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Why Price Stability?

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1. Introduction*

"*But, with regard to money, everything is determined by human beings themselves, i.e. the statesmen, and (so far as they are consulted) the economists; the choice of a measure of value, of a monetary system, of currency and credit legislation – are all in the hands of society, and natural conditions (e.g. the scarcity or abundance of the metals employed in the currency, their chemical properties, etc.) are relatively unimportant. Here, then, the rulers of society have an opportunity of showing their economic wisdom – or folly. Monetary history reveals the fact that folly has frequently been paramount; for it describes many fateful mistakes. On the other hand, it would be too much to say that mankind has learned nothing from these mistakes.*" Knut Wicksell (1935), pp. 3–4.

Following the widespread experience of high and variable inflation in the 1970s and 1980s it seems fair to say that mankind has indeed learned much. Considerable progress has been made, not least within the countries of the euro area, and price stability has been restored. If this conference were being held in the 1970s and 1980s it would be natural to be asked to make the case for price stability as this would represent a change of policy. There would be a need to say why it would be beneficial to move away from the state of high and variable inflation that existed in many countries. We would be discussing the balance between possible short-run transitional costs against the potential for long-run growth and welfare gains.

Today the situation is rather different. I think that it is fair to say that the case for price-stability ultimately proved to be persuasive, not just to statesmen and economists but also, and most importantly, to the wider public.[1] This can be seen in the gradual recognition of the need to give central banks independence and clear mandates to pursue the objective of price-stability. As a result, most developed countries are currently experiencing rates of increases in consumer prices that are low, at least by recent historical standards.

Therefore I would argue that the real question now is: 'Why *not* price stability?' Given that any transitional costs in moving to price stability have already been incurred, can any respectable case be made against the current situation of very low inflation and its perpetuation? What would be the benefits of allowing inflation to rise again? I think that the answers to these questions are clear and that there are no compelling arguments that would lead us to return to the situation that existed in the 1970s and 1980s when inflation did so much damage to many of our economies.

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* I would like to thank Julian Morgan for his valuable contribution.

[1] Indeed, according to the survey results for the US reported by Shiller (1996), the general public place more importance on the need to prevent high inflation than do most economists (p. 20).

At the 1996 Jackson Hole Symposium, John Taylor linked the rise in inflation in the 1960s and 1970s to the temporary acceptance of misleading notions such as a non-vertical long-run Phillips curve (Taylor (1996)). By the early 1980s these notions had been abandoned leading to a move towards price stability.[2] Nevertheless, it is important to continually be on guard against arguments that, in the words of Knut Wicksell, might lead to further "folly".

At the outset, I will make a few remarks about deflation, lest anyone think that I am only concerned about inflation. Clearly, it is important to recognise that many of the arguments against inflation are also arguments against deflation. The fifty years following the second world war were, for the most part, an era of rising prices, so it is not surprising that the focus of academic work has been on the effects of inflation. Over this period there was no real policy concern about deflation. However, as inflation fell to historically low levels in many countries during the course of the 1990s this situation began to change. This is most clearly seen in some special cases, such as the recent experience in Japan. More generally it is fair to say that in a situation of low inflation or price stability, concerns about the possible effects of inflation or deflation become more symmetric.

It is clearly the case that central banks need to be alive to possible risks of deflation as well as inflation. When risks of deflation emerge, the need for both pre-emptive action and the development of strategies to deal with any deviation from price stability is no less pressing than when inflation risks arise. However, such risks of deflation need to be real and not imaginary. At the current juncture, it appears that the risks are more on the upside and the world is once more confronted with inflation risks. Therefore, in this contribution I will place greatest emphasis on the risks to price stability stemming from inflation rather than deflation.

2. The Theoretical Arguments for Price Stability

I will begin the case for and against price stability in what is perhaps the most unpromising place – the theoretical work on the long-run relationship between the growth of money, prices and output. The key question is whether changes in the growth rate of money have the capacity to affect real variables, in other words, whether money is 'superneutral'.[3] Given the importance of this topic it is not surprising that economists have been thinking and writing about it for some time, but it is perhaps more surprising that there are few clear conclusions.

Modern work in this area can be traced to the seminal contribution of Tobin (1965) who found that higher inflation could be linked to higher growth and thus rejected the superneutrality of money. Using a simple model with aggregate saving depending on current income, Tobin showed that an increase in the rate of growth of the money

[2] These issues are pursued in depth in the book by Sargent (1999) who considers two possible explanations for the 'Conquest of American Inflation': 'the triumph of the natural rate theory' or the 'vindication of econometric policy evaluation'. Under the former, policy makers came to believe in the natural rate theory and the reduction in inflation was shaped by this change in beliefs. Under the latter, policy makers were guided by the econometric results as they recurrently re-estimated the Phillips curve and found that it was shifting adversely as they tried to exploit it.

[3] Money as an institution or a technology is, of course, far from neutral – indeed it is probably one of the most productive "discoveries" in the history of mankind. Furthermore, changes in the institutional structure and technology of money (for example, the increasing use of debit cards rather than cheques and of e-money rather than cash) may well have real effects.

stock, and consequently a higher rate of inflation, reduces the own return on money inducing a portfolio shift on the part of agents in favour of real capital. This leads to an increase in the capital stock and thereby a higher steady state level of output. However, this result rested on a number of rather restrictive assumptions (e.g. a constant ratio of personal savings to income and a somewhat ad-hoc treatment of the savings and portfolio allocation decision). Moreover, the policy conclusions from this paper are highly implausible, as taken to its logical extreme, it would imply that hyperinflation would permanently raise output.

A subsequent paper by Sidrausky (1967) came to the opposite conclusion from Tobin. Sidrausky addressed the same problem by focusing on the intertemporal allocation decision within the framework of dynamic optimisation by infinitely lived economic agents. He also introduced money explicitly into the utility function. This paper indicated that the long-run capital-labour ratio (and therefore output itself) is pinned down by the rate of time preference and does not depend on the rate of inflation. Within this framework, the superneutrality of money is (re)established. However, the Sidrauski result was found not to be robust with respect to variations in underlying assumptions in the model.[4]

Since the publication of the papers by Tobin and Sidrauski a wide literature has developed on this subject which is surveyed by Stein (1970) and more recently by Orphanides and Solow (1990). In his 1970 survey of money in growth models, Jerome Stein noted that "*my main conclusion is that equally plausible models yield fundamentally different results*". Two decades later, Orphanides and Solow in their 1990 survey noted that "*all we have is more reasons for reaching the same conclusion*".

I would now like to turn to a more fruitful area of the theoretical literature for addressing the question "Why not price stability?", which is the theoretical evidence on the welfare costs of inflation. In order to do this I will utilise the well-known framework set out by Fischer and Modigliani (1978). This shows that the effects of inflation can vary enormously depending on the institutional structure of the economy and whether inflation is fully anticipated or not. Moreover, as institutional structures can adapt to persistent inflation, the effects of inflation should vary between economies and within the same economy over time. The framework begins with the case of an economy that has adapted, as far as it is imaginable, to the effects of inflation. That is where both public and private institutions are fully attuned to inflation and current and future inflation is fully reflected in inherited and future contracts. This 'inflation-proof' economy, where the real effects of inflation would be expected to be minimised, provides the base case for the assessment. It is then possible to gradually relax the inflation proofing assumptions to examine the additional costs that subsequently accrue.

In a fully indexed economy, the real effects of *anticipated* inflation would principally result from two sources: the absence of interest payments on currency and the 'menu costs' from changing prices and wages. The first arises because there is no practical way to pay interest on currency and as a consequence when all other assets are indexed,

[4] These are discussed in more detail in Issing (2000b). For example, if labour supply is allowed to be endogenously determined, this means that changes in money growth have the potential to affect the relative marginal utilities of consumption and leisure and therefore the level of steady-state output. However, the direction of the effect in this case is ambiguous and depends on the relative sizes of the elasticities of the utility function. Indeed, for certain classes of utility functions (e.g. the logarithmic) the superneutrality result still stands.

inflation should lead to a fall in demand for real currency. This results in the well known 'shoe-leather' costs of inflation which are the search costs incurred whilst looking for alternative stores of value to real money balances. The second source of real inflation effects arises from the costs of changing prices in line with inflation. At low rates of inflation there is a clear incentive to set prices in nominal terms and subject them to periodic revision. There would be a fixed cost to be incurred every time prices were changed and the frequency of these changes would depend on the rate of inflation. Higher inflation would require more frequent price revisions and thus menu costs would be incurred more frequently. The cumulative effect of these costs could become very large at high rates of inflation and hence there may be a tendency to move over to some form of indexed pricing (e.g. setting prices in a "stable" foreign currency) or the creation of new forms of money (for example the use of tokens). These new monies would involve transitional costs, would be costly to carry and would reduce the government's seignorage.

Recently developed consumption-smoothing approaches (e.g. Imrohoroglu (1992)) suggest that there may be additional welfare losses from economising on real balances. Individuals may carry these funds to allow them to consume when they cannot work. Inflation leads them to economise on real money balances and therefore undermines the their ability to smooth consumption over time.[5]

The framework developed by Fischer and Modigliani indicates how the real effects of anticipated inflation are stronger if 'nominal government institutions', primarily relating to tax and welfare systems, are allowed for. Such systems are likely to generate distortions even in the absence of inflation or, for that matter, deflation. For example, the imposition of personal and corporate income tax distorts the allocation of productive resources in a market-based economy because it leads to a bias towards current consumption relative to savings and investment. Nevertheless, such effects can be all the greater when prices are rising. A clear example of this arises with the non-indexation of income tax thresholds since the proportion of income that is paid by personal income tax rises as prices increase. Whilst such effects on income tax payers may not be that large, especially where tax thresholds are periodically updated to take account of inflation, the effects of non-indexation can be far greater for asset holders or corporations. At higher rates of inflation, the post tax real return will decline as the 'inflation-element' of any gain will be taxed along with the 'real-element'. Inflation can also reduce the value of depreciation allowances that are based on historical costs.[6] Overall, it appears likely that, *ceteris paribus*, increases in inflation will tend to increase the cost of capital and reduce the post-tax real return to holders of wealth.

