

## ARTICLES

# EXPECTATIONS AND THE CONDUCT OF MONETARY POLICY



*Monetary policy involves anticipating future developments, monitoring and managing private sector expectations over the cycle, and providing a long-term nominal anchor for the economy. As historical experience suggests, well-anchored long-term inflation expectations are a prerequisite for successful monetary policy conduct and a crucial indicator of central bank credibility. In this respect, the ECB's quantitative definition of price stability is a key asset. Over the cycle, the management of expectations is rooted in the consistent behaviour of the central bank and requires active communication. While aiming for a high level of short-term interest rate predictability, the Governing Council of the ECB articulates its communication around a comprehensive assessment of the macroeconomic situation and the risks to price stability over the medium term. At times of heightened uncertainty, the ECB needs to monitor private sector perceptions of economic prospects and to preserve its ability to steer expectations over the medium term.*

### I INTRODUCTION

Economic decisions are largely driven by agents' expectations. Expectations are at the core of contemporary macroeconomic theory and play a key role in modern central banking practice. As a consequence, monetary policy involves anticipating future developments, monitoring and managing private sector expectations over the cycle, and providing a long-term nominal anchor for the economy. Central banks must constantly form a view of the economic outlook at the medium-term policy-relevant horizon. In devising their policy actions, they always need to consider the lasting significance of their decisions for expectations. The building-up of exaggerated or unreasonable expectations is always a source of concern for monetary authorities.

Section 2 of this article reviews the main reasons for the crucial importance of expectations in monetary policy conduct, illustrating in particular the pivotal role of long-term inflation expectations. Section 3 explores the specific economic configurations in which inflation expectations can become an independent source of macroeconomic instability, while Section 4 analyses the central bank instruments that history and practice have proved to be effective in preventing such adverse circumstances.

Section 5 deals with more specific challenges for monetary policy related to the building-up of unreasonable expectations in asset price formation or to the risk of expectations traps. Section 6 concludes.

### 2 WHY MONITOR EXPECTATIONS?

#### EXPECTATIONS AND MACROECONOMIC PROPAGATION

Central banks need to constantly form and monitor expectations about future economic developments for two reasons. First, monetary policy actions have a lagged impact on the economy and inflation, so a price stability-oriented monetary policy needs to form expectations about the likely future evolution of the economy and respond to risks to price stability in a forward-looking manner. There is indeed a large body of empirical evidence for different countries and alternative monetary regimes that documents the lags in the monetary policy transmission mechanism. This literature suggests that monetary impulses affect economic activity with a delay of several quarters and, subsequently, inflation with some further delay. Results from time series models, such as structural Vector Auto-Regression (VAR) techniques, for the euro area are broadly in line

with the findings of the literature for the United States and many other countries.<sup>1</sup> Evidence from estimated structural economic models broadly confirms those results.<sup>2</sup> Owing to the transmission lags, central banks must calibrate their actions to exert some influence on expected macroeconomic developments several quarters ahead. The operational conduct of monetary policy therefore requires a thorough assessment of the risks to price stability at the policy-relevant horizon.

Second, central banks monitor private sector expectations because expected changes in economic variables (e.g. prices and quantities) can profoundly influence current economic behaviour through multiple channels. For example, expected increases in prices tomorrow exert upward pressures on prices today through various channels, including higher wage claims as workers demand higher wage increases today to offset the expected loss of purchasing power tomorrow. Similarly, higher inflation expectations have an impact on firms' current pricing decisions as firms tend to increase their prices to compensate for the expected increase in their marginal costs of production. Another important channel through which expectations can influence the current state of the economy is asset prices and the impact that asset prices have on the present value of wealth and incomes. There are indeed various channels through which asset prices are considered to affect economic decisions and aggregate demand. Economic research has emphasised the important effect that financial and non-financial wealth has on consumption behaviour, the relevance of the Tobin's Q effect on investment plans, the role played by balance sheets in private spending (via the credit channel) and the confidence effects of asset price changes on consumption.<sup>3</sup>

The close interrelationship between asset price formation, current economic choices and expectations is a further reason for central banks to attentively monitor private sector expectations about future economic outcomes. Expectations formed by economic agents may shift not only in reaction to changes in economic fundamentals,

but also as a result of misperceptions or forecasting errors. To the extent that economic agents act on such misconceptions by formulating economic choices in the present and to the extent that misconceptions are embedded in asset prices, they can constitute an autonomous source of economic fluctuations.<sup>4</sup> Monetary policy is particularly affected by an expectations-driven business cycle, since the effect of monetary policy on the economy is to a large extent conditioned by private sector expectations of future monetary policy actions.

#### THE INSTRUMENTAL ROLE OF INFLATION EXPECTATIONS

While price stability is the best contribution that monetary policy can make to sustainable economic growth, job creation and prosperity,<sup>5</sup>

- 1 This literature is surveyed by L. Christiano, M. Eichenbaum and C. Evans (2000), "Monetary policy shocks: what have we learned and to what end?", in J. B. Taylor and M. Woodford (eds.) (2003), *Handbook of Macroeconomics*. G. Peersman and F. Smets (2003), "The monetary transmission mechanism in the euro area: more evidence from VAR analysis", ECB Working Paper No 91, for example, report that an unexpected, temporary rise in the short-term interest rate tends to be followed by a temporary fall in output after two quarters. The effect on output reaches a peak after three to five quarters and returns to baseline afterwards. Prices, however, respond much more sluggishly, with the impact of monetary policy impulses becoming statistically significant only after two years. Compared with the United States, euro area prices appear to respond more sluggishly, which is most likely due to the well-documented lower degree of price flexibility in the euro area compared with the United States.
- 2 For the euro area, F. Smets and R. Wouters (2003 and 2005) point towards hump-shaped responses of both the output gap and inflation to a monetary policy shock, with peak effects in line with those produced by the structural VAR methodology.
- 3 See F. Altissimo et al. (2005), "Wealth and asset price effects on economic activity", ECB Occasional Paper No 29.
- 4 This mechanism driving business fluctuations is portrayed in early writings on macroeconomic dynamics, e.g. A. C. Pigou (1927), *Industrial Fluctuations*, London (MacMillan), and it lies at the basis of the literature on asset price bubbles. See also the article entitled "Asset price bubbles and monetary policy" in the April 2005 issue of the Monthly Bulletin.
- 5 For instance, when inflation increases it becomes more difficult for private agents to disentangle changes in relative prices (knowledge of which is needed to allocate resources efficiently and to enhance overall productivity in the economy) from changes in the general level of prices. Moreover, higher inflation exerts a negative impact on capital accumulation, and thus on long-run productivity, due to the non-indexation of the tax system. See the article entitled "Price stability and growth" in the May 2008 issue of the Monthly Bulletin for a further discussion.

the credibility of the monetary authority in consistently delivering stable prices is built and preserved over time. Such credibility is key to the process by which agents form expectations of future price developments and thus to the price formation mechanism itself. Therefore, central banks must constantly monitor the general public's perceptions about their commitment to maintain price stability as a proxy for the likelihood that they will in fact accomplish their objective. In this respect, the anchoring of long-term inflation expectations appears to be a crucial indicator of central bank credibility and, indirectly, of central banks' success.

