prices rose from about $12 dollars per barrel in early 1999 to $34 per barrel by mid-2000 (see Figure 2.9). There are several reasons why this increase may have produced slower growth in the OECD. Higher energy costs depress profits and investment. Moreover, since many of the largest economies are net oil importers, a rise in the relative price of oil made them all simultaneously poorer.

A downward revision in output growth expectations in 2000, coupled with the supply shock from a large rise in real oil prices in 1999–2000, had the OECD in reverse gear by the end of 2000. In the euro zone, these difficulties were compounded by various food crises (mad cows, foot and mouth) that further raised the price level.

The September 11 terrorist attack, and the subsequent war in Afghanistan, sharply increased uncertainty across all OECD countries and beyond. These special events, however, had an unambiguous timing. They acted to synchronize business cycles across countries and removed any remaining doubts about whether slowdowns would occur. To the extent that coping with terrorism will add permanent costs to transactions, insurance and security, there is even the prospect that the lingering effect will apply to growth rates as well as to levels.

Thus far, we have argued that the slowdown was significant and applied broadly across OECD countries. Oil price rises had hit all economies. The high-tech bust originated in the US – where its effects were largest – but stock markets' falls were broadly similar in Europe. Confidence also fell everywhere. Nor could anyone be sure that future terrorist attacks would be confined to the United States. In all countries uncertainty increased.

Although monetary authorities had room for manoeuvre, this scope was not unlimited. Low inflation and low nominal interest rates meant that substantial interest rate cuts would take interest rates close to their lower bound. The standard remedy to slowdowns in the last few decades – engineering negative real interest rates – was going to be hard to accomplish.

2.3 Contrasting responses

The slowdown began in the US. Having been more reliant on the ICT sector, it had enjoyed the largest growth during the dotcom boom, but had furthest to fall after the bust. Moreover, given extensive stock market holdings, US consumers are more vulnerable to the subsequent stock market declines. Finally, the US was obviously the most directly affected by the September 11 attack.

The monetary policy response in the US was substantial. The Federal Reserve cut interest rates 11 times, by a total of 475 basis points during 2001 – an annual decline of unprecedented proportions. Moreover, in addition to the unfettered operation of automatic fiscal stabilizers, there were two sources of discretionary fiscal expansion – a rise in military spending and a tax rebate package with the prospect of more tax cuts to follow.

The euro zone, which had no significant downgrading of productivity forecasts, escaped the direct effects of adjusting its expectations of long-run growth. Indirect effects were clearly present, however. Gross trade flows between the US and the euro

zone are small, but several areas were particularly affected by the slowdown in international activity. The big drop in business investment hurt German capital good producers, and Ireland saw a clear decline in foreign direct investment (FDI) from American ICT producers. Similarly, Finland faced a substantial downgrade of its output growth as the result of lower demand for its ICT products.

As a consequence, Germany was the first country to reach the brink of a recession, experiencing both a fall in domestic demand and a contraction in exports. More generally, ICT producers experienced the most dramatic falls in growth rates. Furthermore, the slowdown in US investment demand has been rapidly transmitted to countries with which the euro zone has large trade flows (e.g. South America) exacerbating the slowdown. Oil price rises had a greater adverse effect in the euro zone, which is much more dependent than the US on external oil supply.

Oil prices hikes have now been reversed but oil price changes feed through only slowly to HICP inflation. On the one hand, this explains why euro zone inflation did not peak until May 2001. The same reasoning now implies that sharp falls in oil prices since mid-2001 will induce further falls in euro zone inflation during 2002. Inflation should have disappeared from the radar screen of a policy-maker's concerns.

The euro zone may have had to deal with a smaller shock. The interesting question is whether this justifies a much smaller policy response. With the German budget deficit close to its 3% ceiling, it has been unclear whether fiscal policy in the euro zone would allow the automatic stabilizers to operate in full. Despite that possible concern, interest rate cuts in the euro zone were much smaller than in the US, only 150 basis points versus 475 basis points. This raises the obvious question: did policy in the euro zone move less because less was required or because it was constrained by institutional design or policy strategy? Providing an answer is the main purpose of the analysis in the ensuing chapters.

3

The challenge for monetary policy

3.1 The mandate of the ECB

The mandate of the ECB, defined in the Maastricht Treaty, states that the *primary* objective of the ECB is to maintain price stability. Subsequently, the ECB has interpreted this to mean that inflation should lie between 0 and 2% over the medium run. The Treaty, however, adds that the ECB has a responsibility in other areas of economic policy: 'Without prejudice to the objective of price stability, the ECB shall support the general economic policies in the Community (...) as laid down in Article 2'. These objectives specified in Article 2 of the Treaty include 'a high level of employment'. When the threat of inflation is guaranteed to disappear for a while, the mandate of the ECB *obliges* it to be concerned about output and employment. Thus the Treaty gives the ECB a *double* mandate.

The ECB authorities have largely ignored this second task by arguing that the best way to achieve its second task is to maintain price stability. This is made clear by many pronouncements of President Duisenberg, for example in his testimony before the Committee on Economic and Monetary Affairs of the European Parliament (March 2001):

> ... we always maintain – and we still do – that the best contribution that monetary policy can give to fulfil that second task is to maintain price stability.

This message is repeated tirelessly in almost every press conference of the President of the ECB.

The same message can be found the ECB's *Monetary Policy Strategy*, published in January 1999, which has become the intellectual cornerstone of the ECB monetary policy framework. In this policy statement, the ECB happily espouses the idea that by maintaining price stability, the central bank makes the maximum possible contribution to high employment and high economic growth:

Maintaining price stability in itself contributes to the achievement of output and employment goals, ... *Monthly Report*, January 1999, p.40

In this remarkable interpretation of the Treaty, the ECB fulfils its double mandate by reducing it to a single responsibility, a focus solely on price stability. All other objectives are then realized automatically. In this view the ECB cannot be held responsible for what happens in the real economy.

We consider that this view is not just narrow, but mistaken. This is not the place for a legalistic argument. The practical issue is whether the ECB can now engage in a more active policy of output stabilization without endangering price stability.

3.2 Inflation 2001: a vanishing constraint

Chapter 2 noted that the economic slowdown has significantly affected the prospects for inflation. Having peaked in May 2001 at 3.4%, it stood at 2% in November 2001. Forecasts made in November/December 2001 anticipate significantly lower inflation in 2002 (see Table 2.1). The euro changeover may add some fractions of a percent to the rate of inflation, but this should be considered as a temporary blip. Hence, the ECB has considerable leeway to combat recession without jeopardizing price stability.

The low inflation regime that is now the euro zone, and which is expected to continue, creates a new macroeconomic environment and a challenge for the way monetary policies are conducted.

Table 3.1 2002 inflation forecasts made at end 2001

Forecaster	euro area	US	UK
ECB	1.1–2.1		
European Commission	1.8	1.8	
JP Morgan	1.2	1.6	2.3
OECD	1.6	1.0	2.3
The Economist	1.5	1.6	2.1

Sources: ECB, *Monthly Bulletin*, December 2001
The Economist, Dec 8–14, 2001
JP Morgan, *Economic and Policy Research*, November 16, 2001
European Commission, *European Economy*, Supplement A, no. 10–11 October/November 2001
OECD, *Economic Outlook*, no 70, December 2001

3.3 Symmetric shocks and monetary policy in EMU

As explained in chapter 2, the recession now hitting the euro area is largely a symmetric shock experienced by all member states. This has important implications for the effectiveness of monetary policy in a monetary union. Because the adverse demand shock hits all countries, the single monetary policy is not merely an appropriate tool with which to fight recession but a much better tool than if different central banks had acted independently.

Suppose there had been no monetary union in Europe. Uncoordinated, different central banks would have adopted different interest rate responses to recession, for example because national fiscal policies differed. This would have led to exchange rate movements. Policy conflicts and beggar-thy-neighbour policies would have been the result. Thus, the effectiveness of monetary policy in stabilizing output in the euro area would have been greatly reduced.

The fact that monetary policy is now centralized in the euro

zone enhances the stabilizing power of monetary policy to deal with the common shock. Whereas individual countries might have worried that lower interest rates would stimulate demand, suck in imports and provide jobs for others, collectively the euro area internalizes this externality since the euro area is much less open than its constituent member states used to be. Recession is thus an opportunity for the ECB to take advantage of a potential benefit of monetary union. To do so the ECB must act, however. The existence of monetary union is no excuse for inaction.

3.4 What scope for fiscal policy?

The scope for using fiscal policy in the euro zone to tackle recession is severely limited. Whereas the inflation constraint on monetary policy is receding rapidly, two fiscal constraints in the euro zone are looming ever larger. The first is the deficit ceiling laid down in the Stability Pact, the second is rising levels of public debt in a continent with ageing populations, rising pension obligations, and future fiscal difficulties.

The Stability Pact imposes a ceiling of 3% on government budget deficits. By the end of 2001, the members of euro zone in total had a government deficit amounting to 1% of total GDP. At most this leaves room for a budgetary stimulus of only 2% of GDP. In practice, the scope is considerably less since spare deficit capacity cannot be traded between member states.

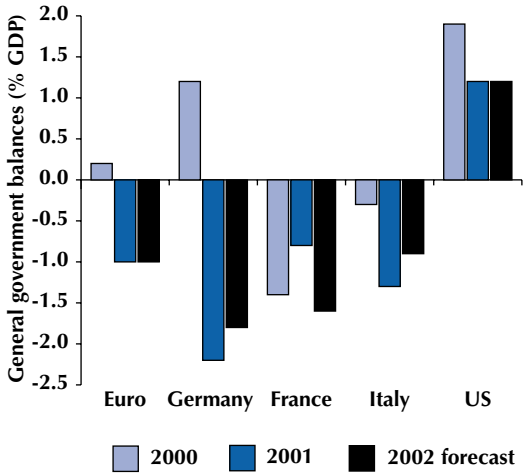
Some large countries, particularly Germany and Italy, have big deficits, precluding decisive fiscal action by them in the role of locomotive. As recession bites, they may even be forced to switch off their automatic stabilizers to prevent temporary cyclical factors taking their actual deficits above the 3% ceiling. This contrasts with the United States, which starts with an initial position of more than 1% budget surplus.

Previous reports in our series *Monitoring the ECB* have noted that it would make more intellectual sense to apply deficit ceilings to the cyclically-adjusted budget, allowing automatic stabilizers to work in full during recession, and to be expected to do so, provided that the same automatic stabilizers are allowed to earn large budget surpluses during booms.

A familiar rejoinder is that potential output is unobserved, so any national estimates are likely to be subjective and open to political manipulation. Here, however, the Maastricht Treaty should have had the courage of its own convictions. If it made sense to delegate monetary policy to an independent central bank, it also makes sense to delegate to an independent body the production of estimates of trends in potential output in member states.

That body might even be the ECB, which is necessarily in the business of contemplating how actual output compares with potential output. In short, the refusal to reformulate the

Figure 3.1 Deteriorating budgets 2000–2



Source: IMF *World Economic Outlook*

Stability Pact in terms of structural budgets is misguided and may now be damaging.

After years of austerity, prompted first by high interest rates in the early 1990s then by negotiating the Maastricht criteria prior to EMU, many members of the euro area were unwilling to maintain tight fiscal policy after 1999. For some, 2000 was a wasted opportunity.

Of course, had interest rates been lower it would have been politically easier to tighten fiscal policy. In early issues of *Monitoring the ECB* we emphasized that no credible mechanism had been devised through which to barter lower interest rates in exchange for tighter fiscal policy.

In an ideal world, the euro zone would coordinate monetary and fiscal policy. In practice the scope for strategic manipulation is large given the problems of fiscal commitment. In such circumstances, it may even be better not to try to coordinate fiscal and monetary policy within the euro zone. Better not to tarnish the ECB with dirty fiscal brushes.

In summary, the Stability Pact may oblige some countries to switch off automatic fiscal stabilizers. Even if they can be left on, fiscal expansion through the automatic rise of benefit levels and automatic fall in tax revenues has to await the slowdown and cannot anticipate events, even when trends are clearly established. Nor have fiscal authorities much scope for any discretionary fiscal stimulus.

This contrasts sharply with the United Kingdom and the United States where until recently governments had significant budget surpluses. In part these could be pursued with political confidence because it was clearly understood that any consequent fall in demand would be fully compensated by expansionary monetary policy undertaken by credible central banks whose policy was well understood.

Thus, ECB obfuscation about its commitment to output stabilization has not always helped its cause. In its *Monthly Reports*, the ECB correctly pressed for budget consolidation in 2000, as much to deal with the medium-run public finances as to create any precautionary spare fiscal capacity for a future cyclical downturn. The more the ECB appears willing to play a clearer cyclical role in output stabilization, however, the easier it may be for politicians to tighten fiscal policy on average.

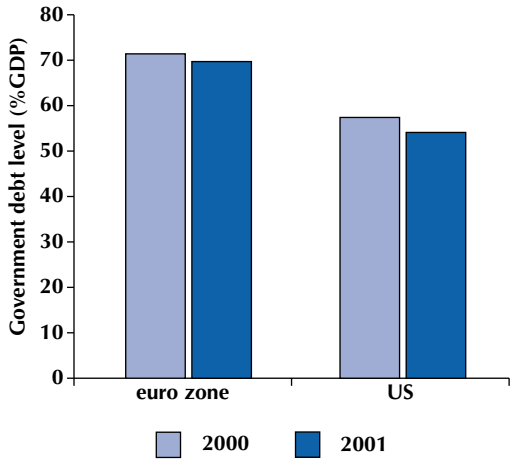
Although a problem over a longer horizon, rising levels of government debt have thus also acted as a constraint on the operation of fiscal policies in the euro zone. More comfortable debt to GDP ratios and lower future pension obligations have allowed governments in the United States (Figure 3.2) and the United Kingdom to contemplate larger fiscal injections. The timing of these was largely fortuitous. For example, fiscal expansion in the United Kingdom reflected a commitment to improve the public services, not the omniscient anticipation of a sharp fall in demand. Nevertheless, governments outside the

euro zone had the scope to make such decisions, those inside the euro zone did not.

The preceding discussion leads to three conclusions.

- Inflation is low in the euro zone and will decline further. There is ample leeway for the ECB to shoulder its responsibility in fighting the recession, as mandated by the Maastricht Treaty.
- Given that the shock hitting the euro zone economies is symmetric, the Eurosystem is the best possible institutional environment through which to combat the recession in Europe.
- Fiscal policy will remain on the sidelines, unable to make a major contribution to stabilization in Euroland. Monetary policy can, and should, look into the future. As long as the danger of a resurgence of inflation remains remote, the responsibility for stabilizing output and employment rests on the shoulders of the ECB

Figure 3.2 Government debt



Source: IMF

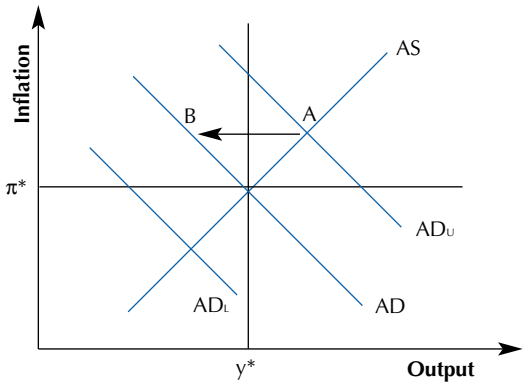
3.5 Does inflation targeting stabilize output?

