

The Monetary Policy Strategy of the ECB Reconsidered

Monitoring the European Central Bank 5

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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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Executive Summary

Finally, Jean-Claude Trichet has taken over the helm at the ECB from his predecessor Wim Duisenberg. It is time to take stock, to look back in order to see what lies ahead.

Chapter 1 of this report sets the stage. Establishing the ECB and meeting a number of challenges was no small feat. The ECB has loftier goals than that, however. In 2000, former President Duisenberg spoke of the 'failure' of the ECB if inflation rates 'over the medium term future' and of the ECB's 'own making' were to 'continue to exceed ... 2%'. This tough anti-inflation rhetoric has contributed towards keeping inflationary expectations low. Yet, actual headline inflation rates mostly exceeded 2%. The verdict is simple; the ECB has failed to achieve its stated key objective of avoiding inflation in excess of 2%, even if one is willing to concede that it has missed this objective by only a small amount. Tough rhetoric without delivery has been a strategic mistake. It may have made life easier for the ECB in the beginning, but it is making it that much harder now.

And life is becoming harder for the ECB for other reasons as well. As of Tuesday, 26 November 2003, the Stability and Growth Pact is dead. The euro zone is experiencing a growth pause and Eastern European expansion is coming up. It is thus all the more important for the ECB to have a clear and credible monetary policy strategy and to base monetary policy choices on this strategy, supported by sound and careful analyses of the issues at stake. There are a number of observers who fear that these analytic considerations will be given less and not more room in the policy deliberations under the new president. That would be a grave mistake at this critical juncture.

Chapter 2 carefully examines the monetary policy strategy of the ECB and its May 2003 review. The changes went in the right direction, but they did not go far enough. It would have been desirable for the ECB to admit more openly the failure to meet its overly ambitious objectives and to raise its inflation target further. Not only would this have brought the ECB's stated objectives in line with past decisions and with the assessment by

professional forecasters about future policy, but it would also make it easier for additional countries, notably the United Kingdom, to join. Instead the ECB has chosen to convey a message of continuity.

Money continues to play too prominent a role in the ECB's stated strategy, even though its importance has diminished somewhat. Can a sound intellectual justification be given for this prominent role? For example, does it serve to anchor medium- to long-term inflationary developments because of observed long-term relationships between inflation and money growth rates? Does it help to provide commitment? Can it help to make policy choices more robust? Can the focus on M3 help the ECB to judge the state of the economy more accurately? We examine all of these arguments, and find none of them convincing. Inflation at present and in the future should be the central focus of the ECB's analysis, not money growth rates.

Chapter 3 deals with deflation. The ECB refers to the risks of deflation and the risks associated with hitting the zero lower bound on nominal interest rates as reasons for aiming at positive inflation. Rather than claiming that it can avoid deflation altogether, however, we recommend that the ECB admits that such risks are always present when inflation is low. The ECB could then mitigate this risk by promising to keep interest rates at zero for as long as is necessary if the economy ever enters a period of deflation. We point out that the dangers of deflation are often exaggerated. For example, deflation does not lead to a redistribution between borrowers and lenders, unless it is unexpected; but then, this is no different from a situation where high inflation rates unexpectedly fall. Deflation actually helps poor and unsophisticated agents, who keep their savings in the form of cash or cash-like bank accounts. In addition, 'deflation' in Germany should be viewed as a relatively benign adjustment of relative prices, which one ought to expect as the common currency leads to more economic integration in the euro zone. There may be good reasons for the ECB not to aim at a near-zero inflation rate, but the risk of deflation is not one of them.

Chapter 4 examines the 'Duisenberg record'. Inflation, measured as the 12-month change of the HICP, has exceeded the stated maximum of 2% in 32 months, i.e. 55% of the time over the (nearly complete) five-year period. Can one find evidence that this was all due to misfortune? Did the ECB try its best to keep inflation under control and to get it back below 2%, when it was creeping up? We examine carefully the explanations of monetary policy choices in the editorials of the monthly bulletins, and outline two findings. First, despite the fact that headline inflation often exceeded 2%, the ECB did not express acute concerns that inflation was too high. Neither the significant decline in interest rates since May 2001 nor the

current level of real interest rates appear to be consistent with the strong anti-inflation rhetoric. Second, M3 growth did not seem to play a substantial role in the decisions. Rather, the editorials indicate that the ECB's concerns have focused on real economic activity. We confirm these qualitative findings by carefully constructing and analysing indicators of the ECB's assessment of economic conditions, and by estimating interest rate reaction functions.

In sum, we do not find evidence that the ECB has succeeded in maintaining price stability. Inflation expectations may still be reasonably low because of tough rhetoric. Actual inflation, however, appears to be adrift due to inattentive policy. This could lead to a dangerous and costly-to-correct climb in the inflation rates, unless sufficient attention is paid soon to this issue by the ECB.

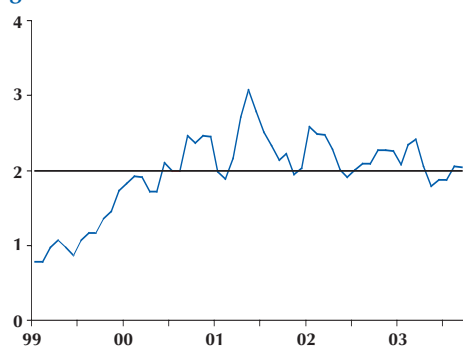
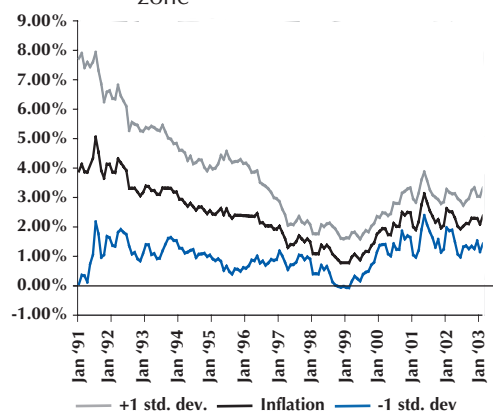
President Trichet may want to consider how his predecessor's record is evaluated. There is no doubt that his leadership will, likewise, be under close scrutiny for the years to come. He should strive to improve upon the 'Duisenberg record'. As observers of the ECB, we are looking forward to it.

A new president

Finally, Jean-Claude Trichet has taken over the helm at the ECB from his predecessor Wim Duisenberg. Should and will the course of monetary policy in Europe be changed under this new president? It is time to take stock, to look back in order to see what lies ahead.

Launching the ECB five years ago, establishing it as a credible, capable central bank and meeting a number of challenges during that time was no small feat. The transition of operations from individual national central banks to the European System of Central Banks passed without a hitch, as did the much-feared transition to the new millennium. The new euro notes and coins have become an accepted part of everyday life so much so that it is hard to remember the issues involved with their introduction and the replacement of the national notes and coins in circulation. The sharp decline of stock markets in 2000, the shock of September 11th and the Iraq war, the volatility of oil prices: the ECB prevented these events from becoming disruptions to financial markets and from drying-up liquidity, as could have happened easily. The explanation of monetary policy choices was done within a single framework throughout these five years and ECB representatives spoke with one voice, thus enabling observers, financial markets and the public to monitor these choices for consistency and credibility. In sum, much could have gone wrong, and did not. Many issues that needed to receive attention were ably taken care of. For this, the ECB should be congratulated.

The ECB had and has loftier goals than that, however. We call into question whether it has met these goals and worry what the failure to do so implies for the future. This is all the more important as the room for manoeuvre has narrowed increasingly. Indeed, we will argue that there is a considerable chance that monetary policy is currently running off track. Once derailed, it will be very costly to return to a path of virtue.

Figure 1.1 HICP inflation in the euro zone**Figure 1.2** Inflation dispersion in the euro zone

At a hearing before the Committee on Economic and Monetary Affairs of the European Parliament in Brussels, 23 November 2000, former President Duisenberg spoke of 'failure' if inflation rates 'over the medium term future' and of the ECB's 'own making' would 'continue to exceed ... 2%'. This tough anti-inflation rhetoric has contributed towards keeping inflationary expectations low. Yet, actual headline inflation rates exceeded 2% for most of the past four years, i.e. the period for which the ECB should be held accountable. And now, professional inflation forecasts also allow for the substantial probability that inflation rates will continue to exceed 2% in the future, see Chapter 2. While the tough rhetoric helped to guide expectations initially, we are concerned that this rhetoric has been relied upon as a substitute for appropriate policy choices to keep inflation in check. This is not sustainable. As we shall argue in Chapter 4, inflation appears to have been adrift. This drift in inflation – compared to the preannounced goals – has undermined the credibility of the ECB already, making it now increasingly difficult for the ECB to guide expectations in the future. Tough rhetoric without delivery has been a strategic mistake. It may have made life easier for the ECB in the beginning, but it is making it that much harder now.

In Chapter 4, we take a careful look back, comparing words and deeds. The ECB has often been criticized in public for being an overly tough inflation fighter with little concern for employment and output growth in the euro area. In line with past MECB reports, we find the contrary to be true. Not only has inflation repeatedly exceeded the preannounced upper bound, but a careful reading of the Monthly Bulletins also fails to turn up evidence that the ECB has made particularly strong efforts of bringing inflation down again, when it should have been regarded as too high. Money growth rates exceeded the self-imposed reference value by several percent due to 'special factors' for almost the entire second half of former President Duisenberg's tenure. There were many months in which special factors were appealed to in order to explain why inflation rates were too high. The random distribution of these special factors appeared to be oddly one-sided, though: none ever seems to have led to inflation rates which are too low. The ECB has arguably helped the euro area economy by implementing a fairly loose monetary policy, while keeping inflation expectations in check with its tough rhetoric. This has helped, but now it has used up its powder: this approach will no longer be available in the future. There always has been a tension between words and deeds, and it has undermined credibility.

Early in 2003, the ECB had a chance to resolve this tension, but missed it. Its monetary policy strategy underwent a substantial review, with the results announced in May. It could have used the opportunity to bring words in line with deeds, and to make sure that it can deliver on what it promises to do.

As we shall argue in Chapter 2, a number of important adjustments and changes were made, but they are not enough. Substituting the 'below 2%' inflation goal by 'below but close to 2%' was not an adjustment of a 0% to 2% target range to a new target range of 1% to 3%, which would appear to be more consistent with actual policy. Instead it was intended merely as a clarification of what the ECB had always meant by its 'below 2%' goal. With this decision, the ECB has manoeuvred itself into a tough and nearly impossible position. The ECB will now either genuinely have to deliver on this goal or it will endanger losing its credibility and thus its ability to guide expectations entirely. Either we should see special circumstances leading to inflation rates of, say, below but close to 1% just as often as rates that are close to but below 3% – in contrast to the rather one-sided experience of the last four years – or we will see average inflation gradually drifting upwards, as it has been doing in the past.

Important details of the strategy still remain opaque. What exactly is meant by the 'medium term' at which the ECB wants to achieve its inflationary goals? Does the ECB have in mind to focus only on medium-term forecasts of inflation, and regard money as a particularly helpful variable to perform these forecasts? Or does the ECB have in mind that the observed average of inflation should be below but close to 2% over a 'medium term' of, say, five years? Or does the ECB have in mind a strategy of reacting to shocks, and bringing inflation back in line in the 'medium term' of two years? We shall discuss these issues both in Chapters 2 and 4. The review of the monetary policy strategy could have clarified this important issue, but it did not.

The monetary pillar, which has been heavily criticized all along by many observers, has been downgraded in importance, but it still remains and will remain a source of confusion. We carefully review the arguments given by the ECB for the continued role of the importance of money in Chapter 2 and find them to be at fault. The fact that there is a reasonably close relationship between the growth of M3 and inflation rates at longer horizons only means that M3 is one of many useful indicators for monitoring inflationary developments and is not a substitute for the more direct objective, namely to monitor inflationary developments at all horizons. The continued focus on money occasionally seems to be meant by the ECB to commit future policy to low inflation and to possibly undo past mistakes. While the objective to undo past mistakes is more usefully thought about in the framework of price path targeting versus inflation targeting (see Box 3.1) rather than a framework of monitoring money growth rates, however, the objective of committing future policy has little or nothing to do with the focus on money.

The resulting gradual loss in credibility from the failure of

Figure 1.3 Inflation and interest rates in Japan

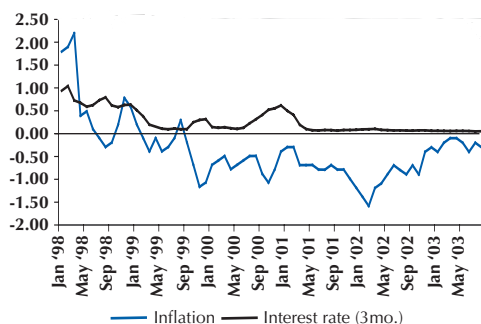
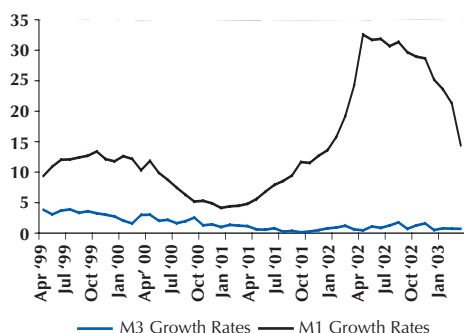


Figure 1.4 Money growth rates in Japan



clearly adjusting words to deeds (or deeds to words) and the failure of taking a clean stance on the role of money means that the ECB is gradually losing its ability to steer inflation expectations since markets and forecasters will increasingly distrust the ECB to deliver what it says it is going to do. As a result, inflationary expectations will increasingly turn out occasionally too high as well as occasionally too low compared to where the ECB wants them to be, with costs resulting from disappointing these expectations (or higher costs from simply giving in to them).

While this is already unfortunate enough when inflation is gradually drifting upwards, it is, however, all the more important when inflation rates spiral downwards and nominal rates hit the lower bound of 0% as they have done in Japan and in Switzerland. The spectre of deflation seems to have slipped away for now, but it may easily reappear again, for example if Europe slips into a recession soon. The fact that the spectre of deflation is out of the limelight of the public debate does not mean that it is gone. Ignoring it or treating it with silence is not wise: instead, we analyse the deflationary scenario in detail in Chapter 3. It turns out that deflation is more benign than is commonly believed. Deflation in individual EMU member countries is nothing more than the adjustment of relative prices in a common currency area, and not a sign of Japanese-style deflation. And even if the euro area were to slip into deflation, it can be controlled, provided the ECB can credibly commit to return to a previously announced price path in the future. This can only be done, however, if the ECB has the credibility to do so. Should deflationary expectations become more severe, the ECB will have to fight them that much more: giving in to them could have dire consequences indeed. It now also appears that as the ECB is losing its grip on inflationary expectations, it gradually chooses higher inflation targets to stay clear of the deflationary region. If, however, this is done without adjusting its rhetoric, it will only serve to accelerate the loss of credibility. Furthermore, it would be a shame to move to higher inflation rates in the euro area merely because the loss of credibility made it harder to manage inflation expectations, as is necessary in the low-inflation regime announced by the ECB.

All these difficulties add to an already complicated situation.

- A number of key countries keep violating the 3% deficit limit set forth by the Stability and Growth Pact, most notably Germany and France – and they do not even seem to care much. The European Commission together with Spain, Austria, the Netherlands and Finland in particular has been struggling to keep up the political pressure to reinstate the fiscal discipline that once ruled when the ECB was established. On Tuesday, 26 November 2003, it lost that

struggle. The deficit procedure for Germany and France has been abandoned. Governments in Germany and France are free to choose the deficit that pleases their electorate without fearing repercussions from other EMU members. The damage to the fabric of the European Monetary Union and to the progress of European integration is substantial, and it is long term. Already, voices call for looser fiscal policies in the fiscally responsible countries. Sceptics of the European constitution are gathering in strength. And restraining fiscal policies in order to support monetary stability will now be more difficult to achieve. In turn, this will make it harder for the ECB to achieve price stability at low interest rates. These issues and their potentially dire consequences have been analysed and discussed in detail elsewhere already (see for example Uhlig, 2003). For this report, there is not much else for us to do other than feel the pulse of the patient – the Stability and Growth Pact, in this case – and confirm its death. Any medicine we might have wanted to recommend would clearly come too late now.

- Additionally, if conditions do not brighten soon in the euro area, and if it instead remains in the current 'growth pause' according to the CEPR business cycle dating committee (<http://www.cepr.org/Data/Dating/>), the ECB will remain under pressure to keep rates low or to even cut them further. Inflation and inflationary expectations are, however, then at risk of continuing to exceed the below-but-close-to 2% target, following a track record of missing it in the past, further undermining credibility.
- In the middle of it all, the ECB will have to deal with eastern European expansion. President Trichet has stated that it 'would be an error' if the eastern European countries rushed to adopt the euro – but this will not be up to the ECB to decide. No matter what the ECB wishes, countries will be added to the mix with their own set of agendas and problems, making European monetary policy more complicated, not simpler. This issue will occupy the agenda for several years to come. With additional countries to be represented, decision-making in the ECB council will be all the more complicated. It will become even more important for the council to deliberate monetary policy choices without national agendas, and to apply a consistent framework.

Figure 1.5 Inflation and interest rates in Switzerland

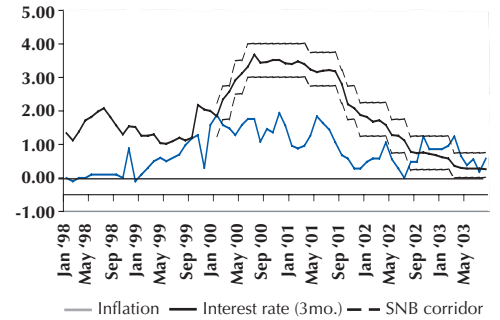
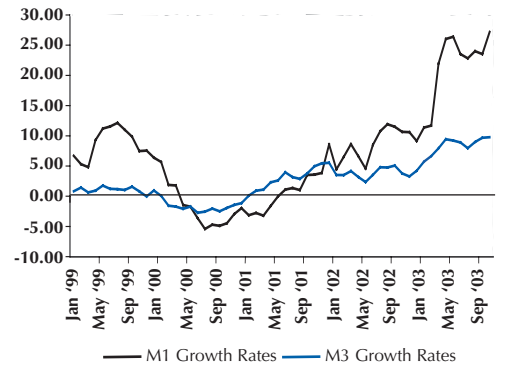


Figure 1.6 Money growth rates in Switzerland



1.1 Recommendations for a practical man

So what could one possibly recommend to President Trichet, as he is taking over? Should our assessments in this report – of a gap between deeds and words (Chapter 4); of the tough anti-inflationary rhetoric as a strategic mistake (Chapter 2); and of the misguided role of money – be read as a reason for abandoning the monetary policy framework entirely? Should it be read as a recommendation to make policy choices based entirely on a 'pragmatic view' of the events? Definitely not. Indeed, the opposite is true. As the discussion of the deflation scenario in Chapter 3 shows particularly clearly, managing inflation expectations is the key to successful monetary policy. Managing inflation expectations can only be done by applying a consistent and clear framework to policy choices, by consistently explaining these choices within this framework and by delivering on what has been announced. The ECB has been reasonably successful in pursuing this route, but as our assessments show and should be read, they need to work even harder at applying these principles in the future. If anything, the monetary policy framework has not yet been taken seriously enough by the ECB.

With President Trichet taking over, there are a number of observers who fear that these analytic considerations will be given less and not more room in the policy deliberations. That would be a grave mistake at this critical juncture. In written responses to questions submitted for the confirmation hearing of the European Parliament, President Trichet has stated that 'in reality, central banks never allow themselves to adopt a totally mechanical approach and they know very well that the extraordinary complexity of reality cannot be reduced to an equation or a system of equations', stressing the need for 'pragmatism and realism' when, for example, assessing the state of the economy. How are we to interpret these words?