As such, it is also a precondition for effective monetary policy conduct. Unstable dynamics of inflation expectations could emerge because market participants lose confidence in the central bank's commitment to maintain price stability or disagree with its assessment of economic prospects. In such a situation, in which the central bank's assessment and intentions and the perceptions of the general public are misaligned, monetary policy becomes more challenging. Therefore, in order to prevent such situations from arising in the first place, constant monitoring of private sector expectations is in order.

### THE ECB'S MONITORING OF MEDIUM TO LONG-TERM INFLATION EXPECTATIONS

A variety of indicators are available to assess private sector inflation expectations in the euro area, each of them involving significant measurement problems (see Box 1 for recent developments in these indicators). Some measures are derived from surveys, while other measures are extracted from financial market data. Among the different surveys which collect information on inflation expectations in the euro area, an important source is the ECB Survey of Professional Forecasters (SPF). The main merits of this survey are the relatively large panel of respondents – which makes the SPF rather representative of the general state of expectations – and the fact that respondents also provide information on their assessment of the

probability of the future outcome falling within specific intervals. Other survey indicators are more qualitative in nature. For example, consumers' opinions on inflation developments in the euro area that are collected by the European Commission give an indication of the general perceptions about inflation in the past and the expected direction of inflation in the future, and refer exclusively to short-term developments.<sup>6</sup>

In contrast to survey findings, inflation expectations derived from financial market data are not directly observable and need to be estimated. A number of measures are available for the purpose of inferring market expectations from asset prices. First, a break-even inflation rate (BEIR) can be constructed across the maturity spectrum. By definition, the BEIR is the rate of inflation that, if realised, would equalise the expected returns from an investment in a conventional nominal bond with those from an inflation-linked bond of the same maturity. Second, the prices observed in the market for inflation derivatives, in particular inflation swaps, allow the construction of alternative measures of inflation compensation. These financial market-based measures of inflation expectations should nonetheless be interpreted with caution, as they typically incorporate various risk premia that compensate bond investors in particular for inflation uncertainty and liquidity risk.

### 3 THEORETICAL SOURCES OF INSTABILITY IN EXPECTATIONS

The evolution of central banking practices, as well as advances in theoretical and empirical research, clearly support the view that

<sup>6</sup> Consumers are asked for their perceptions of past inflation developments (over the previous 12 months) and their expectations regarding future developments (over the following 12 months). By definition, balance statistics only provide qualitative information on the directional change of consumers' inflation perceptions and expectations; they give no indication of the magnitude of the perceived and expected rates of inflation. For a more detailed discussion, see the article entitled "Measured inflation and inflation perceptions in the euro area" in the May 2007 issue of the Monthly Bulletin.

inflation expectations play an important role. Badly managed expectations could constitute an independent source of macroeconomic instability. This section reviews the main theoretical explanations of how inflation expectations can drift away from the central bank objective and emphasises the role that monetary policy, by tolerating such drifts at an early stage, may play in propagating and exacerbating an inflationary disturbance.

#### MONETARY POLICY DESIGN UNDER RATIONAL EXPECTATIONS AND ANCHORING OF LONG-TERM INFLATION EXPECTATIONS

In a world governed by the “rational expectations” paradigm, economic agents are forward looking and form their expectations efficiently and homogeneously using all the information available, including precise knowledge of the functioning of the economy. Under the rational expectations hypothesis, instability of long-term inflation expectations can only develop if monetary policy is not perceived as a credible guardian of price stability.

A systematic record of insufficiently forceful responses to inflationary pressures can lead private agents to doubt the commitment of the central bank to price stability. The literature has widely discussed policy remedies that would anchor expectations around the intended objective of monetary policy in order to avoid this undesirable outcome. In very simple rational expectations modelling frameworks of the latest generation, this remedy takes the form of the “Taylor principle” whereby the nominal interest rate responds more than one-to-one to changes in the (actual or expected) inflation rate. A steady and credible threat to increase the real short-term interest rate in response to rising inflation expectations, for example, ensures – within these simple macroeconomic frameworks – that any inflationary pressure will be promptly reabsorbed. This reassurance, in turn, is sufficient to anchor expectations and prevent destabilising expectations dynamics from developing in the first place.

With more general and realistic descriptions of the functioning of the economy, and notably of the expectations formation mechanism, the requirement for monetary policy conduct to provide a credible focal point for long-term expectations may, to some extent, differ from the Taylor principle.<sup>7</sup> However, the main policy conclusion from this strand of literature remains that well-designed and well-intended monetary policy conduct can and should successfully anchor long-term inflation expectations.

#### LEARNING DYNAMICS AND INSTABILITY IN EXPECTATIONS

Even within the stylised optimising macroeconomic models of the latest generation, it is possible to study inflation expectations patterns where some of the assumptions implicit in the rational expectations paradigm have been relaxed. Once a more complex and realistic description of expectations formation is allowed for, inflation expectations can become an independent source of economic fluctuations, which is not necessarily rooted in a systematic lack of strength of the policy reaction to inflation.

The burgeoning literature on learning and imperfect knowledge in macroeconomics<sup>8</sup> finds that shocks of a similar magnitude are amplified and prolonged under learning relative to a situation where agents form model-consistent rational expectations. Under certain conditions, long-term inflation expectations may in fact overreact to shocks and drift away endogenously, reflecting the impact that disturbances exert on the reassessment by private agents of the key

7 See J. Benhabib, S. Schmitt-Grohé and M. Uribe (2001), “Monetary policy and multiple equilibria”, *American Economic Review*, Vol. 91, pp. 167-186.