If nominal *private* institutions are allowed for, then the list of potential effects of anticipated inflation grows longer. For example, as mortgages for purchasing residential property generally require repayments based on the initial *nominal* value of the loan, inflation – even when fully anticipated – will affect the time profile of real repayments.

[5] In such a model people cannot insure themselves completely against the loss of income since work opportunities are idiosyncratic.

[6] Whilst, these examples indicate that inflation would lead to higher government tax revenues, and conversely deflation would lead to lower revenues, this need not be the case for all interactions between inflation and nominal government institutions. For example, government subsidies for nominal interest payments should rise with inflation and fall with deflation.

For any given real interest rate, higher inflation will necessarily be accompanied by a higher nominal interest rate and a higher mortgage payment based on the nominal value of the loan. With inflation reducing the real value of the outstanding loan, higher inflation will result in a higher initial repayment of real capital. Whilst this only affects the time profile of real repayments, the larger initial mortgage payments will increase the real burden of financing home ownership in the early years and thereby may act as a discouragement to home purchase.[7] A similar effect also occurs with nominal annuities that yield constant nominal payment streams, which can complicate pension arrangements by reducing the real value of future income. Furthermore, the use of nominal accounting methods means that inflation can lead to distortions in reported profits and other accounting magnitudes.

Turning now to the effects of *unanticipated* inflation, there can be important real effects from the impact of unanticipated inflation on nominal contracts. These effects involve wealth distributions from nominal creditors to nominal debtors. There can be many aspects to these wealth distributions, reflecting the distribution of nominal creditors and debtors in the economy. Notably, there can be an age dimension, for example, transfers from the old to the young and there can also be transfers from the less risk averse to the more risk averse. These redistributions can be substantial and have been extensively researched in the literature.[8]

Other real costs of inflation can emerge from uncertainty about future inflation. Uncertainty over inflation will reduce the attractiveness of nominal assets and increase the attractiveness of real assets as 'hedges' against inflation. Such a focus on inflation hedges may result in a decline in saving and ultimately also in physical investment. Furthermore, such uncertainty can seriously disrupt the functioning of the price mechanism, resulting in distortions and the misallocation of resources. It leads agents to confuse transitory and permanent price changes, and thereby distorts their decision-making. In evaluating investment opportunities, it is essential that firms have confidence in the signals conveyed by relative price changes, as these may be crucial in determining whether a project will be profitable or not. The longer the horizon for the investment, the more important it becomes that firms have confidence in the signals conveyed by relative price movements. As Harberger (1998) states:

"*A high product price and a low input cost normally is an invitation clamoring for new investments to be made. This is not so during a serious inflation, when such a signal can easily turn out to be "here today, gone next month" as both product and input prices continue on their separate paths of adjustment to the ongoing inflation.*" Harberger (1998), pp. 21–22.

The impact of inflation uncertainty on relative price changes can also affect more short-term production decisions, leading to two types of mistakes. Firms may increase production when the price increase is only due to overall inflation or fail to increase

[7] In principle, this problem could be addressed by indexing the mortgage and basing repayments on the real value of the loan. This would mean that the mortgage repayments would be reduced to take account of reductions in the real value of the mortgage due to inflation. However, in common with other forms of indexation, the calculation of mortgage repayments based on the real value of the outstanding loan has not generally been undertaken – even in periods of relatively high inflation.

[8] A discussion of research in this area is included in Fischer and Modigliani (1978).

production when the price increase is due to a favourable relative price movement as in the model of Lucas (1973). In either case, resources are wasted.

Taking all of these welfare costs into account there can be little doubt that inflation is harmful for welfare in the medium term.[9] Overall, the theoretical literature on both the impact of inflation on long-term growth and on welfare can provide no reasons for abandoning price-stability. On the contrary, they firmly support the maintenance of price-stability.

3. The Empirical Evidence

I now turn to the empirical evidence, beginning with the link between inflation and growth, before moving on to the estimates of the magnitudes of the welfare costs of inflation. Overall, it seems fair to say that the weight of the empirical evidence points to a negative relationship between inflation and output in the long-run. Studies in this area tend to utilise cross-country data on long-run average inflation and growth. Many papers establish a long-run negative relationship between inflation and growth, or in some cases the variability of inflation and growth, including those by Andres and Hernando (1999), Fischer (1993), Grier and Tullock (1989), Kormendi and Meguire (1985), Cozier and Selody (1992) and Barro (1995). Nevertheless, not all work has found a negative relationship between inflation and growth. Bruno and Easterly (1996) found no link between inflation and growth, except for countries with inflation over 40% per annum. McCandless and Weber (1995), using data for 110 countries, showed that there is a near one-for-one relationship between the average inflation rate and average money growth over the period 1960–1990, but no relationship between inflation and the growth rate of real output.

With regard to the output gains found in most studies from price-stability and low inflation, it is important to bear in mind that they are permanent. Even if they may appear to be small in any one year, in present value terms, the size of these gains can substantial. For example, discounted at a 3% real interest rate, a 0.5% gain in the level of output per year amounts to 17% of GDP in present value terms. In fact, the empirical evidence suggests that the gains may be larger than this. For example, the recent study by Andres and Hernando mentioned earlier points to a permanent gain of between 0.5% and 2% of GDP a year. Barro (1995) estimates that a 10 percentage point rise in inflation will reduce the growth rate of real per capita GDP by 0.2–0.3 percentage points per year, leading to output being lowered by between 4–7% after 30 years.[10]

Research in this area has, inevitably, been criticised on a number of grounds. First, the results do not seem particularly robust to changes in econometric specifications. Second, the negative correlation between inflation and growth appears to be due to the inclusion of relatively high inflation countries. However, a recent study by Andres and Hernando (1999), focusing on OECD countries, found that even in low or moderate

[9] Fischer and Modigliani (1978) also point out that government attempts to suppress inflation using wage and price controls can produce serious distortions and inequities. When these measures are introduced at times of excess demand they are clearly likely to lead to shortages of the items subject to control.

[10] The reduction in the growth rate gradually diminishes over time so that the economy converges back to its unchanged long-run growth rate, but at a permanently lower level of output.

inflation countries, there is evidence of a robust negative relationship between inflation and output in the long run. Third, there is a difficulty in establishing a clear causal link between inflation and growth. It is quite possible that, for example, higher inflation may be caused by adverse supply shocks which will also impact on output.[11] Nevertheless, despite these caveats, one can confidently assert that allowing more inflation is not good for longer-term growth.

To complement the analysis on the theoretical costs of inflation, Fischer (1986) (chapter 2) undertakes a broad ranging assessment of empirical evidence on the welfare costs of inflation. The assessment is based on the comparison of a policy that is expected to result in ongoing inflation of 10 per cent a year with one which is expected to achieve zero inflation. He presents some estimates of the welfare costs of anticipated inflation in the United States, beginning with an assessment of the welfare costs arising from the non-payment of interest on high-powered money. Using the money triangle and an assumed interest elasticity of currency demand of 0.25 (applied to all high powered money) gives a welfare gain of 0.3% of GDP from zero inflation compared with 10 percent inflation.[12] Lucas (1981) also examines the impact of the same reduction in inflation, using the M1 definition of money and finds a slightly higher welfare cost of 0.45% of GNP. Cooley and Hansen (1989) find welfare losses of 0.08% of GNP for base money and 0.3% of GNP for M1.

Nevertheless, it should be borne in mind that there is also a transfer to the government from the non-payment of interest on the money stock. As such, it may be argued that one should compare these welfare losses with those which would occur if the government raised revenues in other ways. However, in practice, it appears that the 'inflation tax' is generally not an efficient means of raising revenue (when measured by the excess burden to government revue, or the so-called inefficiency ratio), certainly when compared with labour income taxation.[13] Moreover, money is in itself an intermediate good which is used to minimise transactions and search costs and taxing intermediate goods is less efficient than taxing final goods (if there are constant returns to scale).[14]

One caveat with the preceding analysis is that it requires the assumption of superneutrality of money. However, in practice it is quite possible that the nominal interest rate on nominal assets other than high-powered money does not adjust exactly in line with the expected inflation rate. If this assumption is dropped then it is likely that the impact of inflation on high-powered money is less but also that there are additional welfare losses associated with the fact that real interest rates on other nominal assets will change when the expected inflation rate rises. Fischer estimates that the welfare losses associated with the change in demand for all nominal assets are also of the order of

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[11] Some studies have looked at the issue of causality, for example Fischer (1993) and Andres and Hernando (1999), with the latter study undertaking Granger causality tests. Whilst the results are not clear cut, the authors note that "*... the causality from inflation to growth is always significant and never positive*".

[12] However, it should be noted that these costs will be significantly lower for smaller reductions in inflation in a low inflation environment – see for example Fischer (1994).

[13] An exception to this may occur where significant parts of currency holdings are in the underground economy or held abroad.

[14] Kimbrough (1986) and Faig (1988) point out that money is an intermediate good, whilst the inefficiency of taxing intermediate goods is discussed in Diamond and Mirrlees (1971).

0.3 per cent of GDP. There have also been some attempts to explicitly quantify 'menu costs' from changing prices – see for example Levy et al (1997) who find that the process of changing prices in large US supermarket chains is '... a complex process, requiring dozens of steps and a non-trivial amount of resources' (Levy et al. (1997) p. 791). Nevertheless, this does not discourage these firms from making frequent weekly price changes as there appears to be a high marginal benefit from changing prices in the face of strong competition in the retail sector.