As an analogy, suppose that the captain on a transatlantic flight announces his flight plans and weather conditions, but then adds that 'in reality, airline captains never allow themselves to adopt a totally mechanical approach and that the extraordinary complexity of weather conditions cannot be reduced to a system of equations'. Would one believe (fear, hope) that the captain will now make his own guesses about the weather by looking at the clouds ahead? Probably not. You would hope that the captain makes use of the best weather forecast services available to him, taking them very seriously. Obviously, you would want a captain – or better yet, an entire team in the cockpit – to have ultimate responsibility for flying the plane rather than an autopilot, because there are always unforeseen contingencies, the handling of which the cockpit crew is paid for. Nevertheless you might still find the captain's announcement a bit odd.

And so it is with central banks. The authors of this Report earn their living by constructing systems of equations to capture the forces most relevant in the complexities of the economy. We understand the limitations of these models, but we also understand the depths of the insights they can deliver. Both should be understood and taken seriously by whoever runs monetary policy.

We hope that the new President Trichet will make use of the best research available to him, and indeed we believe he must. There are unforeseen contingencies, when the models fail and trust needs to be placed in the human judgement: this is why monetary policy choices are made by humans and not by computers. The reverse and faulty conclusion, that a careful, model-based analysis and a clear framework are unnecessary, is even more dangerous, however. Even a slight appearance that this is what the ECB will now do endangers the trust financial markets place in the ECB and thus the very basis on which successful monetary policy is based.

President Trichet should, therefore, rectify this first impression and clearly demonstrate that he values having a clear monetary strategy. He needs to show his esteem for the fundamental ideas shaping the necessary 'realism and pragmatism', as the ECB has to deal with the challenges ahead under his stewardship. His speech on the ECB's monetary policy strategy held at the Center for Financial Studies in Frankfurt on 20 November 2003 is a welcome step in that direction. More is needed, however. To close the gap between words and deeds and to increase credibility, President Trichet should elevate the importance of the quantitative analyses of the ECB's staff for the deliberations of monetary policy and help feed back these deliberations into the modelling choices on which these analyses are based. With a change in the presidency, it is all the more important for the ECB to keep to a consistent, unchanged course for its policy, in order to avoid unnecessary uncertainties about the future monetary policy choices. Any new president is, therefore, under additional pressure to improve communications compared to former President Duisenberg through increased clarity about the monetary policy framework and its future application, and to signal clearly that policy will stay the course. In this way, the intention of the ECB will be understood more clearly; the costs of unnecessary gaps between expected and actual policy choices will be minimized; and the ECB will be able to win much-needed public support more easily at a time when national politicians demand changes in monetary policy. Excellent economic analysis and policy choices that are based on them make for better arguments in public *vis-à-vis* the other political players in the euro zone.

President Trichet may want to consider how his predecessor's record is evaluated. There is no doubt, that his leadership will, likewise, be under close scrutiny for the years to come. He may

strive to improve upon the 'Duisenberg record' as detailed in Chapter 4 of this report. We hope that he does so not only by giving more emphasis to a clear, consistent and credible framework for monetary policy and clear objectives, but also by delivering on these objectives via pursuing the policies that are required within that framework for achieving them. As observers of the ECB, we are looking forward to it.

The new monetary policy strategy: what does it mean?

In a key press release of 8 May 2003 and in its *Monthly Bulletin* of June 2003, the ECB has announced the 'outcome of the ECB's evaluation of its monetary policy strategy'. This is not simply a dry, academic exercise. Rather, it establishes the basis on which the Governing Council will make future monetary policy decisions. It is thus of immense practical importance. The ECB's monetary policy strategy will be of significance for the economic performance of the euro zone for years to come. It therefore warrants a close investigation.

2.1 The monetary policy strategy in the early years of EMU: a summary assessment

Before we turn to the recent internal review, we provide a summary assessment of the suitability of the original monetary policy strategy announced by the Governing Council in October 1998. That strategy had three defining features:

- A strict focus on price stability, ruling out other considerations such as output stability or low unemployment.
- A target range for inflation significantly below that adopted by other central banks whose focus is on price stability.
- A controversial 'two pillar framework', which assigned a prominent role to monetary aggregates. Such a framework has no counterpart among other central banks in the world.

In our opinion the choice of such a strong anti-inflation strategy, with the monetary pillar straightjacket to top it off, was

a serious strategic mistake, even from an *ex-ante* point of view. By setting such ambitious objectives the ECB increased the likelihood of failing to meet them, thus hurting the reputation of the newly established institution. When seen in conjunction with the subsequent outcomes (discussed in Chapter 4), it is hard to avoid the conclusion of a 'strategic failure' in the critical early years of EMU. Unfortunately, bygones are not bygones in monetary policy: through its effect on credibility and expectations, that early failure may considerably impair the ECB's future ability to preserve price stability.

As we elaborate further below, in our perception the ECB has not been sufficiently concerned about attaining its objectives. In particular, it has let inflation in the euro area drift without triggering the sort of response that one would expect from a central bank that has adopted such a strong anti-inflation strategy. This is not a conclusion based on any subtle analysis of a complex model of the economy; it relies instead on simple observations of ECB behaviour. At the time of writing this report, HICP inflation is above the 2% ceiling chosen by the ECB as an upper bound and is not expected to come down soon; yet, short-term real interest rates in the euro area are at a level close to zero, almost 300 basis points below the average real rate in Germany over the period 1960-98.

The ECB's recently completed internal review of the monetary policy strategy offered a remarkable opportunity to get things back on track, before it was too late. There were two possible outcomes of that review that we would have seen as desirable:

- An open recognition of failure, based on the inability to meet its objectives, and accompanied by a renewed determination to make the necessary changes to prevent a repetition of that failure in the future.
- An acknowledgement that the original strategy was not ideal and, hence, that an adjustment to the realities of monetary policy-making in the euro area (and to actual ECB practice) was required.

Unfortunately, while we recognize some hints of a latent willingness to move in the direction of adjusting words to deeds (as discussed below), we believe the internal review (as well as its presentation to the public) is intended to convey a message of 'continuity' and a sense that 'all is well' in EMU.

In the remainder of this chapter we discuss in more detail several aspects of the internal review of the monetary policy strategy. In this review, the Governing Council confirmed the continued relevance of the definition of price stability established in October 1998. Nevertheless, the review contained qualifications and elaborations on several elements of that definition and their rationale. On the basis of this, we identify hints of a possible change of orientation, though only behind the veil of apparent continuity that the ECB has presented.

Section 2.2 deals with the definition of price stability in light of the inflation performance over the first five years of EMU. In doing so, we put aside aspects of that definition that have been discussed in earlier MECB reports, including the choice of the HICP as price index in terms of which the objective is stated as well as the ambiguities associated with the notion of 'the medium term'. These aspects are examined and discussed in Chapter 4 instead. Section 2.3 then focuses on the preservation of a special role for money, and offers a critical assessment of the arguments provided by the ECB's internal review to justify that role.

2.2 The definition of price stability revisited

The first element of the monetary policy strategy announced by the Governing Council in October 1998 consisted of a 'quantitative definition of price stability'. That definition was meant to make operational the mandate given to the ECB by Article 105.1 of the Treaty establishing the European Community (hereafter referred to as the Treaty), which established that 'the primary objective of the ESCB shall be to maintain price stability'.

In its 1998 formulation (European Central Bank, 1998), the Governing Council announced that 'price stability shall be defined as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%', and that 'price stability is to be maintained over the medium term'. Significantly, it also stated that 'the ESCB's monetary policy strategy will focus strictly on this objective' thus apparently downplaying the subordinate mandate to 'support the general economic policies in the Community' also established by the Treaty, where an obvious objective of these policies is the promotion of a high level of employment.

In its statement of 8 May 2003 the Governing Council specified '...that in pursuing its objective of price stability it would aim to maintain inflation rates *close to 2* percent over the medium term' (italics added). That statement was presented as a 'clarification' of the definition of price stability contained in the original strategy, which – as is well known – specified an 'increase in the HICP...of below 2 percent'. Why was the 'close to' qualification needed? There are several possible readings, which we briefly discuss next.

2.2.1 An opaque clarification of the target range?

The 'close to 2 percent' clarification might be interpreted as an opaque way of conveying that the range of inflation rates that the ECB deems consistent with price stability has always been given by the interval 1-2%. In doing so ECB would be rejecting

an interpretation maintained by many analysts and commentators since the ECB's inception and which would take the ECB's inflation target range as being represented by the 0-2% interval.

The ECB has repeatedly stated that the lack of an explicit lower boundary in quantitative definition of price stability is a reflection of the uncertainties associated with the measurement bias in HICP inflation, thus implicitly making that bias the lower boundary of the target range (European Central Bank, 2001, p. 39). In the context of the review of its monetary policy strategy, it has added two additional concerns: the need to 'provide a sufficient safety margin to guard against the risk of deflation' and to address 'the implications of inflation differentials within the euro area' which were absent in the original strategy formulation. The issue of deflation and its justification for an above-zero inflation target deserves a detailed discussion on its own, see Chapter 3.

Independent of the merits of those justifications, the reluctance by the ECB to provide an explicit lower bound for its target range in its quantitative definition of price stability has contrasted with the (implicit) choice of 1% as such lower bound in the calculation of the reference value for M3 growth.¹ Hence, in its regular communications of that reference value, the ECB has always emphasized its consistency with the ECB's definition of price stability. Given the explicit assumptions of a trend real GDP growth between 2% and 2.5%, and a trend decline in M3 velocity between 0.5% and 1%, the 4.5% reference value for M3 growth implies an inflation range deemed consistent with price stability of 1-2%. Under the (plausible) assumption of a symmetric distribution of the ECB estimates of trend velocity and GDP growth, the above back-of-the-envelope calculation leads to a point inflation target of 1.5%, which is indeed a value 'closer to' 2% than the 1% midpoint underlying the conventionally assumed 0-2% target range.

If that is the case, however, one still has to struggle to understand why the ECB would keep falling short of settling this issue once and for all, by stating an explicit lower bound to complement the 2% ceiling, and possibly a 'preferred' point target (presumably the range midpoint).

2.2.2 Towards a new (and higher) inflation target?

An alternative interpretation of the 'close to 2 percent' clarification would view it as a preparatory move before an eventual increase in the target inflation rate. Thus, if the ECB was considering the possibility of adopting in the coming years an explicit (higher) target range between, say, 1% and 3% (to

¹ See, for example, Svensson and Woodford (2003b) and Galí (2003).

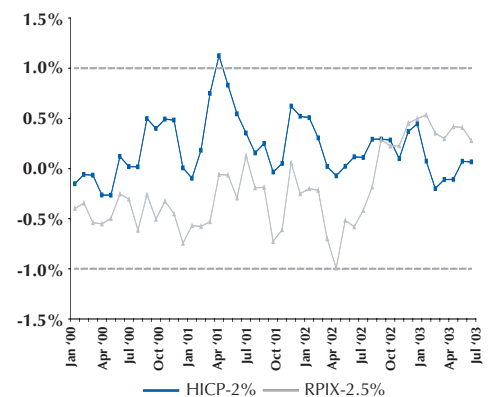
take the range adopted by the central banks of Sweden, Australia, New Zealand and Canada), the recent clarification would certainly help smooth the adjustment to such a 'higher' target inflation regime (and, perhaps most importantly, facilitate its communication).

The adoption of a target range between 1% and 3% could have several advantages from the ECB's viewpoint. First, it would be fairly consistent with how monetary policy has been conducted in practice since 1999 and, hence, would not require any discontinuity in the behaviour of the ECB. In fact, one may argue that the behaviour of inflation in the euro area over the 1999-2003 period can be hardly distinguished from that of retail price index (RPIX) inflation in the United Kingdom, for which an explicit target range of $2.5\% \pm 1\%$ was in place during the same period.

In order to illustrate this point, Figure 2.1 displays the deviations of year-on-year HICP inflation from a hypothetical 2% target, together with the deviations of year-on-year UK RPIX inflation from 2.5%, over the period January 2000-September 2003.² We focus on this period, since euro inflation rates in 1999 were mainly due to monetary policy decisions before the launch of the ECB, see Chapter 4. The former series has a slightly positive mean (0.2%), whereas the latter is, on average, negative (-0.21%), thus suggesting that the ECB has pursued relatively loose policies (compared to the Bank of England), even with respect to a target of 2%. Indeed, it is hard to detect any significant difference in the degree of volatility and persistence of the two series, even though the precise pattern over time has been quite different. In the absence of further information, and on the basis of the previous graph, it would be hard for an external observer to reject the hypothesis that monetary policy in the euro area has been conducted with the aim of stabilizing inflation around a 2% target, with an allowed margin for deviations similar to that in the United Kingdom.

Under that view, an eventual upward adjustment of the ECB inflation would imply a better match between its rhetoric and the actual choice of its policies, and as such it should be applauded. Bringing the rhetoric in line with policy has been a consistent recommendation of all previous MECB reports. Unfortunately, doing so openly and explicitly would require that the ECB recognized a failure to meet its objectives, at least as set originally. As we discuss in detail in Chapter 4, a strict interpretation of its original goals suggests that such a failure has indeed occurred. Far from acknowledging that failure, however, the ECB has adopted a self-congratulatory mood on its fifth anniversary, focusing on the fact that '...longer-term inflation expectations have been firmly anchored at levels in

Figure 2.1 Comparing euro zone HICP inflation minus 2% target to the UK's RPIX inflation minus 2.5% target



² Thus the first observation captures the average rate of HICP changes from January 1999 to January 2000.

line with the definition of price stability since January 1999 remaining in a range between 1.7% and 1.9%...', even though such forecasts should, in principle, worry the ECB deeply. If it really was keen on avoiding ever to have these expectations exceed 2%, the margin is just too close for comfort.³

Secondly, the adoption of a target range between 1 and 3% would also facilitate the eventual adoption of the euro by the UK. In December 2003 Gordon Brown announced a new inflation target for the Bank of England, based on the harmonized index of consumer prices (referred to as CPI in the UK), and set at a level of 2% for the 12-month increase. Thus, the rate for the new target is half a percentage point lower than the old target, which was based on the RPIX index. The size of that downward adjustment corresponds to existing estimates of the persistent component of the gap between the two inflation measures (resulting largely from the different aggregation procedures used). As before, however, if inflation moves by more than 1 percentage point above or below the target, the Governor of the Bank of England will have to deliver an open letter to the Chancellor explaining the reasons for the deviation and the policy actions taken to deal with it. Thus, we can think of the Bank of England as having an implicit inflation target range for the CPI between 1 and 3%, with a midpoint of 2%.

Most interestingly for our purposes, the adoption by the Bank of England of an inflation target of the same index used by the ECB makes a comparison between the two institutions' objectives more transparent. One key difference between their objectives has become more obvious now: the implicit target range of the Bank of England overlaps only partly with the 'below 2%' objective of the ECB; the former would seem to allow for inflation rates persistently above (but close to) 2%, whereas the latter would appear to be inconsistent with such an outcome (even though, as argued in the present, that outcome has become the norm rather than the exception in the euro area).

Under those circumstances, and in the absence of an upward revision in the ECB's inflation target, it is hard to see how the UK government could accept (and make a case for) a regime change that would imply a significant downward adjustment in the average rate of inflation in the UK, especially if one takes into account Balassa-Samuelson considerations and their implications for inflations differentials within a monetary union. In that context, the adoption of a target range between 1

³ One might imagine a political-economy rationale for naming an upper bound and sticking close to the edge. Arguably, such an approach could insulate the ECB from calls for more inflation. One might even be able to argue that the ECB's success in stabilizing private sector forecasts is the result of having cleverly chosen this approach. Yet at the same time, it does not seem that this strategy – if it is the strategy – has succeeded in deterring calls for a looser policy, for the latter have been quite vocal and pervasive since the inception of EMU.

and 3% by the ECB would align the inflation objectives of the EMU and the UK and smooth an eventual accession of the latter to the euro area. A similar argument would apply for Sweden, which already has an inflation target of 2% ($\pm 1\%$), were the decision not to join the euro area be reconsidered in the future.

We don't feel alone in anticipating a gradual upward adjustment in the ECB's inflation objective, and its likely reflection in actual inflation. In fact, some of the data obtained from the Survey of Professional Forecasters (SPF) conducted quarterly and published by the ECB (see <http://www.ecb.int/stats/spf>) allows us to determine the probability assigned by a selected group of professional forecasters to the event that one year ahead, two years ahead, and long-term (five years ahead) inflation in the euro area will fall within a given interval. Table 2.1 summarizes that evidence, uncovered using the probability distributions for HICP inflation obtained in the 2003 Q2 survey round. We report the probability for a variety of two percentage point ranges over the three alternative horizons.

Thus, we see that the probability mass gradually shifts towards higher inflation levels as the horizon increases. This is reflected in the implied distribution mean (constructed using the full distribution reported in the SPF), which becomes as high as 1.84% for the five-year ahead forecast, a horizon for which the effects of any special adverse circumstances that may have hit the euro area economy in recent years can no longer be invoked). While a mean of 1.8% certainly qualifies as 'below but close to 2 percent', a look at the distribution should raise a serious concern: forecasters attach an increasing probability of violating the upper bound of 2% as the horizon increases. In fact, they attach the highest probability mass to the 1.0-3.0% interval for 2007, with a probability over 1/3 of overshooting the 2% ceiling.

These numbers are, however, consistent with a policy that has always aimed at, say, a range of 1-3% inflation, with 2% as the desired midpoint. It is hard to think of any decision or sequence of decisions by the ECB that would not have been consistent with this alternative definition of price stability. We believe that this will indeed be the target range for the future, thus entailing a shift upwards by a full percentage point compared to the previous strategy. This is a significant, though not dramatic move. We see nothing wrong with such an adjustment of the strategy, if there is commitment to it for quite some time and if it is clearly acknowledged and explained to the public.

2.2.3 A cover for more expansionary policies?

There is a final interpretation of why the ECB 'clarified' its position. According to this interpretation, the ECB became more

Table 2.1 Probability distributions for HICP forecasts from surveys of professional forecasters

	March 2004%	March 2005%	March 2007%
Below 2.0 %	73.9	68.8	61.3
0.5-2.5 %	91.8	86.9	84.8
1.0-3.0 %	87.6	87.2	88.8
1.5-3.5 %	61.7	71.0	78.2
Above 2 %	26.1	31.2	38.7
Mean	1.62	1.71	1.84

worried about deflation and so felt the need to be able to rationalize expansionary policies. It would, however, have been considerate if the ECB had said this, although this would have openly contradicted the monetary policy strategy announced in October 1998. The October 1998 announcement made it clear that the ECB was taking its mandate to preserve price stability very seriously, to the point of upgrading its condition of 'primary' objective to one equivalent to a 'single' objective.

Thus, while the Treaty states that 'the primary objective of the ESCB shall be to maintain price stability', with the addendum that 'without prejudice to the objective of price stability' the ECB shall support the Community's general economic policies and its objectives. Among the latter, Article 2 of the Treaty mentions the objective of 'a high level of employment and of social protection', an objective which may collide with that of price stability. Yet, the original monetary policy announcement made no reference to any secondary objective of monetary policy. By way of contrast, the announcement made it clear that the ECB's monetary policy strategy would 'focus *strictly* on [the] objective [of price stability]...' (emphasis added)

Five years later, the review of the monetary policy strategy no longer makes an explicit reference to the 'strict' focus on the objective of price stability. Instead a reference is made to the need to 'provide a sufficient safety margin to guard against the risk of deflation' and to address 'the implications of inflation differentials within the euro area', two concerns that were absent from the initial strategy formulation but which can certainly be used to rationalize more expansionary policies.