8 See A. Orphanides and J. Williams (2005), “Imperfect knowledge, inflation expectations and monetary policy”, in B. Bernanke and M. Woodford (eds.), *The Inflation Debate*, University of Chicago Press; A. Orphanides and J. Williams (2006), “Inflation targeting under imperfect knowledge”, Federal Reserve Bank of San Francisco Working Paper No 2006-14; and V. Gaspar, F. Smets and D. Vestin (2006), “Adaptive learning, persistence, and optimal monetary policy”, *Journal of the European Economic Association*, Vol. 4(2-3), pp. 376-385.

parameters describing the functioning of the economy. The learning process could eventually lead to the convergence of all expectations of medium to long-run inflation to the central bank's objective. However, this line of research has also pointed out that there could be instances in which such a learning process does not converge to a focal point. As a result, monetary

policy rules that would lead to a unique equilibrium under rational expectations can be unstable under learning.<sup>9</sup>

<sup>9</sup> See G. W. Evans and S. Honkapohja (2008), "Expectations, learning and monetary policy: an overview of recent research", CEPR Discussion Paper No 6640.

## Box I

### ANCHORING OF INFLATION EXPECTATIONS IN THE EURO AREA

This box assesses the anchoring of euro area long-term inflation expectations, providing evidence from both survey and market-based indicators.<sup>1</sup> In comparison with the United States, long-term inflation expectations have been more stable in the euro area.

#### Inflation expectations from the ECB Survey of Professional Forecasters

Long-term inflation expectations in the euro area have, since 1999, fluctuated in the range of 1.8%-2%, and, from 2003 to 2007, in the narrower range of 1.9%-2% (see Chart A). The dispersion, as indicated for example by the range between the upper and lower quartiles, has also progressively narrowed, with the lower quartile increasing to 1.9% from a low of 1.5% since mid-2006. The upper quartile has been generally stable at 2.0%, with the exception of the round of the Survey of Professional Forecasters (SPF) for the third quarter of 2008 (conducted in mid-July), where both the upper quartile and mean inflation expectations reached a peak. Overall information on euro area longer-term inflation expectations from surveys, notwithstanding the risks signalled by the slight elevation in 2008, suggests that they remained below, but close to, 2%.

Using survey data, an indirect way of assessing the anchoring of long-term inflation expectations is to consider their sensitivity to changes in very short-term inflation expectations.<sup>2</sup> In this regard, Chart B plots the individual revisions made to short-term (i.e. one year ahead) and longer-term (i.e. five years ahead) inflation expectations for the period from the second quarter of 2001 to the first quarter of 2009. It suggests that there is indeed no clear relationship between movements in shorter-term and longer-term inflation expectations.

#### Financial indicators of inflation expectations

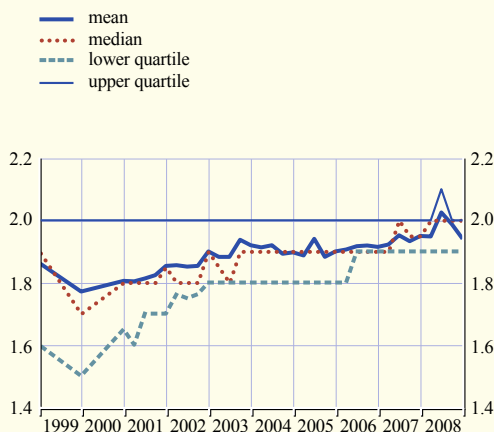
Chart C depicts a decomposition of the ten-year spot break-even inflation rate (BEIR) into the five-year spot BEIR (measuring average inflation expectations over the next five years) and the

<sup>1</sup> See also the article entitled "Measures of inflation expectations in the euro area" in the July 2006 issue of the Monthly Bulletin.

<sup>2</sup> See E. Castelnuovo, S. Nicoletti-Altimari and D. Rodriguez Palenzuela (2003), "Definition of price stability, range and point inflation targets: the anchoring of long-term inflation expectations", ECB Working Paper No 273.

**Chart A Longer-term (five-year ahead) inflation expectations from the SPF**

(annual percentage changes)

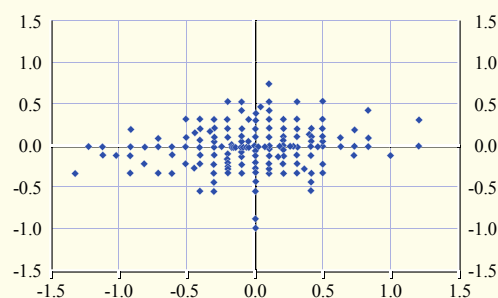


Source: ECB calculations.  
Notes: Latest data refer to Q1 2009. For a summary of the results of the ECB SPF for Q2 2009, see Box 4 in Section 3 of this issue of the Monthly Bulletin.

**Chart B Changes in short-term and longer-term inflation expectations in the SPF**

(percentage points)

y-axis: change in longer-term (five-year ahead) inflation expectations  
x-axis: change in short-term (one-year ahead) inflation expectations  
♦ observations between Q2 2001 and Q1 2009



Source: ECB calculations.  
Note: For a summary of the results of the ECB SPF for Q2 2009, see Box 4 in Section 3 of this issue of the Monthly Bulletin.

five-year forward BEIR in five years (measuring average inflation expectations as of today over the next five to ten years).<sup>3</sup> The five-year forward BEIR in five years has fluctuated in the range of 2%-2.5% for most of the available sample. Large fluctuations were recorded in 2004, in the first half of 2008 and, in particular, since the escalation of the current financial turbulence in the autumn of 2008, when the sharp decline in oil prices and inflation expectations triggered a sell-off of inflation-linked bonds that, under extremely low liquidity conditions, led to severe corrections in the prices of these instruments and affected the computation of break-even inflation rates. Available evidence from the decomposition of BEIRs into inflation expectations and related premia by means of term structure models suggests nonetheless that the term structure of inflation risk premia in the euro area is upward sloping and its fluctuations are the main driver of fluctuations in BEIRs, with (long-term) inflation expectations anchored at levels consistent with price stability.<sup>4</sup>