The central claim made by the theory of flexible inflation targeting[1] is that by stabilizing inflation, output is also stabilized around potential output. This claim is obvious when shocks originate from the demand side.[2] This is illustrated in Figure 3.3, which shows aggregate demand and supply curves.

Suppose there are positive and negative shocks in aggregate demand, leading respectively to the upper and lower levels of demand shown by the AD_U and AD_L curves. Potential output, shown by the vertical line at y*, is determined by productivity growth, labour supply and the size of the real capital stock. Potential output is influenced by structural policies, but not by monetary policy

Flexible inflation targeting implies that the central bank sets a target inflation rate, π^*. In a boom (AD_U), the central bank raises the interest rate, thus lowering the AD curve. In a recession it does the opposite. Because prices are sticky the central bank allows for a gradual adjustment of inflation and output. An attempt to bring back the aggregate demand curve downwards too quickly could lead to a cycle where output declines from A to B. This is why this strategy is called flexible inflation targeting. (The flexible applies to the speed with which the target is attained, not to the speed of wage and price adjustment.) Stabilizing inflation around π^* also stabilizes output around potential output. When a central bank follows a

Figure 3.3 Flexible inflation targeting and demand shocks



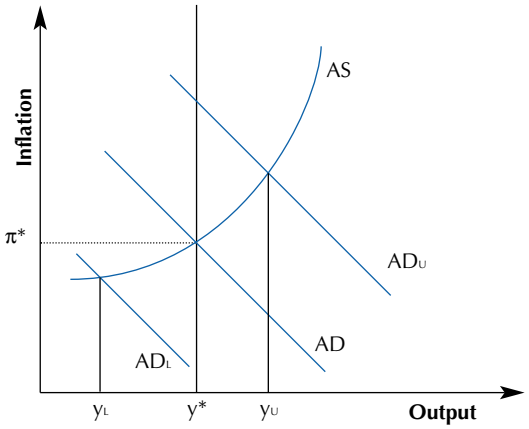
1 By flexible we mean that the monetary authorities allow for a *gradual* adjustment to the target.
2 A supply shock is analysed in Box 3.1.

flexible inflation targeting strategy there is no need to explicitly target the output gap. This is good news because output gap statistics tend to be very unreliable (Orphanides, 2000).

Applied in the present situation in Europe, inflation targeting tells the following story. The economic slowdown in Europe is mainly driven by a fall in aggregate demand. This reduces both inflation and output. Because demand shocks induce a positive relation between inflation and output, the pursuit of price stability accomplishes output stability as a side effect. If inflation continues to fall, the ECB will have time to react and to boost the economy. There is no need for the ECB to target output (or the output gap) except to the extent it signals future inflation.

This view leads to the conclusion that today (end 2001) there is no need for the ECB to relax its monetary policy stance. Forecasts of inflation are all well within the target zone of 0 to 2% (being closer to 2% than 0%). Since stabilizing the rate of inflation within this target zone is the best possible thing the ECB can do to stabilize output, there is no need to cut interest rates.

Figure 3.4 Flexible inflation targeting when supply is non-linear



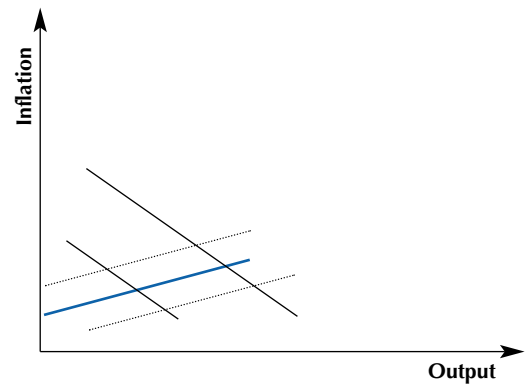
This conclusion only holds because it is assumed that the supply curve is linear. Figure 3.4 shows a non-linear supply curve, which is more realistic. When inflation is low, menu costs lead people to make infrequent price adjustments. Inflation then exhibits considerable inertia. When inflation is high, menu costs of price changes become trivial, and price adjustments are frequent.

The non-linear aggregate supply curve in Figure 3.4 is the counterpart of the New Keynesian Philips curve developed by Akerlof, Dickens and Perry (2000), Mankiw (2001), and Wyplosz (2001). When inflation is low, nominal rigidities matter a lot, and inflation is unresponsive to the output gap. The higher the inflation rate, the less significant are nominal rigidities and the more vertical the Phillips curve (in inflation–unemployment space) and the aggregate supply curve (in inflation–output space).

For empirical evidence of a non-linear aggregate supply curve (Phillips curve) in the United States, see Akerlof, Dickens and Perry (2000); for several European countries, see Wyplosz (2001).

This supply curve has two implications. First, a central bank that targets the inflation rate will react more to a *rise* in output than to an output *fall* of equal magnitude. An inflation-targeting central bank thus follows an implicit stabilization rule for output, but that rule is asymmetric. It acts more forcefully to combat booms than to fight recessions. The central bank may hardly react at all to a recession if the supply curve is sufficiently elastic. This can also be seen in Figure 3.4: small falls in inflation, induced by a fall in demand, are accompanied by big falls in output.

Figure 3.5a Low-inflation-target central bank



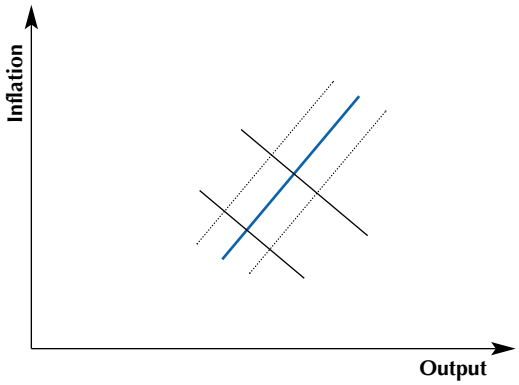
Second, and more important, in a low inflation environment the rate of inflation becomes a less reliable signal of the strength of deflationary forces. Suppose we do not observe the supply curve perfectly because of noise. Figure 3.5 shows a band around the supply curve, within which the supply curve moves up and down. We distinguish two cases: a low-inflation country where

the supply curve is relatively flat; and a high-inflation country with a steeper supply curve.

Suppose that an adverse demand shock hits these economies. In the low-inflation country it is difficult to detect from movements of inflation alone that an adverse demand shock has occurred. The reason is that the signal to noise ratio is low. The signal comes from the demand shock, the noise from the random movements in the supply curve. The flatter is the supply curve the lower is the signal to noise ratio, and the less informative is the rate of inflation about cyclical movements in aggregate demand. In the limit, when the supply curve becomes horizontal, the rate of inflation is not informative about these output movements. Conversely, when the supply curve is steeper (as is generally the case when inflation is higher), inflation contains more information about movements in aggregate demand.

Thus, when inflation becomes very low, as in the euro zone, inflation is a less reliable signal in stabilizing fluctuations in

Figure 3.5b High-inflation-target central bank



BOX 3.1 Inflation targeting and supply shocks

Is inflation targeting the right strategy when shocks in the supply curve occur? Figure B3.1 examines a permanent supply shock, for example a rise in oil prices, that shifts the short-run supply curve up from AS_1 to AS_2 and reduces full-capacity output from y^*_1 to y^*_2. After this supply shock, the short-term equilibrium is at point A. Output exceeds its new long-run level (the output gap is positive), so inflation increases. By targeting inflation (at the rate π^*) the central bank reacts in the correct way. A higher interest rate gradually reduces aggregate demand to new lower level, full-capacity output. Put differently, inflation targeting is equivalent to stabilizing output around its new natural level.

For a permanent supply shock, focusing on the inflation rate is the correct policy. There is no trade-off for the central bank between stabilizing output and stabilizing inflation in the intermediate and long run.

Now consider a temporary supply shock. Again, this shifts the short-run supply curve up, but this time the original level of full-capacity output is unaffected. According to proponents of inflation targeting, the correct response of the central bank is not to react to such temporary supply shocks. Such a policy rule can be implemented by formulating the targeting strategy in terms of core inflation, which ignores the effects of temporary supply shocks on inflation.

Can the central bank distinguish between permanent and temporary supply shocks? In practice this is often difficult. Hence, inflation targeting may not prevent central banks from making policy errors. Moreover, as argued in the main text, the existence of temporary supply shocks (noise) reduces the quality of inflation as a signal of deflationary demand shocks. This is especially problematic when the supply curve is relatively flat.

Figure B3.1 Flexible inflation targeting and supply shocks

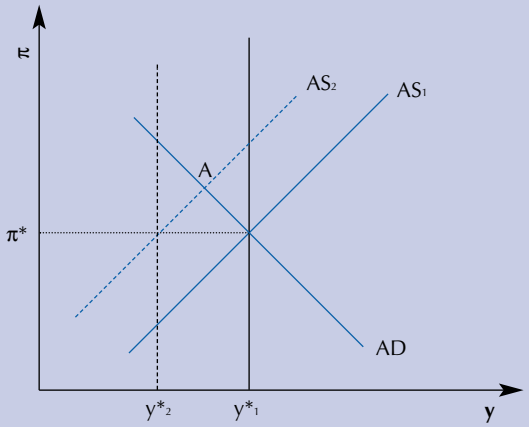
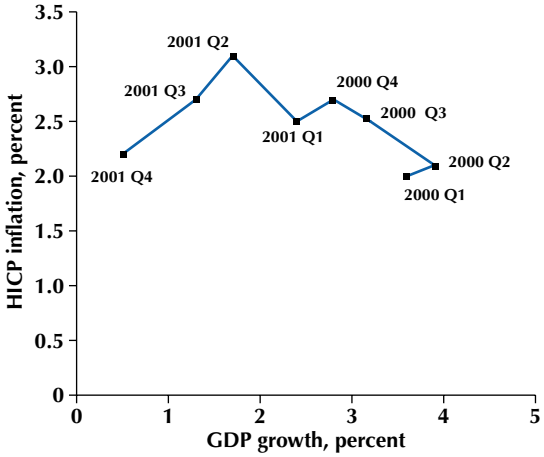


Figure 3.6 Inflation and output movements 2000–01



Source: JP Morgan

output produced by demand shocks. This forces the central bank to attach greater value to other signals (the output gap and other real indicators of the business cycle). Thus, a central bank like the ECB with a low inflation objective, but a mandate also to maintain high levels of employment and output, should give more weight to real signals of economic activity than central banks with a higher inflation target.

This theoretical discussion is given more practical content in Figure 3.6, which shows the evolution of inflation and GDP-growth in the euro zone during 2000–01. The trade-off between inflation and output growth was almost a horizontal line. Output growth in the euro zone fell from close to 4% at the start of 2000 to close to 0% at the end of 2001. During the same period inflation rose and fell by smaller amounts. In such an environment of relatively sticky rates of inflation, using the latter as a guide to stabilize the real economy is not a good idea.

The euro zone was designed as a permanently-low inflation zone. Right now, inflation is particularly low because of global events. The ECB would be well advised to give more importance to indicators of the real economy. The theory that all you have to do to stabilize the economy is to stabilize the rate of inflation may be a good approximation when inflation is not too low. It becomes dangerous when inflation is near zero.

3.6 The poison pillar?

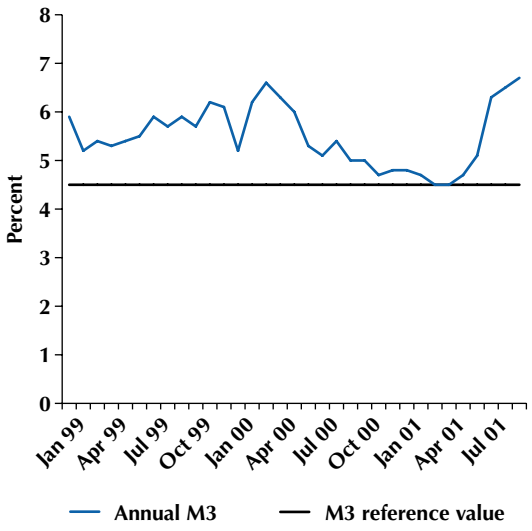
If nominal signals are less informative when inflation is already low, the same argument applies *a fortiori* to signals from nominal money itself. Previous CEPR annual reports on *Monitoring the ECB* have drawn attention to the unconvincing twin-pillar architecture of monetary policy. Monetary aggregates are of interest only to the extent that they are components of expected inflation and expected output, but of little independent interest. Even if the ECB may initially have wished to emphasize continuity with previous Bundesbank procedures, the relevance of this concern recedes steadily as the ECB proves its mettle by its own actions.

The fact that the ECB is driven repeatedly to justify the role of its monetary pillar detracts from the Bank's successes. It raises continuing doubts about transparency and on occasion it has obscured the fact that the Bank has undertaken the correct policy for the correct reason.

During 2001 the ECB has sought to remedy some problems with the monetary pillar. Figure 3.7 displays one obvious problem. The growth of M3 has systematically exceeded its reference annual growth rate of 4.5%.

Month after month, the ECB has been forced to enter a caveat, that M3 is mismeasured because it includes some holdings of liquid financial instruments by non-residents that properly

Figure 3.7 Annual M3 growth



Source: ECB *Bulletin*, November 2001

should be excluded. Successive *Monthly Bulletin*s in 2001 recommend a downward adjustment of around three quarters of a percentage point to M3 growth to take account of this bias. Frequently, the interest rate has therefore been left unaltered despite the fact that the unadjusted M3 growth rate continues to exceed the reference value around which the first pillar is erected.

If this is only a minor crack in the monetary pillar, the natural thing is to call in a plasterer. The ECB did precisely this, and the restoration work is now complete. The ECB's November 2001 *Bulletin* draws attention to two adjustments in the M3 series. The first, embodied since May 2001, removes non-resident holdings of money market funds from the definition of euro zone M3. The second, from October 2001, also purges non-resident holdings of liquid money, market paper and securities.

It is clearly a good idea to make important data as accurate as possible. The ECB is wrong to suggest, however, however, that this adjustment increases the reliability of the monetary pillar. It simply covers up a structural weakness.