We believe that this too reflects an adjustment of words to deeds. The ECB has always shown concern for the state of the euro area economy. As discussed in Chapter 4, the ECB's own pronouncements in its *Monthly Bulletin* and the data both suggest that it has paid considerable attention to economic activity. More intuitively, the fact that inflation has overshoot the 2% level for such an extended time provides strong evidence that monetary policy has been looser than could be justified on the basis of keeping inflation below 2% alone. For political reasons, the ECB might have felt the need to do the right thing while sticking to its tough rhetoric officially during the past five years. With its reputation established, it can now afford to allow a more open discussion about its other objectives when setting monetary policy.

The question is whether this can be done without creating doubts about the ECB's determination to hold the line on inflation in the medium term. Merely affirming price stability as a medium-term goal, and not specifying when nearer-term fluctuations in inflation are acceptable, runs the risk that politicians may expect that they can always ask for inflation above 2% 'under current conditions'. Yet if inflation

'temporarily' above 2% is always acceptable, it will in fact be above 2% permanently. The only solution to this problem is for the ECB to define more clearly its commitments regarding nearer-term outcomes – clarifying what its other objectives are, and the way in which they can legitimately be invoked in justifying departures from price stability.

2.3 The 'two-pillar' approach

A distinctive feature of the ECB's monetary policy strategy, or at least of the way in which it explains its strategy to the public, has been its 'two-pillar framework' for the pursuit of price stability. In the formulation adopted by the Governing Council in 1998 (European Central Bank, 1998), the first pillar assigns 'a prominent role' to money, through 'the announcement of a quantitative reference value' for M3 growth, deviations from which 'would, under normal circumstances, signal risks to price stability'. The second pillar consists of 'a broadly-based assessment of the outlook for price developments,' using 'a wide range of economic and financial variables' that help to forecast inflation. This two-pillar framework has been widely criticized. The quantitative definition of price stability and the reference value for M3

BOX 2.1 Inflation and monetary growth: the common ground

The debate about the importance of money growth rates can easily be misunderstood. It might appear that the debate is about whether money growth is or is not the key force driving inflation. This is not really the point. Friedman's dictum, that 'inflation is always and everywhere a monetary phenomenon' is widely accepted in the profession, but with certain necessary qualifications, and they are important. As simple cross-country correlations show, a country which experiences inflation rates of 50% or 100% is also likely to see its money stock grow at about the same rate. At low inflation rates, however, the connection is far more tenuous. Other considerations, like changes in the structure of financial markets, productivity advances, or the cyclical state of the economy, make the immediate link between money growth and inflation less tight. These are issues which receive substantial attention in research.

In addition, prolonged periods of low inflation may be associated with fast money growth. At very low interest rates, money earns the same real return as non-monetary assets, and 'money demand' becomes indeterminate. For example, the monetary base in Japan has increased dramatically over the last two years, but it would be a fallacy to interpret this as necessarily implying a huge future rise in inflation. Similarly, at low inflation rates and low nominal interest rates, as currently observed in Europe, the pressure on agents to optimize their asset portfolios and holdings of money is far smaller than at high interest rates, and this further disrupts the connection between money growth and inflation.

Ultimately, the importance of the 'monetary pillar' does not hinge on whether this connection is tight or not. Our argument here is simple. If it is inflation that the ECB cares about, then why care about money growth rates above and beyond the best available short-, medium- and long-term forecasts and policy-contingent projections for inflation? Money growth rates may or may not be useful for producing these forecasts and projections, but it is difficult to see how they add information above and beyond them. The new monetary policy strategy still fails to clarify this issue. Is there truly an extra role for money? This is what we examine in detail in this chapter.

growth could not be expected to be mutually compatible in most years, and there was no explanation of which should take primacy in the event of a conflict.

The recent review of the ECB's monetary policy strategy has resulted in a reaffirmation of the two-pillar framework by the Governing Council, though the definition of the two pillars is now somewhat different. The first pillar is now defined as 'economic analysis to identify short to medium-term risks to price stability', while the second consists of 'monetary analysis to assess medium to long-term trends in inflation' (European Central Bank, 2003b, p. 79). This indicates several important changes in the description of the controversial monetary 'pillar'.

First, the monetary pillar has been de-emphasized, insofar as it is now listed second. At least some of the ECB's language now suggests that 'monetary analysis' should be of less importance in determining month-by-month policy decisions, though it retains a role as a 'cross-check' of the soundness of the course determined on the basis of 'economic analysis'. Second, the Governing Council has decided that it will no longer review the reference value for M3 growth each year, 'in order to stress the longer-term nature' of this benchmark (European Central Bank, 2003b, p. 79). It is thus made clearer that the reference value for money growth is not an alternative policy target; instead, 'monetary analysis' is intended as an alternative source of indications as to whether policy remains on a course consistent with the single goal of price stability (defined in terms of a target for HICP inflation). Third, 'monetary analysis' is now defined to involve monitoring of a large range of statistics relating to money and credit (European Central Bank, 2003b, p.90), with no special emphasis given to M3 growth. Finally, a new attempt is made to justify the existence of two distinct 'pillars' in terms of two distinct issues that need to be addressed in pursuit of the goal of price stability: the avoidance of 'short to medium-term' risks to price stability on the one hand, and the maintenance of a correct 'medium to long-term' inflation trend on the other.

2.3.1 Our assessment

The general direction of these changes is surely desirable, and to be applauded. Greater clarity about the existence of a single target for policy is undeniably an important improvement; and given that the ultimate goal of policy is price stability, it seems clear that a broad-based economic analysis of the outlook for inflation (and its determinants) in the short to medium term should be at the centre of policy deliberations. Nonetheless, one may ask whether the Governing Council has gone far enough in its revision of the two-pillar framework. Official statements about the outcome of the policy review stress the degree to

which the ECB's commitment to the previous two-pillar strategy has been 'confirmed', suggesting that it is only the explanation of this strategy to the public that has needed to be clarified. If so, one may fear that the ECB's explanations of its policy deliberations – if not the deliberations themselves – will continue to be clouded by an emphasis on monetary statistics with an obscure relation to judgement about the outlook for inflation.

It is also worth asking whether a convincing case for the existence of an additional, monetary 'pillar' has been made, after the extensive attention given to this question in the strategy review. Here we consider in greater detail the ECB's most recent explanations of the supposed advantages of a two-pillar system. We consider three sources of insight into the ECB's thinking: official summaries of the outcome of the review of strategy in press releases (especially European Central Bank, 2003a) and in the ECB *Monthly Bulletin* (European Central Bank, 2003b); recent speeches by the ECB's chief economist, Professor Otmar Issing; and the background studies published on the ECB website in May 2003, and identified as input into the Governing Council's reflections in the strategy review (European Central Bank, 2003a). Among these latter studies, Masuch *et al.* (2003) provide the most thorough overview of justifications for a two-pillar strategy.

2.3.2 Arguments for the importance of money

Masuch *et al.* (2003) offer a variety of reasons why statistics relating to money and credit may contain important information for judging risks to price stability. First of all, measures of the money supply are available relatively promptly, and so may be 'useful to proxy for variables that are unobservable or observable only with time lags' (p. 3). As an example, the study of Coenen *et al.* (2001) is cited, in which money is found to be a useful proxy for unobserved output. In that analysis, it is assumed that aggregate output is not well observed in real time; monetary statistics can then provide information about economic activity because of the dependence of money demand on the aggregate volume of transactions. In reality, central banks obtain a great many measures of real activity more quickly than GDP statistics become available, so that an important role for monetary statistics in constructing a real-time estimate of aggregate output is implausible. Indeed, we show in the next chapter that the discussion in the ECB's *Monthly Bulletin*, and the available data, suggest that such non-monetary indicators of the state of the real economy are readily available.⁴

⁴ The CEPR's EuroCOIN series provides a highly accurate coincident indicator, by extracting the information contained in a large number of non-monetary series.

What is genuinely difficult to measure in real time, as stressed by Orphanides (2003), is the output gap, owing to the absence of any direct observation of potential output. There is, however, no obvious reason that monetary aggregates should provide information about this, as money demand should depend on aggregate output (the volume of transactions), rather than on output relative to current potential output.

Thus we find that the case for money as an especially valuable indicator has not been made.⁵ Of course, there is no reason for a central bank not to include money and credit statistics among the large number of indicators that may be used to construct optimal estimates of the unobserved state variables, such as the output gap, that matter for an assessment of the optimal instrument setting, using the methods explained in Svensson and Woodford (2003b, 2003c). The mere fact, however, that many indicators may contain useful information, and should therefore be used – rather than relying on some very small number of indicators, as a naïve interpretation of the Taylor rule might seem to advocate⁶ – does not imply any need for multiple, competing approaches to the assessment of the outlook for inflation, as suggested by the reference to 'two pillars'.

Alternatively, Masuch *et al.* (2003) suggest that money and credit may play an important structural role in the monetary transmission mechanism, as a result of financial imperfections that cause changes in balance sheets to affect required spreads and hence spending decisions, as proposed by King (2002). Such imperfections may well be important in the transmission mechanism, at least in some parts of the euro zone; this is an obvious topic for empirical study within the ESCB. It seems more likely to us that such effects, if important, will imply that variables relating to household and firm balance sheets, or indicators of the solvency of the banking system, should be more important state variables than the growth of monetary aggregates such as M3.⁷ Nonetheless, there is no reason not to

5 We recognize that the ECB and others have found that money growth does contain some information regarding future inflation. However, that statistical evidence is of a reduced-form nature, and is in any case established on the basis of synthetic data from before the establishment of the euro. It is therefore unclear (at least to us) to what extent it is relevant for the issues at hand.

6 This is not actually what the Taylor rule implies, because it requires the central bank's interest-rate operating target to be set as a function of variables that cannot yet be observed at the time that the interest-rate decision must be made. Hence the rule must actually be interpreted as requiring interest-rate targets to be chosen on the basis of projections, in the construction of which a large number of indicators may well be relevant.

7 For example, Bernanke *et al.* (1999) develop a complete general-equilibrium model of the monetary transmission mechanism that incorporates a 'financial accelerator' mechanism into an otherwise standard 'new Keynesian' model. The additional state variable introduced by the new feature is a measure of entrepreneurial net worth.

study the possible nature and importance of such financial imperfections, and the usefulness of alternative indicators of the severity of such distortions at any point in time, without preconceptions as to where a serious empirical analysis might lead.

More to the point, even if financial imperfections of the kind mentioned by King were found to be quantitatively important for the monetary transmission mechanism, this would not justify the use of 'monetary analysis' as a separate approach to the evaluation of risks to price stability under a given policy. Instead, it would imply that a model incorporating financial frictions should be used as the basis for the ECB's 'economic analysis' of the short to medium-term outlook for inflation.

Yet, the ECB has reaffirmed the importance of a distinct 'monetary analysis', which appears to differ from what it understands by 'economic analysis' in several respects. Notably, 'monetary analysis' is solely concerned with long-run trends, and not with an attempt to forecast or to judge the optimal response to short-run fluctuations. And 'monetary analysis' is a less model-based approach; it relies only on confidence in a long-run cointegrating relation between money growth and inflation, or in the stability of a long-run money demand relation, and does not require certainty about the detailed specification of any complete model of inflation determination. The ECB has offered several arguments for why it might be important to supplement a more model-based 'economic analysis' of policy by a distinct analysis of this other sort. We now take up these arguments in more detail.

2.3.3 Is control of money growth essential to long-run price stability?

An important argument given for the desirability of a distinct type of analysis – and not a simple consideration of monetary variables in the 'economic analysis' of risks to price stability – is the ECB's assertion that different factors determine inflation in the long run than in the short to medium term (European Central Bank, 2003b, p. 87). Hence a correct analysis of the short- to medium-term outlook for inflation might give little importance to monetary variables. At the same time, the neglected monetary factors are asserted to be the main determinant of inflation over longer horizons. It is consequently argued to be important to monitor monetary conditions, alongside one's analysis of nearer-term inflation prospects, in order to ensure that price stability will be maintained over an extended future. Thus Issing (2002, p. 200) argues that the ECB's monetary analysis serves as a safeguard against 'myopia and short-termism'.

It may well be useful to structure monetary policy discussions

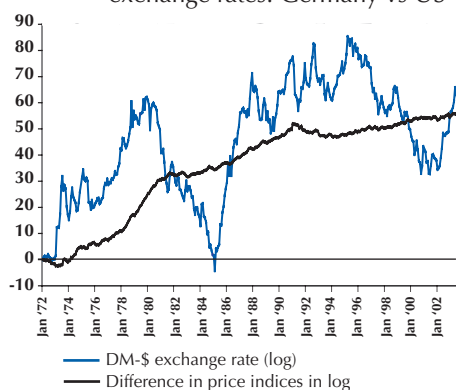
in terms of a section examining factors influencing inflation at a short horizon and another section examining factors that influence inflation at a medium to long horizon. For example, a bad harvest, a particularly cold and long winter or a transitory disruption in oil imports may lead to transitory influences on the inflation rate. If the ECB were to react strongly to each of these transitory changes, the induced variability of output might be too costly. It may be wise to base policy decisions on more persistent influences on inflation instead.

The discussion of the medium-term outlook of inflation should, however, focus on all relevant factors, of which money growth is one, but most likely not the only or even the major one. The focus should directly be on the medium-term inflation prospects. Moreover, it is sensible to unify the short-term discussion and the medium-term discussion under one methodological umbrella. We do not see a good reason to use distinct models to explain inflation determination in the short run and in the longer run. The mere fact that monetary aggregates are found to be more reliably related to the general level of prices at low frequencies implies nothing of the kind. A single dynamic specification can easily account both for the existence of a low short-run correlation between changes in the rate of growth of the money supply and changes in the inflation rate, and for the existence of a stable long-run relation between money growth and inflation at the same time.

Some might argue that a stable long-run relation between money growth and inflation implies that a central bank interested in medium-term stabilization of the inflation rate should monitor money growth rates in particular, see Box 2.2 on cointegration. This is not so, however. The verification of a reliable long-run relationship establishes at most that a policy that prevents money growth from permanently deviating from a reference value will not be inconsistent with a stable long-run inflation rate, and that a policy achieving a stable long-run inflation rate will imply that money growth rates will typically stay within the same range. It is, nonetheless, more sensible and straightforward to condition such a monetary policy directly on the medium- to long-term outlook for inflation rather than some monetary statistic that co-moves with inflation in the long run, but may differ from inflation for many years in succession. In fact, an equally reliable long-run relation is likely to hold between a given currency area's inflation rate (relative to inflation elsewhere) and the rate of depreciation of its exchange rate, see Figure 2.2. Yet that seems no reason to set up an 'exchange rate pillar', or to provide a reference value for the rate of depreciation of the effective nominal exchange rate for the euro.

Nor is it clear why a concern solely with price stability in the short to medium term should allow for risks to price stability over a longer horizon. After all, stability of inflation over the

Figure 2.2 Comparing price differences to exchange rates: Germany vs US



BOX 2.2 What does cointegration of money and prices imply?

A number of studies at the ECB (summarized in Masuch *et al.*, 2003) have provided statistical evidence of a long-run relationship between the evolution of euro-zone M3 and euro-zone HICP. These studies employ the method of cointegration for which Clive Granger and Robert Engle were awarded the Nobel Prize in Economics in 2003. Two or more time series – none of which is individually a stationary (mean-reverting) series – are said to be *cointegrated* if some linear combination of them is nonetheless stationary, meaning that it fluctuates forever around some constant long-run average value. In the ECB studies, a linear combination of the form

$$m - p - ay + bi$$

is found to be stationary [at least up to a time trend], where m is the log of M3, p is the log of the price index, y is the log of real GDP, i is some combination of nominal interest rates, and a and b are constant coefficients.

If one is confident that such a long-run relationship truly holds, and furthermore that it is structural, and so can be expected to continue to hold regardless of the conduct of monetary policy in the future, then the stability of this relation would have implications for inflation forecasts over a sufficiently long run. In particular, the rate of change of the above relation

$$\Delta m - \Delta p - a\Delta y + b\Delta i$$

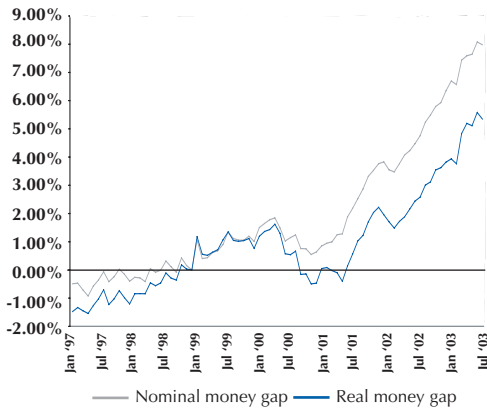
would be expected to have a long-run average value of zero [or at any rate, a constant, in the case of a time trend in money demand]. On the further assumptions that the growth rate of real GDP Δy is stationary, that there exists another cointegrating relation between the nominal interest rates i and the inflation rate Δp [also interpreted as structural], and finally, that a monetary policy is followed that ensures that Δm is stationary as well, one can then predict that the inflation rate Δp should be stationary, fluctuating over the long run around a constant value equal to the long-run growth rate of M3 minus a times the long-run growth rate of output [minus the time trend in money demand]. This is the basis on which the ECB has calculated a reference value for M3 growth, intended to be consistent with its definition of price stability.

The implication just drawn, however, refers only to average inflation far in the future; it does not rule out departures of the inflation rate from its long-run average value that are both large and last for years. Cointegration alone does not provide any advice about how shorter-run fluctuations in the inflation rate can be reduced. Nor does the above reasoning rely on any properties of M3 growth other than the existence of a certain long-run expected growth rate. Hence it does not place any restrictions on how wide a range M3 growth might vary over, or how long departures from the reference value could be allowed to persist, under a policy consistent with the desired long-run inflation rate.

Nor does the existence of a cointegrating relation imply that the current level of M3 allows one to forecast future inflation – even future inflation in 'the medium to long term'. A high current value of $m - p - ay + bi$, relative to its long-run average value, would imply that one or more of those variables should be expected eventually to adjust, so as to eliminate the discrepancy. It does not imply, however, that the adjustment should be expected to occur through higher inflation; it might as easily occur through lower future M3 growth. Nor does mere confidence in long-run mean reversion indicate how quickly M3 ought to be reduced. In particular, it tells one nothing about whether M3 growth can be reduced in the near term without that resulting in undesired reductions in inflation and real activity, rather than an elimination of the 'money gap'.

Finally, there is nothing unique about the cointegration relation that is found between M3 and prices that would suggest a privileged role for M3 in monitoring long-run inflation trends. As Galí (2003) shows, there is equally strong evidence of stable long-run relations between nominal interest rates and inflation, or the rate of depreciation of the exchange rate and inflation, as there is for a long-run relation between money growth and inflation. Indeed, the cointegration of nominal exchange rate depreciation with inflation differentials between countries is one of the leading examples of the economic application of cointegration methodology, cited by the Nobel committee in its award to Granger and Engle. Yet few would suggest that this fact alone would justify an emphasis on a 'reference value' for euro depreciation in the ECB's policy deliberations.

Figure 2.3 Estimates on the nominal and real money gap (on the basis of seasonally adjusted data)



short to medium term, if maintained consistently over many years, must imply stability of the inflation rate over the long run as well. What can be the reason, then, for an independent concern with 'medium to long term trends in inflation'?

In Box 2.3 we discuss a concrete example of how 'monetary analysis' informs discussions of policy by the ECB. Recent issues of the *Monthly Bulletin* have suggested, on the basis of the 'money gap' measures shown in Figure 2.3, that the euro area currently has a problem of 'accumulated excess liquidity'. While this is not judged to be an immediate source of excess inflationary pressures, the ECB's analysis implies that it could easily become a source of such pressures in the future, and that as a result the situation deserves to be carefully monitored. The ECB's discussion, however, does not make it clear how the existence of a potential medium-term threat ought to affect the conduct of policy. No argument is given as to why any preemptive action would be appropriate, while the threat remains merely potential. It is unclear, however, what the usefulness of the supposed indicator of medium to long-term trends should be.