Chart D depicts the five-year forward BEIR five years ahead and the comparable measure from inflation swap rates. Both measures moved closely together, with the discrepancy most likely reflecting factors specific to the government bond and inflation swap markets, including the variations in credit, market and liquidity risk premia caused by large investment flows (e.g. safe-haven flows into government bonds at certain times during the financial market turbulence). However, since the third quarter of 2008 dislocations in various segments of the global financial markets, a general increase in uncertainty and market volatility, and deleveraging and balance sheet consolidation by major players in the markets for inflation-linked products led to significant fluctuations in both indicators, thereby complicating their assessment. In particular, long-term forward BEIRs reached very low levels in late 2008, but these likely reflected the

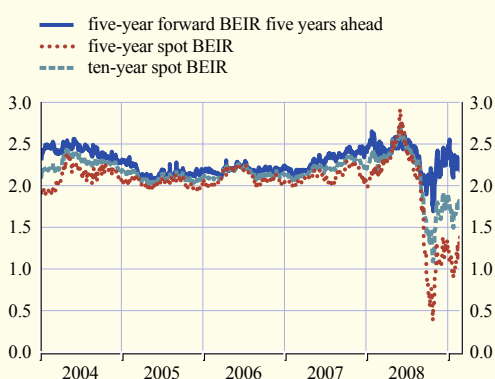
3 For a detailed discussion, see J. A. Garcia and A. van Rixtel (2007), "Inflation-linked bonds from a central bank perspective", ECB Occasional Paper No 62, and for a description of the methodology used at the ECB to calculate BEIRs, see J. Ejsing, J. A. Garcia and T. Werner (2007), "The term structure of euro area break-even inflation rates: the impact of seasonality", ECB Working Paper No 830.

4 See P. Hördahl and O. Tristani (2007), "Inflation risk premia in the term structure of interest rates", ECB Working Paper No 734, and J. A. Garcia and T. Werner (2009), "Inflation risks and inflation risk premia", ECB Working Paper Series, forthcoming.



**Chart C Break-even inflation rates in the euro area at different horizons**

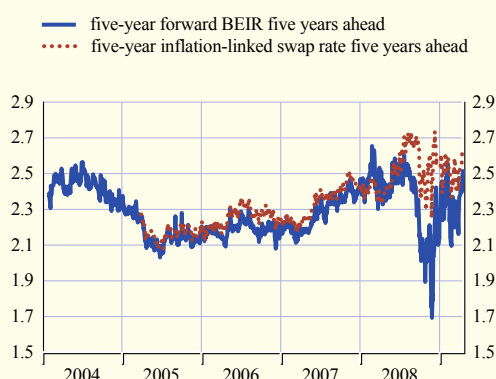
(percentages per annum; daily data)



Sources: Reuters and ECB calculations.

**Chart D Long-term forward BEIRs from inflation-linked bonds and swaps**

(percentages per annum; daily data)



Sources: Reuters and ECB calculations.

temporary effects on yield spreads of large and sudden safe-haven flows into government bonds, and of some dislocations in repo markets.<sup>5</sup>

### A comparison with longer-term inflation expectations in the United States

Some additional insights into the anchoring of long-term inflation expectations in the euro area can be obtained from the comparison with the United States.

The decline in inflation expectations during the 1990s and their stabilisation at relatively low levels over the past decade have not been confined to the euro area, but have also been observed in the United States (see Chart E). Compared with the findings of the US Survey of Professional Forecasters, longer-term inflation expectations in the euro area appear to have been anchored at a lower level. More significantly, disagreement on longer-term inflation expectations, measured as the standard deviation of the point estimates, shows that inflation expectations have been more concordant in the euro area than in the United States (see Chart F). As regards financial indicators, there are also similar conclusions for the long-term forward BEIRs: focusing on the sample period from the first quarter of 2004 to the second quarter of 2008 to avoid periods of major distortions in global markets for inflation-linked products, US five-year forward BEIRs five years ahead have fluctuated within a wider range (2.3%-3.3%) and displayed higher volatility (a standard deviation of about 0.20) than their euro area counterparts (0.13).

A number of studies have investigated the anchoring of inflation expectations by focusing on the reaction of financial indicators (long-term forward BEIRs and nominal interest rates) to macroeconomic news. Ehrmann et al. (2007)<sup>6</sup> show that since the start of EMU long-term forward nominal rates for large euro area countries have not tended to react to macroeconomic

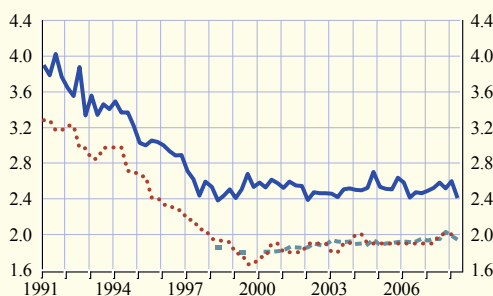
5 For a further discussion of the impact of the current financial market turmoil on market-based measures of inflation expectations, see the box entitled "Recent increases in real yields and their implications for the analysis of inflation expectations" in the November 2008 issue of the Monthly Bulletin.

6 M. Ehrmann, M. Fratzscher, R. Gürkaynak and E. Swanson (2007), "Convergence and anchoring of yield curves in the euro area", ECB Working Paper No 817.

**Chart E Longer-term inflation expectations in the euro area and the United States**

(annual percentage changes)

— United States (SPF - CPI average over the next ten years)  
 ..... euro area: Consensus Economics (average six to ten years ahead)  
 - - - - euro area (SPF - HICP five years ahead)



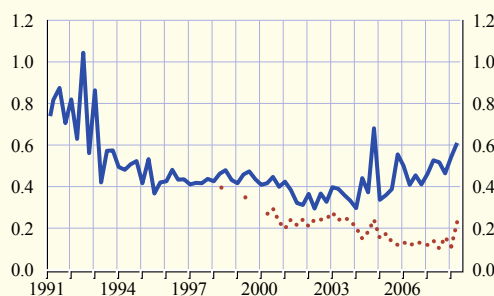
Sources: ECB, Federal Reserve Bank of Philadelphia and Consensus Economics.

Notes: For comparison purposes, the latest data refer to Q1 2009 for the ECB SPF and the US SPF and to October 2008 for the Consensus Economics data. Prior to 2003 euro area data are taken from Castelnuovo et al. (2003) (see footnote 2 for the full reference). From April 2003 the data are from Consensus Economics. For a summary of the results of the ECB SPF for Q2 2009, see Box 4 in Section 3 of this issue of the Monthly Bulletin.

