

## **Lucas Papademos: Monetary policy in a changing world – commitment, strategy and credibility**

Speech by Mr Lucas Papademos, Vice President of the European Central Bank, at the Fourth Conference of the International Research Forum on Monetary Policy, Washington DC, 1 December 2006.

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### **I. Introduction**

It is a great pleasure for me to participate in this conference of the International Research Forum on Monetary Policy. This is the fourth conference of its kind, and testifies to the increasing significance of this forum, which brings together academics and policymakers from both sides of the Atlantic. This year's programme confirms the previously established trend by including papers that address a broad range of issues and which are highly topical and relevant for the practice of monetary policy. I would like to congratulate the organisers for their judgement and hard work that has resulted in putting together an exciting programme for this fourth conference. I find it intriguing that in many cultures the number 4 symbolises the qualities of practicality, application and tenacity, and that it suggests organisation and hard work. I have to say as far as this conference is concerned, the numerologists have hit it right on the spot!

Since the forum provides an occasion for a transatlantic exchange of views, I would like to address some monetary policy issues as viewed from the European perspective of the still relatively young – though mature – European Central Bank. When Europe took the historic step of introducing a single currency, it was a quantum leap into uncharted policy territory. Understandably, some had expressed doubts about the prospects for success. And everybody fully recognised the great uncertainty and potential difficulties that could be encountered. Eight years on, however, I think we can safely say that the evidence confirms that the ECB's monetary policy has been a great success in terms of keeping inflation under control and anchoring inflation expectations at a level in line with our quantitative definition of price stability. I believe the effectiveness of our policy can be attributed to three key features that characterise it: commitment, strategy and credibility. But let me add that we are fully aware that we cannot be complacent. A central bank's job is "never done", especially in a rapidly changing world. The ongoing changes in the external environment within which policy is conducted and in the structure of the economy pose new challenges to us policy-makers.

In my presentation, I would like to address three challenges for monetary policy. They have in common that they derive from ongoing changes in the structure and functioning of the economy that have bearing on the conduct of monetary policy and the transmission of its effects, notably:

1. the process of globalisation;
2. technological advances and changes in productivity growth; and
3. financial innovation and development.

I will first address these three processes and their consequences for the inflation process. Afterwards, I will discuss their common implications for the conduct of the ECB's monetary policy. Although these issues are particularly important for us, I believe they are also of relevance for all monetary policymakers – and for economic research that can help provide answers to as yet unresolved questions.

### **II. The effects of globalisation**

Generally speaking, globalisation can simply be defined as the process of increasing global economic integration and, in particular, the growing internationalisation of trade in goods, services and financial assets. Over the past 15 years international trade and foreign direct investment (FDI) flows have expanded rapidly. The value of world exports of goods and services relative to world GDP has increased by over ten percentage points in the last fifteen years or so, rising from 19% in 1990 to 30% in 2006. [see Chart 1] Since the mid-1990s, the share of cumulated FDI flows (FDI stock) in world GDP has increased at an even faster pace, particularly in non-Japan Asia and in the new Member States of the European Union. [see Chart 2] The current wave of globalisation is largely related to the

integration into the global market economy of emerging Asia and of the former socialist countries in central and eastern Europe. In fact, the share of both regions in world exports has essentially doubled over the past 15 years to 22% and 4%, respectively.

Globalisation affects the functioning of the world economy and of the national economies through many channels and in various ways. Today, I will concentrate on its effects on inflation, which are both direct and indirect. The increasing economic opening up of many countries has led to the emergence of two major and fairly direct effects on world inflation dynamics, which partly offset each other. On one hand, raw materials and basic commodities, most importantly oil and other sources of energy, have become scarcer relative to world demand, leading to substantial upward pressure on prices. [see Chart 3] For example, Brent crude oil prices have almost tripled over the last three years, reflecting to a very large extent the impact of rising demand, especially in emerging market economies [see Chart 4], although supply-side factors have also played a role during some periods.

On the other hand, the integration of an enormous reserve of low-cost, skilled labour in the international economy and the increasing production of manufactured goods in emerging market economies have put downward pressure on import prices of manufactured goods as well as on wage demands in industrial economies. As a consequence, the prices of a wide range of manufactured goods have been declining since 2000. This is reflected in the unit value of imports of manufactured products in the euro area which in mid-2006 was virtually at the same level as in the year 2000. [see Chart 5]

The counteracting effects of these global price pressures on euro area inflation can be observed more clearly if we take a look at the development of the overall Harmonised Index of Consumer Prices (HICP) and selected components (energy and non-energy industrial goods). [see Chart 6] The prices paid by consumers for energy products, which account for approximately 9% of euro area private consumption, have surged at an average rate of 5.4% per annum following the series of sharp oil price increases since 1999. However, the prices of other consumer goods, such as non-energy industrial goods, which account for over 30% of total private consumption, have increased at a more moderate rate of 0.7% per annum on average since 1999.

In an environment of significant changes in relative prices, some price increases, for example those of energy goods, may be more visible to consumers than the relatively stable prices of many other consumer goods, and may as a result affect inflation expectations. Consequently, it is particularly crucial for monetary policy to anchor inflation expectations to price stability, in order to minimise the likelihood of second-round effects of energy price increases.

The impact of globalisation on HICP inflation excluding energy products also reflects its indirect effects on the cost of labour as well as the increased competition it has entailed. Euro area labour cost developments have remained moderate in recent years despite the strong increase in energy prices. [see Chart 7] There are two major reasons for this welcome development. First, the successful anchoring of inflation expectations has helped contain possible second-round effects on wages from energy price increases. Second, globalisation and the increased openness of the euro area economy have influenced labour demand as a result of increased competition and outsourcing and through higher real wage elasticity of labour demand due to a reduction in the bargaining power of workers. It is interesting to note that all labour cost measures increased at a decelerating rate starting in early 2002 until late 2005. Recently, however, a pick-up in the rate of change of some labour cost measures has been observed.