2.3.4 Avoiding the trap of discretionary policy

One possible concern is that sole reliance upon a short-run forecasting model to make policy could allow a central bank to fall into the trap of discretionary policy-making described in the celebrated analyses of Kydland and Prescott (1977) and Barro and Gordon (1983).⁸ One might describe the mistake made by the central banks in these accounts as one of naively assuming that a model that correctly describes the available short-run inflation-output trade-off also describes a trade-off that exists over the long run. And the traditional remedy prescribed for the problem exposed in these models is commitment to a non-inflationary policy rule – which, in the literature of a quarter century ago, was assumed to mean commitment to control the growth of a monetary aggregate.

These classic demonstrations of the inflationary bias of discretionary policy-making do not, however, really imply any need for a separate analysis of long-term inflation trends alongside one's analysis of the short-run relation between real activity and inflation. They imply, instead, that it can be a serious mistake to use one's model of the monetary transmission mechanism – even a highly accurate model – as a basis for discretionary policy-making, rather than committing oneself to a policy rule. The mistake is not a failure to consider the

⁸ This concern is suggested by the ECB's statement (European Central Bank, 2003b, p. 90) that monetary monitoring 'allows a central bank to ... not be tempted to take a more activist course'.

BOX 2.3 Does the euro zone have a problem of 'accumulated excess liquidity'?

As a concrete example of how 'monetary analysis' is used as a check on the soundness of the current stance of policy, the October 2003 *Monthly Bulletin* contains a discussion of the implications of 'the accumulated excess liquidity in the euro area' (European Central Bank, 2003c, pp. 8-10). It points out that euro-zone M3 has grown significantly faster than the reference value of 4.5% per annum for several years, resulting in a nominal 'money gap' (i.e., cumulative excess growth in M3) of 8% by the fall of 2003, as shown in Figure 2.3. Even if one subtracts from this the cumulative increase in the HICP above the level 'compatible with the definition of price stability' over the same period – on the ground that this unwanted increase in prices, which the ECB does not intend to undo even if it succeeds in maintaining price stability from now on, should be expected to have permanently increased nominal money demand in the same proportion – the resulting 'real money gap' is well above 5%. This is taken to indicate that 'large amounts of excess liquidity have accumulated over the past two years'.

According to the ECB's analysis, this represents a threat to price stability over the medium term that deserves to be carefully monitored. Because of the belief in a reliable long-run relationship between M3 and the general level of prices, it is argued that the 'gap' will have to be eliminated eventually in one way or another; and there is a danger that this will be through an increase in the price level. The ECB's way of considering whether this is what one should expect to occur is through a discussion of 'possible uses' of the 'excess liquidity'. If the excess liquidity is currently being held as a result of a portfolio shift away from equities by households since 2001, it might later disappear through a reversal of that shift, on the assumption that financial intermediaries would reduce their own holdings of equities. On the other hand, to the extent that the excess liquidity is currently being held because the low level of interest rates have reduced the opportunity cost of holding M3, or for precautionary reasons, it is argued that 'part of these funds may be used for transaction purposes in the future', implying an increase in nominal expenditure and hence inflationary pressures. While the ECB does not pretend to know 'which use of excess liquidity will dominate in the future', they find the continued unattractiveness of equities and long-term bonds to investors worrying, and conclude that their 'analysis confirms that a close monitoring of developments in excess liquidity and its possible uses is needed in order to detect possible inflationary pressures' (p. 10).

There is, however, no reason to suppose that the current M3 balances must be 'used' in order to avoid increases in nominal spending that will create inflationary pressures. A reduced desire to hold bank deposits or shares in money-market funds as a result of a reduced precautionary demand for liquid balances can be accommodated through reduction of the asset holdings of those intermediaries, without any increased spending on goods and services having to result. And any implied reduction in the demand for base money should be automatically accommodated by the ECB, as part of the implementation of its interest-rate operating target, without any need for a change in the level of interest rates. The expected long-run relation between M3 and the price level could easily be restored through an eventual reduction in M3 growth, without the process through which this occurs having to give rise to any increase in inflationary pressures.

Moreover, even if it were the case that the eventual portfolio adjustment – say, as a result of a reduced precautionary motive – should be associated with an increase in the level of interest rates that would be required for non-inflationary growth, this would mean simply that when such a shift began to occur, it would be appropriate to raise interest rates. Such a shift in policy would be dictated, however, by an economic analysis of near-term inflationary pressures at that time. There would be no need to adjust policy pre-emptively, on the basis of the advance warning given by the existence of a 'money gap'. To the contrary, raising interest rates earlier, while a strong precautionary demand for liquidity remained, in order to reduce the amount of the 'accumulating excess liquidity', would cause unnecessary economic contraction and deflationary pressures.

implications of current policy for longer-run inflation because, as shown in the simple Kydland-Prescott and Barro-Gordon models, past outcomes (past inflation, past money growth, past real activity, etc.) have no effect at all on the inflation/output trade-off available at a given point in time. The mistake is instead a failure to realize that private-sector expectations could be shaped by policy commitments of the central bank. Under discretionary policy, no advance commitments are made, and no account is taken, in policy deliberations, of the effects upon private-sector expectations of the predictable consequences of the approach to policy that is taken.

The (unwitting) inflationary bias of such an approach to policy can be avoided through commitment to a policy rule that will bring about low inflation on average, and so will create expectations of low inflation if correctly understood by the private sector. The ECB's medium-term inflation target, if credibly pursued, would be an example of such a commitment. There should be no need for an additional commitment regarding the growth rate of a monetary aggregate.

2.3.5 Does monetary monitoring allow a more robust approach to inflation stabilization?

Another important argument for the two-pillar approach is the suggestion that it allows for more 'robust decision-making', by checking the predictions of alternative, competing models, representing 'different perspectives' on the determinants of inflation (European Central Bank, 2003, p. 87). Reliance upon 'economic analysis' alone would run the risk of a large policy mistake as a result of overconfident reliance upon a single economic model that may turn out to be inaccurate. Masuch *et al.* (2003, p. 30) suggest that a reasonable approach would be to choose the policy rule that minimizes an expected loss as calculated by putting probability weights on alternative models of the monetary transmission mechanism, as shown in the work of Gerdesmeier *et al.* (2002). It would then follow that as long as some positive probability is attached to a monetarist model being correct, 'monetary developments should influence monetary policy decisions'.

It is certainly prudent for a central bank to take account of the fact that any model of the monetary transmission mechanism must be regarded as provisional; and in particular, it makes sense to check the robustness of contemplated policies by considering what outcomes one would expect them to lead to under more than one possible model. A variety of approaches to the selection of a 'robust' policy rule have been proposed in the recent literature. And there is certainly no reason to be dogmatic about the necessary unimportance of mechanisms that might imply a more important connection between monetary

aggregates and the variables that the bank seeks to stabilize. Once again, however, it is not obvious that such considerations can justify a separate 'monetary analysis' pillar, rather than simply implying that a sound 'economic analysis' of the outlook for inflation should take into account all available sources of information and take proper account of model uncertainty.

2.3.6 Monetary analysis as an 'escape clause'

In any event, it does not seem that the ECB really proposes that 'monetary analysis' should involve the construction of an alternative short- to medium-term forecast on the basis of an alternative (but fully articulated) model of the transmission mechanism. In fact, the ECB has never spelled out explicitly examples or references for the alternative class of models it has in mind that would justify the existence of an independent 'monetary analysis', nor has it discussed their empirical performance, or the plausibility of their underlying assumptions. Rather, that analysis seems to be intended as a sort of escape clause, which should override the recommendations that are produced by the model-based 'economic analysis' under certain circumstances – in particular, when the 'monetary analysis' indicates that policy has got quite far off-track.⁹ This 'cross-check' is not required to give finely calibrated advice about what should be done at each point in time to respond as well as possible to constantly changing conditions; instead, it is intended simply to ensure that policy cannot go too far off track over the long run. Its virtue is not the accuracy of the signals that it can give about how the ideal stance of policy may have changed as a result of the most recent developments, but rather the degree of confidence that it allows one to have that policy mistakes will not have too large a cumulative impact over a longer period of time.

From this point of view, the monetary pillar is important, not because monetarist models of the transmission mechanism are one possible kind of model among others, but because one can have more confidence in the future validity of the long-run relation between money and prices than in the large number of highly debatable assumptions that are incorporated into any (monetarist or non-monetarist) complete model of the transmission mechanism that could be used to judge the optimal short-run responses to shocks. Thus Issing (2002, p. 189) refers to the long-run relation between money and prices as 'the single long-term compatibility condition that monetary

⁹ Issing (2002, p. 200) states that 'there may be extended periods of time in which observers do not detect reactions to monetary indicators.... But if deviations in these measures of money from the long-run trajectory consistent with price stability are ample and persistent, a central bank should intervene ...'

economics has to offer to practitioners, free of model-specificities and restrictive assumptions'.

What sort of large mistakes, as a result of model misspecification, can be avoided through the introduction of an escape clause according to which policy is eventually to be adjusted if the growth of a monetary aggregate remains persistently too far away from the reference value consistent with long-run price stability? Issing (2002, p. 190) speaks of 'possible inadvertent slippages from the intended long-term direction' under an 'exceedingly forward-looking' policy. Common prescriptions for inflation targeting require only that a central bank judge at each point in time that projected inflation at some future horizon conforms to the target rate. A weakness of such an approach is that if the model used to produce the inflation projections is mistaken – for example, if it underpredicts inflation for several years in a row owing to a bias that is not quickly detected – then inflation systematically higher than the target rate may be consistently generated for years on end.

A similar mistake is even more easily made if the central bank pursues a 'flexible' inflation targeting criterion, under which the acceptable inflation projection depends (negatively) upon the projected output gap at some horizon, or follows a 'Taylor rule' under which interest rates depend on a measure of the output gap as well as a measure of inflation (or an inflation forecast). In these cases, a systematic bias in the measurement of the output gap (due, for example, to a mistaken estimate of the natural rate of unemployment or of the growth rate of potential output) can result in inflation systematically higher than the target rate – because the output gap is judged to be persistently negative, year after year – even in the absence of any bias in the method used to forecast inflation.

The risk of such a mistake is all too real, in the light of the analysis by Orphanides (2003) of US policy during the 1970s. Orphanides argues that US policy during 'the Great Inflation' can be well explained by a forward-looking Taylor rule of a kind that also fits recent US policy, using inflation forecasts and estimates of the output gap that were available to policy-makers at the time. The inflationary bias of monetary policy in this period, in his account, resulted not from a high inflation target, but rather from consistent exaggeration during the mid-1970s of the degree to which actual output fell short of potential, owing to a failure to recognize the productivity slowdown of the 1970s for many years.

A sound monetary policy strategy should seek to avoid a repetition of this kind of mistake. It is also true that one plausible way of limiting the degree to which systematically high inflation can persist indefinitely is through a commitment to ensure that the path of some monetary aggregate never

cumulatively deviates by more than some percentage from a deterministic reference path (with a growth rate chosen to be consistent, on average, with the inflation target, see Box 2.2 on cointegration). If the demand function for M3 exhibits the degree of long-run stability suggested by the studies summarized in Masuch *et al.* (2003), one would be able to be fairly confident that the average inflation rate, over a sufficiently long horizon, would fluctuate around the desired rate, regardless of the details of the short-run adjustment of wages and prices, and other controversial features of a complete macroeconomic model.

There is, however, no need to rely upon the quantity-theoretic relation between money and prices in order to achieve 'robustness' of this sort. After all, the central bank is also able to observe directly the long-run behaviour of price indices itself – and there can hardly be any variable more reliably related to inflation than inflation itself. While one can debate the accuracy of any given price index as a measure of the degree to which 'price stability' in the economically relevant sense has been achieved, there can be no doubt that price indices provide much more direct evidence of whether there has been 'systematic slippage' in policy than can any monetary aggregate. And while information about prices is not available to a central bank quite so quickly as are measures of monetary aggregates, it is certainly available early enough to allow accurate monitoring of 'medium- to long-term trends' while there is still time to alter them.

2.4 Is monetary monitoring necessary to prevent instability due to self-fulfilling expectations?

Masuch *et al.* (2003, pp. 3-4) offer as a further argument for the two-pillar approach the view that 'money can provide a nominal anchor for the economy'¹⁰ in the sense of 'help[ing] to rule out destabilizing explosive paths for inflation expectations that could be triggered and sustained by self-fulfilling expectations'. They cite a variety of theoretical analyses according to which popular monetary policy rules that do not involve monitoring of a monetary aggregate (inflation targeting rules or Taylor rules) may be equally compatible with a large multiplicity of rational expectations equilibria, in some of which inflation is far from stable. They further argue that this indeterminacy occurs because the policy rules in question 'can ... be [equally] supported by various rates of money growth', each of which corresponds to a different economic outcome. Modification of such rules by the addition of escape clauses that

¹⁰ The last six words are underlined in the original.

exclude the possibility of extreme rates of money growth, as proposed by Christiano and Rostagno (2001) among others, can eliminate the undesirable equilibria in at least some cases, while preserving the desirable properties of the rule in the case that the desired equilibrium is realized (so that the escape clause is not triggered). Such a theoretical proposal is, of course, similar to at least one interpretation of the ECB's two-pillar system.

Once again, this analysis points to a genuine weakness of some well-known policy proposals that are intended to provide guidelines for the stabilization of inflation and real activity without reference to monetary aggregates. The problem, however, of possible instability due to self-fulfilling expectations does not arise solely in the case of monetary policy rules that make no reference to money; and neither is the introduction of a money-growth target (if only in the form of an escape clause) necessary to address the problem.

Many optimizing models of the monetary transmission mechanism have the property demonstrated by Sargent and Wallace (1975) for a rational-expectations IS-LM model: that is, the rational-expectations equilibrium paths of both prices and output are indeterminate in the case of any policy that fixes a short-term nominal interest rate as a function of the history of exogenous disturbances. As discussed in Svensson and Woodford (2003a) and Woodford (2003, Ch. 7), this implies that a decision procedure under which the central bank computes the desired level of nominal interest rates at each point in time as a function of the current (exogenously given) state of the world – i.e., the level of interest rates associated with the optimal rational-expectations equilibrium, according to the bank's economic model – and then acts to implement that interest-rate operating target, without monitoring the actual behaviour of any endogenous variables, will be flawed. For even if the bank's model is exactly correct and its evaluation of the economy's current state is exactly correct at all times, this pattern of behaviour will be consistent not only with the optimal equilibrium, but also with a vast number of other, much less desirable equilibria.¹¹

This problem can often be avoided if the central bank computes the desired money supply at each point in time (again as a function of the history of disturbances) and implements that as its operating target. In the cases in which an exogenous

¹¹ Rules that make the nominal interest rate a function of the exogenous state of the world may also result in a failure of plausible learning dynamics to converge to any rational-expectations equilibrium, as shown by Bullard and Mitra (2002) and Preston (2002). This problem as well can be solved, however, by a commitment to feedback of the right kind from the evolution of prices and output to the interest-rate operating target, as shown by these authors; and the kind of feedback needed is similar to that needed to ensure determinacy of equilibrium, as discussed in Woodford (2003, Ch. 4).

state-contingent path for the money supply implies a determinate rational-expectations equilibrium, however, there are also interest-rate rules that imply a determinate equilibrium, and that involve no monetary monitoring. These are rules under which the central bank is committed to vary its nominal interest-rate operating target endogenously in response to endogenous variables such as prices and output, in addition to responding to exogenous disturbances. A commitment to a money-supply target implies a commitment to raise nominal interest rates at a certain rate in response to increases in the general level of prices above that characteristic of the optimal equilibrium, and similarly to raise interest rates in response to increases in real activity; otherwise, the central bank would be accommodating the increased money demand that would result from increases in either prices or real activity. In a similar commitment, however, to increase the central bank's interest-rate operating target in response to increases in prices or real activity (as called for under the Taylor rule, for example) will imply determinacy of equilibrium for the same reasons as the money-supply rule, and this can be implemented without monitoring any monetary aggregates (Woodford, 2003, Ch. 2).

In addition to the possible problem of local indeterminacy of equilibrium (i.e., the existence of a large multiplicity of nearby equilibria) under an interest-rate rule, as in the classic analysis of Sargent and Wallace (1975), Masuch *et al.* (2003) also discuss the possible existence of explosive equilibria, in which large deviations of the inflation rate from the desired one occur in equilibrium, sustained by the expectation of even larger deviations in the future. This sort of global multiplicity of equilibrium can occur even in the case of Taylor rules of a sort that imply the existence of a locally unique equilibrium with desirable properties, as stressed by Benhabib *et al.* (2001). Similar problems – the possibility of self-fulfilling hyperinflations on the one hand, or of self-fulfilling deflations on the other – can, however, also occur in the case of commitment to a money growth rule (see Woodford, 2003, Ch. 2), and indeed these problems were first discussed in that context.

Many of the solutions to this problem that have been proposed in the context of the literature on inflation determination under money growth rules have direct analogues in the case of interest-rate rules that make no reference to money. For example, some defenders of the necessary validity of the quantity-theoretic principle (according to which there can be neither inflation nor deflation in the long run that is not accommodated by a corresponding rate of growth or contraction in the money supply) have argued that it is implausible that people's expectations should ever come to be coordinated on one of the explosive equilibria – either on the basis of some formal principle for equilibrium selection, or on the basis of

explicit analyses of learning dynamics as in Lucas (1986) or McCallum (2003). If one is persuaded by such arguments, then they should also imply that one need not worry about the apparent possibility of self-fulfilling inflations or deflations under a Taylor rule.

One case in which a rule that places bounds on the long-run growth in money might appear to be superior to any interest-rate feedback rule that makes no reference to money is in excluding the possibility of a self-fulfilling 'deflationary trap'. Under such a scenario, deflation occurs simply because it has come to be expected to occur – and given these expectations, deflationary pressures cannot be offset by a reduction in interest rates, because the zero lower bound on nominal interest rates implies a positive lower bound on real rates. Concern that such a scenario could occur has grown in recent years, as a result of the continuing inability of the Bank of Japan to halt deflation, despite overnight interest rates at the zero lower bound.

Since the work of Brock (1974) it has been known that in many representative-household monetary models, a money-growth rule that implies a positive floor for the money supply in the long run does not allow for self-fulfilling deflations. Since, under such a policy, real money balances would have to grow too large asymptotically under the deflationary scenario to be consistent with optimal saving behaviour. An interest-rate rule, instead – even one that is equivalent to monetary targeting, under all conditions under which the monetary target would require a positive nominal interest rate – would not require money balances to be supplied beyond the quantity that are demanded at a zero nominal interest rate. In the case of satiation in money at a finite level of real balances, this means that an interest-rate rule could allow the money supply to contract at the same rate as the price level – so that the wealth effect of unboundedly growing real balances would not be present – even under the most 'aggressive' response to deflation that one could propose.

Hence a central-bank commitment to supply money balances beyond the level required to maintain nominal interest rates at zero may be useful in excluding the possibility of self-fulfilling deflationary expectations, as argued by Eggertsson and Woodford (2003). Even so, such a commitment does not require that the central bank should ever override the interest-rate policy that would otherwise be required by its policy rule simply because this is necessary in order to keep the money supply from growing too slowly; the proviso proposed by Eggertsson and Woodford only specifies a particular base-money supply under circumstances where the policy rule requires short-term nominal interest rates to equal zero, so that different quantities of base money are equally consistent with the interest-rate operating target. Thus the policy proposed by Eggertsson and

Woodford would not really involve 'cross-checking' of the bank's analysis of the interest rate required by its price-level target by monitoring the associated growth of any monetary aggregate.

2.5 Conclusions

The most plausible interpretation of the new monetary policy strategy is that it is an exercise in gradualism. Under cover of a concern to preserve the appearance of continuity, the ECB has made small but significant adjustments in its official strategy, that serve to bring its rhetoric more closely in line with its actual behaviour during its first five years. The ECB has behaved as though its actual inflation target is roughly a range between 1% and 3%. This was in contrast to the ECB's rhetoric, and quite different from the common interpretation according to which the ECB targeted a 0% to 2% range. The ECB has now adjusted this gap between words and deeds; yet in our view, it has still not been as explicit about its target as it ought to be.