As already discussed, inflation can significantly exacerbate the economic distortions already resulting from tax and welfare systems. This interaction of inflation with nominal government institutions can lead to substantial welfare effects. For example, Fischer (1986) examines the effects of inflation on savings and investment and its interaction with capital taxation. The welfare losses here are potentially large – of the order of 2–3 per cent of GDP – although they are likely to be reduced by the usual practice of periodically adjusting taxation thresholds for the effects of inflation. More recent estimates are provided in the papers contained in the book edited by Feldstein (1999). These give some magnitudes of the welfare gains for moving from low-inflation to price stability in the US, Germany, Spain and the UK. The effects are found to be large, due mainly to the interaction of inflation with distortions created by the tax and social security systems. In the US it is estimated that such a move would permanently raise GDP by 1 percent, with larger effects for Germany and Spain and somewhat smaller ones for the UK. A recent paper by Robert Lucas (2000) finds that the welfare gains from reducing US annual inflation from 10 percent a year to zero are equivalent to an increase in real income of slightly less than 1 percent.

There is also the question of inflation uncertainty and how this can also be associated with potentially large welfare losses. For the United States it appears that there is a clear link between the average rate of inflation and its variability. Whilst a higher and more variable rate of inflation does not necessarily mean more uncertainty about inflation, there are good reasons for believing this to be so. For example, there may be uncertainty associated with changes in monetary policy needed to reduce such inflation and the likelihood that increased inflation may lead to more relative price changes. Cross-sectional surveys in relation to expected inflation for the US appear to support the notion that the variability of expected inflation across individuals is higher when inflation is higher. However, using time-series data there does not appear to be a significant positive association between the rate of inflation and its variance.[15]

It is sometimes suggested that whilst the potential welfare losses from inflation can be large, it is difficult to definitively link most of these losses to inflation. For example, the welfare costs of nominal institutions, both public and private, could be mitigated if indexation mechanisms were introduced. However, the costs and complexities involved in actually doing this are apparent in the difficulties that were faced in the 1970s when attempts were made in many countries to implement systems of 'current cost accounting'. Ultimately, no satisfactory solution to the problem of appropriately accounting for inflation was found and such systems were rarely implemented in practice. Therefore, in reality, it is reasonable to link these welfare losses to inflation.

[15] The empirical evidence on uncertainty is taken from Fischer (1986).

Overall, the empirical evidence from both the long-run growth and welfare literature seems to be firmly on the side of price-stability. It would certainly seem to provide no support to any notion that abandoning price-stability would raise growth or improve welfare. Indeed nearly all work comes to the opposite conclusion.

4. The Definition of Price Stability

Thus far I have not discussed what exactly should be meant by 'price stability'. Although the term may literally be taken to imply a stable price level, in practice it is also used to encompass other states such as low and stable inflation. In this regard, I will briefly discuss three possible alternatives: steady-state deflation, a constant price level or zero inflation, and low inflation.[16]

Steady-State Deflation

The notion that there should be steady-state deflation is widely associated with Milton Friedman (1969). Friedman argued that, in order to achieve an efficient allocation of resources, the nominal rate of interest should be zero. However, a zero rate of interest would require either very slow growth of the money supply, or in some cases, a steady contraction. In turn, this should result in a steadily falling price level. This was the experience in the US in the last thirty years of the nineteenth century, where productivity gains were reaped in the form of lower prices rather than higher nominal wages.

The line of reasoning that is often used to support the notion of a zero interest rate being optimal is that if the marginal social cost of producing money is close to zero then the private cost of holding money should also be near zero. Any positive rate of interest leads to an opportunity cost from holding money balances instead of interest-bearing securities. Other arguments have been used in favour of a steady-state deflation of consumer prices. Okun (1981) considered the possibility that because of implicit contracts and the search process in the labour market there may be advantages in keeping nominal wages fixed and thereby having prices recording a secular decline.

The arguments against steady-state deflation relate to the potential for both short and long-run costs. A decision to shift to a zero nominal interest rate/negative inflation regime would inevitably result in a transitional loss of output. In relation to the long-run welfare gains from such a move, Lucas (2000) finds these to be substantial – indeed slightly larger than the gains from reducing inflation from 10 percent to zero. In contrast, Wolman (1997), finds that whilst the welfare gains from reducing inflation from 5 per cent to zero are significant, the further gains from reducing nominal interest rates to zero are small. Another issue – to which I will return later in this article – is that there are concerns about nominal floors to wage changes and interest rates that would militate against a permanent state of negative consumer price inflation.

[16] There is also a question of the appropriate horizon with respect to the monetary policy objective. In reality, the inflation rate cannot be expected to equal the target exactly. If the time horizon is too short then the central bank will always be taking corrective action and policy will react too much. However if the period is too long then inflation may be allowed to drift too far away from target for too long and this might adversely affect credibility. These issues are taken up in a recent paper by Smets (2000).

A Constant Price Level or Zero Inflation

A natural alternative is zero inflation, or a constant price level, as there are many costs to inflation and few known benefits. It could be argued that the scorekeeping functions of money work best when there is no change in the overall level of prices. If this happens, individual prices and price movements provide clear signals. In such an environment money functions as a reliable unit of account and can be used as a standard in contracts:

"*We have standardised every other unit in commerce except the most important and universal unit of all, the unit of purchasing power. What business man would consent for a moment to make a contract in terms of yards of cloth or tons of coal, and leave the size of the yard or the ton to chance?*" Irving Fisher (1913) p. 27.

It is important to draw a distinction between a zero inflation and a constant price level objective. With the former, the central bank will aim to achieve zero inflation each period and keep prices at their current level. However, with the latter the central bank would aim to undo the consequences of past divergences from target. This distinction matters and the choice between an objective of zero inflation and a constant price level is frequently seen as a trade-off between long-run price level stability and short term inflation and output stability. In order to stabilise the price level, inflation above zero will need to be subsequently offset by inflation below zero. However, in order to stabilise inflation at zero, positive inflation need only be followed by a return to zero and no period of offsetting negative inflation is required. This would lead to price level having the property of a random walk.

It is widely believed that this leads to greater inflation variability under price level regimes which because of nominal rigidities, would also be accompanied by higher output variability. Therefore, according to this line of argument, price level targeting has the advantage of leading to lower variability in the price level at the cost of greater short-term inflation and output variability.

However, some writers have argued that it may not necessarily be the case that price level targeting leads to more inflation variability. Svensson (1999) argues that "*In more realistic models of inflation targeting and price-level targeting with more complicated dynamics, the relative variability of inflation in the two regimes becomes an open issue*".[17] Gaspar and Smets (2000) also challenge the notion that price-level targeting raises the volatility of inflation and output. They argue that such a finding can only hold for models where agents have backward-looking expectations. In models in which agents are sufficiently forward-looking a small-weight on price stability can allow for reductions in the variability of both inflation and output.

It has also been argued, for example by King (1999), that the contrast between price-level and inflation targeting is somewhat artificial. If central banks with objectives expressed in terms of a point target for inflation are, in practice, expected to achieve this on average then this will equate to a price level objective. As King (1999) shows it is straightforward to augment monetary policy objective functions, such as a Taylor Rule,

[17] As Svensson (1999) indicates it is possible that the trade-off between inflation and output variability will be more favourable under price-level rather than inflation targeting. This can occur if it is assumed that there is at least moderate output persistence or, alternatively, if there is a forward-looking Phillips curve.

with an additional term to correct for deviations from the price level. A key parameter in such an objective function is the time-horizon over which corrections for deviations in the target price-level should take place. As long as this time horizon is not infinite, there will be some weight placed on the price-level and this will be sufficient to avoid base drift. King suggests that an operational inflation target could be adjusted periodically to take account of deviations from the price-level. Such an approach, with small changes in the target at discrete intervals, would maintain the predictability of the long-run price level without inducing large shifts in the inflation rate. Moreover, as Gaspar and Smets (2000) point out, rational forward-looking agents will understand that some weight is being placed on the price-level and this will help to anchor their expectations about the price-level. This should dampen any response to price shocks.

A price level target may also have the particular advantage of avoiding permanent deflations since an unexpected deflation will lead to the price level falling below target and may thereby raise short-term inflation expectations. These higher inflation expectations will reduce the ex ante real interest rate, even if nominal interest rates remain unchanged.

The main advantage of the constant price-level objective is that it should yield greater certainty with regard to the long-run price level. It is sometimes suggested that such long-run certainty is beneficial because it could once again make long-term nominal contracting attractive. Such contracts were used in the nineteenth century when, for example, 99-year nominal leases and 100-year railroad bonds were issued. Prices in Britain were about the same in early part of the twentieth century as they had been in the middle of the nineteenth. However, the 'cost' for such long-run stability appeared to be a high year-on-year variation in output and prices. It is also not clear that the economic value of such long-nominal contracts is that great. Price level-stability may be useful for those saving for retirement, but this could equally done through the issuance of index-linked bonds. Overall, it seems reasonable to say that the question of whether to focus on the price level or the inflation rate remains an open issue.

Another issue is that if it were decided to move from the current environment to adopt a literal price-stability or zero inflation objective, this would be likely to involve some transitional costs. Even if there is no trade-off between inflation and output or between inflation and unemployment in the long-run, trade-offs may nevertheless arise in the short-run. Disinflation can involve short-run, temporary costs in terms of output foregone. Such costs are often measured in terms of 'sacrifice ratios', such as those calculated by Ball (1994). To achieve a reduction in inflation from 2% to zero, Feldstein (1999) found transitory costs in terms of lower output for the US which cumulate to around 6% of GDP. Tödter and Ziebarth (1999) looked at the evidence for Germany and found that disinflation can lead to large, albeit temporary losses in output and increases in unemployment. However, in these studies the temporary costs are still comfortably exceeded by the permanent benefits.[18]

A Gradually Rising Price Level or Low Inflation

It is widely believed that a very low and stable inflation rate may also be compatible with notions of price stability. Okun (1981) suggests that in the US in the late 1950s and mid 1960s there was something close to a secular optimum.

[18] An interesting debate about the relative merits of zero and low inflation can be seen in the papers by Aiyagari (1990) and Hoskins (1991).