**Chart F Disagreement on longer-term inflation expectations in the euro area and the United States**

(standard deviation of the point estimates)

— United States  
 ..... euro area



Sources: ECB and Federal Reserve Bank of Philadelphia.

Notes: For comparison purposes, the latest data refer to Q1 2009 for the ECB SPF and the US SPF. For a summary of the results of the ECB SPF for Q2 2009, see Box 4 in Section 3 of this issue of the Monthly Bulletin.

releases. This evidence is particularly important considering that the reactions of US long-term nominal rates to macroeconomic releases are often found to be statistically significant.<sup>7</sup> Available evidence also suggests that in the United States forward BEIRs react significantly to macroeconomic data releases even at long horizons, while in the euro area reactions are significant for short-term BEIRs but not for long-term ones, supporting the existence of a stronger anchoring of inflation expectations in the euro area.<sup>8</sup>

Overall, the evidence from survey and financial indicators presented in this box suggests that euro area long-term inflation expectations are relatively well anchored. Since the beginning of Stage Three of EMU in 1999, the euro area has been hit by a number of significant upward shocks to short-term price developments, but long-term inflation expectations appear to have reacted little to them and have remained broadly consistent with the Governing Council's aim of keeping inflation at rates below, but close to, 2% over the medium term.

7 See for instance R. Gürkaynak, B. Sack and E. Swanson (2005), "The sensitivity of long-term interest rates to economic news: evidence and implications for macroeconomic models", *American Economic Review*, Vol. 95(1), pp. 425-436; M. Beechey and J. Wright (2008), "The high-frequency impact of news on long-term yields and forward rates: is it real?", Board of Governors of the Federal Reserve, Finance and Economics Discussion Paper No 39.

8 M. Beechey, E. Johansen and A. Levin (2007), "Are long-run inflation expectations anchored more firmly in the euro area than in the United States?", CEPR Discussion Paper No 6536.



#### 4 MONETARY POLICY DESIGN TO FORESTALL AND COUNTERACT INSTABILITY IN EXPECTATIONS

Central banks have successfully designed institutional safeguards that can effectively suppress instability in expectations. Stability-oriented monetary policy frameworks are the first and most effective bulwarks against the emergence of such instability.

##### BENEFITS OF COMMUNICATING A QUANTITATIVE DEFINITION OF PRICE STABILITY

In a world characterised by bounded rationality and imperfect knowledge, the communication of the objective of monetary policy, reinforced by a precise numerical definition of price stability, becomes a powerful instrument for preventing the learning process of private sector expectations from diverging.

An increasing number of central banks have communicated a quantified objective as part of their monetary policy strategy. Available studies clearly indicate that the announcement of an explicit price stability objective contributes to anchoring inflation expectations. In the euro area, the Governing Council of the ECB has defined price stability as a positive annual HICP inflation rate of below 2%. Within this range, the Governing Council has announced that it aims to maintain euro area inflation rates “close to 2%” over the medium term. This aim has provided a very precise orientation for markets and has clearly acted as a focal point for inflation expectations. Both survey and market-based medium to long-term inflation expectations in the euro area have remained firmly anchored at levels consistent with the ECB’s quantitative definition of price stability, even when inflation was subject to the temporary volatility introduced by adverse shocks to supply and demand (see Box 1).

While inflation-targeting frameworks generally also embed a quantification of the policy objective, the ECB’s monetary policy strategy

has two additional distinctive features: the prominent role of monetary aggregates and its medium-term orientation. The monetary analysis is notably based on well-known, fundamental empirical regularities which show that the long-run components of money growth and inflation are closely related, with money growth having a leading indicator property for inflation.<sup>10</sup> The medium-term policy orientation of the ECB has not been quantified with precision because there are long and variable lags in the monetary policy transmission mechanism. The calibration of policy actions depends on the state of the economy, the nature of the structural disturbances and time-varying economic behaviours which would tend to affect the appropriate time frame for policy to stabilise inflation.

In addition to the quantitative definition of price stability, the successful anchoring of long-term inflation expectations depends on the credible commitment of the monetary authority to fulfil its mandate. The credibility of the ECB’s commitment to fulfil its mandate by implementing consistent and systematic policy actions is deeply rooted in the institutional framework of EMU. The Maastricht Treaty clearly establishes that monetary policy in the euro area is conducted by an independent central bank, which has been assigned the primary objective of maintaining price stability.

##### BENEFITS OF A SYSTEMATIC POLICY RESPONSE

In addition to the need for a successful anchoring of long-term inflation expectations through the adoption of a clear quantitative objective, academic research has stressed the virtues of a policy of systematic management of expectations and has emphasised the impact of systematic and predictable monetary policy on the general public’s expectations (see Box 2).

<sup>10</sup> See L. Benati (2009), “Long-run evidence on money growth and inflation”, ECB Working Paper No 1027.

The optimal monetary policy literature indicates that a commitment to adopt a consistent and repeated behaviour when taking monetary policy decisions is superior to a fully flexible conduct of monetary policy, whereby actions are taken sequentially with no attempt to integrate each isolated policy action within a general systematic framework of response to the evolving state of the economy.

If the central bank is able to convince economic agents about its analysis of the economic outlook and its assessment of the risks to price stability, they can fully internalise the systematic response of monetary policy, so that expectations of future monetary policy actions adjust in the equilibrating direction as soon as

the macroeconomic news is released. Such a leverage of central bank pronouncements and actions over private economic behaviour is an asset that can become extremely valuable in cases of major shocks and risks.

Moreover, consistent behaviour is a requisite for credibility and, as a general principle, in weighing up the arguments for and against decisions, central banks should never fail to appreciate that their policy actions have lasting significance for the formation of expectations and hence economic behaviour. The credible commitment of the Governing Council to deliver price stability by implementing consistent and systematic policy actions is deeply rooted in the monetary policy strategy of the ECB.

## Box 2

### ACADEMIC LITERATURE ON THE OPTIMAL MANAGEMENT OF EXPECTATIONS

This box elaborates on the main prescriptions from the optimal monetary policy literature, focusing in particular on the management of private expectations in “expectations traps”, where the short-term nominal interest rate is at levels which cannot be lowered further.