What is the overall net effect of globalisation on the dynamics of euro area inflation? Attempts to quantify the extent to which the globalisation process has helped contain inflation in the euro area over recent years are subject to substantial uncertainty, for the fundamental reason that it has been difficult to identify all the effects of globalisation on inflation dynamics and disentangle them from the influences of other factors, for example those that have contributed to wage moderation and productivity growth in recent years. More specifically, moderate wage developments in the euro area partly reflect such factors as the threat of relocation of production owing to global competitive pressures or "social pacts" that take into account competitiveness objectives. They also reflect, however, the favourable effects on inflation expectations resulting from a credible monetary policy, the reduced bargaining power of labour unions due to changes in workers' preferences and a larger share of part-time and short-term labour contracts, and the refocusing of bargaining on non-wage elements, such as working hours and benefits. Similarly, it has not been easy to isolate the impact of globalisation on competition and productivity growth and separate it from the effects of other factors.

One conclusion that has some empirical support is that domestic inflation is no longer determined predominantly by domestic demand and supply constraints, but seems to depend more on the degree of global economic slack. This can be illustrated if we examine the relationship between domestic inflation and capacity utilisation in the G10 economies, which was rather close until the mid-1990s, but has essentially broken down over the past decade.<sup>1</sup> [see Chart 8]

Against the background of all these uncertainties, it is even more difficult to predict the impact of globalisation on inflation in the future. The favourable influence of globalisation on inflation can be expected to continue in the future as a result of its direct effects on the prices of imported manufactured goods from low-cost countries and, more importantly, as a consequence of its indirect effects on wages and productivity, reflecting the increased competition in labour and product markets. At the same time, this disinflationary impact of globalisation may be partly offset – or more than offset – by global inflationary pressures in energy and commodity markets. The available evidence for the euro area as a whole suggests that the overall effect of globalisation on inflation has been very modest, or almost negligible, in recent years, although global factors have been a main source to short-term inflation volatility.<sup>2</sup> Of course, long-term inflation will ultimately be determined by monetary policy in line with the ECB's price stability objective. Nevertheless, the dynamics of inflation, especially over the short to medium term, are likely to be more influenced by global factors and to be surrounded by greater uncertainty than in the past.

### **III. The impact of changes in productivity growth**

Productivity growth is an important determinant of aggregate output and inflation dynamics, and has significant implications for the conduct of monetary policy. Long-term or trend productivity growth, which reflects the average pace of technological advances, is a key determining factor of the economy's growth potential. In the short to medium term, changes in labour productivity growth can affect the dynamics of inflation and its response to an adjustment of the monetary policy stance. Therefore, measuring productivity developments, assessing their nature, and estimating their likely impact on the economy is important for the effective conduct of monetary policy.

In the euro area, productivity growth developments have been unsatisfactory over the past ten years, compared to Europe's productivity performance in previous decades and the productivity growth recorded in the United States since the mid-1990s. [see Chart 9] Specifically, labour productivity growth (as measured by real GDP per hour worked) in the euro area declined from an average annual growth rate of 2.3% in the period 1980-1995 to just 1.2% in the most recent ten-year period 1996-2005. By contrast, there was a marked improvement in the productivity performance of the US economy, where average annual productivity growth rose significantly from 1.3% in 1980-1995 to 2.3% in 1996-2005.<sup>3</sup> This reversal of the relative productivity growth performances of the euro area and US economies since the mid-1990s is striking and it is also symmetric. Moreover, it is independent of whether productivity is measured by GDP per employed person or per hour worked.

The key issue is, of course, to what extent the remarkable rise in productivity growth in the US, and the relative decline in the euro area, are of a fairly temporary nature, or whether they represent a more permanent trend. With regard to the US, it has been argued that, while the increase may partly reflect cyclical factors, the apparent resilience of US productivity growth during the recent downturn and the significant further pick-up over the last two years supports the thesis that the mid-1990s marked a structural improvement in US productivity growth. In the euro area, the trend decline in labour productivity growth has been partly related to higher levels of employment of relatively low-skilled workers, but it also reflects an insufficient use of new productivity-enhancing technologies especially in the services sector.

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<sup>1</sup> See Frey and Moëc (2006). In a recent study Borio and Filardo (2006) find that for many euro area countries the global output gap is statistically significant in explaining domestic inflation, while the contribution of the domestic output gap is reduced, especially since the 1990s. For the euro area as a whole, their findings are more ambiguous: the effect of the global output gap is not statistically significant when import prices and oil prices are included in the equations explaining the dynamics of inflation.

<sup>2</sup> See Ciccarelli and Mojon (2006) and Borio and Filardo (2006).

<sup>3</sup> The average annual growth rates of productivity in the US and the euro area during the period 1980-1995 remained fairly stable.

Partly as a result of these developments, estimates of the potential output growth in the euro area have been revised downwards over the past few years and are now close to the lower bound of the range of 2.0 % to 2.5% of potential growth, published by the ECB in 1998, just before the launch of the euro.<sup>4</sup> [see Chart 10]

However, annual productivity growth (per person employed) in the euro area has increased more recently, rising from 0.4% in early 2005 to 1.4% in the second quarter of 2006, and we expect this level to remain broadly stable over the coming quarters. This improvement is confined to the industrial sector, which is more affected by cyclical developments. In the services sector, labour productivity growth has remained subdued, with an annual rate of growth of only 0.6% in the second quarter of 2006. Nevertheless, these recent developments may turn out to be the initial signs of an overall improvement of the euro area's productivity performance.

What are the policy implications of the observed recent improvement in productivity growth in the euro area? The crucial question is whether this recent improvement is temporary, influenced by the current upturn in the cycle, or permanent. To disentangle temporary and persistent changes in productivity – and to do so in real-time – is a formidable challenge for policymakers who have to make forward-looking assessments. But we have to face this challenge, because temporary and persistent shocks to productivity growth may have opposite effects on inflation developments. If the decline in productivity growth is temporary, its effect on aggregate demand is likely to be limited because the lifetime incomes of households are not significantly affected. At the same time, the aggregate supply of output will be temporarily depressed. The resulting excess demand is likely to have an inflationary impact. If, by contrast, the productivity decrease is considered to be persistent, (perceived) wealth and aggregate demand are likely to decline, leading to a situation of excess supply that will have a negative impact on inflation.