"*Wages rose slightly more rapidly than productivity; the prices of goods had a nearly horizontal trend; and the prices of those services that were labor intensive (and subject to only slow productivity growth) displayed an upward trend. The overall upward trend in prices was between 1 and 2 percent a year, and that in annual labor compensation around 4 percent. I do not believe that a case can be made that 6 percent or 8 percent inflation is inherently better or even as good as that earlier performance.*" Arthur Okun (1981) p. 281.

This interpretation of price stability can also be defined in terms of either a deterministic or trend price-level path or the inflation rate. The deterministic price level objective would imply that policy would aim to keep the price level on a fixed trend path based on a constant increase in the price level each year. This would mean that the monetary authorities would still try to offset past mistakes, but the steady upward price trend should mean that this would very rarely require an actual fall in prices in any one year. There would also be a greater certainty about the long-run price level, albeit around a rising trend. Nevertheless, a price-level objective might still result in more variability in the inflation rate. It would also mean that following periods of undershooting, the central bank would have to aim for increases in prices above what is normally considered price stability. In contrast, an objective of a constant small positive inflation rate would imply that an overshooting of the inflation target in any one period would not need to be corrected by an identical undershooting in subsequent periods (and vice-versa).

In the academic literature, four main reasons have been identified for targeting a small positive rate of inflation. First, there is seignorage as a form of government revenue. Second, it is possible that the long-run Phillips curve is non-vertical at very low inflation rates. Third, there is the difficulty for monetary policy posed by a lower bound of zero on the nominal interest rate. Fourth, it is possible that measured inflation may overstate true inflation. I will now consider each of these in turn.

For developed economies the seignorage argument is not particularly compelling. As has already been discussed, seignorage is a relatively inefficient way of raising revenue and is only likely to be useful for countries that have difficulties in raising revenues in other ways – perhaps because of the existence of a large informal sector. Therefore, for developed economies seignorage is not a strong argument with which to justify even low inflation.

The second argument is that the Phillips curve, which is vertical at moderate or high rates of inflation, may exhibit a trade-off at very low rates of inflation as the constraint imposed by the floor on nominal wages becomes increasingly binding. The most popular idea in this context is that a little inflation is necessary to 'grease the wheels of the economy', a view which goes back to Tobin (1972). The argument is that downward nominal rigidity in wages means that it is easier to cut real wages if there is inflation. It does not necessarily rest on the idea of money illusion but rather on the possibility that workers may resist relative wage cuts. Inflation provides a way of synchronising real wage cuts across workers.[19]

Another influential contribution in this area is that of Akerlof et al, 1996 who developed a theoretical model to explain the behaviour of wage, price and unemployment

[19] There may also be nominal rigidities in price setting, as discussed in Yates (1995).

determination under conditions of low inflation and derived empirical estimates of the model parameters. On the basis of this evidence, it is argued that, in the face of downward nominal rigidity, a shift to a zero inflation objective would imply a permanent increase in the equilibrium level of unemployment. More specifically, they argued that a shift from 3% inflation to zero would result in an increase in the US equilibrium unemployment rate of up to 2.6 percentage points. The rationale is straightforward. With a zero inflation rate, individual firms facing adverse firm-specific circumstances will not be able to secure real wage reductions in the presence of downward nominal wage rigidity and, instead, will lay-off workers. Thus, even in equilibrium, it is argued that a permanently higher level of unemployment will prevail under low inflation.

The argument that a small positive rate of inflation can 'grease the wheels' of the economy rests on the extent to which nominal wages and prices are downwardly rigid. Yates (1995) examines the properties of the distribution of earnings in the UK to see if there is any evidence of downward nominal rigidities. Overall he finds that the weight of evidence is against there being significant downward nominal rigidities in either wages or prices. The evidence presented by McLaughlin (1994) also supports this view as widespread incidences of nominal wage cuts in the US are found. In contrast, other studies have found signs of nominal rigidities. Akerlof et al. (1996) examined a range of evidence and studies which examine post-war US experience. They report that the incidence of actual cuts in nominal wage rates is very rare in practice, supporting the notion of downward wage rigidity over the period studied. Work by Carruth and Oswald (1989) and Ingrams (1991) for the UK also finds that nominal wage cuts are rare. However, since the period covered by these studies was one in which inflation was substantially above zero this finding may not be an accurate guide to the situation which would prevail in an environment of low inflation. Moreover, as Gordon (1996) notes, the prediction that a lower rate of inflation would imply a higher permanent level of equilibrium unemployment is not confirmed by cross-country analysis of the relationship between inflation and unemployment rates, nor by the recent historical experience of the US.

As discussed by Groshen and Schweitzer (1999), inflation can add 'sand' to wage and price adjustments as well as 'grease the wheels' of the labour market. Such a sand effect can also arise because of the existence of nominal rigidities (such as menu costs and contracts that are made for fixed periods). General inflationary price changes may not be transmitted instantly or uniformly across the economy and may therefore generate unintentional and disruptive price relative price changes within markets. On the basis of their analysis – which importantly is based on data from a low inflation environment - Groshen and Schweitzer (1999) conclude that "*low inflation may not raise unemployment or impair the smooth functioning of the economy*". In any case, the need for downward nominal wage flexibility may be overdone. As long as trend productivity growth is positive, zero nominal wage growth will enable reductions in unit labour costs to take place without explicit reductions in nominal wage rates. Further, to the extent that earnings (and thus actual labour costs) contain flexible elements, such as overtime payments, bonuses etc., wage costs may be reduced without reducing negotiated wage rates.

I would therefore argue that the 'greasing the wheels' argument does not constitute a convincing argument against price stability. A cursory look at the US data for the 1990s shows that low unemployment and low inflation are not necessarily incompatible. Moreover, concerns about nominal rigidities are best overcome through structural reforms in

the labour and product markets. Nevertheless, whether nominal rigidities provide an argument against aspiring to a constant price level/zero inflation as opposed to a small positive rate of inflation is an open issue.

The third reason for aiming for a low inflation rate is the possible need for negative real interest rates – an argument associated with Summers (1991). Summers pointed out that since nominal interest rates can never be less than zero, the lower bound for real interest rates is minus the rate of inflation.[20] It is often argued that there may periodically be a need for negative real rates in the face of a severe downturn. Choosing an objective of price level constancy or zero inflation effectively rules out this option. Some empirical support for the notion that it is costly to rule out negative interest rates is provided in Fuhrer and Madigan (1997). Using a small model of the US economy they investigate the extent to which the zero bound on nominal interest rates, in the face of negative spending shocks, prevents real rates from falling and thereby cushioning output. They find that the output losses in response to such shocks are somewhat larger when a zero inflation monetary policy objective is pursued rather than an alternative of 4% inflation. Generally the output losses are not large, except in the case of large shocks which persist for several quarters. However, as the authors note, the results are "... *no doubt model-specific* ..." and "... *depend on the specification and parameterization of the model* ...".

The fourth reason for aiming to achieve low inflation is that it is sometimes argued that conventional price measures may overstate inflation. If this is the case then a policy which achieved a constant measured price level, may actually be causing a decline in the 'true' price level. This is an issue that I will now consider in a discussion of the measurement of prices for monetary policy purposes.

5. The Measurement of Prices For Monetary Policy Purposes

It has long been recognised that there can be measurement biases in relation to price indices.[21] The publication of a report from a US commission headed by Michael Boskin in December 1996 has given rise to a renewed interest on this topic among economists and statisticians within statistical agencies, academic circles, as well as within other government agencies and central banks all over the world.

There are a wide range of possible measurement biases affecting consumer price indices. These relate to such matters as the substitution of goods within an index, changes in the outlets used by consumers to purchase goods, difficulties in adequately accounting for quality change and the need to take account of new products. The work of the Boskin Commission on US data indicated that the effects of these statistical issues can be large, leading to an overstatement of the measured inflation rate of between 0.8 and 1.6 percentage points per annum.

[20] This raises the question of whether equilibrium real interest rates will ever need to be negative. Yates (1995) discusses the possibility that equilibrium interest rates may be negative with reference to life cycle behaviour discussed by Konieczny (1994).

[21] For example, in 1961 a report on the state of official price statistics in the U.S. was produced by a Commission headed by George Stigler of the University of Chicago. One of the more important recommendations of the Stigler Report was the need to adopt a rigorous probability approach to the sampling of outlets, items and product specifications, a recommendation which was subsequently adopted by the Bureau of Labor Statistics.

In addition to these measurement issues, there is the general question as to which items should be included in price measures used for assessing price stability. There could be a case for using broad measures – such as the GDP deflator – which cover all final goods and services prices in the economy and may thereby better relate to the decisions made by investors and savers. However, the standard consumer price index (CPI) has considerable advantages, being familiar to the average consumer, easily understood, published regularly and in a timely fashion and infrequently revised. However, it is sometimes suggested that it is appropriate to develop measures of 'core inflation' which exclude volatile components over which monetary policy has little or no control. However, in doing so there is a danger in making the index less transparent and more remote from the prices actually paid by the general public.

Another potential criticism of using CPI indices is that they focus only on currently produced goods and services and do not take account of future prices. It could therefore be argued that monetary policy should focus on measures that accord some weight to asset prices as they reflect expectations on future prices of goods and services as well as being indicators of aggregate demand pressures. The issue of whether to include asset prices in price indices used for monetary policy purposes and more generally what account policy should take of asset price developments has been and continues to be a heavily debated one. Recent contributions have come from a BIS conference (BIS (1998)), Gertler et al. (1998), Bernanke and Gertler (1999) and Cecchetti et al. (2000).

It has sometimes been suggested that asset prices should be directly included in price indices. Alchian and Klein (1973) argued in favour of broad price measures that would measure the change in the cost of purchasing a lifetime stream of consumption in current prices. In this regard current asset prices are claims on future consumption and can be used as measures of future prices. This leads to the notion of an intertemporal cost of living index – the cost of claims at current prices to a consumption basket that yields a fixed level of lifetime utility. However, one result is that the bulk of the weight will be on future consumption and therefore asset prices. With a 3% discount rate this means that the weight would be around 97% on asset prices and thus only 3% on current consumption.[22] Effectively this means that policy makers should just target asset prices.