In its policy choices, the ECB has not given much attention to monetary growth rates so far. Rather, this has been a rhetorical means to borrow the reputation of the Bundesbank as the guarantor of a stable European monetary policy. With the ECB now able to walk by itself, it no longer needs the Bundesbank monetary crutch. We have carefully examined in this chapter whether there can be some special role for monitoring the growth rate of a monetary aggregate – assuming that the ECB surely should and does monitor medium-term inflationary trends – and we did not find any. We therefore view the new strategy as slowly adjusting the original 'monetary pillar' toward a clarification of what the ECB really means by the still opaque 'medium term' orientation of its inflation policy goals. The rhetoric is not fully in line with its behaviour yet. Once again, however, it has moved closer.

Finally, the ECB judges it important to continue educating the public about the fact that high inflation and high money growth go together. This is not wrong, and it may be useful. Ultimately, however, it is inflation and not money growth that they and we should care about.

3

Deflation

3.1 Dealing with the threat of deflation

Because of a downwards drift in the prices of goods and services, Japanese nominal GDP fell by 5.6% from the fourth quarter of 1997 to the first quarter of 2003. At the same time, the real GDP of Japan in the second quarter of 2002 was, at annual rates, barely above its level in 1996. This combination of stagnant output amidst falling prices has sensitized everyone to the risks of deflation, where by this we mean exclusively a period of sustained falls in the prices of goods and services. Indeed, the Japanese experience surely played a role in the surge of newspaper stories about the possibility that European countries would enter a period with disastrous deflation. To be fair, a majority of these reports have suggested that this scenario was relatively unlikely. On the other side, however, two recent events have added fuel to this discussion. The first was the release of German monthly inflation figures for April and May 2003, which showed drops in consumer prices of 0.3% and 0.2% respectively. The second was a report from the IMF, which both dwelled on the costs of deflation and characterized as 'considerable' the risk of mild deflation in Germany.¹

The emphasis on deflation in Germany is understandable both because of the central role that Germany plays in the world economy and because German 12-month inflation from June 2002 to June 2003 was the lowest in all the euro countries. Indeed, its 12-month inflation rate over this period was around 1% lower than that in the euro area as a whole. Even averaging inflation from 1999 onwards, inflation in Germany was about

Figure 3.1 Inflation and interest rates in Japan

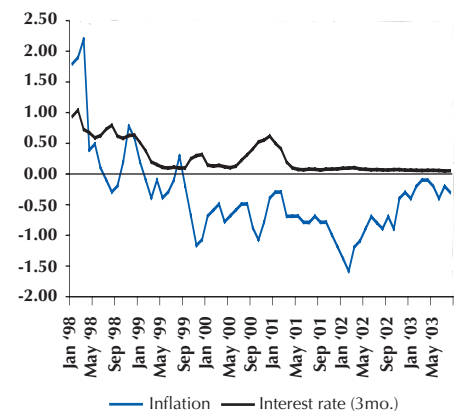
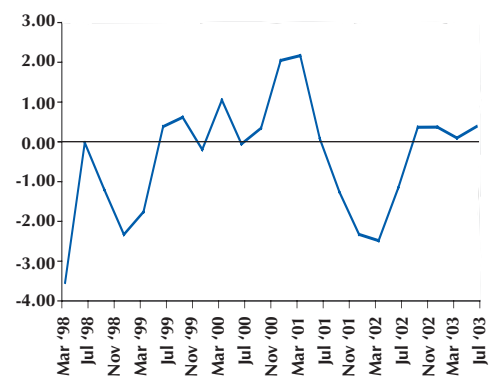
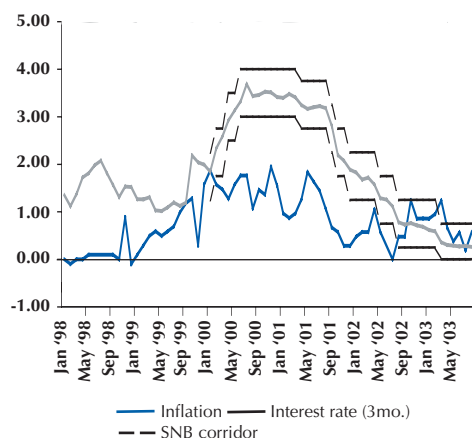
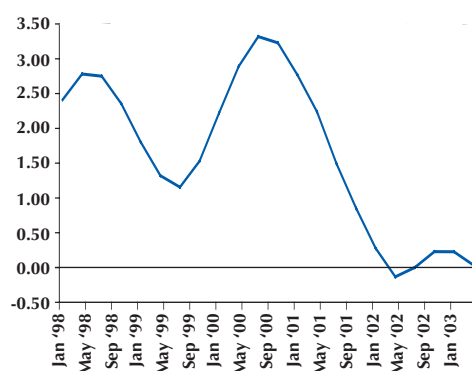


Figure 3.2 Real GDP growth in Japan



¹ 'Deflation: Determinants, Risks and Policy Options – Findings of an Interdepartmental Task Force' Approved by Kenneth Rogoff, p. 27.

Figure 3.3 Inflation and interest rates in Switzerland**Figure 3.4** Real GDP growth in Switzerland

0.5% lower than that in the euro area as a whole. Given the persistence of this inflation differential, it seems reasonable to suspect that, if any European country is to experience a sustained period of price declines in the near future, Germany is the most likely candidate. This still leaves three questions concerning an outcome in which prices fall for some time in Germany while they rise elsewhere. The first is the extent to which it leads to economic suffering. The second is whether it is likely and the third is whether ECB policies ought to be changed to avert it.

A more extreme scenario would have prices falling for a sustained period of time in Europe as a whole. This is obviously less likely than having them fall just in the country with the lowest inflation rate. We argue, however, that, if it were to occur, the threat it would pose to economic well-being would be considerably larger. Moreover, while there is no reason to believe that this outcome is at all likely, it would also be a mistake to believe that it is impossible. The reason is that inflation is notoriously hard to predict. Thus the question of what the ECB can do to reduce the likelihood of euro-wide deflation remains pertinent.

3.2 Potential problems caused by deflation

3.2.1 Redistribution between lenders and borrowers

The most commonly mentioned adverse consequence of deflation is that, because most debt contracts are denominated in nominal terms, it increases the real obligations of debtors relative to what they would have been if prices had remained stable. It is important to stress, however, that it is an essential component of capitalism that lenders can expect to receive resources from borrowers and, indeed, this is the whole point of allowing contracts that pay positive rates of interest. Thus, the statement that deflation increases real obligations to creditors fails to clarify what exactly is wrong with deflation.

One might argue that deflation is particularly pernicious when it is unexpected, because it puts debtors in a position that they were very much hoping not to be in when they signed their original debt contract. Such unexpected changes can easily bankrupt debtors and thereby put strains on financial intermediaries. Unexpectedly low inflation would be just as serious a problem in an inflationary environment, however. In other words a borrower that was expecting an inflation of 5% when he borrowed at 7% for a year would be just as upset at an inflation rate of 3% as a borrower who borrowed at 3% expecting an inflation of 1% and found himself with a fall in prices of 1%. In either case, the *ex-post* difference between the

interest rate he pays and the inflation that actually takes place is 4% whereas he expected a real interest rate of 2%. The problem, then, is created by the unpredictability of the inflation rate, rather than its average level. Such problems can be reduced by adhering to an inflation target. It is not clear that a low inflation target should be more problematic, from this point of view, than a higher one.

In fact, it is a well-established empirical regularity that inflation is more variable and less predictable in situations where average inflation is high than in situations where average inflation is low. Thus, the problem of large departures between the *ex-post* real interest rate paid by borrowers and what they expected to pay is actually less severe in environments where average inflation is low enough that deflation emerges as a real possibility. This means that, if one wants to avoid situations where borrowers find themselves obliged to make larger transfers than they planned, one should pursue a low-inflation policy, even though such a policy may make deflation more likely, rather than a policy that reduces the possibility of deflation.

3.2.2 High real interest rates when deflation is expected

Financial contracts obviously reflect people's expectations of inflation rates. This led Irving Fisher to theorize that expected inflation would be reflected in interest rates one-for-one so that *ex-ante* real interest rates – in other words, the difference between nominal rates and expected inflation – would be independent of people's expectations regarding inflation. A large empirical literature has sought to find out whether this is true. There is substantial evidence against the hypothesis that short run *ex-ante* real rates are independent of expected inflation. For longer run changes, the evidence is more mixed. Mishkin (1992) shows that real rates are less persistent than either inflation or interest rates, suggesting that persistent changes in inflation are indeed incorporated into interest rates.

This can be seen also in Figure 3.5, which shows smoothed versions of the German monthly inflation rate and of German short-term interest rates.² These series do indeed move together. On the other hand, these data can also be presented in the form of Figures 3.6 and 3.7, which plot the smoothed inflation rate and the difference between the smoothed interest rates and the smoothed inflation rate. These charts show that this measure of the real interest rates is negatively correlated with the inflation rate, and the correlation between these series is -0.51. This

Figure 3.5 Inflation and nominal interest rates in Germany

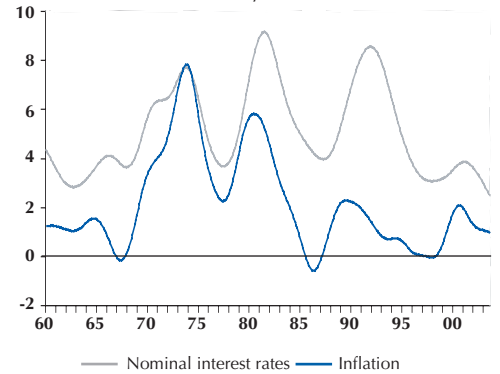


Figure 3.6 Inflation and real interest rates in Germany

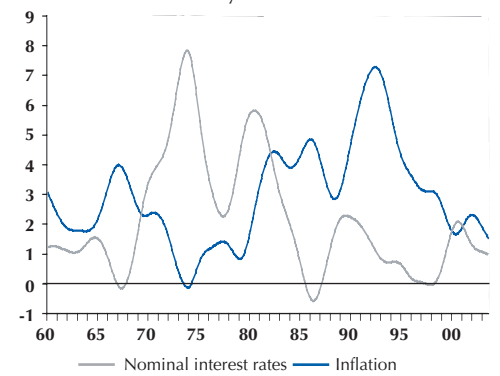
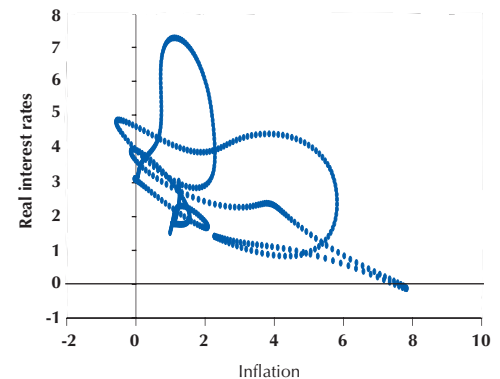


Figure 3.7 Inflation vs real interest rates in Germany, 1960-2003



² The smoothing was done using an 'HP filter', though other moving averages produce quite similar results.

correlation is heavily influenced by the fact that real interest rates were generally low during the inflationary 1970s, while they were higher during periods of lower inflation. This fits with the finding of Summers (1983), that real interest rates were generally lower in those decades where average inflation was higher.

In a way, this confirms the idea that deflation – viewed here simply as representing lower inflation – increases the amount that borrowers pay lenders. This is not necessarily a sign of poor resource allocation, however. It seems to suggest, on the contrary, that borrowers are willing to pay more for funds when inflation is lower. This might be because, as explained above, a lower inflation environment is a more certain one. In any event, it seems very plausible to believe that the degree to which expected real interest rates are higher when inflation is kept low is a sign of improvement in resource allocation that flows from having a low inflation environment.

In this context, special mention ought to be made of savers that are relatively poor and unsophisticated. These tend to keep a fairly large fraction of their wealth in assets such as currency and demand deposits that pay essentially no interest. When inflation is high, they end up receiving very low real rates of return and it is hard to see this with anything other than dismay from both the points of view of both equity and efficiency.

3.2.3 The zero lower bound on nominal interest rates and deflationary spirals

There is one limited but important sense in which deflation is more likely to lead to real interest rates that are 'too high'. This is when expected inflation is so low that even a zero nominal interest rate keeps output below full employment. This is obviously more likely to happen when prices are expected to decline because this implies that the real interest rate when the nominal rate equals zero is positive. Full employment may, however, sometimes require negative real rates (so that the problem would arise even with a small positive inflation rate) and is sometimes consistent with a quite high positive real rate (so that the problem would not arise even if there was significant deflation). In situations like these, the central bank would, if it could, lower nominal interest rates further so as to reduce expected real rates of interest and boost output. The zero nominal interest rate floor prevents it from doing so, however. The result is that the economy operates as if monetary policy were too tight – in other words, as if the nominal rate of interest paid by borrowers were too high for the given rate of expected inflation.

One difference with the situation where real rates are high with positive inflation is that, in the case where interest rates are

bounded by zero and there is deflation, unsophisticated households do better (since they lose very little by holding cash). This hurts those financial institutions that cater to this clientele. To attract any deposits at all, they now must pay the rate of interest to which sophisticated investors have access. Once they do so, however, there is no reason to fear that these institutions will be unable to raise funds. It is possible, however, that the reduction in the gap between the interest rates that financial institutions must pay to attract deposits and open market interest rates further raises the cost of borrowing for certain borrowers.

While the central bank is impotent to lower rates as much as it would like to when deflation is sufficiently severe, it is worth clarifying one point that comes up often in popular discussions of this issue. In those discussions, deflation is often depicted as a 'spiral' that goes out of control once the nominal interest rate reaches the zero bound. This nightmare scenario is often explained by saying that the high real rates, which accompany a zero interest rate when deflation is large enough, lead to further deflation, so that nothing puts a stop to this situation. In fact, there are good theoretical and empirical reasons to think that a deflationary spiral will eventually come to a stop on its own, though as described in section 2.4, this may require that the government commit itself not to allow its nominal indebtedness to fall beyond some tiny amount.

Consider first the theory: people will only continue to expect deflation if this deflation does materialize and, precisely because deflation keeps real rates of return high, it increases the wealth of people with positive net worth. In particular, it increases the real value of the government obligations that people hold (at least if the nominal value of these obligations does not continue falling) while also increasing the real value of any claims on foreign exchange (even if the currency appreciates at the rate of deflation, their real value rises at the foreign nominal rate of interest). As this wealth increases, one can thus expect people to increase their spending and thereby end the deflation.³ Empirically, the Great Depression was of course a quite disastrous episode of deflation. Even in this case, however, where the GDP of many countries remained low for nearly a decade, the deflations themselves lasted much less.

As the ECB has noted, a deflationary spiral of this sort can only plausibly occur in a monetary union as a whole. Even if prices rise in the union as a whole, they may decline for some time in a region, such as Germany. The region will not suffer a deflationary spiral, however, because its goods will then keep gaining in competitiveness *vis-à-vis* those of the other members

³ Note that this claim is considerably weaker than the claim that this wealth effect is sufficient to restore full employment.

of the monetary union. It is also worth stressing that the problem just discussed should only arise to the extent that the zero lower bound on nominal interest rates is reached. This again is not an immediate problem for the euro area, though it is a situation that could in principle arise, as it has in Japan.

3.2.4 Deflation and relative price distortions

Deflation may also create problems in goods and labour markets. Consider goods markets first. Like inflation, deflation constitutes a departure from price stability and therefore requires that the typical firm change its price. If firms are reluctant to adjust their prices continuously, as a vast empirical literature suggests, the relative prices of each firm will tend to depart from their 'ideal' values. To take the inflation case, which is more intuitive, suppose that the price level is rising by 5% per year and that firms are reluctant to change their prices more than once a year. The relative price of the typical firm thus declines by 5% between the times at which the firm changes its price. If all firms have similar cost structures and their prices are changed at different times, then the relative price of each firm is, on average, 2.5% away from what the firm would ideally like. The identity of the firm whose price is relatively low changes over time and consumers are likely to take advantage of these relative price fluctuations. While this may seem counterintuitive, these relative price fluctuations are also ultimately bad for consumers, even though consumers may enjoy the feeling that they are always buying relatively more of those goods that are relatively cheap. The reason is that, by varying the amount they buy from each particular firm, consumers effectively prevent firms from always producing at the lowest possible cost, and the resulting cost increases do, ultimately, have to be paid by them.

The argument above is really an argument for price stability, since it applies symmetrically to increases and reductions in overall prices. Indeed, the ECB has, at least in some publications, taken pains to explain that it sees the social cost of having price indices decline as symmetric to the cost of having price indices rise. The above argument does, however, hinge to some extent on the assumption that all firms face very similar circumstances. In practice, some firms discover methods for reducing costs while other do not and the former are likely to want to lower their relative prices over time. Moreover, those firms that want to reduce their prices are probably not very reluctant to do so. While firms that raise their prices must contend with the risk of upsetting their customers, firms that cut prices can use these cuts as part of their marketing campaigns.

This means that, when cost reductions are concentrated among relatively few firms, many firms would actually be better

off if the economy experienced a mild deflation over time. The reason is that this allows the firms whose costs do not fall to keep their prices constant and still experience the necessary rise in their relative prices. With a stable overall price level, by contrast, these firms would have to raise their prices over time. With a mild deflation, the firms whose costs decline still need to lower their prices, and they need to do so by more than if the price level were constant. But, insofar as price changes are not particularly onerous for these firms they do not suffer as a result.

3.2.5 The measurement bias in inflation and monetary policy consequences

An argument that is sometimes made in favour of mild inflation is that, due to quality improvements that are not captured by surveys of consumer prices, the 'true' cost of living rises by less than is measured by indices such as the European Harmonized Index of Consumer Prices (HICP). In fact, this argument has recently been cited by President Trichet in a speech on 20 November 2003, as the second rationale for aiming at positive inflation. That the cost of living rises by less is beyond doubt, though there is much uncertainty regarding the strength of this effect. This effect has, however, very little to do with the desirability of pursuing a monetary policy whose average inflation is positive. The reason is that the existence of quality improvements in no way makes it desirable to have some firms raise their prices over time, and that is what growth in a consumer price index signifies. In other words, if the costs of inflation are due to price distortions arising out of some firms adjusting their prices while others do not, then it is measured inflation and not quality-adjusted inflation that matters. Surely, firms will find it just as costly to change the list prices of their goods and communicate these changes, regardless of whether the quality of their goods changed or not.

A more subtle argument arises in this context due to the first reason for aiming at positive inflation cited by President Trichet in his speech: keeping the nominal interest rate away from zero. The nominal interest rate can be broken down into the sum of a real interest rate plus the inflation rate, but these last two magnitudes require that one be quite explicit about the basket of goods one has in mind and it makes sense to focus on quality-adjusted goods. One would then use the quality-adjusted inflation rate to ensure that the quality-adjusted real rate plus the quality-adjusted inflation rate equals the observed nominal rate. For example, if headline inflation is 0%, the quality improvement is 2% (meaning, that one unit of the new good is as good as one unit plus 2% of a unit of the old good), a nominal interest rate of 1% now corresponds to a (constant-basket) real rate of 3% rather than 1% as would be the case

without the quality adjustment. Put differently, in times of rapid quality growth and low inflation, the central bank will find it very difficult to temporarily achieve a low quality-adjusted real rate through a low nominal rate. This argument also works in reverse, however. Presumably, low real rates are needed precisely at times when the economy is not doing particularly well and when one might be more worried about falling rather than rising quality. Falling quality then opens up additional manoeuvring room for monetary policy, however.