Incorrect perceptions or estimates of underlying productivity developments can easily lead to policy errors and costly adjustment processes. The inflationary episodes of the 1970s provide telling examples in this respect and research at the Federal Reserve clearly highlighted the potential risks.<sup>5</sup> Research carried out at the ECB confirms these findings and suggests that imperfect information about potential output growth can have substantial adverse effects on macroeconomic outcomes. Even if central banks continuously update their estimates of potential output and, in doing so, they fully exploit all available information, misperceptions of potential output growth can be substantial and persistent ex post.

Of course, “to make no mistakes is not in the power of men; but from errors and mistakes the wise and good learn wisdom for the future” – as Plutarch once remarked. Heeding his counsel, it appears advisable for us policymakers to account for and address the uncertainties that are inherent in identifying the underlying productivity pattern by employing an appropriate and robust policy framework and implementing policy in a consistent manner.

#### **IV. The influence of financial innovation and development**

Structural changes and associated uncertainty about the stability of structural and behavioural relationships are not confined to the real economy. Financial markets and institutions have been undergoing a remarkable transformation over the past 20 years as a result of deregulation, advances in information technology and financial innovation. The pace of financial development and innovation has markedly increased in recent years. Let me just give you one figure that exemplifies the dimensions of this phenomenon: in the first six months of this year, the global derivatives market (according to the Bank for International Settlements) increased by almost 25%, reaching 370,000 billion US dollars. That's 370 and twelve zeros! New financial instruments are continuously being introduced, and non-bank financial institutions are playing a more prominent role in the intermediation process than in the past.

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<sup>4</sup> See ECB (1998). This assessment is supported by subsequent revisions of euro area potential growth by the European Commission, the International Monetary Fund, and the OECD.

<sup>5</sup> For example, in the 1970s, the Council of Economic Advisers revised its real-time forecasts of trend productivity growth downwards in a sequence of adjustments, which brought it from 2.8% in 1970 down to 1.5% in 1980.

There are various consequences of these developments for economic efficiency, financial stability and monetary developments. Let me focus on the latter which are pertinent for the conduct of monetary policy. As a result of financial innovation and the introduction of new financial products, coupled with changes in payment technologies and practices (e.g. internet banking), the demand for monetary and financial assets as well as the characteristics of available financing instruments have been affected. Consequently, the interpretation of developments in monetary and credit aggregates and the extraction of information for the assessment of the risks to price stability require more detailed analysis. Let me give an example. How do we ascertain the effects of the development of deeper and more liquid securities markets and the increasing importance of non-monetary financial intermediaries, other than insurance corporations and pension funds (other financial institutions, or OFIs), on monetary developments? [see Chart 11] The OFI sector comprises a variety of financial firms, such as investment funds, corporations engaged in securitisation, lending and factoring, or clearing houses, which maintain specialised relationships with banks and whose operations may affect monetary developments in several ways. For instance, if changes in the money holdings of clearing houses reflect a shift in former interbank business to electronic trading platforms, this could affect the indicator properties of M3 for future price developments. However, discarding money holdings of OFIs altogether when assessing the information content of M3 – on the grounds that these holdings reflect portfolio considerations and are not directly related to the demand for goods and services – would be premature. After all, OFIs' money holdings are likely to mirror to a very large extent developments in private sector wealth, and may thus help explain the more complex relationship between monetary growth and future developments in economic activity and prices.

This is just one example of how financial innovation can influence the information content of monetary aggregates – and I could mention others – but it points to the need for a deeper and more refined monetary analysis that separates the “noise” from the “signals” in monetary aggregates which contain relevant information with regard to risks to price stability. This example also suggests that it may be intrinsically difficult to determine the extent to which the observed monetary developments reflect the effects of financial innovation that can be characterised as noise – that is, shocks that may “distort” money demand. In a low interest rate environment, the fast pace of financial innovation and the increased importance of OFIs might also reflect the so-called search for yield rather than a structural change in fundamental market relationships. Moreover, another pertinent issue is the extent to which new innovative derivative products held by households and non-financial firms have liquidity and risk characteristics that would justify their inclusion in a broad monetary aggregate, such as M3. These observations underscore the importance of further research to enhance our understanding of the implications of ongoing financial innovation for the analysis of monetary developments and the signals they provide about the risks to price stability.

## V. Implications for monetary policy

The three processes I have examined – globalisation, productivity developments, and financial innovation – pose challenges for monetary policy for two interrelated reasons. First, they influence the functioning and dynamics of the economy in ways that may affect the assessment of the outlook for, and the risks to, price stability as well as the transmission of the effects of monetary policy. Second, and more importantly, a common feature of these three processes is the considerable uncertainty associated with the size and nature of their effects on the economy over time, particularly on price developments, and the difficulties we face in sufficiently accurately measuring these effects in real time. As policymakers we have to take into account and assess the ongoing stochastic changes in the structure and functioning of the economy. Moreover, we must do this on the basis of data that may be revised significantly and of indicators whose informational content may be impaired by noisy signals. Using the technical jargon of our economic profession, we face not only the “usual” type of uncertainty resulting from unanticipated shocks to demand and supply, but also model, parameter and data uncertainty.

What are the implications of all this for the formulation and implementation of monetary policy? There are several conclusions pertaining to the assessment of the risks to price stability, the overall monetary policy strategy, and the actual conduct of policy. Let me elaborate on these issues with particular reference to the ECB's monetary policy.

A first conclusion that emerges from the ongoing changes in the real economy and the financial system is that we must deepen our analysis and sharpen our statistical tools so as to better understand these phenomena, improve the measurement of their development and impact in real

time, and thus enhance our assessment of their implications for the risks to price stability. The uncertainty we face makes it advisable to use insights drawn from various modelling approaches, and to avoid any exclusive dependence on a single approach which may primarily rely on certain structural relationships, as these may be suffering from instability. In this context, it should be noted that globalisation and productivity developments affect the functioning of labour and product markets and the stability of the "generalised Phillips curve relationship". In other words, they affect the workings of the real economy which is at the centre of the economic analysis of the inflationary process. Financial development and innovation, on the other hand, impinge on the functioning of the financial system and the stability of the demand for money and its counterparts – and therefore affect our analysis of the monetary factors determining price developments.