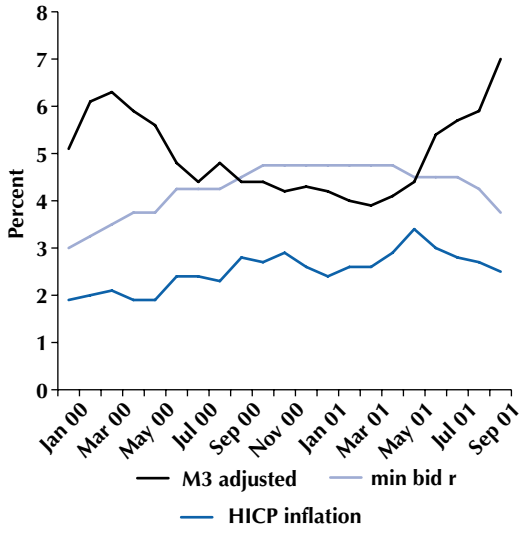
The purpose of an intermediate target for monetary policy is to guide the setting of interest rates in the short run. In the medium run it has no function. Eventually, the best way to examine whether a central bank is delivering price stability is to examine the path of prices themselves. The *only* possible justification for a monetary pillar is that it might be a useful leading indicator of inflation. But this is where M3 fails so spectacularly, even after its cosmetic adjustment. (In Box 3.2 we present some cross-country evidence suggesting that in a sample of low inflation countries, money growth is a poor predictor of inflation).

Figure 3.8 shows data on three series: HICP inflation, the interest rate set by the ECB, and the fully-adjusted M3 series, available since January 2000, released by the ECB in its November 2001 *Bulletin*. The adjustments to M3 certainly reduce its mean, closer to the reference value of 4.5%, but that is of little benefit. Over the medium run, retrospective assessment of ECB performance, on which its credibility depends, can examine actual inflation.

Figure 3.8 confirms that the adjustments undertaken essentially shift down the mean rate of M3 growth but have little effect on its short-run pattern. It continues to have no bearing on the actual setting of interest rates by the ECB. The correlation between interest rate decisions and M3 growth clearly has the *wrong sign* in Figure 3.8. Even the contemporaneous inflation rate is a much better indicator of ECB decisions on interest rates.

Thus the trumpeted improvements to the first pillar are completely spurious. The ECB will never acquire the reputation it deserves until it overcomes this communications catastrophe. To watchers of the ECB its decisions are reasonably transparent in the sense of being understandable to an outsider. But they still do not reflect the story the ECB insists on telling.

Figure 3.8 The rescaled M3 pillar



Source: ECB *Bulletin*, November 2001

Nowhere is this more evident than after in the aftermath of September 11. M3 growth in September 2001 surged at a time when output was in freefall and future inflation had just stopped being a concern. The surge was not caused by a sharp change in non-resident holdings of liquid assets: Figure 3.8 shows that fully adjusted annual M3 growth increased sharply to 7% in September.

Non-resident holdings were not the issue. Rather, as the ECB itself acknowledged, what happened was that investors got out of risky securities and flooded into safe liquid assets. However measured, M3 surged because interest rates were pegged and the asset demand for M3 rose sharply. Volatility of money demand is of course the principal reason that most central banks discarded monetary targeting long ago. The strong negative correlation between adjusted M3 growth and interest rate changes revealed in Figure 3.8 confirms that the ECB regularly ignores the monetary pillar: it provides unreliable, or downright mistaken, guidance.

If the monetary pillar is no use as a short-run compass, it is no use at all. The ECB cannot base monetary policy on hunches about recent portfolio shifts in money demand. The ECB would earn wide acclaim if it now acknowledged this. It should announce that its understanding of the euro zone is now sufficient to permit reliance on flexible inflation targeting that takes full account of the signals from the real economy, and has careful regard to output stabilization when deciding how quickly any deviation of inflation from target should be eliminated. Cracked beyond repair, the monetary pillar should be dismantled.[3]

Having discussed the challenges to monetary policy in the euro zone, we next discuss international linkages. Did Europe and the United States face a common shock, or was a US shock tranmitted more rapidly to Europe than had previously been anticipated? What implications should be drawn for the extent to which the monetary policy of the ECB can be formulated without closer coordination with other leading central banks? Having answered these questions, we can then turn to a detailed discussion of actual interest rate policy.

3 In this connection it is instructive to know that the ECB is using a model of the euro zone as a forecasting instrument and as a tool to evaluate monetary policy actions. It is both surprising and revealing to find out that the money stock plays no role in the model, i.e. it has no independent influence on inflation and output. See Fagan, Henry and Mestre, (2001) .

BOX 3.2 Cross-section evidence: inflation and money growth in the long run

It is well known that across countries the long-run relation between money growth and inflation is very strong. Figure B3.2 shows average yearly growth rates of M1 and the CPI in a sample of over 100 countries during the last 30 years. A regression line through these observations has a unit slope: inflation and money growth move one for one across countries. Statistically, the R^2 is 0.99.

This evidence is used in many textbooks as proof that the quantity theory holds very strongly in the long run. In this cross-section evidence most of the action, however, comes from the countries with very high rates of inflation. If we look at the cross-section of the countries with low inflation we obtain a very different picture. Figure B3.3 examines countries with an average rate of inflation below 5% during 1970–99. The picture is now very different. In these low-inflation countries (including euro zone countries) the relation between money growth and inflation is very weak. In fact we find no statistically significant relation between these two variables for low inflation countries, even after correcting for differences in the growth of output (see De Grauwe and Polan (2001) and De Grauwe and Grimaldi (2001)). This means that for low inflation countries, differences in money growth do not explain differences in inflation rates *even over very long time horizons of 30 years*.

In a low-inflation environment, where the growth rates of money are typically low, variations in these growth rates are dominated by noise (e.g. portfolio shifts that we discussed earlier and which seem to have occurred after September 11; or measurement problems with money stock statistics). This noise overwhelms the potential inflationary signals that could come from an acceleration of money stock growth, which in a low inflation environment will tend to be small. Put differently, the noise to signal ratio of money growth is likely to be high when countries experience a low inflation regime. As a result, the growth of the money stock gives poor signals about inflationary tendencies in these countries.

Paradoxically, central banks that are successful in eradicating inflation discover that the money stock is then little help as an intermediate target (or in ECB terminology as a reference value) to control the rate of inflation.

Figure B3.2 Inflation and money growth (1970–99), average yearly changes

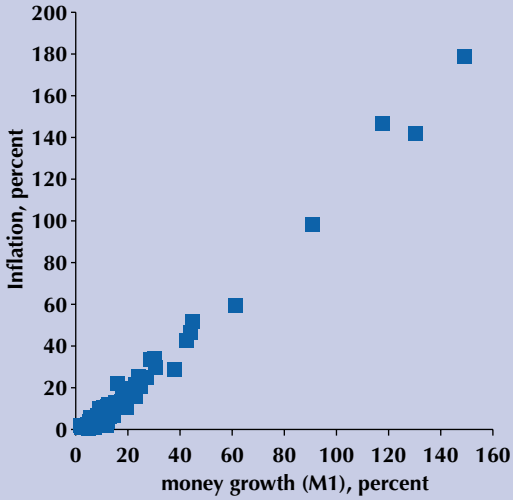
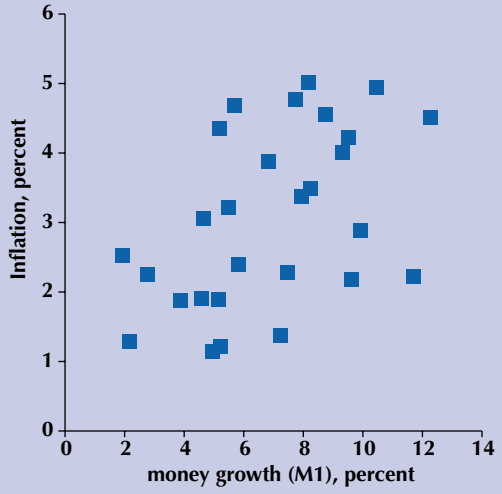


Figure B3.3 Inflation and money growth (1970–99), average yearly changes: countries with inflation below 5%



4

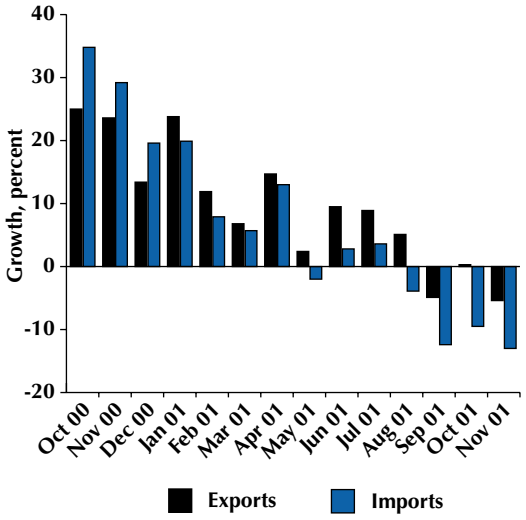
The international dimension

In chapter 3 we noted that the current recession is more synchronized across OECD countries than previous recessions have been, both because shocks have hit all regions and because cross-country linkages have been increased by globalization. Does a global recession require cross-country policy coordination, particularly between the major players, or can national authorities continue to act on their own?

In thinking about interdependencies between the economies of the euro zone and the rest of the world (especially the United States), it is important to distinguish between global and idiosyncratic economic shocks. Two economies could exhibit identical business cycle fluctuations, even if they were completely autarkic, if they experienced the same underlying disturbances. For this reason, the occurrence of common shocks means that the correlation of macroeconomic variables across countries in itself is not informative about the role played by international linkages in driving economic performance.

We first assess the various linkages that bind together the economies of the euro zone and the rest of the world, then discuss whether international policy coordination is justified or not.

Figure 4.1 Year-on-year percentage growth in value of exports and imports for the euro zone



Source: Eurostat Yearbook 2001 website.

4.1 Reassessing channels of international transmission

Trade Linkages

In early 2001, the view of the ECB was that the US slowdown would have relatively little impact on the European economy. This belief was based on the fact that direct trade linkages between the euro zone and the United States are quite small, such that a reduction in US demand would have relatively little impact on the European economy. However, as is shown in

Figure 4.1, 2001 has seen a significant decline in the growth of European trade.

One reason that the trade transmission mechanism has been more important than is normally the case is that the ICT sector has played a leading role in the current slowdown. High value-to-weight ratios and an advanced degree of vertical specialization mean that production of ICT goods and services is highly internationalized. For this reason, the direct impact of the US slowdown on the euro zone has been larger than indicated by aggregate trade ratios.

Moreover, there have also been indirect trade effects as other countries supplying the US ICT sector (primarily Asia) have sharply contracted, reducing demand for euro zone imports. As a consequence, a one-percentage point decline in GDP that originates in the ICT sector has a much larger impact on international trade than a similar contraction in a more inward-orientated sector. The impact of the trade slowdown is well illustrated by the fact that export volumes for the advanced economies fell by 0.3% during 2001, compared with 11.6% growth in 2000 (IMF, *World Economic Outlook*, December 2001).

Financial Interdependence

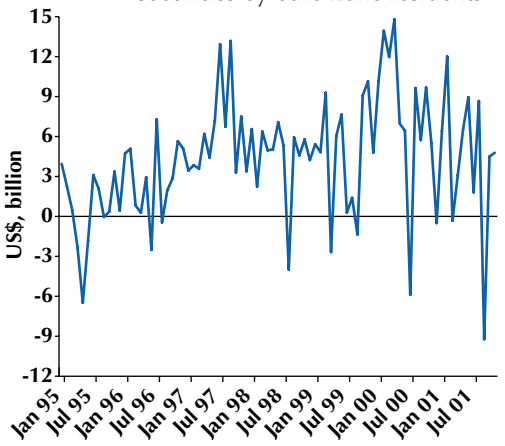
International asset trade has grown rapidly in recent years. The global integration of financial markets links economies through several channels.

One of the primary functions of international financial trade is to share production risks across countries. By purchasing international assets and issuing liabilities to foreign investors, exposure to domestic production risk is reduced. In the current context, this approach views the losses suffered by euro zone entities on their US asset positions during 2000 and much of 2001 as a natural manifestation of risk sharing between US and European investors.

An alternative perspective, however, is that Europe was especially exposed to the bursting of the US asset pricing bubble. Large-scale purchases of US assets occurred during the peak bubble years, such that European investors have essentially suffered a permanent decline in their wealth, with the writing off of overvalued purchases. To illustrate the growth in European investments in the United States, Figure 4.2 shows the net purchases of US long-term securities by euro zone residents during the late 1990s and Figure 4.3 shows the value of euro zone claims on US non-bank enterprizes.

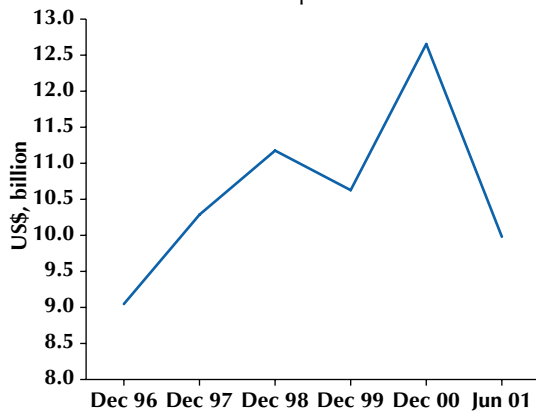
Figures 4.4 and 4.5 show the decline in the United States and euro zone equity markets and changes in government bond yields respectively over 1999-2001. The decline in value of European financial markets does not, of course, just reflect spillovers from the US markets. To the extent that the major

Figure 4.2 Net purchases of US long-term securities by euro zone residents



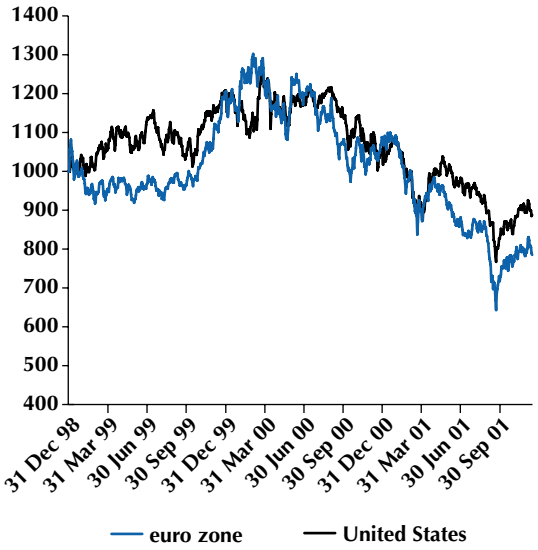
Source: US Federal Reserve TIC data set.

Figure 4.3 Value of euro zone claims on US non-bank enterprises



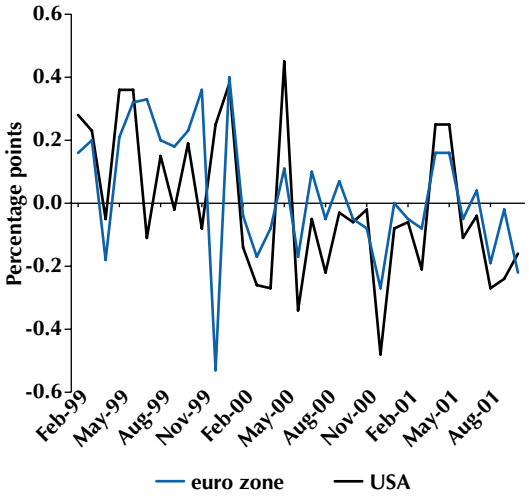
Source: Treasury Bulletin, December 2001. Data exclude Belgium and Luxembourg.