There are, however, many potential pitfalls from attempting to target asset price movements for policy purposes. There is no reason to expect that historical relationships between asset prices and the ultimate target variable will remain stable if the central bank tries to exploit them, not least because asset prices are highly dependent on expectations. It is very difficult to know whether asset price movements reflect fundamental or non-fundamental factors. There is also a danger of causing a sudden correction by bursting asset price bubbles through over vigorous monetary policy responses. Furthermore, central bank action aimed at targeting or systematically influencing asset prices could prove to be destabilising, as such attempts may give rise to "moral hazard" in asset markets. The public could come to expect that the central bank would act to prevent dramatic falls in asset prices, thereby underwriting accumulated capital gains. This could encourage speculation and be destabilising for the economy in general, and the price level in particular.

[22] See Cecchetti et al. (2000) and Shibuya (1992).

Therefore, there is a widespread view that monetary policy should not respond to changes in asset prices, except in so far as they signal changes in expected inflation.[23] Moreover, a focus on consumer price developments provides stable macroeconomic conditions and implies that rates will rise during inflationary asset price booms (and vice versa) which may reduce the possibility of such booms and busts emerging in the first place.[24]

Overall, with regard to price measures, I would argue that the inflation measure used needs to be credible. While there may be economic arguments over which prices to include or exclude, private sector expectations will be crucial. If policy does not aim at something that private agents recognise as inflation then policy may lack credibility.

6. Price Stability in Practice

The discussion of the definition and measurement of price-stability has highlighted that it is difficult to conclusively choose one definition over another. Whilst there are potential welfare gains from achieving zero inflation, these have to be weighed against any adverse effects coming from nominal rigidities and bearing in mind the possibility that measured inflation may be overestimated. At this juncture there are many open issues that cannot be settled until we gain more experience with price-stability in practice and more research is undertaken on price measurement.

I now turn to a discussion of the stability orientated monetary policy strategy of the Eurosystem. The mandate, objectives and tasks of the Eurosystem are laid out in its Statute, which is an integral part of the Treaty of Maastricht establishing the European Community. Article 2 of the Statute states that: "*... the primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, it shall support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community ...*".[25]

This indicates the clear priority that has been assigned to the maintenance of price stability. This reflects the belief that an environment of stable prices creates the economic conditions which foster sustainable output growth, a high level of employment creation and better living standards, which are all mentioned in the Treaty under the objectives of the European Community.

Upon announcement of the monetary policy strategy, the Governing Council decided to provide a quantitative definition of price stability in the euro area: "*a year-on-year increase in the Harmonised Index of Consumer Prices of below 2 percent*". The use of the word "*increase*", makes it clear that year-on-year falls in the HICP are inconsistent with the definition of price stability. The definition is therefore symmetric, in the sense that it excludes both negative and significantly positive rates

[23] See for example, BIS (1998) or Bernanke and Gertler (1999). However, a challenge to this view comes from a recent comprehensive study by Cecchetti et al (2000) which reviews the role of asset prices in monetary policy formulation. The authors of this study argue in favour of incorporating asset prices more systematically in central banks' policy making processes. However, they do not recommend that central banks attempt to 'burst' asset price bubbles once they have formed, or target asset prices or include them in the monetary policy objectives.

[24] It is often argued that central banks should pay closer attention to developments in the prices of assets that are used as collateral (e.g. property) than to the prices of those that are not (e.g. equities). For example, see Kent & Lowe (1998), Cecchetti et al. (2000).

[25] A fuller discussion of the experience of the ECB's first year is given in Issing (2000a).

of change of the price index. In essence it encompasses both a zero inflation and a low and stable inflation definition of price stability. The Council further clarified that price stability is to be achieved over the medium term, acknowledging the existence of short-term developments in prices which cannot be controlled by monetary policy. The medium term orientation permits a gradual and measured response to economic shocks, so as to avoid introducing unnecessary volatility into interest rates or real economic activity.

The decision to provide a quantitative definition of price stability reflects the need to anchor expectations and to be accountable. Such a numerical definition also provides a benchmark against which performance can easily be monitored. Nevertheless, the decision to provide a quantitative definition inevitably gives rise to a debate as to the appropriateness of the exact figure chosen. The upper bound of 2 percent, is in line with implicit or explicit previous goals of most participating NCBs. It is also consistent with past Recommendations of the Council of the European Union, which since July 1995 have used an upper bound of 2 percent to define the rate of inflation that is compatible with price stability.

There were also a number of practical considerations with regard to the economic environment that existed when the definition of price stability was announced. It is important to recall that price stability was inherited from the NCBs and it has been and will continue to be the job of the ECB to preserve this situation. When the main features of the stability-oriented strategy were announced in October 1998, the euro area inflation rate, as measured by the year-on-year increase in the HICP for the euro area, stood at 1 percent – a level well below the upper boundary of the definition of price stability adopted by the Governing Council. It was particularly important at this time to signal that the ECB would be the guardian of price stability and would preserve the hard fought reductions in inflation made by NCBs. For this reason it was crucial that the quantitative definition of price-stability that was chosen should not be seen as representing any weakening in the resolve to maintain price stability (Chart 1).

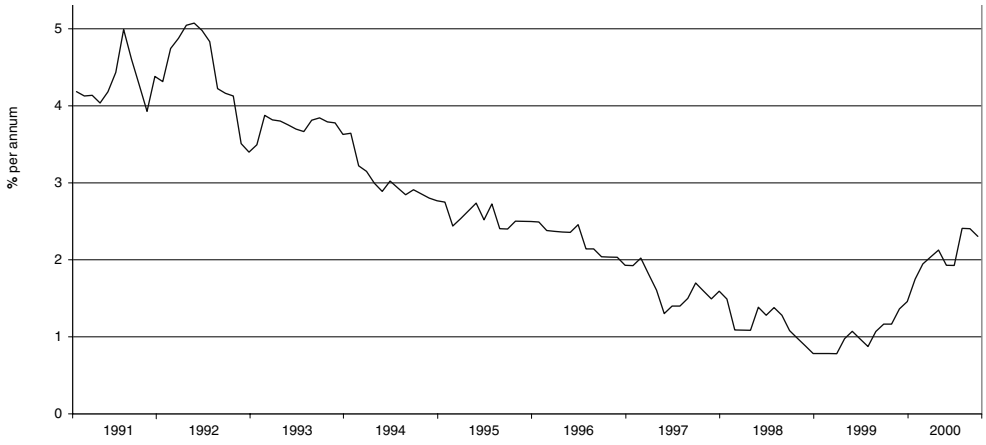

Chart 1. Consumer Price Inflation in the Euro Area 1991–2000
(Measured by an aggregate of national CPIs prior to 1995 and thereafter by the HICP)

At the same time, in the final months of 1998, a number of developments raised the possibility of a further decrease in the inflation rate. In particular, the turmoil in financial markets after the Asian crisis had spread fears of a potential credit crunch. It was thought that the marked fall in stock prices, which had reached 25 percent in some countries with respect to the maxima of mid-July, may have a negative effect on consumer spending. Data signalling a slowdown in production in the third quarter of the year were beginning to be released in the euro area. Reflecting the weaker economic outlook, official interest rates had declined in most prospective euro area countries over 1998, reaching levels that were very low by post-war European standards. It was particularly important not to act in a way which might appear unduly restrictive and hence jeopardise the apparently fragile state of the euro area economic recovery. Hence, adopting a more restrictive definition – such as a constant price level – would have been a particularly risky step to take at this time. Also given the potential validity of some of the arguments that I have discussed in favour of a very low and stable inflation rate, it did not seem appropriate to rule out this possibility.

The strategy has been criticised by those who favour a more pre-eminent role for monetary policy in fine-tuning real activity and steering the unemployment rate. One argument that is sometimes used in the European context is that a temporary downturn can have persistent (or in the extreme case permanent) effects on unemployment due to the existence of a degree of hysterisis (Blanchard and Summers (1986)). This can be explained in a number of ways. Once people become unemployed, they loose human capital and motivation and may become less attractive to potential employers. Alternatively, in an insider-outsider wage setting framework, unions are seen as setting wages taking only the interest of those currently employed into account; wages are thus set higher than the level necessary to raise employment and thereby reduce unemployment. Because of such persistence effects it is sometimes suggested that central banks should be extremely cautious in tightening policy since any adverse output effects could prove protracted and costly; as a corollary, it is suggested that central banks should "give growth a chance" even if this means "taking risks with inflation".

In spite of remarkable reforms in a number of countries, the severe rigidities in European labour markets mean that there is still the risk of a substantial degree of persistence in unemployment.[26] Nevertheless, I believe that the policy conclusions that are sometimes drawn from this are deeply misguided and indeed dangerous. The existence of persistence in unemployment makes it even more important to ensure that the central bank avoids a situation in which disinflation becomes necessary. Given the favourable starting position of the ECB, this militates towards a forward-looking and pre-emptive approach which prevents inflation from emerging in the first place and in particular avoids inflation becoming ingrained into people's expectations.

The persistence in unemployment observed in Europe is itself due to institutional and structural rigidities in labour and product markets. The root causes of the problem need to be tackled by means of structural reform. Attempting to tackle the symptoms of this problem with monetary policy would be doomed to failure and would represent

[26] These rigidities are discussed in a recent ECB Monthly Bulletin article (ECB (2000)) and have been comprehensively addressed in the OECD Jobs Study programme of work (beginning with OECD (1994)) and academic literature such as papers by Elmeskov et al. (1998) and Nickell & Layard (1999).

a serious misuse of a policy instrument. The credibility of the central bank's commitment to price stability in the medium term would be put in jeopardy. Once lost, the reputation of a central bank can only be restored with great difficulty and at substantial cost. This would typically involve a tighter policy for a protracted period than would otherwise be the case in order to restore inflation and price expectations to appropriate levels. A new central bank such as the ECB, without an established track record of its own, is in no position to take such risks.

Is it Working?