3.2.6 The effect of deflation on wages

While it seems difficult to argue that a mild deflation causes difficulties for the adjustment of the relative prices of goods, it seems more compelling to argue that it makes certain real wages difficult to adjust. Several researchers have shown evidence that nominal wage declines are extremely rare while months in which workers experience no change at all in their wages are commonplace. This combination of wage observations has been interpreted as evidence that it is very difficult to lower wages. As these observations were made in environments without significant deflation, however, they could signify mainly that wages are adjusted only occasionally while economic conditions are such that, whenever wages are changed, firms wish to increase them. Even in an environment with a constant price level, we would expect firms to be raising wages if productivity rises. So, one might argue that the rarity of observed wage declines does not necessarily signify that real wages are distorted by downwards wage inflexibility.

There are three reasons to be at least somewhat concerned by the possibility that the absence of wage declines actually matters. The first is that ethnographic evidence suggests that workers react to nominal wage cuts with anger. Thus, it may well be true that wages are indeed inflexible downwards. Consistent with this, employers seem reluctant to cut wages even when their local labour market exhibits a great deal of unemployment. In trying to explain this behaviour to Truman Bewley, many employers said that they thought morale would suffer if wages were cut (Bewley, 1999). Lastly, the evidence of Fehr and Goette (2003) suggests that those industries (and Swiss cantons) in which nominal wages remain unchanged also have higher unemployment rates.

Even accepting that wage cuts are problematic, the extent to which this problem requires that inflation be high on average depends on the extent to which wages have to decline for a given increase in prices. If one anticipates that real wages (even deflated by standard indices of consumer prices) generally grow over time – as they have – the problems caused by lack of real wage reductions may affect only a small subset of the

population. On the other hand, if the inability to cut real wages leads firms to make certain workers redundant who are then unable to find employment, the social costs could be large.

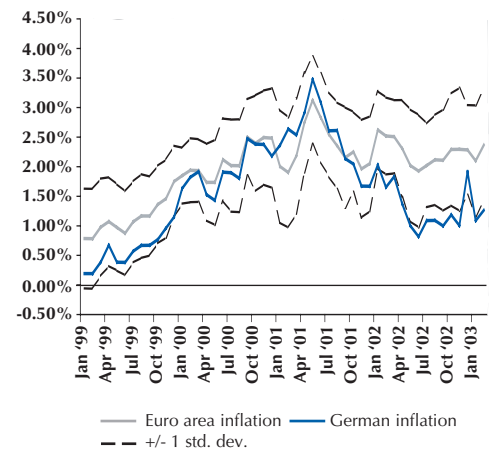
3.3 The problem of deflation in Germany

As discussed above, Germany has recently experienced several consecutive months of reductions in its consumer price index. As we mentioned earlier, however, Germany's membership in a monetary union makes it essentially impossible for it to enter a deflationary spiral. Another reason not to see a few months of price declines as dramatic is that monthly inflation rates are quite volatile. The standard deviation of monthly German CPI inflation rates in the period July 2002-June 2003 was 0.39, while their mean was 0.08% (for an annual inflation rate of nearly 1%). If inflation rates had been normally distributed and independent from one period to the next, this combination of mean and standard deviation would imply negative monthly inflation rates in 41% of the months, so that a few consecutive months of negative inflation rates would be common.

None of this should obscure either that inflation has been lower in Germany than elsewhere in Europe or that this may well have increased the strain on the German banking system. The experience of differences in inflation rates across European regions has led to an extensive literature. This literature has both tried to understand the causes for these inflation differences and compared the diversity of European inflation rates with the corresponding diversity across the regions of the United States. The resulting discussion is ably summarized in the European Central Bank's September 2003 report, 'Inflation Differentials in the Euro Area: Potential Causes and Policy implications' (European Central Bank, 2003d).

The weight of the evidence suggests that price differences in the euro area are comparable in size to price differences in the United States. It also suggests that differences in productivity growth are not at all sufficient to explain euro-area inflation differences. When looking across European countries, there is a strong positive correlation between the level of activity (or output 'gap') and the level of inflation, so that Germany has both low inflation and a depressed level of activity. Both of these seem to be caused, at least in part, by a depressed level of domestic demand for German goods and services. One bit of evidence that points in this direction is that the current account of Germany has been rising recently. Thus, it is not the case that Germans are turning to foreign goods or that other Europeans are shunning German goods. Rather, it is German purchasers that are keeping their domestic purchases low. This means that, but for the constraints imposed by the monetary union, it

Figure 3.8 Inflation dispersion in the euro zone



would be desirable for Germany to pursue more expansionary macroeconomic policies (though the Stability and Growth Pact limits the use of conventional fiscal stimuli for this purpose).

It is highly uncertain, however, that this has strong implications for the euro-wide monetary policy. Even an interest rate that is 'too high' for Germany could easily be consistent with good policy-making on the part of the ECB if other countries in Europe, such as Ireland and Greece, experience excessive inflation. In fact, Bank of Greece Governor Nicholas Garganas has complained about high inflation in his country, so that the German experience alone is insufficient to determine whether the ECB has kept policy too tight.⁴ Different countries in the euro-area ECB might thus benefit from different area-wide policies. The fact that inflation differences among euro-area countries have been relatively modest suggests that this problem is not severe. Even so, a 1% difference between the euro-wide average and the inflation of any one country is not at all rare. This means that a drop of the euro-wide inflation rate slightly below 1% for an extended period could easily involve a sustained period of price declines for one country.

This has led some commentators to worry that 'an inflation target below 2% for the area as a whole may mean that the rate of inflation in the group of regions that need to reduce their relative price levels could become very low, under some circumstances even dangerously close to deflation' (EEAG, 2003, p. 3). This particular report goes on to suggest that an increase in the target inflation rate of the ECB to 2.5% would be sufficient to 'accommodate the required dispersion in national inflation rates' (*ibid.*, p. 5).

The question remains, however, whether the possibility that some countries experience deflation while the euro area as a whole experiences mild inflation is a danger that ought to be counteracted by raising the overall inflation target. We do not think so and tend to agree with former President Wim Duisenberg's statement that this should be of no more concern (to the IMF in this case) than the difference in inflation between California and New Hampshire.⁵ As discussed above, this very partial deflation should not lead the ECB to wish to set a rate of interest lower than zero for the euro area as a whole, so that it does not make the zero bound on interest rates binding. Since we do not think this type of deflation would create large distortions in relative prices for goods, we are left with the question of whether it would distort real wages a great deal.⁶ As

4 See Ekatherimi, 16 July 2003, available at http://www.ekathimerini.com/4dcgi/_w_articles_politics_5096835_16/07/2003_31933.

5 Press conference of 5 June 2003.

6 The data refer to negotiated wages in the producing sector. For the overall economy, the rates of change of wages are marginally below 3% in the same period. See table 9, p. 66, *Bundesbank Monthly Bulletin*, August 2003, Statistical Appendix.

we discussed above, some distortion in real wages is quite possible, particularly because changes in the supply and demand for different types of workers in different parts of the economy imply that wages need not all change by the same amount.

One must note, however, that in the specific case of Germany, nominal wage growth has kept up with productivity growth, which has been relatively high. Four-quarter changes in manufacturing wages have been close to 3% in late 2002 and early 2003. Thus, even if a zero nominal wage change floor exists, it was probably not binding for the vast majority of individuals. The same would probably have remained true had German inflation been 1% lower (so that the country would have skirted deflation) and average wages rose about 1% less. Thus, the actual changes in real wages could probably have been accomplished even with a mild deflation.

Still, a longer period of sustained deflation may well complicate real wage adjustments because real wage growth may have been excessive over this period. If this were true, one would expect that a sustained period of deflation would lead to an important change in the positive relationship between inflation and the 'output gap', with countries that have this deflation showing markedly worse GDP performance. For the moment, data to settle this question are simply unavailable.

3.4 Dealing with the threat of euro-wide deflation

The likelihood of sustained reductions in prices in the euro area as a whole may seem so low as to be undeserving of discussion, particularly since HICP inflation has persistently exceeded 2%. On the other hand, inflation is sufficiently uncertain that it is hard to be confident that it will not fall dramatically in the future even though there is little reason to believe that it will.

The main issue we take up in this section is whether the ECB is taking appropriate steps now both to reduce the odds of a deflationary episode and to ensure its speedy end if such an episode ever begins. The sort of episode whose risk we are considering here would be one where, just as in Japan, the ECB would like to set a real rate of interest lower than is possible by setting nominal rates equal to zero. At that point, setting an interest rate of zero would exhaust the ECB's interest rate instrument. Monetary policy operates, however, both through current interest rates and through market expectations of what the interest rate is likely to be in different circumstances. Expectations of future monetary policy actions would remain important in a deflation. Moreover, the expectations in a

deflation would not depend only on what the ECB would say and do at that time. Rather, the ECB's current actions and pronouncements would influence them as well. Thus, it is pertinent to discuss whether these actions and pronouncements are ideal for preventing deflationary episodes and for curing them if they ever get started.

The ECB and its officials have expressly declared that their policy was to mitigate the risk of deflation. Professor Otmar Issing, in particular, has said 'the definition of price stability is consistent with the need for monetary policy to pre-empt risks of prolonged periods of deflation'.⁷ More specifically, some ECB officials have written that '... the Governing Council's decision to lower interest rates "as a precautionary measure" in April 1999 could be seen as an attempt to insure the euro area against potential deflationary risks ... acting in a pre-emptive manner to potential serious downside risks to price stability...', see Gaspar *et al.* (2002). As we discuss in the next chapter, this move may have been a mistake.

If price setters are forward-looking, it may not actually be necessary to 'pre-empt' the risk of deflation by cutting interest rates as soon as the ECB sees a risk of future declines in inflation.⁸ With forward-looking price setters, price setting today depends mostly on what interest rates will be in the future, since prices are being set for some period of time. By contrast, and somewhat counterintuitively, current short-term nominal interest rates have relatively modest effects on current prices because the current 'period' represents a small fraction of the length of time over which prices set today will remain in effect. Thus, the essential feature of a successful monetary policy in the presence of forward-looking price setters is that future interest rates respond to current shocks in such a way that current price setters respond appropriately to these shocks. By contrast, it is much less essential that current interest rates respond and, indeed, if the stability of short-term interest rates is desired, there is even an argument for having interest rates respond gradually to these shocks. When we take up the properties of actual ECB policy in Chapter 4, we shall see that this policy has at least one common feature with these desiderata. In particular, periods where the ECB changes its interest rate are followed by

7 'The Euro after Four Years: Is There Risk of Deflation?' Speech presented at 16th European Finance Convention, London, December 2002. <http://www.ecb.int/key/02/sp021202.pdf>

8 Eggertsson and Woodford (2003) present an analysis of optimal monetary policy in a case where a shock that causes the zero lower bound on interest rates to bind can be foreseen in advance, and show that optimal policy involves no pre-emptive increase in the inflation target. The news that the disturbance will occur may require a reduction in interest rates, but only because the effect of the news on private-sector behaviour is such that a lower interest rate comes to be compatible with the central bank's unchanged inflation target.

BOX 3.1 Inflation targeting versus price level targeting

A useful distinction is the difference between inflation targeting and price level targeting. With inflation targeting, the central bank aims at achieving a particular inflation rate over, say, the next year or two, independent of where inflation rates have been in the past. With price level targeting, a period of high inflation would need to be followed by a period of low inflation in order to achieve a previously fixed price level aim. Alternatively, price level targeting is tantamount to targeting average inflation over longer periods.

As discussed in Eggertsson and Woodford (2003), price level targeting is particularly useful during a deflationary episode. To see this, suppose that the economy witnesses the onset of a deflation. If the central bank targets some inflation rate, it rides out the deflationary episode (in which its hands are tied by the zero lower bound on interest rates) and continues with its inflation target, once this episode is over. Thus, after a prolonged period of deflation, the central bank targets a path for the price level that is permanently lower as a result of the deflation. The anticipation of this during the deflation makes the real interest rate associated with the zero nominal interest rate higher, contracting demand, and also gives wage and price setters a reason to cut wages and prices more quickly; thus the deflation, with its associated distortions, and the output contraction are both made more severe.

By contrast, if the central bank is committed to a particular future price level, participants on markets will know that a current deflationary episode will be offset by a corresponding and equal-sized inflationary episode in the future. This will imply a lower real rate of interest, stimulating spending, and give wage and price-setters little reason to lower wages or prices. Price declines automatically give rise to countervailing forces that tend to limit the extent of those price declines; as a result, the deflationary impact of a given size of real disturbance will be much less.

periods where this rate stays constant. Thus, new rates of interest can be expected to persist for some time.

Our discussion also suggests that pre-emption of deflation risks – interpreted as an immediate reaction of interest rates to the fear that deflation has become a future possibility – does not have very much to recommend it. On the contrary, it may be counterproductive for the ECB to make statements suggesting that it aims to pre-empt such risks. Such statements make it easier for outsiders to argue against tight monetary policy even when such a policy is warranted. They lead, in particular, to a very difficult public discussion of the probability that current policy would cause deflation in the future. Observers that are soft on inflation are likely to see this probability as larger than others, thereby leading to a debate in which hard data would play a very limited role. By the same token, reporters are likely to ask about risks of deflation at ECB press conferences. This could then push ECB officials into taking absolutist positions such as former President Wim Duisenberg's statement that: 'We are of the firm opinion that such risks [of deflation] do not exist in the euro area'.⁹

It would seem much safer to admit that such risks are always present when inflation is low, but that the ECB's policy mitigates such risks by promising to keep interest rates at zero

⁹ Press conference of 10 July 2003.

for as long as is necessary if the economy ever enters a period of deflation. One concern might be that, by admitting that deflation risks exist, firms are more likely to lower their prices because they are likely to believe that the ECB has superior information. This would seem easy to deal with, however, by having the ECB say that it sees no reason why there should be a general tendency for firms to lower their prices while also recognizing its inability to predict perfectly what firms will in fact do. The ECB could then emphasize that it would respond aggressively if inflation were to fall excessively.

The Duisenberg record

4.1 Inflation outcomes

Jean-Claude Trichet has now taken over from Wim Duisenberg as President of the Governing Council of the ECB. It therefore seems timely to evaluate the performance of the ECB during the presidency of Wim Duisenberg. What has the strategy of the ECB been under his stewardship? What can we learn from official ECB statements *vis-à-vis* the ECB's actions and data? What has happened to inflation and macroeconomic conditions more broadly in the euro zone economy? In summary, how well has the ECB done?

President Duisenberg gave a positive assessment of the Governing Council's accomplishments under his presidency. In a speech taking stock of the ECB's first five years, he stated that '(s)tarting with our experience of monetary policy, and, of course, speaking as an impartial observer, I can say that I am very satisfied with how the Governing Council of the ECB has functioned over the last five years'.¹

How should the ECB's inflation record be evaluated, however? Former President Duisenberg himself gave the answer. At a hearing before the Committee on Economic and Monetary Affairs of the European Parliament in Brussels on 23 November 2000, he responded to a question by a committee member: 'At what point would I say that we can talk about a failure? That would be if, over the medium term future, we were to have domestic inflation of our own making, not caused by external factors, but of our own making, which would over time,

¹ Speech by Dr Willem F. Duisenberg, President of the European Central Bank, at the International Frankfurt Banking Evening, Frankfurt, 16 June 2003 (www.ecb.int/key/03/sp030616.htm).

Table 4.1 HICP inflation in the euro area

	Forecast for the year (%)	
	Average twelve-month rate	December to December
1999-2003 (until September)	1.97	2.14*
1999	1.14	1.70
2000	2.08	2.50
2001	2.34	2.10
2002	2.24	2.30
2003 (until September)	2.14	2.10**

Note: *Average of the annual data 1999-2003.

**From September 2002 to September 2003.

continue to exceed the definition of, at maximum, 2% inflation. Then we would be justified in speaking of a failure, but this is a hypothetical situation which I do not envisage happening at all'.²

This, then, is the standard by which the track record of the ECB over the last five years ought to be measured. On the face of it, this appears to be an easy exercise. Between January 1999 and October 2003, inflation measured as the 12-month change of the HICP has exceeded the maximum of 2% in 32 months, i.e. 55% of the time over the (nearly-complete) five-year period. That percentage rises to 67%, when leaving away the initial transition period of 1999. Alternatively, the average of these inflation rates from January 2000 to September 2003 was 2.20%, exceeding 2%, while the average from January 1999 to September 2003 was 1.97%, just barely below 2%. Or finally (and to avoid 'averaging twice' and to take into account compounding), calculate the change in the natural log of the price level over these episodes, divide by the number of months and multiply with 1200 to get the average inflation overall: this yields 2.14% from January 1999 to September 2003 and 2.23% from January 2000 to September 2003.

No matter how one calculates these numbers,³ the verdict is simple. The ECB has failed to achieve its stated key objective of avoiding inflation in excess of 2%, even if one is willing to concede that it has missed this objective by only a reasonably small amount.

The picture even darkens further, if one examines the transition argument more carefully. For example, the inflation measure for 1999 depends partially on actual inflation during the calendar year 1998, the year before the ECB took over the management of monetary policy.⁴ Since the inflation rate was very low in 1998, this approach underestimates inflation since the introduction of EMU. This can be seen by computing the annual average of the 12-month inflation rates or by defining inflation as the percentage change in the HICP from December to December. Table 4.1 (where we consider only the first nine months of 2003 because of data availability reasons) shows that the average 12-month inflation rates were below 2% only in 1999. December-to-December inflation exceeded 2% in all years, except 1999.

The statement by former President Duisenberg came with some qualifiers, though. The excess of 2% had to be due to the ECB's 'own making' and it had to occur over the 'medium term future'. The rest of this chapter thus aims at giving these

² See www.ecb.int/key/00/sp001123_1.htm.

³ The one exception here is the 1.97% average of the 12-month inflation rates, when averaging from January 1999 to September 2003.

⁴ For instance, the 12-month rate of inflation in June 1999 is an average of the monthly change in prices between June 1998 and December 1998 and between December 1998 and June 1999.

qualifiers a fair reading and interpretation. In particular, we will ask whether past ECB actions can be understood to be geared towards some reasonable interpretation of the below-2% 'medium term' inflation objective. At the end, our verdict will still turn out to be a negative one: we cannot find convincing evidence that the ECB has worked hard at keeping inflation in check and back in line, when it crept above the 2% maximum.