Figure 4.4 Evolution of equity indices in euro zone and the United States, in US dollars. (31 December 1998 normalized to 1000)



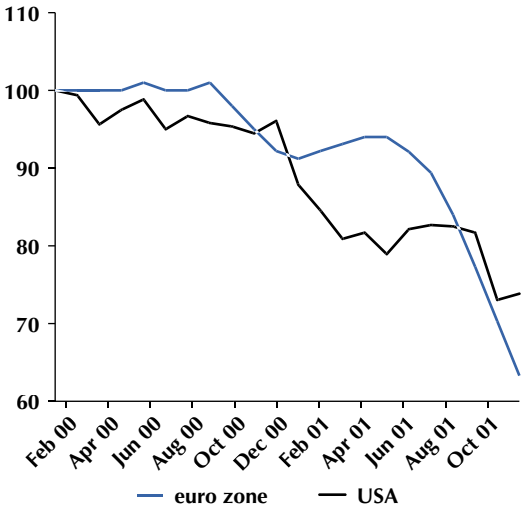
Source: MSCI

Figure 4.5 Monthly changes in 10-year government bond yield



Source: ECB and St Louis Fed FRED database.

Figure 4.6 Evolution of consumer confidence indices (January 2000=100)



Sources: ECB *Monthly Bulletin* and Michigan Survey of Consumer Confidence.

macroeconomic shocks have been revealed to be ultimately global in character, it is natural for euro zone asset values to fall. In addition, even if the fundamentals of European firms were stronger than their US counterparts, a fall may also have occurred globally because, throughout the world, global investors have raised their discount rate to reflect a perception of greater risk than before. A herd effect may also have operated, however, with the decline in US markets leading to an under-pricing of European assets.

Portfolio equity assets represent a smaller fraction of household portfolios in the euro zone than in the United States, and European firms have also been less reliant on stock markets as a funding source. Even so, the rapid growth in equity investing in recent years, and the dependence of ICT start-up firms and much merger-and-acquisition activity on equity financing, may strengthen the direct impact of the decline in asset values, relative to what might have been suggested by historical estimates.

Falling asset prices in international financial markets may also have contributed to the decline in business and consumer confidence through indirect channels. In addition to providing an important signal about projections of future profitability, the stock market fall may have acted as a 'cue' for individuals and firms to re-assess their expenditure plans.[1] The increasing prominence accorded to the US financial markets in the popular media may have increased its role in driving confidence indices in Europe as well as in the United States. Figure 4.6 graphs the co-movement between European and US consumer confidence indices during the recent period.

Foreign Direct Investment

FDI flows between Europe and the United States grew rapidly during the late 1990s. FDI can generate economic interdependence through a number of mechanisms.

US FDI in Europe may significantly increase European exposure to US shocks. In addition to a decline in trade between the subsidiary and the parent company, 'right-sizing' by US firms with overseas subsidiaries/affiliates may involve the closure of production facilities in Europe, if these are deemed to be the marginal sites.

Moreover, the profit levels of European firms are hurt by the falling sales of *their* affiliates in America. European firms that acquired or merged with American firms during the late 1990s have also had to endure substantial write-downs in the value of these assets, in line with the recent correction in equity markets. Figure 4.7 displays the rise in European FDI positions

1 See, for example, Shiller (2000).

in the United States during the late 1990s (albeit valued at historical cost).

To the extent that the net worth and cash flow positions of a firm affect its cost of capital, these FDI linkages may also have resulted in curtailment of new investment plans due to a decline in the quality of the balance sheet of the parent company. In this way, declining conditions in the US market may spill over into a decline in investment demand in Europe.[2]

Bank Lending

International lending by euro zone banks provides another potential transmission mechanism for external shocks. A rise in non-performing loans in their overseas affiliates could constrain domestic lending by these banks, to the extent that their capital positions need to be rebuilt. Figure 4.8 documents the extent of international lending to euro zone banks. However, the capital position of the euro zone banking sector is currently strong so that the risk of externally driven lending constraints is low.

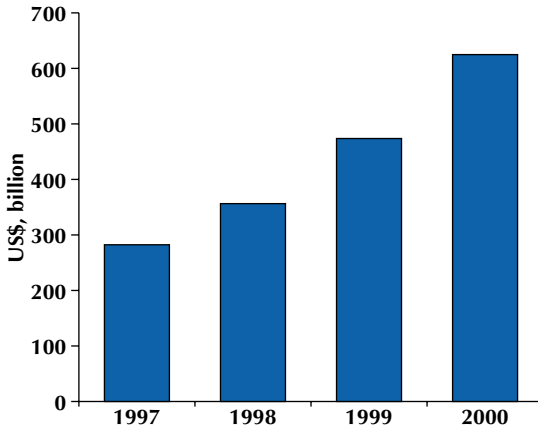
Technology Diffusion

Even if two regions have no trade or financial linkages, economic spillovers can occur to the extent that technological diffusion takes place over time. Technological diffusion links the dynamics of productivity growth across countries. As such, a technology disturbance in one country will over time turn into a 'global' shock. Since, in broad terms, the United States has been the leading innovator in the ICT sector, the downward revision in projections regarding growth in this sector initially affected the US market but also signalled that European productivity growth would be hampered, with forward-looking firms accordingly revising investment plans.

Summary

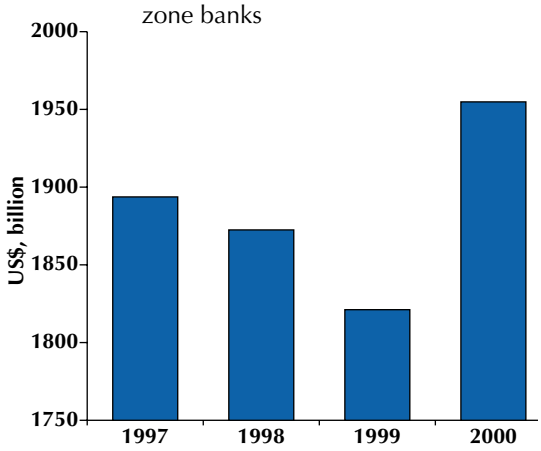
International linkages have played an important role in the current slowdown, over and above the fact that the major economies experienced some common shocks. The fact that financial interdependence has sharply increased in recent years also makes it difficult to construct good empirical estimates of its role in macroeconomic dynamics, due to its relatively short recent history. Although recent theoretical work in international macroeconomics has attempted to develop better models of interdependence, academic understanding of global linkages is far from complete. Inadequate data on the scale of these global

Figure 4.7 Value of euro zone FDI assets (at historical cost)



Source: Bureau of Economic Analysis.

Figure 4.8 International bank lending, value of international claims of euro zone banks



Source: BIS

Note: Data exclude Greece and Portugal.

2 For related evidence, see Peek and Rosengren (1997).

linkages presents a basic problem in incorporating these linkages fully into the ECB's monetary strategy.

4.2 Policy Coordination

Does the existence of global linkages justify a role for international coordination of monetary policies? In this section, we first review the lessons from the literature that examines coordination in fundamentals-based macroeconomic models before considering the role of coordination in dealing with non-fundamental shocks. Of course, at one level, the debate about international policy coordination reflects earlier arguments about the gains from forming a currency union among the individual European countries.

Coordination and Fundamentals

Fundamentals-based macroeconomic models, whether of the traditional or 'new open economy macroeconomics' varieties, provide theoretical reasons why coordination may qualitatively improve the performance of monetary policy.

The traditional literature relied on *ad hoc* but intuitive loss functions for central banks by which monetary policy attempted to minimize a weighted average of fluctuations in inflation and output.[3] Since domestic CPI inflation is affected by the evolution of import prices, there is a direct externality effect in these models: non-cooperation results in excessively tight monetary policy in response to a negative common productivity shock, since each country fails to take into account the impact on other countries of shifts in the real exchange rate.

At a quantitative level, however, limited trade linkages between the major economies mean that the gain from implementing a cooperative monetary response is relatively small. Although it is at an early stage of development, the initial findings of the 'new open economy macroeconomics' literature are also that coordination gains are possible but probably limited in scale (see Box 4.1). Since seeking to coordinate monetary policies involves significant effort and has some potential costs (see below), elaborate mechanisms to coordinate monetary policies on a continuous basis is not a first-order priority at this stage of the ECB's development.

Coordination and Non-Fundamentals

Fundamentals-based models are not well suited to explore the potential role for policy coordination when exchange rates and

3 See Canzoneri and Henderson (1991) and Persson and Tabellini (1995).

BOX 4.1 Policy coordination and the new open economy macroeconomics

This new line of research has developed a set of micro-founded models in which explicit welfare analysis can be undertaken. The greater sophistication of this class of models permits new dimensions of policy coordination to be analysed, such as the impact of exchange rate uncertainty on the volume of trade and risk premia in setting export prices. Indeed, new sources of coordination gains have been identified in this literature. In addition, this recent literature has also paid more attention to the impact of greater financial market integration and the distinction between rules-based versus discretionary monetary policy in determining the gains to coordination.

One important result in the recent literature is that increased financial integration reduces the gains from policy coordination. Since international diversification links consumption growth rates across countries, even self-interested countries will naturally take into account economic conditions overseas in setting policies and will be more reluctant to engage in beggar-thy-neighbor manipulations of the terms of trade. Another key finding is that a commitment by central banks to rules-based monetary strategies can do much to improve performance relative to a discretionary regime, with the marginal gain to implementing a coordinated approach correspondingly smaller.

Some conclusions of the traditional literature have also been reversed: for instance, Obstfeld and Rogoff (2001) argue that coordination problems only potentially arise with respect to idiosyncratic shocks with self-oriented regimes able to respond optimally to common shocks. This new literature has employed a range of modelling assumptions, such that the sources of coordination gains differ across specifications. No theoretical or empirical consensus has yet formed on the 'preferred' specification.

See Corsetti and Pesenti (2001), Betts and Devereux (2000), Clarida, Gali and Gertler (2001) and Obstfeld and Rogoff (2001) for recent analyses of policy coordination in this new theoretical framework. Canzoneri, Cumby and Diba (2001) provide an alternative view.

other asset prices exhibit volatility not induced by changes in the fundamentals themselves. The case for policy coordination may then rest on its potential role in offsetting the impact of non-fundamental shocks in financial markets and correcting extreme exchange rate misalignments.

The events of September 11 provided an important challenge to the major central banks in restoring stability to the international financial system. Liquidity operations began immediately and there was close coordination between the ECB and Federal Reserve System. An important element of this coordination was the $50 billion euro–dollar swap agreement between the ECB and the New York Fed, signed on 13 September, that enabled the maintenance of the international payments system between the euro zone and US economies. (Of course, it is important to ensure the extra liquidity is subsequently withdrawn in order to ensure such operations do not interfere with longer-term monetary performance.)

The collective benefit of restoring confidence in financial markets was underlined by the unprecedented simultaneous reduction in interest rates that took place on 17 September. This action revealed that the ECB was indeed willing to engage in policy coordination, at least under some circumstances. Acting to stop incipient financial panics is fully consistent with maintaining price stability, given the deflationary implications

of a financial meltdown, and a coordinated response is most likely to reassure market investors, in view of the high degree of international integration in financial markets.

A second role for policy coordination is in correcting severe non-fundamental exchange rate misalignments. A currency that is sharply undervalued or overvalued generates significant economic inefficiencies by distorting patterns of trade and investment and pushing the level of output away from its trend growth path. Since these distortions impose costs on both domestic and foreign agents, it is in the joint interests of the home and foreign authorities to correct these imbalances. Even if the costs are asymmetric, coordination can be sustained as part of an ongoing relationship with support provided today in exchange for the expectation of support received in the future. Unilateral intervention may be undone by offsetting policies by other central banks, such that coordinated interventions are generally to be preferred.

The empirical evidence is that sterilized intervention can generate sustained movements in exchange rates via a 'signalling' channel or a 'coordination' channel (Sarno and Taylor 2001; *MECB3*, 2001).[4] The former mechanism generates a significant exchange rate response if intervention is viewed as a signal that future domestic and foreign monetary policies will change as required to deliver the desired result.

Successful policy interventions to correct large exchange rate misalignments do not compromise the price stability target, since the shift in the nominal exchange rate is intended merely to restore the real exchange rate to a more sustainable value and will not pass through to import prices under such circumstances.

To the extent that the persistence of misalignment is due to a collective-action failure among traders to push the exchange rate back towards its equilibrium value, the second way in which intervention may work is by coordinating expectations: central banks act as large players that lead the market to realign expectations. For this to succeed, the intervention should be public and have the committed backing of the central banks: small-scale interventions that are perceived to be transitory are unlikely permanently to shift market sentiment.

In response to a period of sustained depreciation of the euro against the dollar, there was joint intervention in support of the euro in September 2000, followed by unilateral intervention by the ECB in November 2000. These interventions can be viewed as quite successful, since the euro–dollar rate has been relatively stable subsequently. It seems that the ECB is satisfied that a floor for the euro–dollar rate has been established, even if it is a low level.

4 *MECB3* also analyses the September 2000 joint intervention in support of the euro and the impact of intervention on exchange rates via an 'order flow' channel. Traditional models emphasize a 'portfolio balance' channel but this is unlikely to be empirically important.

If further weakness in the euro does not materialize, the next challenge for intervention policy may be to manage any sharp reversal in the strength of the dollar. If the United States does not quickly recover from recession, there may be renewed focus on its net external liability position and the need for a significant dollar depreciation. The danger here is that overshooting may occur, with the dollar falling below its long-run equilibrium value. An excessive appreciation of the euro in this scenario could potentially obstruct economic recovery in the euro zone and the ECB should be on guard against this eventuality.

Practical difficulties in coordinating policies

EMU should make transatlantic coordination easier. Instead of having to deal with twelve independent monetary authorities the United States needs to deal with one central bank in the euro zone. A smaller number of players reduces communication difficulties and makes it easier to establish (implicit or explicit) commitment mechanisms.

That the ECB is a young institution also presents difficulties, however: it may be reluctant to engage in coordination for fear of diluting its independent status or blurring its focus on achieving domestic price stability. Moreover, its credibility may be damaged by interventions that fail to have the desired result.

These concerns make it crucial that the ECB now clarifies the conditions under which it is prepared to engage in policy coordination. With respect to stabilizing the international financial system, Issing (2001) emphasizes that coordinated monetary policy responses should only occur under extreme circumstances. While true at some level, the threat of international financial panic is sufficiently regular that a market understanding of the ECB's contingent strategy would be welcome and indeed stabilizing.

Regarding foreign exchange interventions, the ability of the ECB successfully to lead markets is currently constrained by its fear of failure. The paradox is that half-hearted interventions are more likely to fail. A 'Powell doctrine' applies: the commitment of sufficient resources can achieve quicker and more sustained results. The ECB should recognize that neither sterilized interventions nor policy innovations that correct large-scale misalignments are a threat to price stability and that its responsibilities in these areas should be discharged in a self-confident and effective manner.