The ECB's monetary policy strategy which relies on both economic and monetary analysis allows us to use all available information in order to extract, in a comprehensive manner, signals concerning the risks to price stability that are as meaningful as possible. Our analytical framework permits us to cross-check the assessment derived from our economic analysis, which (given the current state of models and statistical tools) is more pertinent for short to medium-term horizons, with the assessment resulting from our monetary analysis, which can be especially relevant over the medium to longer term. This cross-checking, which may also lead to an averaging out of possibly "noisy" signals or persistent prediction errors that may be associated with a particular analytic approach, contributes to a more robust assessment of the evidence available and the risks to price stability. It is therefore conducive to robust decision-making in the presence of heightened uncertainty. Our experience has shown that the ECB's strategy has proven effective because it has employed all available information to reach a comprehensive assessment of the medium to long-term economic outlook and inflation risks. This has been essential for taking decisions on the appropriate monetary policy stance.

However, the effectiveness of the ECB's monetary policy also depends on other features of its strategy and its conduct. Let me therefore now turn to two elements which characterise the ECB's monetary policy: commitment and credibility. The ability of any central bank to maintain inflation expectations well anchored depends crucially on these two notions which concern the central bank's intentions and the perception of these intentions by the markets and the public. For monetary policy to be effective, especially in a world of changing economic structures and heightened uncertainty, it is essential that the central bank has a well-defined objective and that it expresses clearly and unambiguously its commitment to do everything that is needed to achieve that objective. Yet by itself this may still not be sufficient, as this commitment must also be perceived as credible by all the actors affected by the decisions of the central bank. I think that almost eight years since the introduction of the single European currency, it is fair to say that the ECB has been successful in demonstrating this type of credible commitment.

For this success, it was instrumental that the ECB decided early on to adopt and announce a quantitative definition of price stability, namely to keep HICP inflation below but close to 2% over the medium term, as a clear yardstick which serves two purposes. On one hand, it clarifies and quantifies the notion of price stability, as mentioned in the Maastricht Treaty, which, therefore, represents the benchmark to assess our performance over the medium term. On the other hand, the quantitative definition of the price stability objective guides and helps to anchor private sector expectations of future inflation rates to a clearly defined objective.

The commitment to pursue a publicly announced explicit price stability objective is important for a successful monetary policy. However, it is not on its own sufficient. It will lead to the appropriate anchoring of expectations only if policy is implemented in a credible manner, that is, in such a way that markets and the public are convinced of the central bank's commitment and ability to conduct policy effectively. In other words, *ex ante* commitment must be confirmed *ex post*. This requires the central bank to respond in a timely and determined manner to shocks to price stability, and to effectively communicate its policy actions, so that markets and the public understand the rationale behind these actions and their consistency with the objectives and the strategy adopted. In an environment of increased uncertainty and structural change, the potential for making mistakes increases. An undesirable, and possibly substantial, decoupling of inflation expectations from the central bank's objective can occur if the policy response to inflation is not sufficiently determined – or is perceived not to be. If inflation expectations were to become "unanchored", a much tighter monetary policy would have to be pursued to secure price stability, and high inflation is likely to be accompanied by an economic slowdown or recession. These arguments are supported by analysis concerning the optimal

conduct of monetary policy under uncertainty and imperfect knowledge.<sup>6</sup> Credibility is established over time on the basis of the policy outcomes achieved, and as the public understands and learns that policy actions are consistent with the central bank's quantitative objective and strategy.

Increased uncertainty about the economy's structure and functioning and its response to a change in monetary policy may have another implication for its conduct. As pointed out a long time ago by William Brainard (1967) and subsequently by other economists<sup>7</sup>, this type of uncertainty suggests that it is prudent for a central bank to adopt a more cautious attitude in responding to shocks, leading to a more "gradualist" approach in the conduct of policy. This conclusion seems to imply that structural uncertainty and imperfect knowledge about the effects of monetary policy may pose a trade-off between a cautious, gradualist response to shocks, and the need for timely and determined action. Addressing such a potential trade-off will require reliance on the most comprehensive and high-quality analyses as well as judgement. But under most circumstances, prudence, timeliness and determination are not likely to be conflicting, but rather complementary, attributes of an effective monetary policy. The commitment to an explicit price stability objective, the adoption of a well-defined strategy, and the credible conduct of policy in line with this commitment should enhance its effectiveness: it calls for determined and prompt action, though without unwarranted activism in responding to shocks and noisy signals.

What does the available evidence tell us about the effectiveness and credibility of the ECB's monetary policy? Euro area long-term inflation expectations, as measured in surveys or derived from financial market data, have remained remarkably well-anchored to price stability during a period characterised by numerous and sizeable inflation shocks.<sup>8</sup> [see Chart 12] This conclusion is clearly supported by the findings from the surveys conducted by Consensus Economics and from the ECB Survey of Professional Forecasters. Alternative measures of long-term inflation expectations can be obtained from the so-called breakeven inflation rates, derived from index-linked bonds, which are often referred to as "inflation compensation" in the United States. Breakeven inflation rates have been higher – occasionally considerably higher – than our definition of price stability and much more volatile. But this concept does not represent a pure measure of inflation expectations because the breakeven inflation rate incorporates inflation-risk and liquidity premia which may affect its level and time profile. Recent ECB studies have constructed quantitative estimates of euro area inflation-risk premia based on so-called macro-finance and affine models of the term structure of interest rates. If corrected for such premia, long-term inflation expectations derived from breakeven inflation rates appear to be fully consistent with those derived from survey data and in line with our definition of price stability (as shown in Chart 13).

Finally, I would like to point out that the credible commitment of the ECB to price stability and the effective communication of its readiness to act when necessary to achieve this objective have favourably influenced inflation expectations during certain periods, without making it necessary to change the policy stance in response to shocks or temporarily deteriorating expectations.<sup>9</sup> This is illustrated in Chart 13, which shows that inflation expectations, as measured by the consensus inflation forecast as well as by the five-year forward breakeven inflation rate, adjusted to take into account the inflation-risk and liquidity premia, have remained firmly anchored or have rapidly converged to price stability, even during the two-year period when the policy rate of the ECB remained unchanged. In that period, however, the ECB made it clear that it was exercising "strong vigilance" and was ready to act to secure price stability. More recently, since last December, and despite the anchoring of inflation expectations, policy rates have been steadily adjusted in the light of our assessment of the upside risks to price stability over the medium term. The credible commitment of policy must be preserved by action when this is warranted by the assessment of potential inflation risks over the medium term.