On first inspection the experience in the course of this year does not appear particularly encouraging. The year-on-year increase in the HICP has remained above 2 percent for several months now, a level that is not consistent with the definition of price-stability. Whilst, the recent rise above 2 percent, which took place in June 2000, is closely related to the rise in energy prices, this is not a situation that can be allowed to persist. In this regard, it is especially important that those responsible for wage developments, and firms in their pricing decisions, base their actions on the clear commitment of the Governing Council of the ECB to maintain price stability over the medium term.

Despite the recent rise in inflation, it is not appropriate to judge the success of the monetary policy strategy which is explicitly medium-term orientated by short-term movements in the growth rate of HICP. Instead it is much more informative to look at the evidence of the credibility of the strategy and the reputation of the central bank as a determined inflation fighter.

The numerical definition of price stability has provided a firm anchor for agents' long-term expectations. This is particularly important for a "new" institution which does not have a reputation arising from its track record. The issue of establishing reputation and credibility for a central bank is a fundamental concern for both central banks and for academic scholars.[27] The behaviour of financial market variables, in particular yields on long-term bonds, can tell us much about credibility. If one looks ahead far enough beyond the business cycle frequency, then changes in long-term nominal interest rates will typically reflect markets' perceptions of long-term inflation. If the central bank is credible, long-term rates will not move far away from levels consistent with an expectation of continuing price stability. They will quickly jump to higher levels if this credibility is lost (Chart 2).

Prices of long-term bonds denominated in euros show that the ECB already enjoys a considerable level of credibility. Long-term interest rates appear fully consistent with a prolonged period of price stability. In particular, the expected inflation rate implicit in index-linked bonds continues to be in line with price stability for the foreseeable future (Chart 3).

In the days following the interest rate cuts of December 1998 and April 1999, bond yields decreased slightly or remained broadly unchanged. Financial markets appeared to fully understand the motivations for easing monetary conditions and to consider the moves appropriate, given the state of the economy. Similar developments – in particular, a significant fall of implied forward overnight rates at very long maturities – could be observed at the time of the decisions to increase official rates on the 4 November 1999.

[27] See, for instance, the discussion in Blinder (1999).

Chart 2. Long-Term Government Bond Yields

The high degree of credibility enjoyed by the ECB is especially remarkable for an entirely new institution. As emphasised by Blinder (1999), academics and central bankers agree that, when it comes to establishing credibility, the only route available is the old-fashioned one of building a track record of living up to one's word. In the case of a new institution such as the ECB, however, the track record is simply missing. The current level of credibility is mainly a result of the belief by financial markets, and the public at large, in the pre-commitment expressed through the announcement of the stability-oriented strategy.

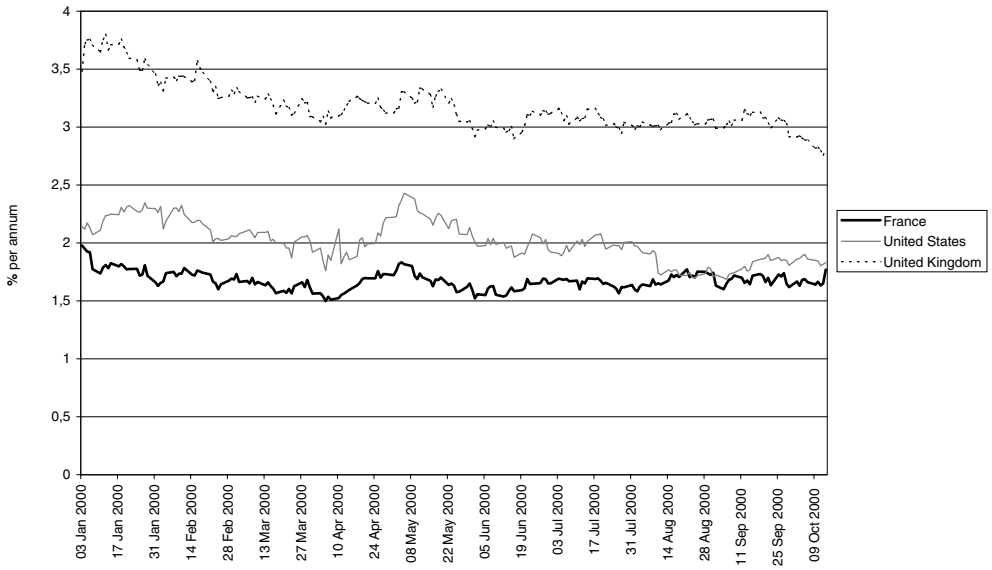

Chart 3. Ten-year maturity break-even inflation rates for France, United States and United Kingdom

Adapting to Price-Stability

Before concluding this article I would just like to make one final point. The experience of an extended period of low inflation should influence and possibly alter behaviour and attitudes of economic agents and institutions. For example, it could be argued that the downward nominal rigidity that forms the basis of the arguments for small doses of inflation to 'grease the wheels' of an economy may disappear in a world of price stability. As Stanley Fischer succinctly put it:

"*Money illusion is after all an illusion, one that is likely to yield eventually to the weight of the facts. Most likely, wages that are now inflexible downward would eventually become more flexible if the economy lived through a period of sustained low inflation and/or high unemployment.*" Fischer (1996) p. 11.

The adaptation to price stability may be much more widespread, not just taking place in the labour market. A recent paper by John Taylor (2000) discusses the recent decline in the degree to which firms 'pass through' changes in costs to prices as a possible explanation for the tendency for US inflation to stay low in the face of seemingly strong demand pressures in the late 1990s. Taylor links this development to the low inflation environment that has been achieved in many countries. In such an environment, when firms set prices for several periods in advance, they have less need to pass-through cost changes if they perceive the persistence of these changes to be low. Another sign of the increased stability of the current macroeconomic environment can be seen in the financial markets. For instance, the range of variation in government bond yields is relatively low by historical standards.

However, this greater stability is not something that can be taken for granted. For example, as Taylor (2000) notes, if there was a move away from the current situation of low inflation, the reduced pass-through could be quickly reversed and we would once again see large aggregate price responses to changes in output. If this occurred, then the tendency for inflation to remain low despite strong growth would disappear.

7. Conclusions

"*The efficiency of the transactions mechanism of a price-tag economy depends on some reasonable degree of confidence in the stability of money. Without that confidence, the system could never have progressed beyond the primitive stage of barter. The cost of inflation is the impairment of that confidence and the resulting retrogression towards barter, or crawl away from money.*" Arthur Okun (1981) p. 278.

At the start of this article I suggested that the key question that should be asked is 'why not price-stability?' As the preceding discussion has shown, the weight of economic evidence is firmly on the side of price-stability. Both the theoretical and empirical literature can provide no reasons for opting for a return to significant levels of inflation. The discussion of the definition and measurement of price-stability has highlighted that it is difficult to conclusively choose one definition over another. However, this is a question of second-order importance compared to the strong case for maintaining price-stability.

Due to the determination and perseverance of the national central banks in the euro area, the ECB was bequeathed an environment of price stability. It is our duty to preserve

this inheritance. Above all we must avoid the possibility that society reacquires a significant 'habitual' rate of inflation. As we know from the 1970s it can become all too easy to allow inflation to ratchet-up to ever higher and ever more costly levels. As we have seen, such a move would generate significant social costs and, as Okun (1981) has argued, there must be uncertainty about when and where such an adaptive process would end. If inflation is allowed to rise then either society has to accept a situation which is clearly second best in the long-run, or endure a painful period of reversion to price stability.

The experience since the start of Monetary Union shows how the ECB has rapidly acquired a high degree of credibility for its monetary policy. The maintenance of price-stability has a medium term orientation which appears to be readily understood in the financial markets. Inflation expectations remain low and in line with the quantitative definition of price stability. It also appears possible that the experience of an extended period of price-stability will influence the behaviour and attitudes of economic agents and institutions. In turn, this may help to further entrench the culture of price stability.

I will conclude by emphasising that we should not underestimate the importance of stable money as one of the most important institutions in the economy and the wider society and that there is a case for price-stability beyond economic arguments.[28] As Nicolaus Oresme, Bischof of Lisieux (1325–1382) noted, allowing the purchasing power of money to fall represents a betrayal of the people.[29]

References

Aiyagari, S.R. (1990), 'Deflating the Case for Zero Inflation', *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 14, No. 3, Summer, pp. 2–11.

Akerlof, G.A., Dickens, W.T. and Perry G.L. (1996), 'The Macroeconomics of Low Inflation', *Brookings Papers on Economic Activity*, Vol. 1, pp. 1–59.

Alchian, A.A. and Klein, B. (1973), 'On a Correct Measure of Inflation', *Journal of Money, Credit and Banking*, Vol. 5, pp. 173–91.

Andres, J. and Hernando, I. (1999), 'Does Inflation Harm Economic Growth? Evidence from the OECD', in M. Feldstein (ed.), *The Costs and Benefits of Price Stability*, University of Chicago Press, Chicago.

Ball, L. (1994), 'What Determines the Sacrifice Ratio', in G. Mankiw (ed.), *Monetary Policy, Chicago*, University of Chicago Press.

Barro, R. (1995), 'Inflation and Economic Growth', National Bureau of Economic Research Working Paper No. 5326.

Bernanke, B. and Gertler, M., 'Monetary Policy and Asset Price Volatility', *Federal Reserve Bank of Kansas City Economic Review*, Vol. 84(4), pp. 17–51.

BIS (1998), *The Role of Asset Prices in the Formulation of Monetary Policy*, Conference Volume 5, March.

Blanchard, O.J. and Summers, L.H. (1987), 'Hysteresis in Unemployment', *European Economic Review*, Vol. 31(1/2), pp. 288–95.

Blinder, A. (1999), 'Central Bank Credibility: Why do we Care? How do we Build it?', NBER Working Paper No. 7161.

Bruno, M. and Easterly, W. (1996), 'Inflation and Growth: In Search of a Stable Relationship', *Federal Reserve Bank of St. Louis Review*, Vol. 78(3), pp. 139–46.