Of course, a committed intervention strategy should only be undertaken when it is sufficiently clear that the euro is far from its equilibrium value. Small deviations from equilibrium are unlikely to impose major economic costs.[5] Moreover, our models of

5 See Obstfeld and Rogoff (2001) on the 'exchange rate disconnect' phenomenon

equilibrium exchange rates are insufficiently precise to provide accurate guidance about the exact level of the equilibrium exchange rate. We should confine advice to saying that intervention is warranted only for large and evident misalignment.

Although the euro has depreciated since its birth, its constituent currencies had appreciated significantly during the pregnancy. We find it hard to conclude that the euro is decisively undervalued, or that the ECB should yet be endeavouring to engineer a major appreciation. If such a conclusion ever becomes warranted, the ECB should then adopt a robust intervention policy to support the euro's return to a more appropriate value. On the other side, the ECB should also be on watch against a sharp fall in the dollar, since overshooting in the adjustment process is also undesirable.

4.3 Conclusions

Understanding global linkages in trade and financial markets is critical if the ECB is to achieve its mandate of achieving domestic price stability, without undue fluctuations in levels of real activity. Increasing levels of global market integration means that the international dimension to ECB monetary analysis is likely to become increasingly important in the years ahead. Improving data resources and the ECB's analytical framework for understanding global spillovers is an urgent priority in this regard.[6]

International interdependence also means that coordinated policy responses may be required in responding to extreme non-fundamental shifts in financial and exchange rate markets. As part of its overall monetary strategy, it is desirable that the ECB provide a more transparent account of its philosophy concerning the legitimate roles of policy coordination rather than interpreting all its actions exclusively in terms of its domestic price stability remit.

Looking forward, it is plausible that the next challenge for intervention policy may be to guard against excessive appreciation in the euro, if the US recovery fails to materialize and the dollar comes under attack in the coming months. This will require the ECB to stand ready to lead a coordinated effort to ensure euro–dollar adjustment does not overshoot.

6 The ECB's area-wide macroeconomic (AWM) model has only a rudimentary external dimension. Trade dynamics are driven by a measure of external demand and an aggregate competitiveness indicator; bond markets are just linked by a simple UIP condition. See Fagan et al (2001).

5

Interest rate decisions in an uncertain environment: theory and practice

In this chapter, we first document the rise in uncertainty. Second, we evaluate the guidance that economic theory offers on how central banks should respond to greater uncertainty. Third, we ask whether the ECB had to pay special attention to continuing to build up its credibility in delivering price stability. Fourth, we examine what light empirical evidence sheds on interest rate decisions. We discuss lessons from the existing literature then present new evidence comparing the actions of the Fed and the ECB in 2001. In particular, we discuss whether a much smaller interest rate response by the ECB is evidence that it was too slow to react to rapidly deteriorating economic conditions. The final section summarizes our results and draws conclusions.

5.1 The deteriorating environment and rise in uncertainty

Greater uncertainty

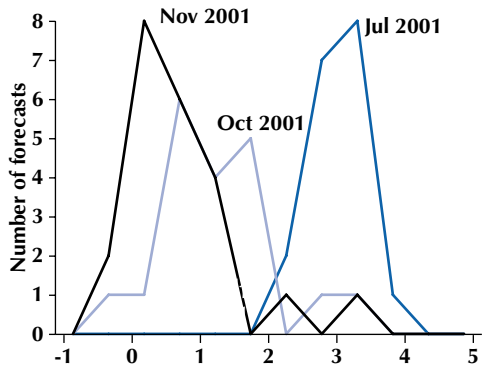
Uncertainty always rises near turning points in the business cycle. Superimposed on this, the effects of September 11 and its aftermath were hard to judge. Was it an isolated event, or the start of a permanently more difficult economic environment? We document the market perception of a rise in uncertainty and discuss how policy-makers should respond.

Market perceptions of uncertainty changed over the last few months. Stock market volatility rose dramatically after September 11, but then subsided significantly with a month.

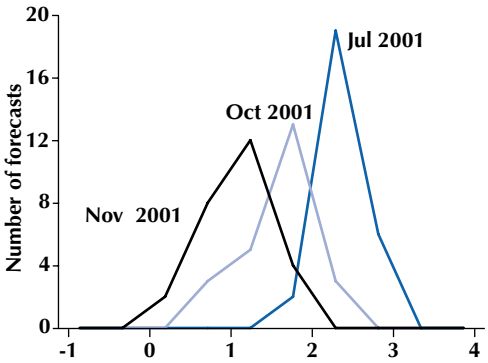
Figure 5.1 shows increasingly disparate growth forecasts by the private sector, reflecting the underlying uncertainty about the

Figure 5.1 Evolving uncertainty during 2001: private sector growth forecasts 2002

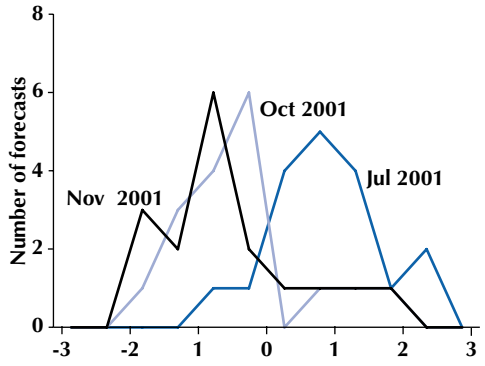
United States



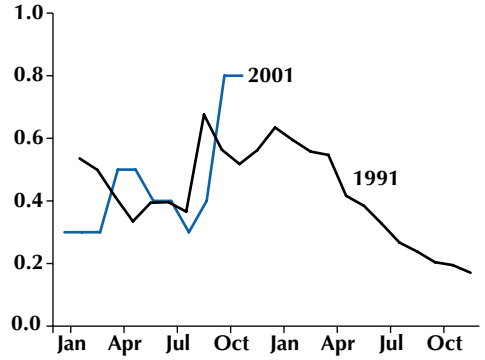
Germany



Japan



Standard deviation of US forecasts



prospects for the three major world economies. In the case of the United States, this rise in uncertainty is similar to that during the previous recession in 1991.

Statements by the OECD, IMF, and major central banks illustrate the more uncertain environment in which monetary policy decisions had to be made in the past months.

> Substantial uncertainty and risk persist, as the downturn makes the world more vulnerable to further unexpected developments, and a significant danger of a deeper and prolonged slowdown.
> IMF *World Economic Outlook*, October 2001

> Projections of future economic development are conditional on a crucial set of assumptions … current projections are subject to a high degree of risk.
> OECD *Economic Outlook*, November 2001

> These results must be interpreted with particular caution given the difficulties businesses face assessing the impact of the terrorist attacks in the United States on the euro economy
> ECB *Monthly Bulletin*, November 2001

5.2 How should policy respond to a less certain environment?

We distinguish three arguments. These relate to uncertainty about the consequences of policy, to the option value of waiting, and to a change in the skewness of the distribution of outcomes.

Risk versus uncertainty

By greater risk, economists mean a greater dispersion in possible outcomes, the probability of each outcome being well understood. By uncertainty, economists mean imprecise knowledge of the true probabilities and hence ambiguity about the distribution of possible outcomes. Risk and uncertainty *both* increased in 2001. For example, there was considerable disagreement on how September 11 affected the distribution of possible future outcomes. When the policy debate refers to a rise in uncertainty, sometimes it means greater risk and sometimes it means greater uncertainty. In both senses, the environment became less certain.

Less certainty about the effects of policy

Since Brainard (1969), economists have argued that when there is less certainty about the structure of the economy, policy should optimally be more cautious since its transmission mechanism is less certain.

Brainard's insight is discussed extensively in Clarida, Gali and

Gertler (1999) and Orphanides, Porter, Reifschneider, Tetlow and Finan (1999). It helps to explain why policy instruments are (optimally) slow to adjust to new information. However, all central banks faced a rise in uncertainty. It is hard justify a *differential* speed of response across central banks by a general rise in uncertainty.

Where this argument might be relevant is that the ECB is still learning about the economic structure of the euro zone, whereas the Fed already has a good understanding of the US economy. If so, ECB policy should optimally be less responsive than the Fed or the Bank of England, not because uncertainty increased but because of differential uncertainty in the first place. Any such discrepancies should diminish as our understanding of the euro zone increases.

In any case, although qualitatively correct, all these effects are small when quantified in a theoretical model (Rudebusch, 2000). Moreover, they are very sensitive to the type of uncertainty. Indeed, some forms of uncertainty make it optimal to act more aggressively (see for example, Meyer, Swanson and Wieland, 2001).

Tetlow and von zur Muehlen (2001) confirm that where uncertainty can be properly specified (e.g. uncertainty about the number of lags it takes for the economy to react to changes in interest rates) robust monetary policy is more cautious. Levin, Wieland and Williams (1999) reach a similar conclusion. Refining our knowledge of the euro zone is consistent with this situation.

Tetlow and von zur Muehlen, however, also show that if uncertainty is unspecific, optimal policies are more aggressive. After September 11 there was a rise in general uncertainty, which may, therefore, argue for more radical policy action. Thus, from the ECB viewpoint, uncertainty pulled in both directions: caution is required until more is known about euro zone behaviour and its reaction to monetary policy, boldness is required in dealing with the unspecified uncertainty of the recent months.

Irreversibilities and the option value of waiting

A reduction in certainty leads to precautionary saving, the effect of which is a fall in spending and demand. Additionally, but quite distinct, since investment is irreversible, the option value of waiting rises. Firms adopt a 'wait-and-see' investment policy and households delay purchasing consumer durables. The more current events are perceived as a one-off and unprecedented, the more it makes sense to await further information.

Should policy-makers also wait and see? This depends in part on the extent to which policy itself faces irreversibilities. In recent years, many central banks have been prepared to adjust interest rates frequently, if necessary reversing the direction of recent changes when new information becomes available.

BOX 5.1 Persistence in interest rates

Table B5.1 Sluggish interest rates responses: an estimated Taylor rule for the UK

Interest rate response to	Immediate	Eventual
1% more inflation	0.79	1.32
1% extra output (relative to potential)	0.13	0.2

Empirically, the interest rate decisions of central banks are well explained by Taylor Rules, especially when lagged interest rates are also included. The Bank of England is often held up as an example of an active central bank prepared to adjust interest rates frequently. Table B5.1 shows an estimated Taylor rule for UK interest rate decisions since 1992, when the United Kingdom stopped using the interest rate to peg its exchange rate inside the Exchange Rate Mechanism.

A significant coefficient on lagged interest rates indicates a cost of adjusting interest rates. Hence, when shocks occur, the short-run response of interest rates is less than the long-run response.

Source: Goodhart (1999).

There is considerable evidence, however, that even for established central banks, the autoregressive component of interest rate policy is surprisingly high (see Box 5.1). One interpretation is that central banks need not just do the right thing, but, as delegated agents of government monetary policy in a democracy, need to be *seen* to do the right thing. Since the public can see the costs of a mistaken action more easily than the costs of mistaken inaction, this biases policy in the direction of inaction. Central banks may act cautiously, and in smaller steps, to avoid criticism for acting rashly or in the wrong direction.

Whether less certainty should induce a slower response depends critically on the form of these adjustment costs. It requires a fixed cost to provide a motive to wait and see. Increasing marginal costs of adjustment, which gives rise to sluggish behaviour, is also consistent with certainty equivalence in which greater risk has no effect on optimal behaviour. Moreover, making short-term interest rates highly autoregressive has another effect: a given change in short rates has a larger effect on long-term interest rates because the bond market can reliably price-in the persistence of any change in interest rates.

Still being on trial, the ECB may have judged that the costs of mistaken actions were high. Central banks with long, proven records may be forgiven the odd mistake. Knowing this, they can be more aggressive in the first place. We return to credibility building shortly.

Interest rate cuts: size versus frequency

The Fed has been prepared to cut frequently, sometimes by small amounts. The ECB has often indicated that it has a preference for less frequent changes in interest rates. Are several small steps better or worse than one large step?

There are also costs of moving too slowly. Small cuts *that are expected to be followed by further cuts* can exacerbate the wait-and-see reaction of the private sector (Caplin and Leahy, 1996). Furthermore, small cuts may fail to produce the required stimulus, inducing additional cuts in the future. Waiting until future cuts occur may further delay private investment and a vicious cycle may ensue.

Greater asymmetry in the costs of risks

A reduction in certainty may have a third effect. Japan is evidence that the cost of falling into the mire of deflation is much larger than the cost of temporarily overheating the economy. Thus, even a symmetric increase in the dispersion of outcomes may affect behaviour if the cost of the extreme downside outweighs the benefit of the extreme upside.

Moreover, the reduction in certainty may itself have been asymmetric, making the extreme downside more likely without a corresponding increase in the probability of the extreme upside. Since nominal interest rates cannot be reduced below zero, a rise in the dispersion of outcomes raises the probability of deflation when the economy already begins with low inflation and low nominal interest rates.

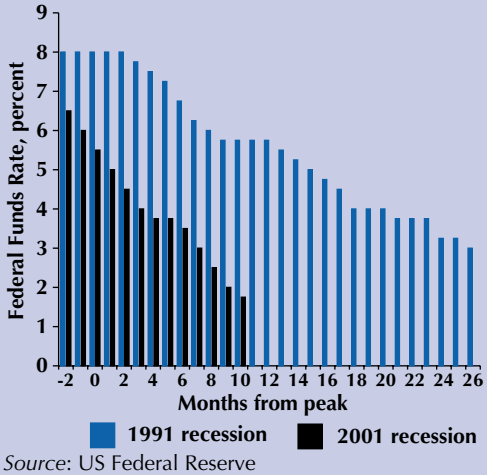
Thus, for both reasons, it may be wise for monetary policy to take out some insurance until the probability of the extreme downside events recede.

BOX 5.2 Small or large steps? The 'slow Fed of 1991' versus 'the quick Fed of 2001'

The contrasting reaction of the Federal Reserve to the last two recessions illustrates the two arguments in action. In the recession of 1991 the Fed's reaction was cautious. From the peak of expansion in July 1990, it took 27 months to bring the interest rate down from 8% to 3% (in September 1992). This was done through 12 cuts of 25 basis points and 4 cuts of 50 basis points. This sustained but gradualist reaction led to widespread criticism at the time.

In 2001, the Fed cut the interest rate from 6.5% to 1.75% with 8 cuts of 50 basis points and 3 cuts of 25 basis points (Figure B5.1). Compared with the early 1990s, the Fed took larger steps. This faster reaction may reflect a reaction to an economy slowing down much faster, for which there is corroborating evidence, but may also reflect a wise response to the extra uncertainty surrounding recent events.

Figure B5.1 The Fed reaction to two recessions



Source: US Federal Reserve

Summing up

There is no easy answer to the question of how central banks should respond to a decline in certainty. And the question still remains of why different central banks apparently acted differently. One possible answer lies in the fact that the ECB is still investing in a track record.