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<sup>6</sup> See Orphanides and Williams (2002).

<sup>7</sup> See Brainard (1967) and also, *inter alia*, Orphanides and Williams (2003) and (2006).

<sup>8</sup> These included, in addition to sizeable and persistent oil shocks, the effects of the cash changeover to the euro banknotes and coins, indirect tax increases, etc.

<sup>9</sup> See Trichet (2005).

## **VI. Concluding remarks**

"Nothing endures but change," Heraclitus observed more than 2,500 years ago. His observation is still valid today. However, what is particular about the past decade and half is the acceleration of the rate of change coupled with the all-encompassing nature of the change. Globalisation, technological advances, and financial innovation are altering economic relationships at an unprecedented pace. In such an environment of continuous and rapid change, it is vital that certain key values remain stable: one of these is the real value, the purchasing power, of money. A central bank which publicly and credibly commits itself to attaining its price stability objective provides a compass that helps orient the expectations and actions of economic agents towards price stability.

But there is another element that should also remain stable: the need to continuously improve our analysis and extend the frontier of our knowledge about the structure, functioning and dynamics of the economy. And it is for this reason that I am looking forward to the sessions of this conference and to the fifth conference of the International Research Forum on Monetary Policy to be held in May 2008 at the ECB in Frankfurt am Main. Incidentally, if we return to the symbolic meaning of numbers that I referred to at the start of my speech we find that, the number 5 is said to represent growth through experience, intellectual capacity, and the ability to think analytically and critically. In other words: the fifth conference is undoubtedly an event to look forward to!

Thank you very much for your attention.

## **References:**

- Borio, C. and A. Filardo (2006), "Globalisation and inflation: New cross country evidence on the global determinants of domestic inflation", BIS, March.
- Brainard, W. (1967), "Uncertainty and the Effectiveness of Policy", American Economic Review, Vol. 57, No 2, May, pp. 411-25.
- Ciccarelli, M. and B. Mojon (2006), "Global inflation", ECB working paper No. 537.
- European Central Bank (1998) "The Quantitative Reference Value for Monetary Growth", press release, 1 December, [http://www.ecb.int/press/pr/date/1998/html/pr981201\\_3.en.html](http://www.ecb.int/press/pr/date/1998/html/pr981201_3.en.html).
- Frey, L. and G. Moëc (2006), "Are we heading towards a heightening of global inflationary pressures?", Bulletin Digest, Banque de France, No. 153, September.
- Orphanides, A. and J. C. Williams (2002), "Robust Monetary Policy Rules with Unknown Natural Rates", Brookings Papers on Economic Activity, Vol. 2, pp. 63-118 .
- Orphanides, A. and J.C. Williams (2004), "Imperfect Knowledge, Inflation Expectations and Monetary Policy", in B. Bernanke and M. Woodford (eds.), The Inflation-targeting Debate, Chicago: University of Chicago Press.
- Orphanides, A. and J. C. Williams (2006), "Inflation Targeting under Imperfect Knowledge", Finance and Economics Discussion Paper No 2006-20, Federal Reserve Board, April, <http://www.federalreserve.gov/pubs/feds/2006/200620/200620abs.html>
- Trichet, Jean-Claude (2005), "Monetary Policy and Credible Alertness", Intervention at the Panel Discussion at the Symposium of the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 27 August, <http://www.ecb.int/press/key/date/2005/html/sp050827.en.html>

## I The Increasing pace of globalisation: Exports relative to GDP

Global exports of goods and services (percent of world GDP)



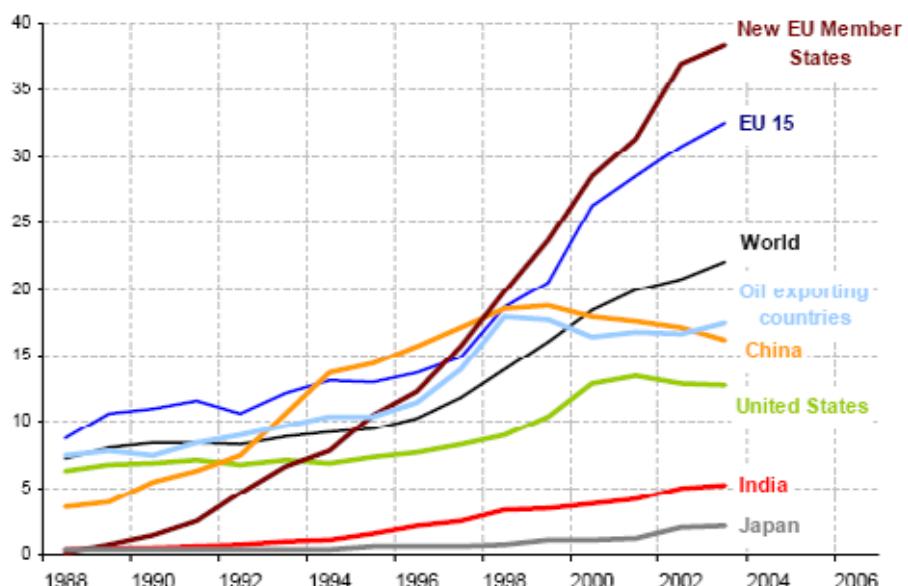
Source: IMF, World Economic Outlook (figures beyond 2005 are WEO forecasts)

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## 2 The increasing pace of globalisation: Foreign Direct Investment (FDI) relative to GDP

Inward FDI stocks (percent of GDP)



Source: UNCTAD

Note: Last figures relate to 2003

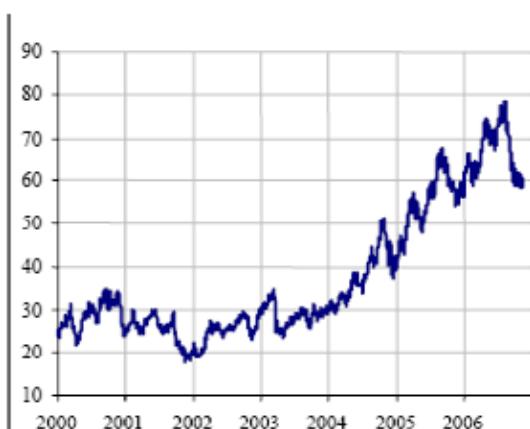
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### 3 Recent increases in oil and other commodity prices

Brent crude oil price

(USD per barrel)



World market prices of raw materials  
(excluding oil)

(Index, 2000=100)



Source: Bloomberg

Note: Last observation refers to 15 November 2006.