Carruth, A. and Oswald, A. (1989), *Pay Determination and Industrial Prosperity*, Oxford University Press, Clarendon Press.

Cecchetti, S.G., Genberg, H., Lipsky, J. and Wadhwani, S. (2000), *Asset Prices and Central Bank Policy*, Geneva Reports on the World Economy 2.

[28] The issue of moral responsibility and ethics in central banking was addressed in Issing (1995).

[29] Nicolaus Orseme. Bischof of Lisieux (1325–1382), Traktat Über Geldbewertungen.

Cooley, T.F. and Hansen, G.D. (1989), 'The Inflation Tax in a Real Business Cycle Model', *American Economic Review*, Vol. 79, September, pp. 733–748.
Cozier, B. and Selody, J. (1992), 'Inflation and Macroeconomic Performance: Some Cross–Country Evidence', Bank of Canada Working Paper No. 92–106.
Diamond, P. and Mirrlees, J. (1971), 'Optimal Taxation and Public Production', *American Economic Review*, Vol. 61, pp. 8–27.
Dolado, J., Gonzalez–Parmo, J.M. and Viñals, J. (1999), 'A Cost-Benefit Analysis of Going from Low Inflation to Price Stability in Spain', in M. Feldstein (ed.), *The Costs and Benefits of Price Stability*, University of Chicago Press, Chicago.
ECB (2000), 'Developments in and Structural Features of the Euro Area Labour Markets', *European Central Bank Monthly Bulletin*, May.
Elmeskov, J., Martin, J.P. and Scarpetta, S. (1998), 'Key Lessons for Labour Market Reform: Evidence from OECD Countries' Experiences', *Swedish Economic Policy Review*, Vol. 5, pp. 205–252.
Faig, M. (1988),'The Optimal Taxation of Money Balances in Different Environments', *Journal of Macroeconomics*, Vol. 13, pp. 171–181.
Feldstein, M. (1999) *The Costs and Benefits of Price Stability*, University of Chicago Press, Chicago.
Fischer, S. and Modigliani, F. (1978), 'Toward an Understanding of the Real Effects and Costs of Inflation', *Weltwirtschaftliches Archiv*, pp. 810–832.
Fischer, S. (1986), *Indexing, Inflation and Economic Policy*, MIT Press.
Fischer, S. (1993), 'The Role of Macroeconomic Factors in Growth', *Journal of Monetary Economics*, Vol. 32(3), pp. 485–512.
Fischer, S. (1994), 'Modern Central Banking', in Capie, F., Goodhart, C., Fischer, S. & Schnadt, N. (eds) *The Future of Central Banking*: The Tercentenary Symposium of the Bank of England', Cambridge.
Fischer, S. (1996), *Why are Central Banks Pursuing Long–run Price Stability*, paper presented at the 1996 symposium in Jackson Hole.
Fisher, I. (1913), 'A Remedy for the Rising Cost of Living: Standardising the Dollar', *American Economic Review*, December III (1), Supplement, March, pp. 20–38.
Friedman, M. (1969), 'The Optimum Quantity of Money', in *The Optimum Quantity of Money, and Other Essays*, Aldine Publishing Company: Chicago.
Fuhrer, J. C. and Madigan, B.F. (1997), 'Monetary Policy When Interest Rates are Bounded at Zero', *Review of Economics and Statistics*, vol. 79, pp. 573–585.
Gaspar, V. and Smets, F. (2000), 'Price Level Stability: Some Issues', *National Institute Economic Review*, No. 174, October.
Gertler, M., Goodfriend, M., Issing, O. and Spaventa, L. (1998), *Asset Prices and Monetary Policy: Four Views*, CEPR, London and BIS, Basle.
Gordon, R. (1996),'The Macroeconomics of Low Inflation: Comment', *Brookings Papers on Economic Activity*, Vol. 1, pp. 60–66.
Grier, K.B. and Tullock, G. (1989), 'An Empirical Analysis of Cross-National Economic Growth, 1951–1980', *Journal of Monetary Economics*, Vol. 24(2), pp. 259–76.
Groshen, E.L. and Schweitzer, M.E. (1999), 'Identifying Inflation's Sand and Grease Effects in the Labour Market', in M. Feldstein (ed.), *The Costs and Benefits of Price Stability*, University of Chicago Press, Chicago.
Harberger. A.C. (1998), 'A Vision of the Growth Process', *American Economic Review*, March, Vol.88, No. 1, pp. 1–32.
Hoskins, W.L. (1991), 'Defending Zero Inflation: All for Naught', *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 15, No. 2, Spring, pp. 16–20.
Imrohoroglu, A. (1992), 'The Welfare Cost of Inflation Under Imperfect Insurance', *Journal of Economic Dynamics and Control*, Vol. 16, pp. 79–91.
Ingram, P. (1991), 'Ten Years of Manufacturing Wage Settlements', *Oxford Review of Economic Policy*, Spring.
Issing, O. (1995), 'The Role of the Central Bank and its Responsibility', in St.F. Frowen and F.P. McHugh (eds), Financial Decision–Making and Moral Responsibility, Basingstoke.
Issing, O. (2000a), 'The ECB's Monetary Policy: Experience After The First Year', *Journal of Policy Modelling*, Vol. 22(3), pp. 325–343.
Issing, O. (2000b), 'How to Promote Growth in the Euro Area: the Contribution of Monetary Policy', Conference at the National Bank of Belgium, 12 May.

Kent, C. and Lowe, P. (1998), 'Property Price Cycles and Monetary Policy' in *The Role of Asset Prices in the Formulation of Monetary Policy*, BIS, March.
Kimbrough, K. (1986), 'Inflation, Employment and Welfare in the Presence of Transactions Costs', *Journal of Money Credit and Banking*, Vol. 18, pp. 127–140.
King, M. (1999), 'Challenges for Monetary Policy: New and Old', paper presented at the 1999 symposium in Jackson Hole.
Konieczny, J. (1994), 'The Optimal Rate of Inflation: Competing Theories and their Relevance to Canada', in *Economic Behaviour and Policy Choice under Price Stability*, Bank of Canada, Ottawa.
Kormendi, R.C. and Meguire, P.G. (1985), 'Macroeconomic Determinants of Growth: Cross–Country Evidence', *Journal of Monetary Economics*, Vol. 16(2), pp. 141–63.
Nickell, S. and Layard, R., (1999), *Labor Market Institutions and Economic Performance*, in O. Ashenfelter and D. Card (eds), Handbook of Labor Economics, Vol. 3., Elsevier Science B.V.
Levy, D., Bergen, M., Dutta, S. and Venable, R. (1997), 'The Magnitude of Menu Costs: Direct Evidence from Large U.S. Supermarket Chains', *Quarterly Journal of Economics*, Vol. CXII (3), pp. 791–826.
Lucas, R.E. (1973), 'Some International Evidence on Inflation–Output Trade-offs', *The American Economic Review*, Vol. LXIII, No. 3, pp. 326–339.
Lucas, R.E. (1981), 'Discussion of: Stanley Fischer, "Towards an Understanding of the Costs of Inflation: II"', *Carnegie-Rochester Conference Series on Public Policy*, Vol. 15(0), Autumn, pp. 43–52.
Lucas, R.E. (2000), 'Inflation and Welfare', *Econometrica*, Vol. 68, No. 2, pp. 247–274.
McCandless, G.T. and Weber, W.E. (1995), 'Some Monetary Facts', *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 19(3), pp. 2–11.
McLaughlin, K. (1994), 'Rigid Wages?', *Journal of Monetary Economics*, Vol. 34, pp. 383–414.
OECD (1994), *The OECD Jobs Strategy*, Paris.
Okun, A.M. (1981), *Prices and Quanitities: A Macroeconomic Analysis*, Oxford.
Orphanides, A. and Solow, R. (1990), 'Money, Inflation and Growth' in B.M. Friedman and F.H. Hahn (eds.), *Handbook of Monetary Economics*, Amsterdam: North Holland.
Sargent, T.J. (1999), *The Conquest of American Inflation*, Princeton University Press, Princeton, New Jersey.
Shibuya, H. (1992), 'Dynamic Equilibrium Price Index: Asset Price and Inflation', *Monetary and Economic Studies, Bank of Japan*, Vol. 10 (1), pp. 95–109.
Shiller, R.J. (1996), Why do People Dislike Inflation?, NBER Working Paper No. 5539.
Sidrausky, M. (1967), 'Rational Choice and Patterns of Growth in a Monetary Economy', American Economic Review Papers and Proceedings, Vol. 57, pp. 534–544.
Smets, F. (2000), What Horizon for Price Stability, ECB Working Paper No. 24.
Stein, J. (1970), 'Money Growth Theory in Perspective', *American Economic Review*, Vol. 60, pp. 85–106.
Summers, L. (1991), 'How Should Long-Term Monetary Policy be Determined?', *Journal of Money, Credit and Banking*, Vol. 23, pp. 625–31.
Svensson, L.E.O. (1999), 'Price Stability as a Target for Monetary Policy: Defining and Maintaining Price Stability', NBER Working Paper 7276.
Taylor, J. (1996) 'How Should Monetary Policy Respond to Shocks While Maintaining Long-Run Price Stability – Conceptual Issues', paper presented at the 1996 symposium in Jackson Hole.
Taylor, J. (2000), 'Low Inflation, Pass-Through, and the Pricing Power of Firms', *European Economic Review*, Vol. 44, pp. 1389–1408.
Tobin, J. (1965), 'Money and Economic Growth', *Econometrica*, Vol. 33, pp. 671–684.
Tobin, J. (1972), 'Inflation and Unemployment', *American Economic Review*, Vol. 62(1), pp. 1–18.
Toedter, K.H. and Ziebarth, G. (1999), 'Price Stability Versus Low Inflation in Germany: An Analysis of Costs and Benefits', in M. Feldstein (ed.), *The Costs and Benefits of Price Stability*, University of Chicago Press, Chicago.
Wicksell, K. (1935), *Lectures on Political Economy*, London.
Wolman, A.L. (1997), 'Zero Inflation and the Friedman Rule: A Welfare Comparison', *Federal Reserve Bank of Richmond Economic Quarterly*, Vol. 83(4), Fall.
Yates, A. (1995), "On the Design of Inflation Targets", in A.G. Haldane, ed., *Targeting Inflation, Bank of England*.