5.3 Investing in building up credibility

Contrasting the Federal Reserve and the ECB

During 2001 the Fed cut the discount rate 11 times, from 6.5% to 1.75%, its lowest level since the start of the 1960s. In the same period, the ECB cut its corresponding rate on main refinancing operations four times from 4.75% to 3.25%.

Without September 11, the contrast might have been even greater. Prior to September 11, the Fed cut its rate *seven* times by a total of 300 basis points, while the ECB acted *twice* and reduced its basic rate by only 50 basis points.

Economic commentators, market analysts and street experts praised the 'aggressive' measures adopted by the Fed to stimulate the slumping US economy, achieved apparently without jeopardizing the permanent fight against inflation. The ECB, in contrast, has been criticized for being slow to respond to adversity. Was continuing investment in the build up of credibility the reason that the ECB acted differently?

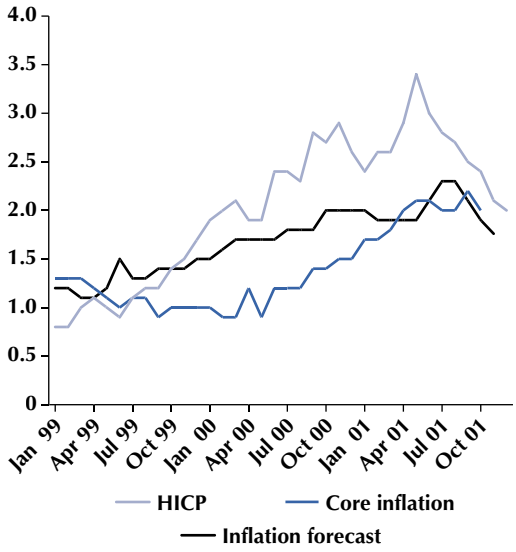
Credibility building by the ECB

Movements in interest rates that are subsequently revealed to be a mistake may be more costly for a young central bank than for one whose credibility is long established. If those monitoring its performance are better able to detect wrong action than they are to detect wrong inaction, gradualism may be inevitable until credibility is more firmly established. A bias towards more restrictive policy may therefore reflect the process of investing in strong anti-inflationary credibility.

Figure 5.2 shows that HICP inflation has exceeded 2% for roughly half the ECB's lifetime to date. Adverse supply shocks during late 1999 and 2000, notably higher oil prices and rises in food prices caused by epidemics in farming, confronted the ECB with tough choices from 2000 onwards. To bring inflation under control required high interest rates at a time when demand began to weaken sharply.

Against this background, cutting interest rates early in 2001, before HICP inflation had yet peaked, was probably unrealistic. The ECB would have had plenty critics if it had cut interest rates while inflation was over 3% and still rising.

Figure 5.2 HICP, core HICP, and median HICP inflation forecasts in the euro zone



Source: ECB and *The Economist*

Having discussed the effects of uncertainty and the role of credibility building, we turn finally to an empirical investigation of interest rate decisions. This we do in two parts. First, we ask what lessons can be learned from the previous empirical literature. Then we present new empirical work that directly sheds light on the issue of interest rates.

5.4 The empirical analysis of interest rate decisions

Lessons from recent empirical research

Empirical research in the last decade has tried qualitatively to examine the effectiveness of monetary policy as a short-run stabilization tool. Three main questions have been addressed. First, through what channels can monetary policy affect the real economy? Second, how long are the gestation lags? Third, how uncertain are the outcomes of policy actions?

The vector autoregressive (VAR) approach, which examines how changes in policy that were previously unanticipated are then transmitted to macroeconomic variables, offers a tractable and useful procedure for answering these three questions.

First, monetary policy can partly stabilize the economy. Second, an unanticipated change in interest rates takes a year, often longer, fully to affect the real economy. No significant effect may occur for at least two quarters. Third, the conventional wisdom is that the size of these real effects is nevertheless quite small.[1]

The methodology on which these two last conclusions are based is now being challenged, however. Using alternative assumptions tightly linked to dynamic economic theory, Faust (1998) and Canova and De Nicolo' (1999) have shown: (a) that monetary policy can have big real effects; and, (b) that, historically, the effects of policy were felt with variable lags, sometimes long but sometimes rapid.

In addition to VARs, recent empirical literature has estimated simple rules that describe the behavior of central banks in response to economic decisions. Taylor type rules, which are the most popular among practitioners, view interest rates' movements as related to changes in actual (or expected) inflation and to changes in the actual (or expected) output gap. Despite their simplicity, these rules fit central banks' behaviour quite well and have proved very useful in understanding systematic monetary policy actions.

1 For US evidence, see Leeper, Sims and Zha (1996), Uhlig (1999) or Kim (1999); for the euro zone, see Ciccarelli and Rebucci (2001), Mojon and Peersman (2001), Peersman and Smets (2001).

New evidence: Comparing the Fed and the ECB

We now examine data on interest rates and the state of the economy. A sharp way to pose our central question is to compare the actions of the Fed and of the ECB. Did their very different responses reflect measurable differences in the environment that they faced or did they reflect measurable differences in the policy response to a similar environment?

We pursue the answer in three ways. First, did interest rates merely respond to new information or did they reflect changes in policy? Second, we ask if each central bank's previous policy rule, fitting its own past data, continued to fit its behaviour in 2001. We also ask whether these policy rules differed significantly across the Atlantic. Finally, we examine the relationship between long-term interest rates and short-term interest rates set by central banks.

Does the Fed react quickly to new information?

Over the fifteen years of Greenspan's chairmanship, the Fed has had periods of calm and periods of intense activity. In the calm phase, little action was taken, and, when it was, it entailed small changes in interest rates (25 basis points). In the active phase, the Fed was more aggressive, both in verbal statements declaring its intentions and in interest rate changes that were frequently repeated in short time-gaps or took larger steps (50 basis points or more) at each change.

Several events threatened the stability of the US (and world) financial system: the stock market crashes of 1987 and 1989, the savings and loan crisis at the beginning of the 1990s, and the more recent Tequila, Asian and Russian crises. In these cases, the Fed adopted a lender-of-last-resort attitude. Whether interest rate cuts threatened price stability depended on whether it was credible that monetary expansion in a crisis would be reversed as soon as the crisis was over.

Turning to Taylor rules, the large academic literature suggests that over the last 25 years, nominal interest rate changes responded to deviation of inflation from its target and of output from potential output. Some episodes do not fit this story well. For example, the increase of May 1987 cannot be explained by such a rule. It was probably designed to signal the tough intentions of the Fed's new management, establishing their credibility. Similarly, during 1998–9 the Federal Funds rate deviated significantly from its counterfactual Taylor-rule counterpart. For most of the period, however, interest rate changes were well explained by what was happening to inflation and the output gap.

The September update to the *MECB3* report argued that the US interest rate decisions in 2000 and 2001 were the continuing implementation of previous policy rules. Had markets foreseen

the state of the US economy, they would have correctly anticipated the Fed's behaviour.

A policy rule estimated over the entire Greenspan period up to 2000 would have been consistent with the Fed's behaviour in 2001. Until October, the sequence of interest rate cuts in 2001 (some individually large and cumulatively very substantial) reflected the Fed's 'normal' reaction to news: cumulative interest rate changes were large because the news steadily indicated a worsening of economic conditions. The worsening slump, on which September 11 was superimposed, was just such a run of events.

The more recent cuts of November and December 2001 are only just compatible with the estimates of the policy reaction function under Greenspan. Whether these two observations signal a switch in policy or an attempt to influence agents' expectations is hard to tell without knowing the current state of the US economy. Thus, with some caveats about the very end of 2001, the Fed's actions in 2000–1 were 'business as usual'.

Uhlig (2001) examines the causes of the rapid swings in the Federal Funds rate in 2000–1 and persuasively argues that both the rise in interest rates and their subsequent fall was largely explained by changes in output. Interest rates rose in 2000 because of booming conditions in the goods markets and fell in 2001 as the slowdown took hold. Neither the evolution of inflation nor swings in stock market valuations played a significant role in inducing the Fed to change interest rates. Inflation dynamics created no news over the last two years.

Figure 5.3 confirms the significance of output movements for US monetary policy in the Greenspan era, plotting the cyclical movement of output, industrial production, and the Fed Funds rate. Cyclical fluctuations are computed using a Hodrick and Prescott filter but the qualitative conclusions are independent of the precise way that de-trending is accomplished.

Industrial production and GDP experienced a cyclical boom in 1999, peaked early in 2000, and quickly began to fall at the start of 2001. Interest rates track these movements quite well. Indeed, interest rates track real fluctuations pretty well over the entire Greenspan's period. Interest rates and output both rise to a cyclical high in 1989, dip in 1991–2, and go up and down in the middle of the 1990s.

Does this indicate that the Fed is uninterested in price stability? Not necessarily. Figure 5.4 shows that cyclically, current output leads future inflation by 5–7 months. Positive co-movements of the cyclical component of output and the Fed Funds rate are therefore perfectly consistent with a policy rule that uses real information to forecast future inflation.

Figure 5.3a Cyclical component of industrial production and Fed Funds rate

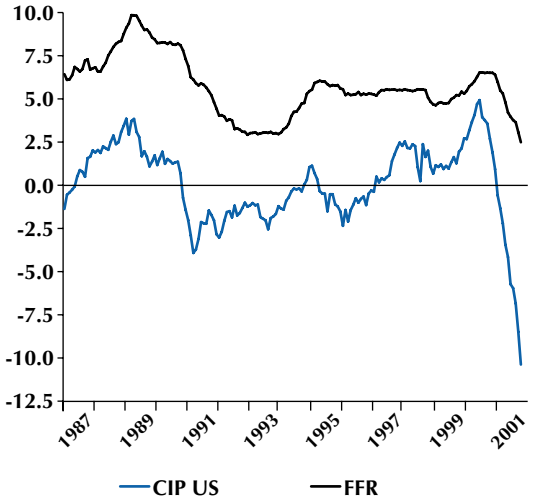


Figure 5.3b Cyclical component of GDP and Fed Funds rate

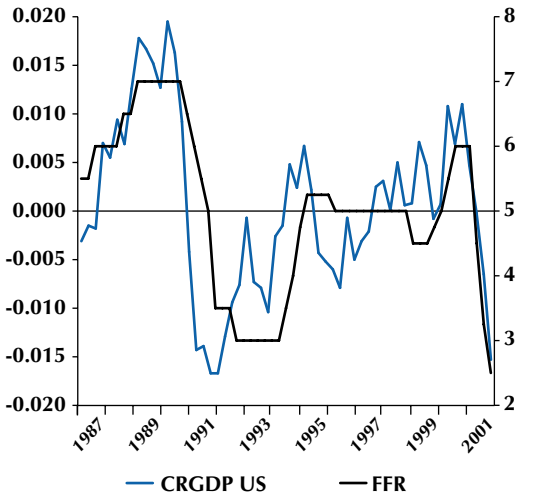


Figure 5.4 Cyclical component of industrial production and price

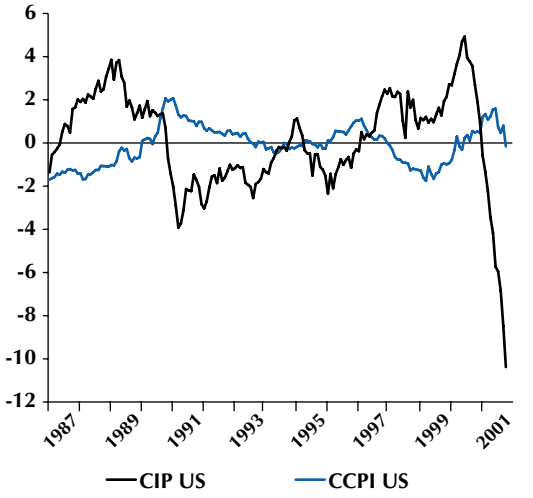
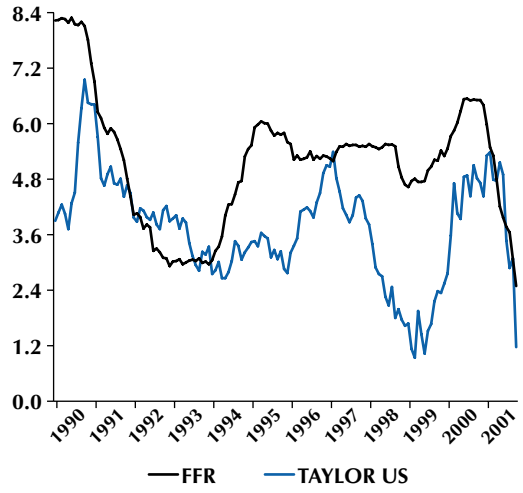
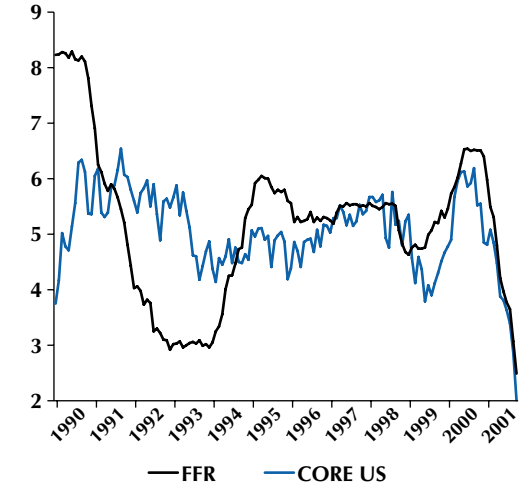


Figure 5.5 US Taylor rules

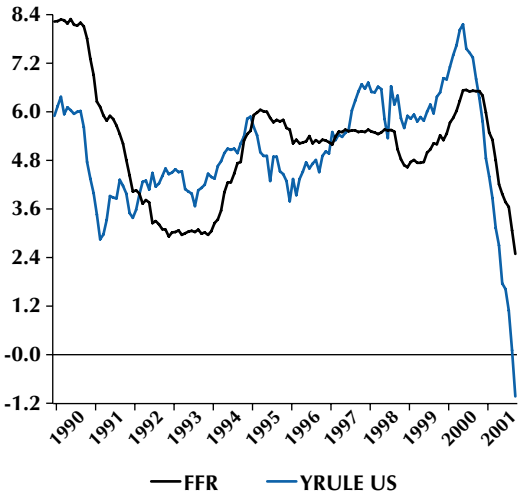
Taylor rule



Core inflation rule



Output rule



Taylor rules for US monetary policy

Similar evidence can be obtained by endowing the Fed with several versions of a Taylor rule. Although we use Taylor rules here as descriptive devices, they provide interesting economic information.

Figure 5.5 shows the Federal Funds rate and three counterfactual interest rate paths. The first uses an intercept of 3.5, an aggressive 1.6 parameter on the cyclical component of prices, and 0.2 on the cyclical component of industrial production. The second uses an intercept of 4.5, an aggressive 2.2 on the cyclical component of the core price index and a mild 0.4 on the cyclical component of industrial production. The third uses an intercept of 4.5, a coefficient of 0.6 on the cyclical component of industrial production, and a zero coefficient on the cyclical component of prices.