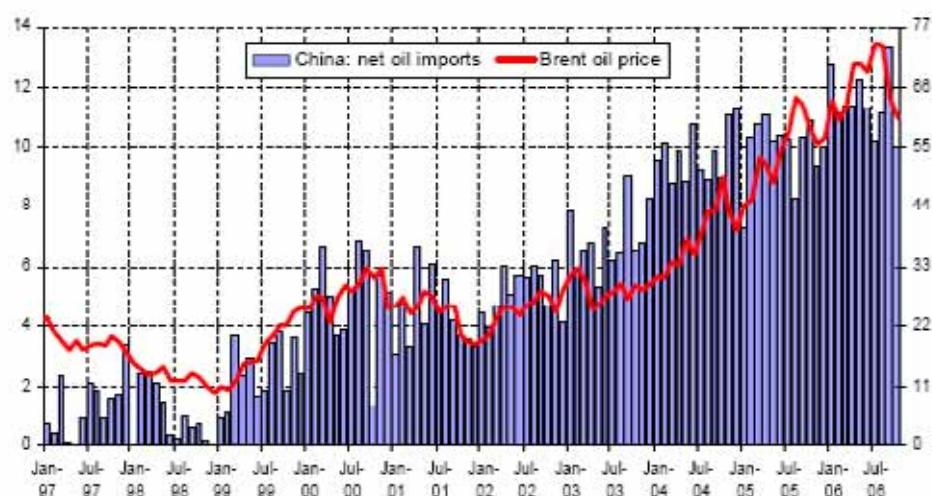
Source: Hamburgisches Welt Wirtschaftliches Archiv

(HWWA)

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### 4 China's net oil imports and Brent oil price



Note: China's net oil imports: left-hand scale, monthly data, millions of tons. Brent oil price: right-hand scale, US dollars per barrel, monthly averages. Latest observation: October 2006

Source: China General Administration of Customs, Bloomberg, ECB calculations.

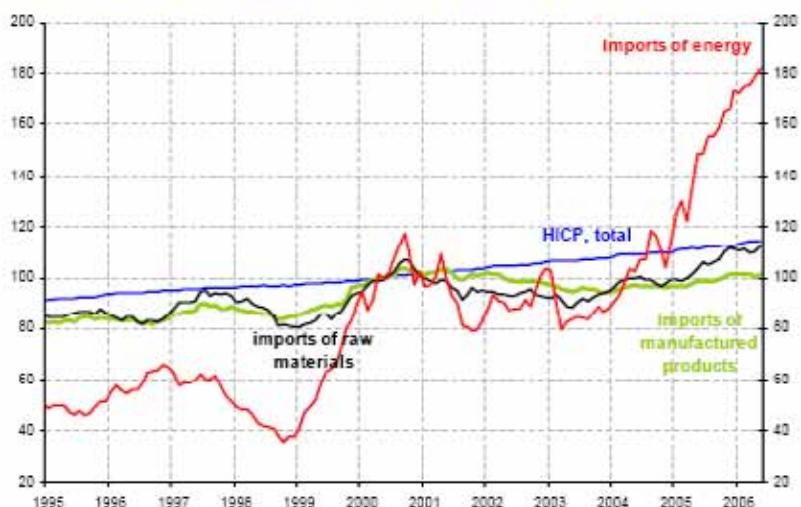
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## 5 Consumer prices and import prices in the euro area: dynamics and trends

### Euro area import unit value indices

(Indices: 2000=100; monthly data – last observation refers to July 2006)



Source: Eurostat, OECD

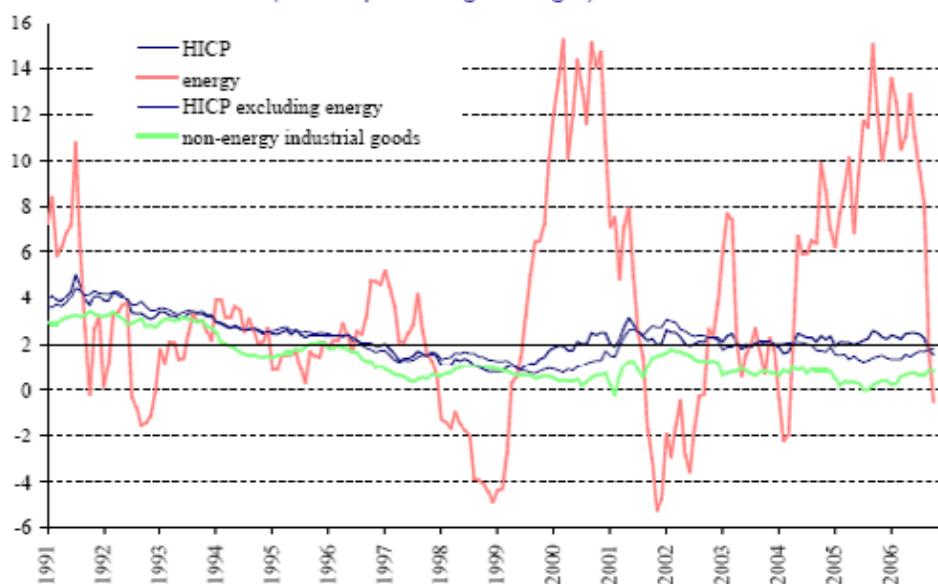
Note: HICP (Harmonized Index of Consumer Prices). Imports of energy include oil and gas.