From an academic perspective, extensive research on optimal monetary policy under rational expectations has found that it is crucial to take account of the effects of the repeated and consistent behaviour of monetary policy on private expectations. Two prescriptions emerge from this line of research. First, optimal monetary policy under commitment delivers a better outcome than a fully flexible monetary policy, whereby decisions are taken sequentially with no consistent strategic framework for designing and communicating policy actions.

Second, in the “workhorse model” used in monetary policy analysis,<sup>1</sup> optimal policy conduct entails a measure of “history dependence” whereby a central bank – while being firmly forward looking – does not lose sight of past behaviour when setting interest rates. A policy that includes an appropriate measure of history dependence is found to be able to dampen the impact of disturbances on macroeconomic stability by influencing private expectations about subsequent policy actions in a stabilising direction. The result comes from the optimal management of private sector expectations when the central bank benefits from perfect credibility. The central bank’s commitment to correct past deviations from price stability induces agents to anticipate that current risks to price stability will be undone, which exerts a moderating influence on current price-setting decisions. A simple rule which – in these models – would force a degree of history dependence on the central bank would be “price-level targeting”, whereby the central bank would undo past deviations of the price level from the path that it was expected to follow *ex ante*.

<sup>1</sup> See M. Woodford (2003), *Interest and prices: foundations of a theory of monetary policy*, Princeton University Press.

The prescriptions about optimal policy that are shown to be valid under rational expectations still remain crucial for the design of monetary policy in the presence of imperfections in the formation of expectations. In particular, the value of commitment and the history dependence of policy are robust to “near rational” private expectations formation.<sup>2</sup> While basic intuition would suggest that the benefits of price-level targeting, notably through the expectations channels, should be lower under learning or imperfect credibility, recent research suggests that a policy incorporating some degree of history dependence would still be effective in anchoring expectations in a world of adaptive learning.<sup>3</sup>

The academic literature has highlighted the benefits of credible commitment and history dependence in the face of persistent downside risks to price stability and with short-term nominal interest rates at very low levels. The appropriate management of expectations regarding the future course of monetary policy can be very effective in driving ex ante real interest rates in a self-equilibrating manner. The ability of the central bank to steer expectations about its future policy stance as adverse shocks materialise has the potential to stabilise private inflation expectations over the medium term, putting downward pressure on real interest rates and therefore contributing to an even more accommodative stance. Within the narrow confines of the theoretical models used in the literature, and under a number of assumptions concerning the fiscal policy regime, some form of price-level targeting strategy would implement the optimal policy and succeed in lowering appropriately the ex ante real interest rates.<sup>4</sup> Note that, in this formulation, the conditional commitment to a path-dependent policy made by the central bank concerns the outlook for prices and not the monetary policy instrument.

This strand of economic research shows that the lower bound on short-term nominal interest rates has important implications for economic outcomes and optimal monetary policy conduct, as agents behave differently if they anticipate that the constraint could be binding. At the same time, a policy framework based on a clear definition of the monetary policy objective of price stability and on a careful management of inflation expectations emerges as an effective tool for countering deflationary episodes in the event that they should develop.

The comforting findings of this line of research concerning the ability of a stability-oriented monetary policy to prevent deflationary spirals are even reinforced if one steps away from the narrow confines of the simple model on which these findings are predicated. Indeed, the description of the implementation channel of monetary policy which is embedded in this simplified model, according to which monetary policy only acts on the economy by affecting the inter-temporal substitution of private expenditures, is overly simplified and in particular ignores the plurality of interest rates that characterises the functioning of fixed income and credit markets in advanced economies. In practice, there are important financial frictions in the economy, which are reflected in the credit and liquidity spreads observed in financial markets. Therefore, monetary policy can also exert some influence on economic developments by trying to affect these spreads. By contrast, in the simple model referred to above, the determination of the prices of long-dated securities is based on the assumption that the expectations theory of

2 See M. Woodford (2008), “Robustly optimal monetary policy with near-rational expectations”, mimeo, Columbia University.

3 See V. Gaspar, F. Smets and D. Vestin (2007), “Is time ripe for price level path stability?”, ECB Working Paper No 644.

4 These arguments are made formally in, for example, G. B. Eggertsson and M. Woodford (2003), “The zero bound on interest rates and optimal monetary policy”, *Brookings Papers on Economic Activity*, Vol. 34, Issue 1, pp. 139-235, and K. Adam and R. M. Billi (2006), “Optimal monetary policy under commitment with a zero bound on nominal interest rates”, *Journal of Money, Credit and Banking*, Vol. 38(7), pp. 1877-1905.

the term structure of interest rates holds true, so that the only channel for monetary policy to influence long-term rates is by committing to a path for the future short-term interest rate.

Overall, this box has offered support for the contention – expressed in the main text – that a clear strategic framework and a policy of expectations management supported by that framework can act as an effective line of defence against expectations traps. The success of such tools hinges crucially on the credibility of their implementation, precisely because they work by affecting private sector expectations. This places a premium on the consistency and effectiveness of central bank communication. It should also be emphasised that central banks can avail themselves of other, complementary and reinforcing, policy measures to change credit conditions and support financial intermediation, as short-term nominal interest rates may come close to very low levels in the face of persistent downside risks to price stability.<sup>5</sup>

<sup>5</sup> See D. Reifschneider and J. C. Williams (2000), “Three lessons for monetary policy in a low-inflation era”, *Journal of Money, Credit and Banking*, Vol. 17(4), pp. 145-166.

## 5 CHALLENGES IN MANAGING EXPECTATIONS

### THE USE OF COMMUNICATION IN EXPECTATIONS MANAGEMENT

As mentioned already, the survey evidence about private sector expectations, as well as the forecasting practice at central banks, suggest that a considerable amount of learning takes place in the economy and that expectations seem to be quite heterogeneous among agents. Indeed, short-run private sector expectations that are misaligned with respect to the central bank objective are often simply due to imperfect information regarding the current state of the economy. Against this background, there have been some reflections on the use of communication as a reinforcing tool in expectations management.