The three rules replicate, with different degree of success, the behaviour of the Federal Funds rate in the 1990s. The conventional specification fits reasonably well in the early 1990s but is less satisfactory after 1994 when cyclical movements in prices were at or below the historical trend. The second rule does not fit the Federal Funds Rate well in the first part of the sample but captures its movements much better after 1994. Finally, the third rule nicely tracks the behavior of the Federal Funds rate over the last few years.

Thus, while the relative weights on output and inflation may have altered in the mid 1990s, for the last five years monetary policy actions seem to have reflected stable concerns. Interestingly, the last two rules suggest that interest rate declines in 2001 were, if anything, slower than the Taylor rule would have implied.

Thus the dramatic actions of the Fed were no departure from its previous policy. What was dramatic was the news to which the Fed was reacting. The boom created by false optimism about a permanent rise in total factor productivity growth and the subsequent gradual recognition of this error were the driving forces behind short-term interest rate movements in the United States in the last two years.

Information from the term structure

Since information about output and prices is slow to appear, and subject to continuing revision, other high frequency indicators may provide on-time information useful in judging the state of the economy. The slope of the term structure – the gap between short and long interest rates – contains important information about developments of the real economy in the short run and inflation expectations over the medium–long run (Jorion and Mishkin, 1991; Plosser and Rowenshort, 1994).

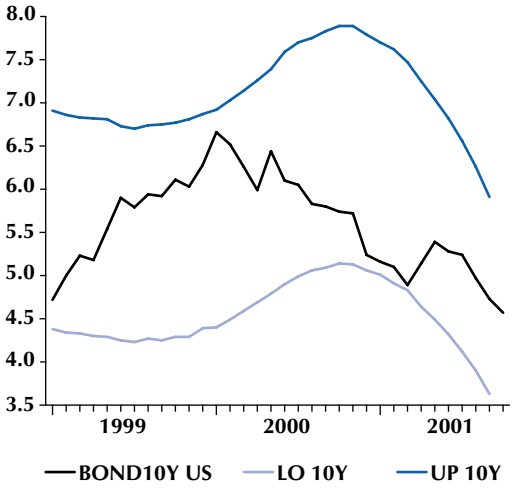
By examining the relationship between the Federal Funds rate and long-term interest rates we get an alternative perspective on US monetary policy in the last two years. Suppose long-term

interest rates are an average of expected future short-term rates. Favero (2001) shows that US long rates were consistent with the subsequent path of the Federal Funds rate during 1984–99: the counterfactual path of long rates produced by averaging Federal Funds rates is not significantly different from the actual long-term interest rates over the period.

Do the long rates in 2000 and 2001 continue to fit this story? If so, the monetary policy rule is unlikely to have changed. Figure 5.6 shows that the path of actual 10-year interest rates is inside the 95% tunnel of paths for the 10-year interest rates produced by stochastically simulating Favero's model. According to this metric, no major policy changes occurred in the last three years.

In conclusion, no matter what angle we take, we reach the same conclusion. Recent policy is entirely consistent with the stance of monetary policy in the previous five years. Aggressive changes in interest rates were *not* changes in previous policy rules. Instead, they reflected a rapidly changing environment. Contrary to common perceptions, the Fed did not act unduly rapidly to news in 2001.

Figure 5.6 Actual and simulated 10-year interest rates



What about the ECB?

Compared with the Fed, the ECB changed interest rates less often and by smaller amounts in 2001, implying much smaller cumulative reduction in interest rates. Furthermore, as Figure 5.7 shows, changes in ECB rates generally occur about five months after changes in Fed rates. Is this evidence that the ECB is slow and timid in reacting to news, or does the cycle in the euro zone lag five months behind its US counterpart?

Figure 5.7 ECB and Fed interest rates 1999–2001

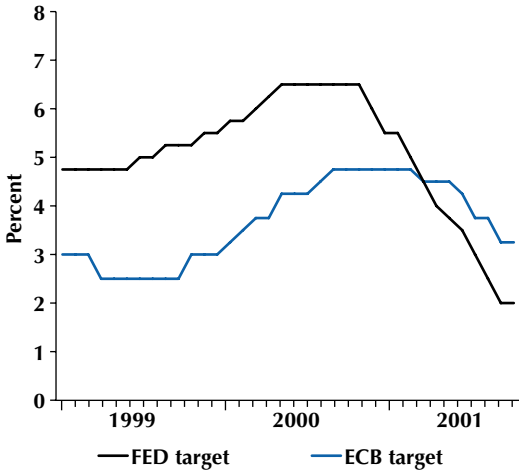
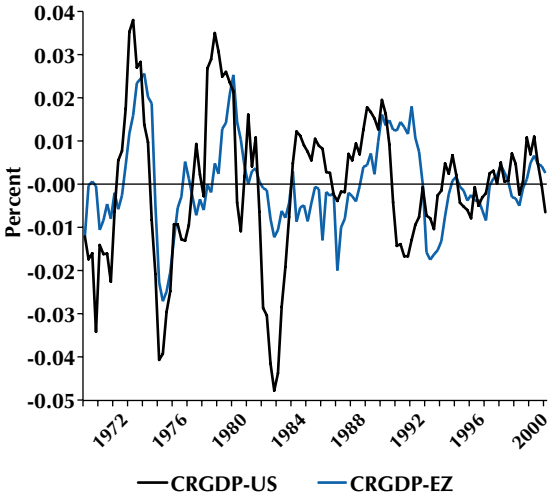


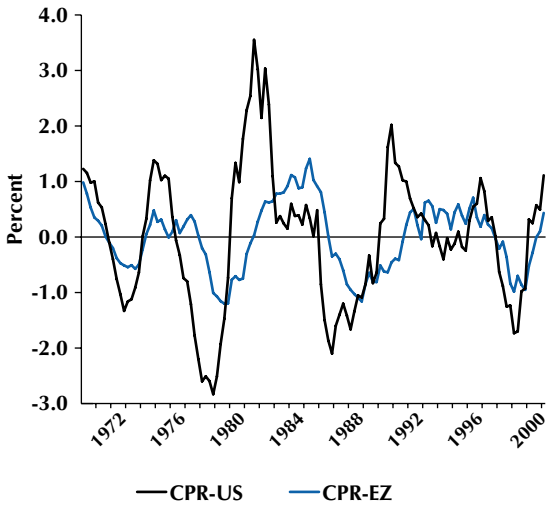
Figure 5.8 plots the cyclical components of output and consumer prices in the United States and the euro zone. The cyclical correlation is striking, and in the last three years the contemporaneous correlation between the US and euro zone variables has risen. It is also clear, however, that on average, the euro zone cycle lags the US cycle. For GDP the lag is about two quarters, and for prices the lag is about five quarters. Visual inspection suggest that these lags have somewhat shortened in the last three years.

In the euro zone, cyclical fluctuations in output lead cyclical fluctuations in prices. Hence, a policy rule for the ECB that makes interest rates react to current cyclical movements in output and prices can be reinterpreted as a rule in which interest rates react to current and past deviations of output from the trend, or a rule which makes interest rates a function of current and future price fluctuations.

Regardless of interpretation, if the Fed and the ECB have similar rules, interest rate changes by the ECB should lag corresponding changes by the Fed. In this sense, the general timing of ECB interest rate changes seems appropriate: interest rates move in the euro zone after they have moved in the United

Figure 5.8 Cyclical components of prices and output in United States and euro zone





States because the cycle in the euro zone lags that in the United States. The fact that the Fed changes first does not necessarily mean that ECB is systematically slow in reacting to news.

This argument however requires two caveats regarding future developments. First, controlling for other cyclical effects, the reaction to an event unambiguous in timing should be largely concurrent. The ECB appeared to have passed this test in the days after September 11. Second, if cyclical developments in the US economy generally and reliably lead those in the euro zone, the ECB should use this information in its assessment of the state of the euro zone economy and, in principle, act to anticipate forthcoming events in Europe.

The ECB is concerned with price stability in the medium run. Inflation developments in the United States provide important information about future inflation developments in the euro zone (Canova, 2001); furthermore, cyclical movements in the United States have large effects in other areas (e.g. Latin America) with close trade, financial and other business-cycle links with countries in the Europe. Neglecting US information fails to stabilize prices in the euro zone as efficiently as possible.

To sum up, conditional on *all* available information, a 4–5 month gap between US and euro zone interest rate changes may suggest that the ECB is wasting important information.

ECB officials keep emphasizing that the main goal of the ECB is price stability in the euro zone, to be achieved by relying on the famous two-pillar strategy. Emphasizing both the adequacy of its announced strategy and its independence not just from politicians but also from other central banks may, encourage the ECB to stress how its policy is shaped largely by events within the euro zone.

Thus, for example, in a recent speech to the German British forum (17 October 2001), Mr Issing, discussing a model of future cooperation among central banks observed:

> ... without doubts these recent concerted actions [after September 11] have been unusual, but it is important to note that they represent an exceptional response to exceptional circumstances. One would expect ... that such situations would very much remain a rare exception, rather than the rule in the future.

Nothing prevents US variables from playing a suitable leading-indicators role for euro zone inflation within the ECB's second pillar, however.

Leading indicators

Even though cyclical movements in US macroeconomic variables lead cyclical movements in European macroeconomic variables, the strength of the association across continents is weaker than that between domestic output and inflation. If domestic output is a more reliable indicator of future domestic inflation, the ECB may find it easier to communicate with markets by stressing

developments within the euro zone, even if this means neglecting (at least in the rhetoric) leading indicators based on US data.

Perhaps private markets distill information better than the ECB. If so, the ECB may efficiently neglect noisy US news and instead react, for example, to revisions in private forecasts of inflation in the euro zone. We examine this argument in two stages. First, we study the relation between cyclical news in the United States and revisions of inflation forecasts of private agents (as reported in *The Economist*) over the 1999–2001 period. Second, we analyse whether inflation forecasts are related to current cyclical movements of output and prices in the euro zone.

Figure 5.9 shows that there is little relationship either between cyclical news in the United States and changes in inflation forecasts, or between changes in inflation forecasts and actual cyclical movements in output or prices. Hence, the three years of available data suggest that US news *is* a valuable piece of information inefficiently used by both inflation forecasters and the ECB.

ECB policy in 2001

Next, we use the yardsticks applied earlier to assess the Fed to examine ECB actions in 2001. In particular, we ask three broad questions. Did the ECB surprise markets by being too slow to reduce interest rates? Second, if this is not the case, were the size and the timing of the changes consistent with the flow of information. In other words, was the news in the euro zone simply not as bad as in the United States? Third, would a Fed-in-Frankfurt have reacted more vigorously than the ECB in response to the news?

Figure 5.10 shows the actual path of the three months EURIBOR rate and the tunnel of simulated paths generated by a VAR model, comprising output, CPI inflation, the nominal interest rate and M1. The simulations use information available at the end of the second quarter of 2000. There are two simulation tunnels: one comprised between the lines LO-RATE and UP-RATE reflects the uncertainty about future interest rates when all sources of disturbances are considered. The other, between the lines LONO-RATE and UPON-RATE describes the paths obtained if no monetary policy shocks had occurred from the second quarter of 2000 onward. The difference between the two tunnels represents the *additional* uncertainty caused by monetary policy shocks.

Figure 5.10 shows that unexpected policy changes have a negligible effect on the blossoming uncertainty as we project into the future. The two tunnels almost coincide and both widen at a spectacular rate. Although actual interest rates rose during 2001, there was nothing historically abnormal about ECB monetary policy in 2001, but the confidence interval is wide so any inference is extremely weak.

Figure 5.9a Inflation forecasts and cyclical component of output and prices in the United States

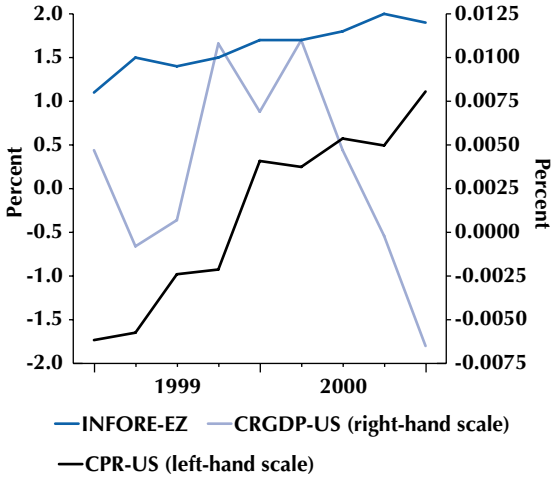


Figure 5.9b Inflation forecasts and cyclical component of prices and output in the euro zone

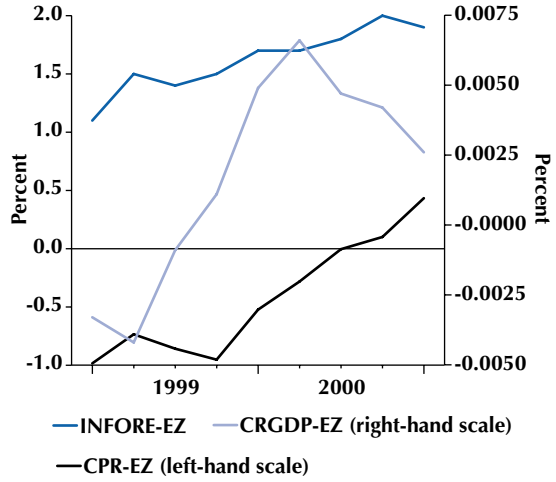


Figure 5.10 Interest rate forecasts and actual ECB behaviour

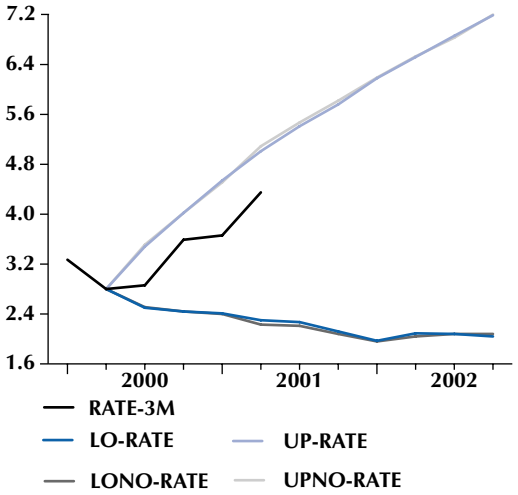
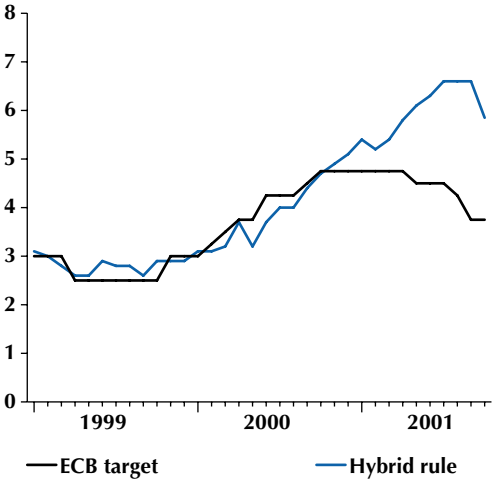
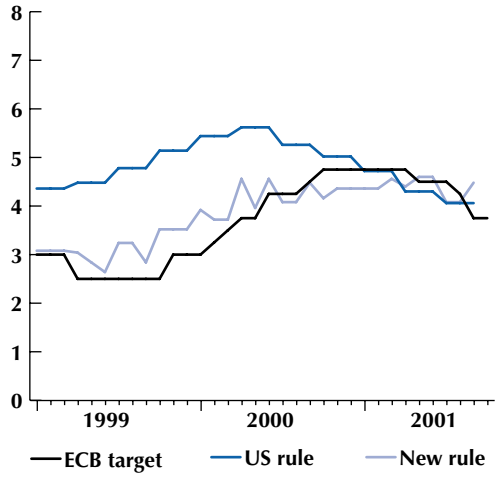


Figure 5.11 Actual interest rate, hybrid rule, new rule, and US rule





We therefore turn to our second assessment, based on Taylor rules. To verify further that ECB actions in 2001 reflected its 'normal' reaction to new information, we take the policy rule that best fits previous ECB behaviour, estimated using data up to end of 2000, and ask whether interest rate movements in 2001 are consistent with this rule. The rule, named the 'hybrid rule' in *MECB3* (2001), views the ECB as reacting to current core inflation and expectations of future inflation. Figure 5.11 shows the implied interest rate during 1999–2001 and the actual rate on main refinancing operations of the ECB.