4.1.1 Assessing 'medium-term' inflation

One can reasonably interpret the 'medium term' to dictate taking averages over four or five years, just as we have done above. The ECB, however, takes a different tack in defending its price stability record. It noted from the outset that shocks could drive inflation temporarily above 2%.⁵ In conversations, Professor Issing and senior staff members of the ECB have suggested that 'medium-term inflation' could be thought of as what the inflation rate would be under current policy, except for the effects of certain price shocks that are expected to be transitory. Stabilization of 'medium-term inflation' in this sense would imply stability of a rational forecast of future inflation, but the future horizon at which the inflation forecast must equal the target rate is not fixed, since the effects of different price shocks may be more or less persistent. The ECB also noted that inflation in the euro area has been subject to three adverse shocks in the form of the increase in oil prices and non-energy import prices in 1999 and unprocessed food prices in 2001.⁶ While such shocks are likely to be temporary, although perhaps protracted, and over time just as likely to reduce as to raise HICP inflation, they can have a large impact on the average inflation rate over a few years. While it is no doubt true that inflation in the euro area was exposed to large shocks, prices in Sweden and the United Kingdom were arguably subject to similar shocks. As Figures 4.1-4.3 show, however, these shocks did not push inflation above the inflation-targeting range in these countries, except very briefly in Sweden.⁷

One possible interpretation of 'medium term' is that it means 'forward looking'. While not easily measured, this may lie behind the ECB's emphasis of its success in stabilizing inflation expectations. For example, in the speech by President Duisenberg quoted above, he says: 'The ECB has pursued its mandate of maintaining price stability with vigour and determination. The public has understood this. Inflation expectations, as measured by survey data or by financial market

Figure 4.1 CPI inflation in Sweden (together with target and range)

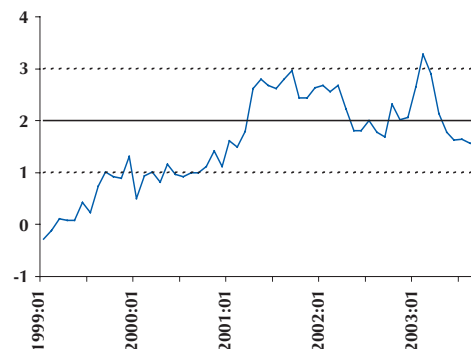


Figure 4.2 RPIX inflation in the UK (together with target and range)

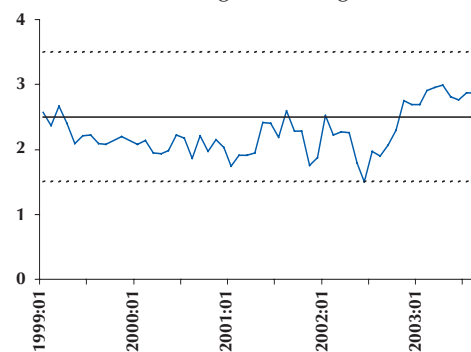
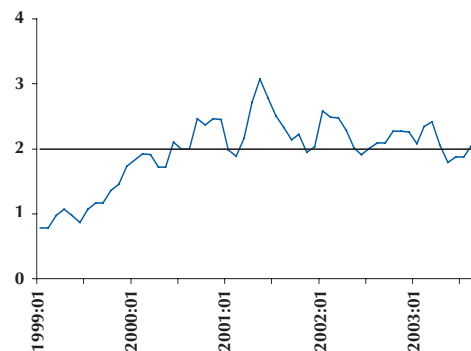


Figure 4.3 HICP inflation in the euro area (together with the upper endpoint of the definition of price stability)



5 See 'The stability-oriented monetary policy strategy of the Eurosystem', ECB *Monthly Bulletin*, January 1999, pp. 39-50 (in particular p. 47).

6 See ECB *Monthly Bulletin*, June 2002, Box 4, pp. 34-36.

7 It should perhaps be noted that the upper limit of the inflation targeting range is 3% in Sweden and 3.5% in the United Kingdom.

Table 4.2 'Medium-term' inflation in the euro area

	'Medium-term' inflation %	
	Average twelve-month rate	December to December
1999-2003 (until July)	1.99	2.15*
1999	1.92	1.89
2000	1.86	2.11
2001	1.87	1.87
2002	2.18	2.46
2003 (until July)	2.46	2.40**

Note: *Average of the annual data 1999-2003.
**From July 2002 to July 2003.

Figure 4.4 Inflation and 'medium-term' inflation in the euro area

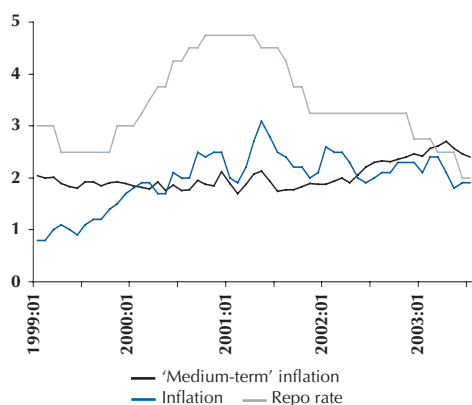
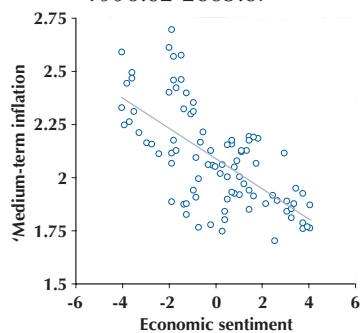


Figure 4.5 'Medium-term' inflation and economic sentiment (sample 1996:02-2003:07)



indicators, have always remained consistent with our definition of price stability'.

This reasoning is followed by the background study by the ECB (European Central Bank, 2003a) that states that a principal reason for defining price stability is to stabilize inflation expectations. If so, the ECB is entitled to claim credit for having achieved one of the objectives for having a 'definition of price stability'. That is by no means, however, the same thing as having achieved the 'overriding objective' of price stability itself. Indeed, at least one of the background studies that is available on the ECB's website, and which is mentioned in the overview itself, specifically says that 'medium-term' developments in the HICP indicator can be used to hold the ECB 'accountable *ex-post*'.⁸

It is no doubt sensible for the ECB to disregard exogenous price-level shocks in setting policy. Such shocks have at most a temporary effect on inflation and, in any case, responding to them might require large movements in interest rates that could induce excessive volatility in real economic activity. Thus, the notion of 'medium-term inflation' is potentially helpful. As the discussion above makes clear, however, this notion must be given an explicit definition in order for the ECB to be held accountable for its conduct of monetary policy.

In the absence of such a definition, we have attempted to develop a measure of 'medium-term' inflation (see Box 4.1). We emphasize that it is somewhat crude and imperfect. Figure 4.4 shows that (our estimate of) 'medium-term' inflation has indeed been more stable than headline inflation in the 1999-2003 period. Table 4.2 indicates, however, that it has averaged just above 2% since 1999. Strikingly, as revealed in Figure 4.4, 'medium-term' inflation started to increase in mid-2002, that is, a little more than a year after the start of a series of interest rate cuts in early 2001, and stood in July 2003 at 2.4%.

This suggests that the increase in 'medium-term' inflation may be due to an attempt by the ECB to offset the weakness in economic activity that started in late 2000. That such smoothing is taking place is suggested by Figure 4.5, which indicates an inverse relationship between the state of the business cycle (as measured using a sentiment variable that is discussed at length in section 4.2.3) and 'medium-term' inflation. We can use these data to estimate what the rate of 'medium-term' inflation would be if the output gap was zero (that is, if sentiment was equal to its mean). Interestingly, that estimate, which is a potential measure of the inflation rate the Governing Council may have been aiming for, is 2.09% using data for the period 1999:1-2003:7.⁹

⁸ See Castelnovo *et al.* (2003, p. 6).

⁹ It remains 2.09% if the estimation is carried out on data starting in 1996:01. The slope parameter is -0.07 in the longer, and -0.08 in the shorter, period. In both cases the intercepts and slope parameters are highly significant.

BOX 4.1 Estimating 'medium-term' inflation

We interpret the ECB's notion of 'medium-term' inflation as the rate of inflation that would be observed in the absence of any shocks to energy, unprocessed food and non-oil import prices. As rough but not unreasonable ways to remove the influence of these prices, we first regress the rate of HICP inflation on a constant, its own first lag, and on the current and once-lagged rates of increase of energy prices, unprocessed food prices and the non-oil import deflator. The estimation is performed on data from February 1996 to July 2003 (the changes are all measured over 12 months because of data availability). Next we assume that the latter three prices are constant and compute a counterfactual rate of inflation that can be thought of as inflation in the absence of price shocks, that is, 'medium-term inflation'.

4.2 The ECB's monetary policy: was it inflation by its 'own making'?

While, in an *ex-post* sense, the ECB record in maintaining low inflation is not stellar, it is perhaps more relevant to assess whether it tried its best *ex-ante*. This is one interpretation of the stated objective of avoiding above-2%-inflation by the ECB's 'own-making'. It also both sheds light on the reasons for its failure in achieving this goal *ex-post* and clarifies whether – leaving aside its stated objectives – the ECB has tried to steer a desirable course. We therefore next turn to the issue of how the ECB has, in fact, conducted monetary policy. How has it assessed the outlook for monetary policy? Has it misjudged the state of the economy? What variables has it responded to?

4.2.1 The ECB's views of the economy

As discussed in Chapter 3, there are several possible explanations for why the ECB has failed to maintain inflation clearly below 2%. For instance, it may have misjudged economic conditions. Or it may have systematically underestimated inflationary pressures in the economy. An alternative view, which to us is more plausible, is that it may not have been overly concerned by inflation in the vicinity of, or just above, the 2% ceiling in order to avoid weak economic conditions. To discriminate between these two hypotheses, we need to have a sense of how concerned the ECB has been by inflation above 2%. Has it interpreted this as warranting an immediate tightening of policy, or has it taken the view that inflation may return on its own to below 2% without further policy measures? Furthermore, how did it view the near-term outlook for inflation? In order to get a handle on these questions, we consider a set of indicators of the Governing Council's views of the economic outlook. These are constructed by reading the

editorials of the *Monthly Bulletin* of the ECB in the period between January 1999 and August 2003.¹⁰

The reason for focusing on the editorials, rather than the full report, is as follows. The *Monthly Bulletins* contain a thorough review of economic conditions in the euro area. While the members of the Governing Council presumably agree with that analysis, it is arguably best interpreted as expressing the views of the ECB's staff rather than those of the Governing Council. By contrast, the editorial covers the first few pages of the report, contains a short explanation for the ECB's actions concerning interest rates in the previous month, and frequently attributes explicit views about the economy to the Governing Council.¹¹ In what follows we therefore rely on the editorials to construct indicator variables to formalize the Governing Council's view of the economy.

Since the editorials focus on three elements – the outlook for economic activity and inflation, and the Governing Council's interpretation of money growth – we construct an indicator variable for each. The indicator variables can take five values (-2, -1, 0, +1 and +2) and should be interpreted as follows. Under 'normal' conditions, that is, when the editorials do not suggest that the Governing Council believes that the outlook for the variable in question warrants any change in policy, the indicator is coded as 0. If the editorials suggest that the behaviour of the variable in question is interpreted as providing some ground for a tightening (relaxation) of policy, the indicator is coded as +1 (-1). Finally, when the editorials indicate an acute concern that the variable in question warrants a change in policy, the indicator is coded as +2 (-2). To be sure, the coding of these indicators is subjective and debatable. Despite this, the indicators may be useful in that they add qualitative information about the ECB's thinking of economic conditions.

In addition to giving us a view of the ECB's thinking about the state and prospects of the economy, reading the editorials closely has a second benefit: they provide a sense of the variables that the ECB regards as being particularly important. By and large, there are no surprises in this regard. The ECB has clearly adopted an information-inclusive strategy, and looks at a broad range of standard indicators from across the different sectors of the euro economy. Despite this, the editorials point to several interesting conclusions.

First, there are frequent references to the behaviour of 'HICP inflation excluding the more volatile items of energy and

¹⁰ This discussion follows Gerlach (2003) who provides more information about the construction of the indicators used below.

¹¹ For instance, in June 1999 it states that '...the Governing Council did not consider that recent monetary developments were indicative of future price pressures' (p. 5) and in January 2000 it notes that '... recent data confirm the Governing Council's previous assessment regarding the outlook ...' (p. 6).

unprocessed food prices'.¹² For those that do read through the editorials, it is clear that this is a measure of core inflation that the ECB is very concerned about. While the ECB has decided not to use core inflation in discussing economic developments on the ground that second round effects make it impossible to remove all the influences of volatile prices on headline inflation, no central bank that uses core inflation believes that its method to compute such a measure is perfect. Rather, core inflation is used merely because it is less subject to temporary distortions than headline inflation. It would simplify the discussion if the ECB also adopted this notion. It could at least provide data on this measure of inflation in the statistical section of its *Monthly Bulletin*. Despite its central role, this data is not available now.

Second, the editorials indicate just how pervasive is the ECB's uncertainty about the current state of the economy. For instance, 'output gaps', in the traditional sense of a discrepancy between actual and detrended output, are never discussed for the simple reason that real GDP data are only observed with a long lag and are then subject to potentially large revisions. Instead, the ECB appears to attach much greater attention to 'leading indicators and survey data' (e.g. September 2002, p. 5) and to measures of 'business confidence' (e.g., May 2002, p. 5). Such indicators have been extensively analysed in the *Monthly Bulletin*.¹³

Third, and perhaps for this reason, there are frequent references to the information contained in financial markets indicators, in particular the yield curve, for the outlook for real economic activity. For instance, 'the yield curve ... remained relatively steep, consistent with expectations of a continuation of economic growth' (May 2000, p. 5).

4.2.2 Inflationary pressures

We first consider the ECB's views of inflation pressures.¹⁴ Figures 4.6a and 4.6b plot the repo rate, actual HICP inflation, HICP inflation computed excluding energy prices and unprocessed food (which we for simplicity we refer to as 'core inflation'), a measure of expected inflation in the coming 12 months computed from forecasts published by *The Economist* and our indicator of the Governing Council's view of inflation pressures.

Several aspects of the figures are interesting. Consider first the surprise interest rate cut in April 1999. The figures attribute this to the ECB believing that inflationary pressures were abating, despite the fact that actual and (our measure of) expected future

12 This reference is from the August 2002 *Monthly Bulletin*, p. 5.

13 See the article on 'The role of short-term economic indicators in the analysis of price developments in the euro area' in the April 1999 *Monthly Bulletin*, pp. 27-39.

14 These are more correctly described as the Governing Council's views.

Figure 4.6a The repo rate against the inflation rate and core inflation

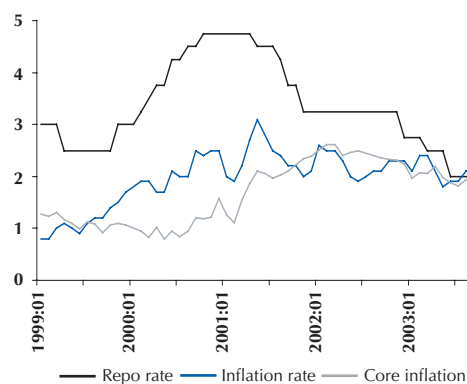


Figure 4.6b The repo rate against expected inflation and the inflation indicator

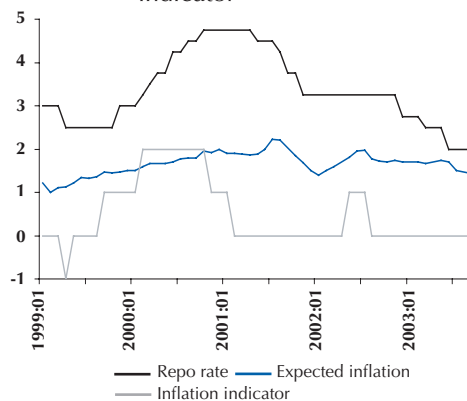


Figure 4.7a The repo rate against industrial production growth and economic sentiment

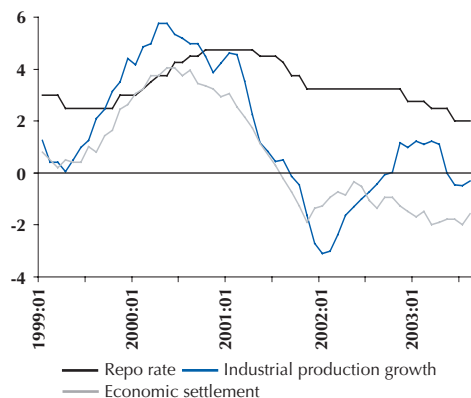
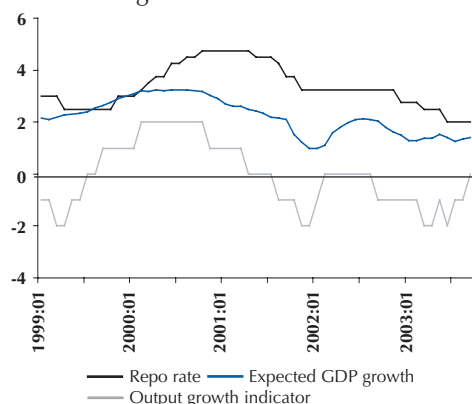


Figure 4.7b The repo rate against expected GDP growth and the output growth indicator



inflation were essentially constant. While it is possible that the ECB had private indications that inflation was slowing rapidly, it is unclear why its views about the outlook for inflation changed.

Subsequent to the relaxation of policy in the spring of 1999, the ECB grew increasingly concerned as actual and expected inflation started to rise. In early 2001, however, the ECB suddenly became much less concerned by inflation pressures, despite the fact that headline inflation was above the 2% level that constitutes the upper limit of its definition of price stability. The editorials again signal concerns regarding inflation for a brief period in the middle of 2002 as expected inflation rose temporarily to the 2% level.

Overall, the editorials suggest that despite the fact that headline inflation exceeded 2% for a large part of the time period considered, the ECB did not express acute concerns that inflation was too high. Instead, the ECB seemed to feel that inflation was high because of various disturbances outside its immediate control (chiefly the behaviour of energy prices and exchange rates) and that, furthermore, these influences were expected to abate soon and therefore did not warrant a change in policy.

It is important to stress, however, that the international value of the euro and the cost of imports are affected by the ECB's actions. While an attribution of euro area price developments to movements in the exchange rate has the potential for letting the ECB off the hook, the causation may have indeed been in the reverse direction. The rate cut of April 1999, in particular, may well have been responsible for some of the euro depreciation that the ECB later blamed on randomness in its external environment: anticipated future inflation can cause a current depreciation of the currency.

4.2.3 Economic activity

The editorials also contain a clear review of the Governing Council's assessment of economic activity. While the discussion is phrased in terms of the implications of current and prospective movements in activity for future inflation pressures, a competing interpretation is that, despite its rhetoric, the ECB cares about activity in much the same way as inflation targeting central banks do.¹⁵ To explore these issues, Figures 4.7a and 4.7b contain the indicator capturing the outlook for economic activity together with three measures thereof: industrial production, expected future real GDP growth from *The Economist*, and a measure of 'economic

¹⁵ That is, it attaches some weight to economic activity over and beyond what it implies for future inflation.

sentiment'.¹⁶ While the latter variable is not traditionally considered in analyses of interest-rate setting by central banks, the discussions of the outlook for activity in the editorials contain strikingly frequent references to the behaviour of economic sentiment, which suggests that it plays an important role in the Governing Council's thinking about the economy. To understand the information contained in the sentiment index, it is helpful to compare it with commonly used measures of the business cycle. Figure 4.8 contains a plot of sentiment and the output gap and Figure 4.9 contains plots of sentiment and the business cycle component of real GDP.¹⁷ Not only is sentiment strongly correlated with these series, it seems to be leading the other measures of business cycles (by two and five quarters, respectively). We conclude that since sentiment is strongly correlated with objective measures of activity, but available more rapidly (except for, of course, the surveys of GDP expectations) and is never revised, it makes eminent sense for the ECB to use this as an indicator *primus inter pares*.

Figures 4.7a and 4.7b show a strong correlation between the different measures of real economic activity. Indeed, the pairwise correlations of industrial production, sentiment and expected GDP growth are all above 0.80. Interestingly, the highest correlation, 0.95, is between sentiment and expected real GDP growth, again suggesting that the sentiment indicator does in fact capture important and relevant information. Overall, Figures 4.6 and 4.7 indicate that while the Governing Council's outlook for inflation is not tightly linked to formal measures of inflation, its interpretation of the outlook for economic activity is strongly correlated with a number of measures of output. Of course, this suggests, as we argued earlier, that the ECB has not been overly concerned about inflation even when it was above 2%.