There is an intrinsic tension, which central banks cannot ignore, between their ability to manage private sector expectations and provide guidance to professional market participants, on the one hand, and their need to learn from markets, on the other hand. To the extent that the central bank is effective in influencing the actions of economic agents through signalling its intentions, individual market participants may be encouraged to put a relatively higher weight on central bank announcements than on

their own private information when taking decisions.<sup>11</sup>

As a result, the coordinating role that the central bank can play in the process of expectations formation should be used carefully, as it may imply a disproportionate impact of the central bank’s judgement on economic behaviour. Besides, if the central bank does not recognise that the information value of the decentralised sources of economic insight could be degraded as a result of its own success in influencing beliefs, a misguided sense of comfort from anchored inflation expectations can arise. Such complacency could at times blur signs that unreasonable expectations are being built up in some segments of the economy.<sup>12</sup>

For the purposes of enhancing the expectations formation mechanism and minimising any misalignments between private sector expectations and the intentions of the central bank, there have been proposals that central

<sup>11</sup> See for example S. Morris and H. S. Shin (2002), “Social value of public information”, *American Economic Review*, Vol. 92, No 5, pp. 1521-1534, and S. Morris and H. S. Shin (2005), “Central bank transparency and the signal value of prices”, *Brookings Papers on Economic Activity*, Vol. 36, Issue 2, pp. 1-66.

<sup>12</sup> See also C. Borio and P. Lowe (2002), “Asset prices, financial and monetary stability: exploring the nexus”, BIS Working Paper No 114.

banks should provide market participants with fairly precise quantitative indications about the likely future path of their policy interest rates beyond the very short term. While such lines of communication may indeed align market expectations with the central bank's considerations at the time of the announcement, there are concerns about the feasibility and desirability of announcing a specific likely future path of policy rates.<sup>13</sup>

On the feasibility of the central bank formulation of a future path for policy, it has been noted that decision-making committees may face a binding operational constraint in agreeing on an entire path for future policy rates, particularly if they also endeavour to build a consensus on the economic outlook and on the balance of risks to the policy objectives. With regard to the desirability of central bank announcements of this sort, it has also been noted that the uncertainty about economic disturbances as well as macroeconomic behaviour makes it very difficult to define in a precise and reliable manner the extent and timing of future adjustments of the monetary policy stance. Therefore, there is a risk that the markets and the public may not fully understand the conditionality of the announced future policy path on the information and judgement available at the time of the announcement. As a consequence of such possible misunderstandings, frequent deviations of the actual policy path from the one that was communicated may put at risk the central bank's credibility, as it may weaken the public's confidence in the central bank's forecasting ability or commitment to deliver on past promises.

Ultimately, the benefits and costs of communicating the likely future policy rates will depend on the economy's structure and complexity, the nature and extent of the uncertainty faced by policy-makers, and the institutional framework of the central bank. The potential problems of publishing an interest rate path can easily outweigh the benefits. The ECB has adopted a rather pragmatic and flexible

approach within its clearly defined strategic framework, focusing its communication on the Governing Council's assessment of the current situation and macroeconomic prospects. This has provided clear guidance for market participants to form expectations about inflation and a basis for understanding and anticipating the likely response of monetary policy to shocks or to new information. Available studies support the conclusion that actual and perceived transparency about policy-makers' assessments of the state of the economy strengthens the predictability of monetary policy.<sup>14</sup>

#### UNREASONABLE EXPECTATIONS

The possible occurrence of protracted periods of atypical price configurations in certain segments of the financial market presents central banks with serious challenges.

A recent strand of academic literature has focused on the role of "unreasonable expectations" about future economic opportunities as a source of marked fluctuations in asset prices and in economic conditions. Intuitively, since economic agents only receive imperfect signals about, for example, future productivity developments, excessive optimism about technological progress looking forward may lead to phases in which – in anticipation of future high payoffs – agents build up capital at an accelerated pace and asset prices tend to appreciate. Once expectations are not met, this leads to a sharp retrenchment of investment, an asset price correction and a possibly severe generalised reassessment of economic prospects. This phenomenon can be formalised in the context of structural macroeconomic models under rational expectations where "news shocks" about economic fundamentals occur and drive

13 See T. Blattner et al. (2008), "The predictability of monetary policy", ECB Occasional Paper No 83.

14 See for example A. Weber (2008), "Communication, decision-making and the optimal degree of transparency of monetary policy committees", Deutsche Bundesbank Discussion Paper No 02/2008.

aggregate fluctuations.<sup>15</sup> While the presence of imperfect signals at the source of “unreasonable expectations” does not alter the normative monetary policy prescriptions regarding the primacy of price stability, recent studies have illustrated the possibility of inappropriate pro-cyclical monetary policy setting if the central bank fails to keep its medium-term orientation and focuses excessively on resisting short-term disinflationary pressures stemming from positive news on the supply side.<sup>16</sup>

From an operational perspective, the central banking community has long held the view that it may be inappropriate to counteract the principal side-effects of such waves of exaggerated or “unreasonable” expectations, namely asset price misalignments. Broadly speaking, information on asset price dynamics has always been considered paramount for a central bank to form a sound judgement on whether and to what extent asset prices have deviated from their fundamental determinants.

The depth of the current financial crisis, however, calls into question the wisdom of ignoring asset price imbalances in the conduct of monetary policy. While central banks’ communication can contribute to curbing asset price developments, the financial crisis also shows that the impact of such public pronouncements is limited in the absence of reinforcing strategic mechanisms over and above a quantitative price stability orientation. In this respect, the ECB’s two-pillar strategy is an instrument that contributes to limiting the tendency of monetary policy to be pro-cyclical in good times. By exploiting the association between asset price dynamics and monetary and credit developments, the monetary analysis indirectly incorporates asset price developments into policy conduct. By monitoring constantly developments in asset markets and cross-checking them with developments in the credit market and with the evolution of a number of liquidity indicators, the ECB can, at an early stage, contribute to limiting the potential of unreasonable expectations about asset prices to develop further.<sup>17</sup>

Certainly, stability-oriented macroeconomic policies around the world are a necessary condition for global financial stability. Efforts to correct the weaknesses of global macroeconomic surveillance are therefore essential. Addressing the pro-cyclical nature of macroeconomic policies and devising incentive schemes that lengthen the time horizon that financial market participants focus on would contribute to building equilibrating automatic stabilisers at the core of the financial system.