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## 6 Euro area HICP inflation and components

(annual percentage changes)



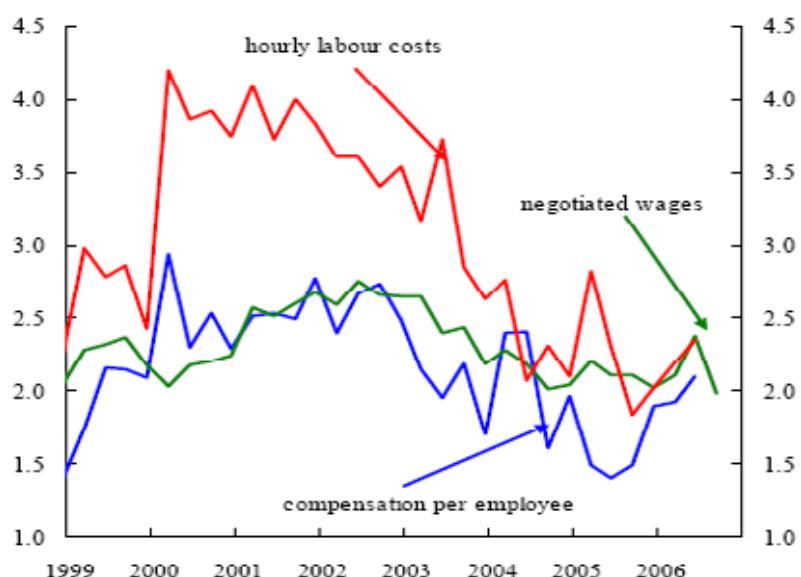
Source: Eurostat

Note: Latest observation October 2006

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## 7 Euro area labour cost developments

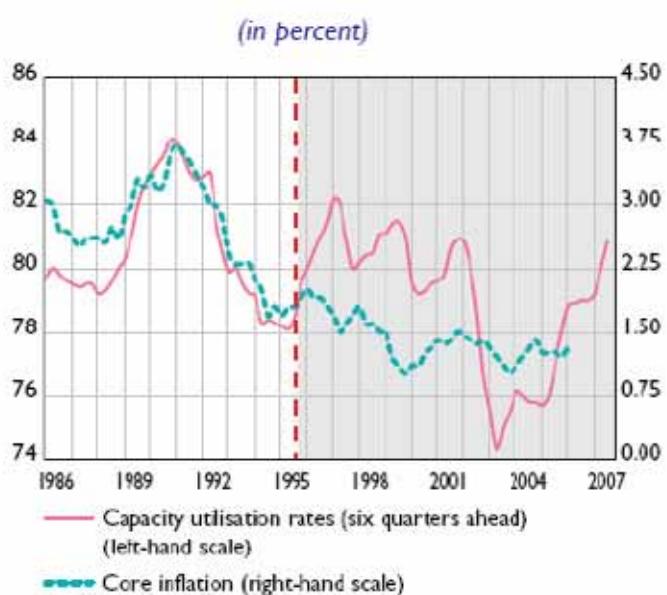


Source: Eurostat, national data and ECB calculations.

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## 8 Capacity utilisation and core inflation in the G 10 economies

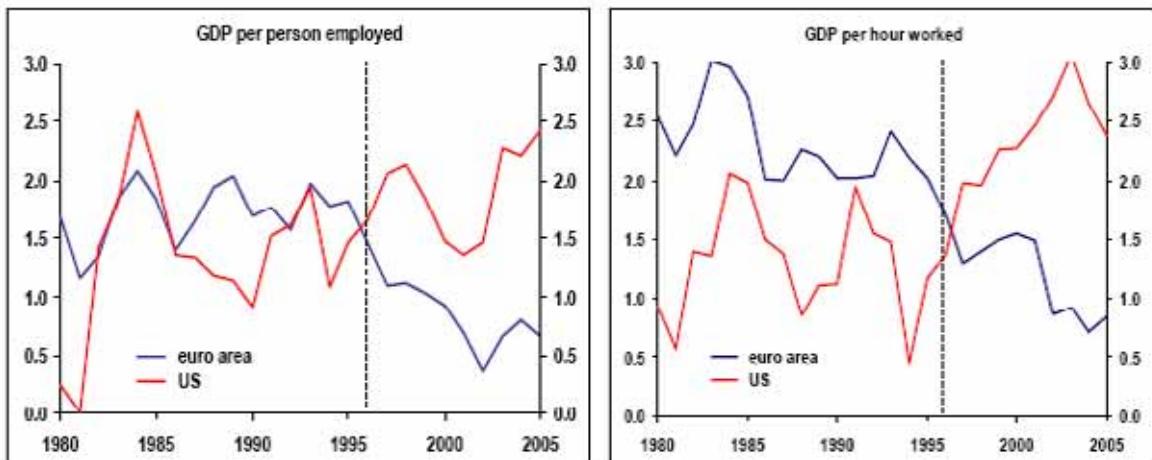


Source: L. Frey and G. Moec, "Are we heading towards a heightening of global inflationary pressures?", Banque de France Bulletin Digest, 153, September 2006.

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## 9 Turnaround in labour productivity performance in the euro area and the US since the mid-1990s

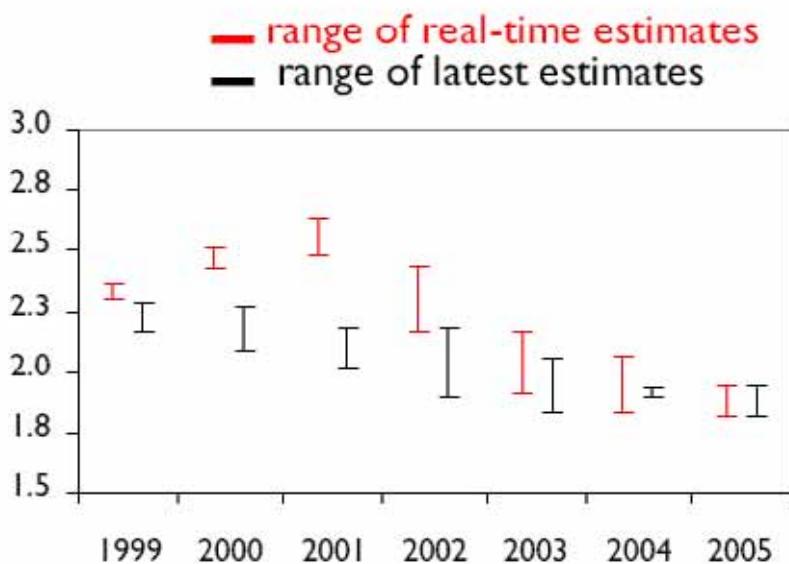


Source: European Commission (AMECO database), and Groningen Growth and Development Centre Total Economy Database and ECB calculations. Data shown are three-year centred moving averages.