The rule tracks reasonably well the actual ECB target in 1999 and 2000 but deviates substantially in 2001. Because of the spike in oil prices in 2000 feeding through to inflation in 2001, a mechanical application of the rule to this year's events would have implied a large *rise* in interest rates to over 6%. Note also that interest rates should have begun to fall only around September 2001, after core inflation peaked.

Does this indicate a change in policy in 2001? Figure 5.11 also examines the path of another rule, called the 'new rule' which weights core HICP and GDP growth with coefficients of 2.0 and 0.8 respectively. The path of this new rule is drawn under the assumption that the long-term real rate is 2.0%, the core inflation target is 2.0% and target output growth is 1.2%.

Four observations can be made. First, the new rule reproduces quite well the path of interest rates chosen by the ECB over the three years. It captures the rise in ECB rates starting in late 1999 in response to higher core inflation and GDP growth; it reproduces the stable period in late 2000 and early 2001 (with a gradual rise in interest rates because of the rise in core inflation); and it anticipates the interest rate cuts since May 2001. Second, it appears to do a much better job then the hybrid rule in 2001, precisely when news of the slumping economy was appearing.

Third, although the ECB was slow in reacting to news over the summer of 2001, the interest rate set by the ECB in November 2001 was only 10 basis points lower than the one suggesed by the rule at the end of the sample. In other words, although the initial change was smaller in size, subsequent changes brought the ECB rate approximately in line with the counterfactual rate produce by the rule. Fourth, the ECB target is smoother than the one obtained by the rule suggesting that the increase in uncertainty may have created policy inertia.

How would a Fed-in-Frankfurt have behaved? To find out, we examined the rule that best fitted US data over recent years and applied it to the euro area data. Figure 5.11 shows the result: it does not reproduce very well the path of ECB rates in the first two years (actual interest rates should have been higher) but gets closer to the actual path of interest rates on main refinancing operations in 2001. Interestingly, the 'US rule' would have set the ECB rate to about 3.4% by end of the available sample.

We draw three important conclusions. First, the behaviour of

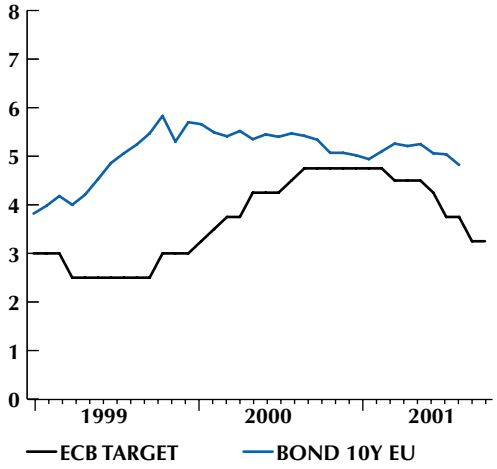
the ECB has been broadly consistent over 1999–2001: a rule with a large weight on core HICP and a smaller weight on GDP tracks reasonably well the actual path of interest rates for the last three years. Second, although the ECB was initially slow in reacting to (euro zone) news, by the end of the sample the ECB rate and the rate set by the rule pretty much coincide. Third, the ECB was not obviously more passive than a Fed-in-Frankfurt would have been. The rule that best fits movements in the Fed Funds target over the last 5 years suggested that the ECB should have acted two months earlier but, by the end of the sample, the counterfactual and actual rate are very close.

In practice, any temporary discrepancy may be explained by fact that despite the increasingly evident slowdown in output, the ECB may have felt that it needed to wait until HICP inflation had peaked and was seen to be falling, before it felt that interest rates could be safely cut.

Finally, we examine the relationship between long-term bond yields and ECB interest rate decisions. In the United States this differential provided information about the likely behaviour of the Fed; it also indicated the existence of an implicit threshold above which the Fed became more active in adjusting the Federal Funds rate, and confirmed that 2001 was not unusual relative to historical experience. Can we derive similar conclusions for the ECB?

Figure 5.12 presents the path for both long and short rates during 1999–2001. With such a short sample, it is hard to relate the two rates either by visual inspection or by formal statistical analysis. Nevertheless, there is a positive, although variable, relationship between the interest rates, and 2001 was not unusual relative to 1999 and 2000.

Figure 5.12 ECB interest rate and rate on 10-year government bonds



5.5 Concluding remarks

In 2001 cuts in ECB interest rates were 'business as usual' even if increased uncertainty or imperfect credibility may have induced some policy inertia.

Fasrter reductions in interest rates in the United States in 2001 reflected a more rapid deterioration in economic conditions than in Europe, not any systematic difference in how the ECB and the Fed respond to new information.[2] Our analysis reveals that the behaviour of each central bank during 2001 was

2 Table 1.1 showed that between October 2000 and December 2001 the IMF forecast for growth in 2001 fell from 3.2% to 1.0% for the United States and from 3.1% to 1.5% for the euro zone. Applying standard Taylor rule coefficients directly does not appear to generate a large enough differential reduction in interest rates. It should be remembered, however, that IMF forecasts at the end of 2001 were only as high as they were for the United States because the Fed had *already* reduced interest rates a lot during 2001. Without this, growth forecasts would have been much lower for the United States.

consistent with its own past behaviour and that a Fed-in-Frankfurt would have replicated ECB behaviour fairly closely.

Three caveats need to be stressed before giving the ECB a clean bill of health. First, the fact that recent interest rate changes are interpretable and coherent does not directly imply that the ECB reaction was optimal. The optimal reaction of interest rates should reflect the objectives of the Central Bank, the structure of the economy as well as the behavior of fiscal policy. If there are more rigidities, or if we think that fiscal policy is more constrained in Europe than in the United States, a more activist stand may be required by the ECB in the future to support general economic conditions in the euro zone.

Second, the fact that crucial information coming from US variables is partially or totally neglected in timing interest rate changes draws the attention to the existence of transatlantic business cycles and to the design of international policy coordination activities which can potentially improve both the medium run control of inflation and the effectivenes of monetary policy actions.

Third, our empirical analysis cannot attach any special meaning to recent events. September 11 comes near the end of our sample and we can only speculate about its likely consequences. If there is a systemic increase of uncertainty, however, both in terms of action to take and outcomes, blindly following existing strategies may quickly bring interest rates out of line with economic developments. While great care should be used in this situation and subjective judgement must play a role, increased uncertainty may call for the ECB to exert more leadership in guiding euro zone markets.

References

Akerlof, G., W. Dickens and G. Perry (2000), Near Rational Wage and Price Setting and the Long Run Phillips Curve, *Brookings Papers on Economic Activity* 1, pp. 1–60.

Bernanke, B., M. Gertler and S. Gilchrist (2000), 'The Financial Accelerator in a Quantitative Business Cycle Model,' in (J. Taylor and M. Woodford, eds) *Handbook of Macroeconomics* Vol 1, Amsterdam: North Holland.

Betts, C. and M. Devereux (2000), 'International Monetary Policy Coordination and Competitive Depreciations: A Re-Evaluation,' *Journal of Money, Credit and Banking*, 32, 722-746.

Brainard, W.C. (1969), 'Uncertainty and the theory of policy', in: K. Brunner, ed., *Targets and indicators of monetary policy*, Chandler Publishing Company, San Francisco, 113–23.

Canova, F. and G. De Nicolo', (1999), 'Monetary shocks matters for business Fluctuations in the G-7', forthcoming, *Journal of Monetary Economics*.

Canova, F. (2001),'G-7 Inflation forecasts', manuscript.

Canzoneri, M. and D. Henderson (1991), *Monetary Policy in Interdependent Economies: A Game-Theoretic Approach*, Cambridge, MA: The MIT Press.

Canzoneri, M., R. Cumby and B. Diba (2001), 'The Need for International Policy Coordination: What's Old, What's New, What's Yet to Come?,' mimeo, Georgetown University.

Caplin, A. and J. Leahy (1996), 'Monetary Policy as a Process of Search,' *American Economic Review*, 689-702.

Ciccarelli, M., and A. Rebucci (2001). 'The Transmission Mechanism of European Monetary Pol-icy: Is There Heterogeneity? Is It Changing over Time?' University of Alicante and International Monetary Fund. mimeo.

Clarida, R., J. Gali and M. Gertler (1999), 'A Simple Framework for International Policy Analysis,' presented Fall 2001 *Carnegie-Rochester Conference Series on Public Policy*.

Corsetti, Giancarlo and Paolo Pesenti (2001), 'International Dimensions of Optimal Monetary Policy,' Federal Reserve Bank of New York Staff Report No. 124.

De Grauwe, P., and M. Grimaldi (2001), Exchange Rates, Prices and Money. A Long Run Perspective, *International Journals of Finance and Economics*, 6(4), pp. 289–314.

De Grauwe, P. and M. Polan (2000), Is Inflation Always and Everywhere a Monetary Phenomenon? CEPR Discussion Paper, no. 2841.

Duisenberg, W. (2001),'What exactly is the responsibility of Central

Banks of large economic areas in the current slowdown of the world economy?', www.ecb.int (key speeches)
Fagan, G., J. Henry and R. Mestre (2001), 'An Area-Wide Model (AWM) for the Euro Area,' European Central Bank Working Paper, 42.
Favero, C. (2001),'Does macroeconomics help to forecast the term structure of interest rates?', IGIER manuscript.
Faust, J (1998),'The Robustness of Identified VAR Conclusions about Money', *Carnegie Rochester Conference Series in Public Policy*, 49, pp. 207–44.
Goodhart, C. (1999), 'Central Banks and Uncertainty', B*ank of England Quarterly Bulletin*, February.
Issing, O. (2001), 'The Challenge for Monetary Policy: a European Perspective', www.ecb.int (key speeches)
Jorion, P. and Mishkin, R. (1991),'A Multicountry comparison of term structure forecasts at long horizons', *Journal of Financial Economics*, 29, pp. 59–80
Kim, S. (1999),'Do Monetary Policy Shocks Matters in the G-7 countries? Using Common Identifying Assumptions about Monetary Policy across countries', *Journal of International Economics*, 48, pp. 387–412.
Leeper, E, C. Sims and T. Zha, (1996),' What Does Monetary Policy do?', *Brookings Papers on Economic Activity*, 2, pp. 1–63.
Levin, A., V. Wieland and J. C. Williams (1998), 'Robustness of simple monetary policy rules under model uncertainty,' Finance and Economics Discussion Series, 1998-45, Board of Governors of the Federal Reserve System (U.S.).
Mankiw, N. (1985), Small menu costs and large business cycles: a macroeconomic model of monopoly, *Quarterly Journal of Economics*, 100, pp. 529–39.
Meyer L.H., E.T. Swanson and V. W. Wieland (2001), 'NAIRU Uncertainty and Nonlinear Policy Rules', Finance and Economics Discussion Series, 2001-1, Board of Governors of the Federal Reserve System (U.S.).
Mojon, B. and G. Peersman (2001),'A VAR description of the effects of Monetary Policy in individual countries of the Euro area', ECB manuscript.
Obstfeld, M. and K. Rogoff (2001), 'Global Implications of Self-Oriented National Monetary Rules,' *Quarterly Journal of Economics*, forthcoming.
Orphanides, A., (2000), The quest for prosperity without inflation, ECB Working Paper, 15.
Orphanides, A., R. Porter, D. Reifschneider, R. Tetlow and F. Finan (1999), 'Errors in the Measurement of the Output Gap and the Design of Monetary Policy', Federal Reserve Board.
Peek, J. and E. Rosengren (1997), 'The International Transmission of Financial Shocks: The Case of Japan,' *American Economic Review*, vol. 87(4), pp. 495–505.
Peersman, G. and F. Smets 2001),'The Monetary Transmission Mechanism in the Euro area: More evidence from VAR analysis', ECB manuscript.
Persson, T. and G. Tabellini (1995), 'Double-Edged Incentives : Institutions and Policy Coordination,' in G. Grossman and K. Rogoff (eds), *Handbook of International Economics,* Vol 3, Amsterdam: North-Holland.
Plosser, C. and G. Rowenshort (1994),International Term Structure and Economic Growth, *Journal of Monetary Economics*, 33, pp. 133–55.
Rudebusch, G.D. (2000) 'Is the Fed Too Timid? Monetary Policy in an Uncertain World', Forthcoming in *Review of Economics and Statistics*.
Sarno, L. and M. Taylor (2001), 'Official Intervention in the Foreign

Exchange Market: Is it Effective and, If So, How Does it Work?,' *Journal of Economic Literature,* XXXIX, pp. 839–68.
Shiller, R. (2000), *Irrational Exuberance,* Princeton, NJ: Princeton University Press.
Tetlow, R.J. and P. von zur Muehlen (2001), 'Robust monetary policy with misspecified models: does model uncertainty always call for attenuated policy?' Finance and Economics Discussion Series, 2000-28, Board of Governors of the Federal Reserve System (U.S.).
Uhlig, H. (1999),What are the effects of Monetary Policy. Results from an agnostic identification approach, CEPR discussion paper 2137.
Uhlig, H. (2001),'Did the Fed surprise markets in 2001?', Humboldt University manuscript.
Wyplosz, C. (2001), Do we know how low should inflation be?, in Herrero, Gaspar, Hoogduin, Morgan, Winkler (eds.), *Why Price Stability?*, First ECB Central Banking Conference, European Central Bank, pp. 15–33.

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