## EXPECTATIONS TRAPS

“Expectations traps” have been studied as a theoretical explanation for situations in which shifts in private sector beliefs about the future course of inflation are validated ex post, with sizeable and protracted deviations from price stability resulting from distorted interactions between economic agents and the monetary authority. Expectations traps may lead to excessively high inflation rates or – more rarely – to protracted episodes of deflation. Over the last twenty years, through a long and successful process of institutional reform, central banks have designed built-in safeguards in their strategic frameworks to avoid falling into expectations traps.

While the interpretation of many episodes of economic history in which inflation expectations have manifested upward or downward instability is still open, the role of misguided monetary policy regimes in tolerating the emergence and persistence of instability in expectations is very often evident. The “Great Inflation” of the 1970s in many countries is seen as paradigmatic of a

15 See for example P. Beaudry and F. Portier (2004), “An exploration into Pigou’s theory of cycles”, *Journal of Monetary Economics*, Vol. 51, pp. 1183-1216

16 See L. Christiano, C. Ilut, R. Motto and M. Rostagno (2008), “Monetary policy and stock market boom-bust cycles”, ECB Working Paper No 955.

17 See the article entitled “Asset price bubbles and monetary policy” in the April 2005 issue of the Monthly Bulletin and C. Borio (2008), “The financial turmoil of 2007-?: a preliminary assessment and some policy considerations”, BIS Working Paper No 251.



situation in which upward instability in long-term inflation expectations severely complicated monetary policy conduct and resulted in poor macroeconomic performance. The hypothesis that the US economy fell into an expectations trap by the late 1960s and early 1970s has been supported by several research studies.<sup>18</sup> In many of these episodes, the dual message to the general public was that either the central bank was in no position to re-establish price stability unless other economic actors had acted first, or the central bank could have regained control of inflation dynamics, but the short-term costs of doing so were perceived as excessively high and disruptive. Accordingly, the causes of the Great Inflation can be traced back to the lack of an appropriate institutional framework that could have counteracted the public perception that no policy reaction would stand in the way of high and persistent inflation.

The Great Inflation might plausibly have been avoided had alternative macroeconomic policies been implemented. The fact that neither Germany nor Switzerland experienced the Great Inflation to the same extent as many other countries is likely to reflect different approaches to macroeconomic policy management, and shows the benefits of a sound policy framework, including a firm determination to resist inflationary pressures.<sup>19</sup>

Expectations traps have also been studied in the context of deflation expectations in an environment of very low levels of short-term nominal interest rates. Deflation is a self-perpetuating fall in prices over a sustained period of time, where a severe contraction in aggregate demand is reinforced by entrenched expectations of further price declines and postponement of spending plans. Analysis of the very rare historical episodes in which such downward spirals seem to have taken hold and advances in economic theory suggest that monetary policy has a significant influence on economic developments and can prevent deflationary dynamics from developing in the first place or can terminate them in the event that they should start.

The principal instrument of prevention is a monetary policy framework geared to the achievement of a numerical definition of price stability. In none of the very few episodes in the distant past in which deflationary spirals threatened the stability of the market economy was the central bank perceived as a guardian of price stability. In those episodes, price and wage setting propagated and perpetuated the observed original negative shocks to prices, as guidance for price and wage expectations was only sought in past inflation developments rather than in the intentions of the central bank. By contrast, well-anchored expectations in price and wage setting can break this potentially formidable propagation mechanism and restore equilibrating forces at an early stage of the process.

Central banks remain powerful even when the monetary policy accommodation delivered through conventional channels is exhausted. First, the influence of monetary policy actions on the economy cannot be summarised by their changes to the very short-term interest rates. Instead, interest rates at longer maturities are far more relevant to spending and investment decisions of households and businesses. The crucial link between policy rates and longer-term interest rates is the formation of private sector expectations, which can be influenced by a central bank committed to price stability. Second, measures can also be taken to influence credit spreads and credit flows in conditions of very low short-term interest rates. Therefore, even if confronted with persistent downward risks to price stability, decisive actions together with a clear steering of expectations are of the essence in order to reaffirm the determination of the central bank to maintain price stability.

In the euro area, the assignment of monetary policy to an independent central bank with the primary objective of maintaining price

18 See in particular L. Christiano and C. Gust (2000), "The expectations trap hypothesis", *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 25(2), pp. 21-39.

19 A. Beyer, V. Gaspar, C. Gerberding and O. Issing (2009), "Opting out of the Great Inflation: German monetary policy after the breakdown of Bretton Woods", ECB Working Paper No 1020.

stability, the quantitative definition of price stability and the medium-term orientation of the ECB's monetary policy strategy constitute solid bulwarks against the destabilisation of inflation expectations. The credibility of the central bank in delivering price stability over the medium term is a precious asset in turbulent times. In times of crisis, the ECB acts as an anchor of confidence, allowing economic agents to make projections into the future with the assurance that their purchasing power will be preserved.

## 6 CONCLUSION

Monitoring and managing private sector expectations are at the core of modern central banking. Central banks must constantly keep in sight the medium-term policy-relevant horizon, taking into account the lasting significance of their decisions for expectations. In calibrating their actions, private sector expectations are of prime importance, not least because they have implications for current macroeconomic outcomes and the monetary policy transmission mechanism. The maintenance of price stability in many countries over almost two decades is partly due to the full recognition of the pivotal role of expectations in macroeconomic behaviour and monetary policy conduct.

The design of the monetary policy strategy of the ECB was based on the recognition of the role of expectations as a key determinant of macroeconomic outcomes. The ECB's monetary policy strategy provides a quantitative definition of price stability, which acts as a focal point for long-term private sector expectations, and has a clear medium-term orientation, thereby avoiding excessive activism and the introduction of unnecessary volatility into the real economy. The comprehensiveness of the analysis underlying the Governing Council's decisions, based on the two pillars of the strategy and reflected in the detailed communication on how its primary objective of price stability is systematically pursued, allows coordinated expectations among the general public and market participants of a predictable conduct of monetary policy. This

has far-reaching favourable implications for the dynamics of expectations over the cycle and for the success of monetary policy in delivering price stability.

Monetary policy-making faces formidable future challenges. The current financial crisis calls into question the wisdom of ignoring unreasonable expectations embedded in asset prices and may call for a reinforcement of strategic mechanisms beyond a quantitative price stability objective. The ECB, notably through the monetary analysis of its monetary policy strategy, is well placed to detect a build-up of asset price misalignments at an early stage while actual and expected inflation remain under control.