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## 10 Revisions to euro area potential output growth estimates from international organisations



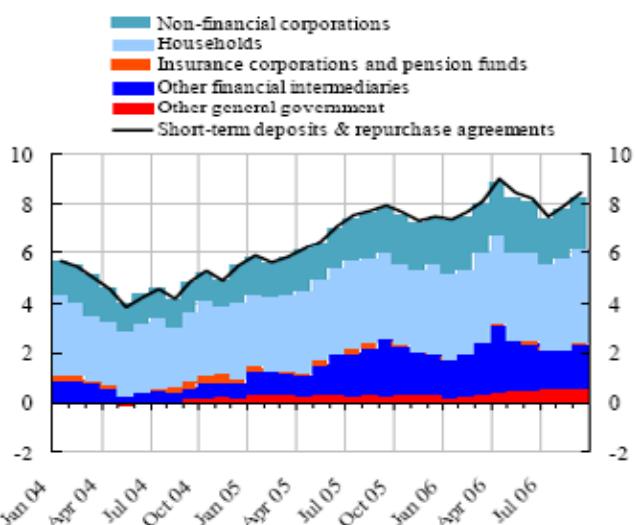
Source: IMF, European Commission and OECD

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## II The contribution of non-monetary financial intermediaries to M3

**Short-term deposits and repurchase agreements by sector**  
(annual percentage changes and contributions in percentage points)



Source: ECB and ECB calculations.

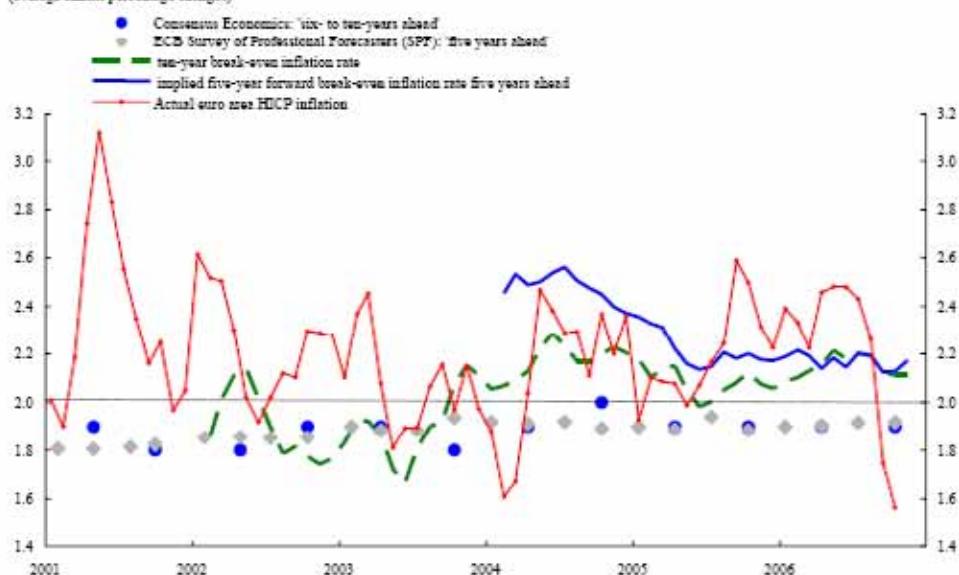
Note: Data on OFI holdings of short-term deposits are only available since January 2003.

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## 12 Commitment and credibility: inflation expectations and actual inflation

(average annual percentage changes)



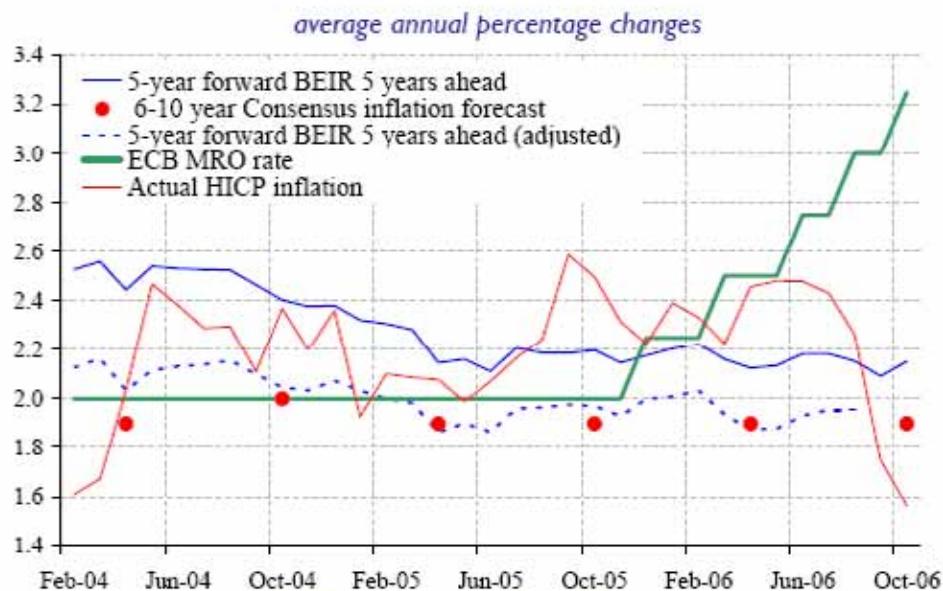
Source: Consensus Economics, ECB, Reuters, Eurostat and ECB calculations.

Note: Ten-year break-even inflation rate derived from 2012-maturity bonds until March 2005 and from 2015-maturity bonds thereafter. Latest Consensus Economics survey refers to 2012-2016. Latest ECB SPF refers to 2011.

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## 13 Commitment and credibility: inflation, inflation expectations, policy interest rates



Source: Consensus Economics, ECB, Reuters, Eurostat and ECB calculations.

Note: Ten-year break-even inflation rate derived from 2012-maturity bonds until March 2005 and from 2015-maturity bonds thereafter. Latest Consensus Economics survey refers to 2012-2016.

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