Two aspects of Figures 4.7a and 4.7b are particularly interesting. First, the cut in interest rates in spring of 1999 is

Figure 4.8 Output gap and sentiment (normalised data, using Hodrick-Prescott filter)

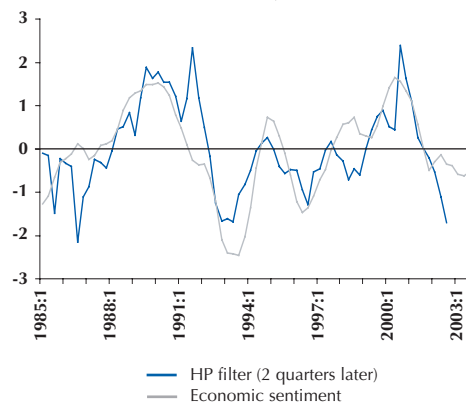
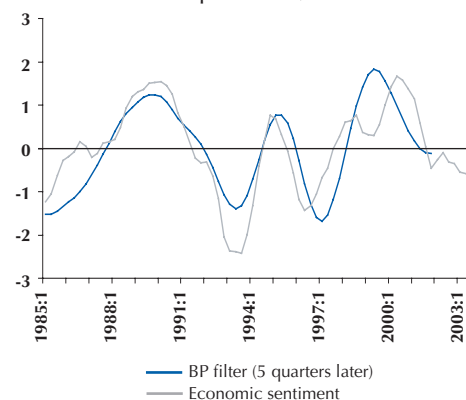
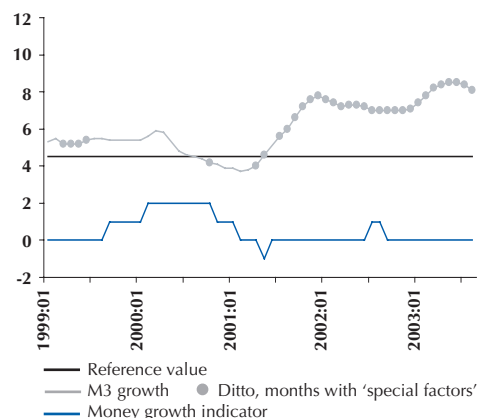


Figure 4.9 Business cycle component and sentiment (normalised data, using band-pass filter)



16 Since the industrial production index is quite volatile, we use a three-month moving average of it in the analysis that follows. The economic sentiment index pertains to the euro area. It is based on surveys of firms and consumers conducted at the national level. The data sample is very large: for the EU it is based on a sample of 68,000 firms and 27,000 consumers. The sentiment indicator attaches a weight of 40% to the industrial confidence indicator, 20% to the consumer confidence indicator, 20% to the construction confidence indicator and 20% to the retail trade confidence indicator. The sentiment indicator takes values close to 100 and we demean it in order to facilitate the graphical presentation. For more information about the index, see: http://europa.eu.int/comm/economy_finance/indicators/business_consumer_surveys/userguide_en.pdf

17 For the technically interested reader, the output gap has been computed using the Hodrick-Prescott filter (with $l = 1600$) and the business cycle component by using a band-pass filter to extract from the logarithm of real GDP the frequency band corresponding to a periodicity of between 16 and 32 quarters.

Figure 4.10 Measures of money growth

clearly tied to a weakening of economic activity. Second, a comparison of the figures for inflation and economic activity indicates that the surprising shifts in the ECB's outlook for inflation in late 2000 and in the middle of 2002 appear due to the weakening of economic activity rather than to a decline in inflation. While it is hazardous to interpret these data solely by inspection, they do suggest that the ECB attaches greater weight to movements in activity than to movements in inflation. The sometimes-heard claim that the ECB ignores the real economy due to an exclusive focus on price stability thus seems ill founded. As we discuss further below, the evidence suggests that the ECB's approach is one that implies a great deal of response to variations in real activity, whether or not that turns out to also be consistent with the pursuit of price stability.

4.2.4 Money growth

Given the prominence the ECB attaches to the 'first pillar' in its monetary policy strategy, it is of particular interest to review its interpretation of money growth. Figure 4.10 contains the money growth indicator together with M3 growth and the reference value. Since the ECB emphasizes a three-month moving average of M3 growth in discussing monetary developments, we use that definition. As discussed in past issues of this report, the ECB has tended to downplay the importance of money growth on the occasions when it has exceeded 4.5%. Initially, it attributed this tendency to 'special factors', 'portfolio shifts', etc., but has more recently merely stated that the growth of M3 posed no risks to the inflation outlook despite the fact that it has been above the reference value. In the figure we show when the editorials indicated that the Governing Council felt that the information from money growth could be disregarded in setting interest rates.

The figure shows a familiar story: money growth has exceeded the 4.5% limit for most of the period, particularly so after the tragic events of September 11 2001.¹⁸ Furthermore, the editorials show that for most, if not all, of the last two years, the ECB has felt that the information content of money growth for inflation was impaired and that the 'first pillar' did in fact not signal 'risks to price stability'. It is also notable that in the spring of 1999, as economic activity slowed and the ECB cut interest rates despite the fact M3 growth was above the reference value, the ECB argued that the first pillar should not be interpreted as pointing to inflation risks.

Turning to the money growth indicator, in the second half of 1999 as inflation was rising, the comments in the editorials

¹⁸ In fact, in the period between January 1999 and September 2003 M3 growth averaged 6.1%.

suggest that the ECB grew more concerned by money growth. As, however, economic activity weakened towards the end of 2000 and the Governing Council initiated a series of interest rate cuts, it felt increasingly less worried about the information from the first pillar (although, admittedly, M3 growth during this period was below the reference value).

4.2.5 Summary

We interpret the editorials as indicating that in setting interest rates the ECB's concerns have focused on real economic activity. Furthermore, when economic activity has suggested the need for a change in monetary policy, the information in headline inflation or in M3 growth has been downplayed. Overall, our reading of the editorials supports the conclusions in Chapter 2 of this report that the ECB has been satisfied with inflation in the neighbourhood of 2%. Since this has been the case for most of the period we consider here, it has concentrated on stabilizing real activity and has systematically judged developments in money growth as being uninformative about future risks to price stability. It is indeed doubtful that the ECB's interest rate decisions would have been any different, had it adopted a standard flexible inflation targeting strategy of, say, a 2% HICP inflation target with a tolerance interval of plus/minus 1%, with no explicit role for money.

4.3 Interest-rate setting by the ECB

So far, we have relied on qualitative measures of the ECB's views of economic conditions, constructed from the editorials in the *Monthly Bulletin*, to analyse its interest rate decisions. Next, we formalize this discussion and use empirical reaction functions, of the Taylor-rule variety, to understand better the ECB's assessment of the need for policy changes.

Interest rate rules similar to the one proposed by Taylor (1993) have played a prominent role in outside commentary on the ECB and have been used in one way or another by all earlier reports in the series on 'Monitoring the European Central Bank'.¹⁹ Since these were written before there were sufficient data to estimate a reaction function solely for the ECB period, they used estimates for the Bundesbank and the Federal Reserve, or studied the path of interest rates implied by different calibrations of the reaction function. A Taylor-type rule appears also to have played a role in the ECB's (although not necessarily the Governing Council's) own thinking about monetary policy. In particular, it is incorporated in the ECB's area-wide model of

¹⁹ See Begg *et al.* (1998, 2002), Alesina *et al.* (2001) and Favero *et al.* (2000).

the euro area (see Fagan *et al.*, 2001) and employed by a number of other ECB working papers.²⁰

Despite this, there are two shortcomings of the literature estimating interest rate rules on euro area data. First, a mixture of data from before and after the establishment of EMU is typically used.²¹ This makes it difficult to interpret the results as providing clear estimates of the ECB's interest rate decisions. Second, the rules are estimated using OLS, which is not appropriate given that in most months interest rates are left constant and that changes are typically equal to plus/minus 25 basis points.

Gerlach (2003) uses information on interest rate changes from February 1999 to June 2003 to estimate an ordered probit model. In this model the dependent variable equals +1 in the months when interest rates were raised, 0 when they were left unchanged, and -1 when they were cut.²² The probability of an increase (decrease) is assumed to depend on the lagged level of the repo rate (r) in relation to the lagged level of (some measure) of inflation (π), economic activity (y) and M3 growth (Δm). If the interest rate last month was 'low' relative to the other variables included in the analysis, one would expect the ECB to be relatively likely to raise interest rates. Moreover, the lagged change in the repo rate (Δr) is included. This variable might have a positive sign, thus accounting for interest rate smoothing, or a negative sign, capturing the fact that immediately after a policy change, the ECB may be less likely to change interest rates again.

While this specification is straightforward, it remains to ascertain which variables best capture the interest rate decisions of the Governing Council. For instance, is headline HICP inflation statistically more strongly related to subsequent interest rate changes than other measures of inflation? Given the time lags by which real GDP data are reported and the resulting inability to rely on the output gap, what real-side variables does the ECB appear to react to? In particular, what is the role of the indicators of business confidence or sentiment that appear so frequently in the editorials?

Estimating the ordered probit models on the data used in Figures 4.6, 4.7 and 4.10, one finds that core inflation is more reliably tied to changes in the repo rates than the other measures of inflation (see Box 4.2). Of course, this does not

20 The Dynamic Stochastic General Equilibrium (DSGE) model of the euro area presented by Smets and Wouters (2003) also comprises a version of the Taylor rule. Gerdesmeier and Roffia (2003) contains an exhaustive series of empirical estimates of reaction functions for interest rates in the euro area.

21 Papers that use data solely from the ECB period include Breuss (2002), Heinemann and Hüfner (2002), Hayo (2002) and Ullrich (2003).

22 It would be possible to use more than three states since interest rates on some occasions were changed by more than 25 basis points. Due to the small size of the sample, however, it does not seem appropriate to do so.

BOX 4.2 Estimates of interest rate reaction functions

The discussion in the text is based on estimates of ordered probit regressions on monthly data spanning 1999:02-2003:06 in which the probability of an interest rate increase is given by:

$$Prob(increase)_t = f(\rho_1 r_{t-1} + \rho_2 \Delta r_{t-1} + \beta \pi_{t-1} + \delta y_{t-1} + \mu \Delta m_{t-1}) + v_t \quad (1)$$

The probabilities of no change and of a cut are defined accordingly. We expect that $\rho_1 < 0 < \beta, \delta, \mu$ so that the probability of a rise (cut) in interest rates depends, *ceteris paribus*, negatively (positively) on the lagged level of the repo rate and positively (negatively) on the lagged levels of inflation, real economic activity and, potentially, money growth. The impact of Δr is unclear. Inflation, real economic activity and money growth are dated $t-1$ to account for reporting lags.

As a first step we need to render the sentiment index interpretable. Much empirical work on interest rate reaction functions has used a measure of the output gap, defined as $100 \times \log(y/y^*)$ where y denotes real GDP and y^* some estimate of potential GDP. We proceed in an analogue fashion. Since sentiment, s , is stationary, however, we use the percentage difference between the sentiment index and its mean, that is, $100 \times \log(s/s^*)$, where s^* denotes the mean of s .

To ascertain what variables best capture the interest rate decisions of the ECB, we estimate the model using alternative measures of inflation and economic activity, incorporating the lagged level and change of the repo rate and the lagged three-month average of money growth. Table 4.3, in which we provide the pseudo R -squared from the different specifications, shows that the model fits best when the sentiment index and core inflation are used.

Table 4.3 Pseudo R -squared from preliminary estimates of ordered probit model sample 1999:02 2003:06

	Measure of economic activity		
Measure of inflation	Industrial production	Sentiment	Expected real GDP growth
Headline inflation	0.21	0.47	0.30
'Medium-term' inflation	0.25	0.35	0.26
Core inflation	0.21	0.50	0.28
Expected inflation	0.23	0.44	0.34

Table 4.4 Estimates of ordered probit models 1999:02-2003:06

	A	B	C	D
Change in repo rate, lagged	-4.76 (2.48)	-3.92 (2.44)	-3.92 (2.44)	-3.39 (2.30)
Fundamental, lagged			2.76 (3.63)	1.66 (3.95)
Core inflation, lagged	2.86 (2.06)	3.61 (2.81)	0.86 (1.10)	
Sentiment, lagged	2.47 (3.79)	2.35 (3.81)	-0.41 (1.37)	
Money growth, lagged	0.57 (1.37)			
Repo rate, lagged	-2.29 (2.80)	-2.76 (3.63)		
Pseudo R -squared	0.50	0.48	0.48	0.43
Log likelihood	-20.88	-21.89	-21.89	-24.09
p-value	NA	0.16	0.16	0.13

Notes: Absolute value of z -statistic in parentheses. The fundamental is defined as core inflation plus sentiment minus the repo rate. The p -values stem from tests of the restrictions imposed by Models B, C and D on Model A.

BOX 4.2 continued overleaf...

BOX 4.2 Estimates of interest rate reaction functions (cont.)

We provide the estimates of equation (1), using sentiment for γ and core inflation for π , as Model A in Table 4.4. The results show that all variables are significant, except money growth. Dropping this variable, we obtain Model B. Since $\rho_1 \approx \beta \approx \delta$, we impose this restriction, but also include the sentiment variable and core inflation separately (Model C). This amounts merely to a reparametrisation of the model. These latter variables are insignificant, however, implying that the restriction is not binding, and we therefore drop them. The final model, Model D, thus sees decisions to change interest rates as driven by two factors. The first of these is the level of inflation and the percentage point deviation of sentiment from its mean relative to the repo rate, which one may think of as a fundamental, that is, $f_t = \pi_t + \gamma r_t$. The second is whether the repo rate was changed in the previous month. Overall, the two forcing variables can be written as $1.7f_t - 1 - 3.4\Delta r_{t-1}$.

A critical feature of this reaction function is that the coefficient on core inflation is unity, which implies that the ECB has not raised real interest rates in response to increases in core inflation. We interpret this as providing compelling evidence of the lack of priority given to inflation control.

mean that in fact the Governing Council focuses only on this variable in conducting policy. In setting policy it is natural and appropriate to rely on a range of variables, including different measures of inflation. In applied econometric work, by contrast, it is necessary to focus on a limited number of such variables in order to avoid multicollinearity. Thus, while this finding does not indicate that core inflation is the only measure of inflation of concern to the ECB, it does suggest that further clarification of its special role, if any, may be desirable.

Regarding the real side variables, the prominence of sentiment and confidence indicators in the editorials is confirmed by the econometric analysis, which suggests that the measure of sentiment is statistically much more significant than several alternative measures of economic activity. Moreover, the lagged level of the repo rate is highly significant. By contrast, the growth of M3, perhaps not surprisingly, is insignificant. Finally, the lagged change in the repo rate is also highly significant and negative.

It turns out that the ECB's policy decisions can be captured by a very simple statistical model, just as Taylor (1993) found for the United States. The model suggests that the ECB's interest rate decisions depend on two factors. The first of these captures the state of the economy and is given by the linear combination of core inflation plus the sentiment variable relative to the level of the repo rate, which we think of as the fundamental determinant of interest rate changes. The second factor is simply the lagged change of the repo rate and captures the fact that the ECB is somewhat hesitant to change the interest rate again in the month immediately after a policy change.

Despite its simplicity, the model does a reasonable job in accounting for changes in the repo rate: of the 53 observations

in the sample it classifies 48 correctly.²³ It predicts six of the seven months in which the repo rate was increased, and five of the eight months in which it was cut (and consequently over predicts the number of months the interest rate was left unchanged by four).

Figure 4.11, which plots the fundamental determinant of interest rates over time, provides further evidence on the in-sample fit of the empirical model. We have marked the months in which the repo rate was increased or cut and the levels of the fundamental at which the probability of a repo rate change is 50%. Furthermore, Figure 4.12 shows the probability of a change in the repo rate as a function of the value of the fundamental (assuming that there was no change in monetary policy last month). Given that the fundamental was about -1.9 in September 2003 when the core inflation data ends, the probability of an interest rate change does not appear high. Finally, Figure 4.13 contains a plot of the repo rate together with the implied probability of a tightening and loosening of monetary policy. The figure shows that in the latter part of 1999 and early 2000, the probability of interest rate increases was quite high, and that subsequently, the probability of interest rate cuts was high, particularly in late 2001 and early 2003.²⁴

4.4 Conclusions

The main conclusions of this chapter are as follows.

First, headline HICP inflation has averaged above 2% since the ECB took charge of monetary policy in the euro area in January 1999. Whether that implies that the ECB has failed to live up to its commitment to deliver price stability is, strictly speaking, debatable since there is no indisputable measure of 'medium-term' inflation by the ECB's 'own making'. Based on the evidence reviewed in this chapter, however, our judgement is that it has not succeeded in maintaining price stability. We believe that this is primarily because the ECB has not been overly concerned by headline inflation in excess of 2%, given the shocks to energy, food and import prices and the weakness of real economic conditions. This interpretation is supported by our reading of the editorials in the ECB's *Monthly Bulletin*, in which the Governing Council repeatedly took the view that inflation was above the 2% limit because of temporary disturbances that did not warrant policy action. Furthermore, we interpret the evidence as suggesting that the Governing Council has aimed for headline inflation close to 2% on average,

23 The model is said to predict an outcome (say, an interest rate cut) if the estimated probability of that event is higher than the estimated probabilities of the two other possible events.

24 The estimated probabilities are somewhat rugged because they depend on whether or not a policy change occurred in the last month.

Figure 4.11 Fundamental and repo rate changes

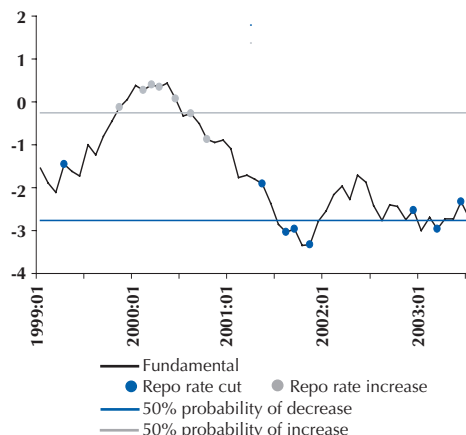


Figure 4.12 Probability of repo rate change as a function of fundamentals

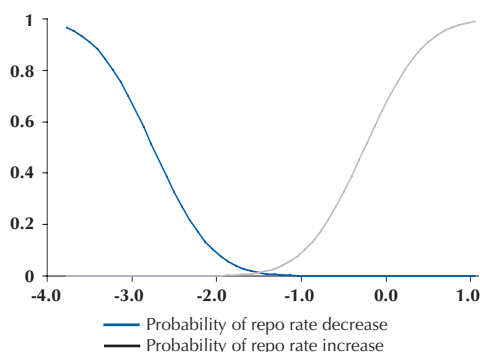
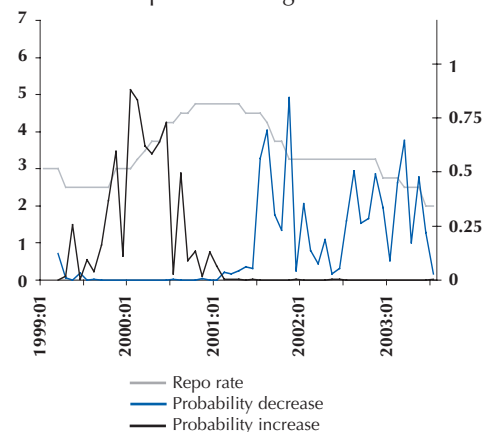


Figure 4.13 Repo rate and probability of repo rate changes



rather than a rate clearly below 2%. And often, policy rates have declined without evidence that inflation could be expected to fall again below the 2% upper bound soon.

Second, the editorials give the clear impression that the Governing Council has attached considerable weight to real economic developments. While this may be because they signal future movements in inflation, another interpretation is that the ECB has attempted to smooth or even stimulate real activity. The editorials also demonstrate that the Governing Council has interpreted movements in money growth as largely due to shocks to portfolio preferences and changes in the interest rate environment. Arguing that they are of limited significance for future risks to price stability, it has attached little importance to the rapid growth of M3, despite its rhetoric of a prominent role for money, see Chapter 2.

Third, these conclusions are supported by the estimated reaction functions that show that the ECB has reacted strongly to economic sentiment, to which the editorials attach significant weight as an almost real-time measure of economic activity. Lagged core inflation is also significant but money growth is not. Strikingly, the estimates are compatible with the notion that the Governing Council's interest rate response to inflation is so tepid that, if this policy continues, inflation could rise well above 2% in the future. This would be costly to correct once it has occurred, and it should therefore be avoided. Inflation expectations may still be reasonably low because of tough rhetoric. Actual inflation appears, however, to be adrift due to inattentive policy.

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