Panel Discussion

Laurence Ball

The question posed to this panel is "Why Price Stability?" Professor Issing's paper does an excellent job of answering this question. His survey of the benefits of price stability is comprehensive, leaving me with little to add or disagree with.

Therefore, to have something to say, I will follow Professor Issing in changing the question slightly. Issing's question is "why *not* price stability?" My question is "why *only* price stability?" For many central banks, including the ECB, price stability is not just *an* objective of policy, it is *the* objective. Why shouldn't central banks pursue other goals along with price stability? In particular, why shouldn't they try to achieve low unemployment?

Policymakers at the ECB have given a clear answer to this question: they should largely disregard unemployment because they have little influence over it. Monetary policy can affect cyclical fluctuations in unemployment, but not its trend. As Professor Issing put it in a recent speech, over the "medium term" there is "neutrality of monetary policy with respect to real variables", including unemployment. In particular, monetary policy did not cause the rise in European unemployment since the 1970s, and it cannot do anything to reverse this rise. Structural reforms are the only hope.

These views are widely accepted by both central bankers and academic economists. However, there is a significant minority that rejects them, believing that monetary policy *can* influence long-term unemployment trends. This minority happens to include me, so I will briefly outline the views of this school.

Monetary policy has long-term effects on unemployment because of "hysteresis", to use the term popularized by Blanchard and Summers (1986). A policy tightening causes a rise in unemployment that is initially cyclical, but cyclical unemployment can change into permanent unemployment. This occurs for several reasons: the unemployed lose human capital, become less attractive to employers, and reduce their job search, all of which contribute to keeping them unemployed.

In my opinion, there is strong evidence that hysteresis occurs in the real world. Because of hysteresis, tight monetary policy aimed at reducing inflation in the 1980s and meeting the Maastricht criteria has contributed to the high unemployment that currently afflicts Europe. Evidence supporting this view includes a close relationship across countries between the rise in unemployment and the tightness of monetary policy, measured various ways. I don't have time now to discuss this evidence in detail, but perhaps I can during the open debate (and see Ball, 1999).

In the rest of these remarks, I will discuss the policy implications of hysteresis. If central banks can influence the long-term path of unemployment, should they seek to do so? Does this require a departure from the single-minded pursuit of price stability?

These are difficult questions. Even believers in hysteresis acknowledge that we are unsure about its causes, why it seems to arise in some circumstances and not others, and the strength of the effects. We need to understand hysteresis much better before we can confidently make policy conclusions.

Today, we can speculate. Professor Issing discusses hysteresis toward the end of his paper. I was pleasantly surprised that Issing acknowledges the possibility of hysteresis. He argues, however, that this *strengthens* the case for pursuing price stability. Hysteresis raises the cost of reducing inflation, making it all the more important that central banks prevent inflation from rising in the first place.

This is a fair point, but there is more to say. In a world with hysteresis, the goals of monetary policy should be different in different circumstances. There are some circumstances in which the central goal should be to fight unemployment, and the pursuit of price stability should take a back seat.

The clearest case is a deep recession. Suppose, for example, that some kind of financial crisis causes a sharp fall in aggregate demand and rise in unemployment. In such a situation, it is imperative for the central bank to push unemployment down through a monetary expansion. Some argue that this will happen automatically under inflation targeting, but I believe that policy must be based explicitly on unemployment. This belief is shaped by the experience of the early 1980s, when most OECD countries experienced deep recessions. In some countries, such the United States, the central bank loosened policy sharply and employment recovered. In others, including most of Europe, policymakers failed to expand because they feared the effects on inflation and exchange rates. In these countries, high unemployment persisted through the 80s and beyond.

Of course Europe today is not facing a sharp recession: unemployment is high but not rising. The immediate question is whether monetary policy has a role in fighting unemployment when it appears stuck at a high level. I think the answer is yes. In the last fifteen years, relatively expansionary monetary policy has helped to reduce unemployment in several countries, including the U.K., Portugal, and Netherlands. On the other hand, these countries have also experienced episodes of rising inflation. There appear to be uncomfortable tradeoffs between the goals of stable inflation and lower unemployment.

These tradeoffs make it difficult to identify the best policy strategy. The conventional view is that unemployment should be attacked through labor-market reforms, such as limits on unemployment benefits. If I had to bet on a policy, I would choose a *combination* of labor-market reforms and a jolt of demand stimulus from the ECB – what Blanchard et al. (1986) have called a "two-handed approach". The two parts of this policy would be complementary. Unemployment is most likely to fall when the unemployed are given incentives to seek work *and* a strong economy creates jobs for them to find.

Since this strategy includes a monetary expansion, it carries a risk of somewhat higher inflation. In my view, however, it is worth taking some risk to reduce the terrible problem of unemployment.

Papers Cited

Ball, Laurence, "Aggregate Demand and Long-Run Unemployment", *Brookings Papers on Economic Activity 1999: 2.*

Blanchard, Olivier, and Lawrence H. Summers, "Hysteresis and the European Unemployment Problem", *NBER Macroeconomics Annual 1, 1986.*
Blanchard, Olivier et al., "Employment and Growth in Europe: A Two-Handed Approach", in Blanchard, Dornbusch, and Layard (eds.), Restoring Europe's Prosperity: Macroeconomic Papers from the Centre for European Policy Studies, MIT Press, 1986.

Paul De Grauwe

The paper of Otmar Issing provides us with an admirable synthesis of the economic literature on the costs and benefits of inflation. What I want to do in this brief comment is to present a synthesis of this synthesis using a very simple graphical framework. In doing so, I will ask the question of what we know for sure about these costs and benefits. I will also derive some policy conclusions.

Let us start from figure 1, where I present the costs and benefits of inflation. The cost curve represents the costs resulting from misallocations, inefficiencies and uncertainties produced by increasing rates of inflation (the "sand effect" of inflation). The most visible (but not exclusive) way these costs manifest themselves is by lower rates of investment and lower rates of economic growth. I have drawn this cost curve in a highly non-linear way for the following reason. The empirical literature suggests that for high rates of inflation these costs are quite substantial. For low rates of inflation

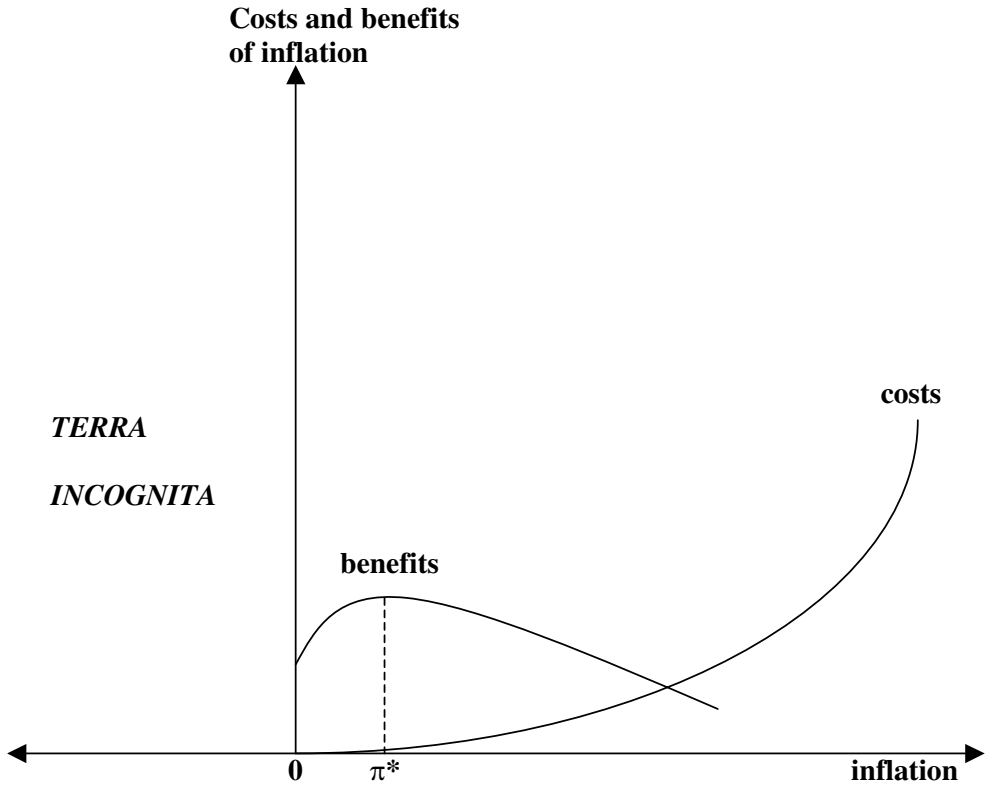

Figure 1. Consensus view

(say less that 10% per year) researchers have been unable to detect much. Put differently when one moves from say 2 to 4% inflation per year one cannot observe increasing costs. Moving beyond, say from 10 to 20% or more, leads to significant cost increases.

The benefit curve is the sum of two components, which we represent in figure 2. One is the credibility bonus, which is at its maximum when inflation is zero. With increasing inflation this credibility bonus declines exponentially. The second component is the benefit resulting from the "grease effect" of inflation, i.e. the greater flexibility in real wages provided by inflation. This effect tends to taper off, and even decline when inflation increases too much (see Akerlof, Dickens and Perry (1996) and Wyplosz (2000)). The sum of the two components is the benefit curve that is also used in figure 1.

The confrontation of costs and benefits in figure 1 then leads to the view that there is an optimum rate of inflation π^* greater than zero for which the difference between benefits and costs is at its maximum.

The case represented in figure 1 is called the consensus view. It is clear from the discussion during this conference that a large fraction of the economists does not share

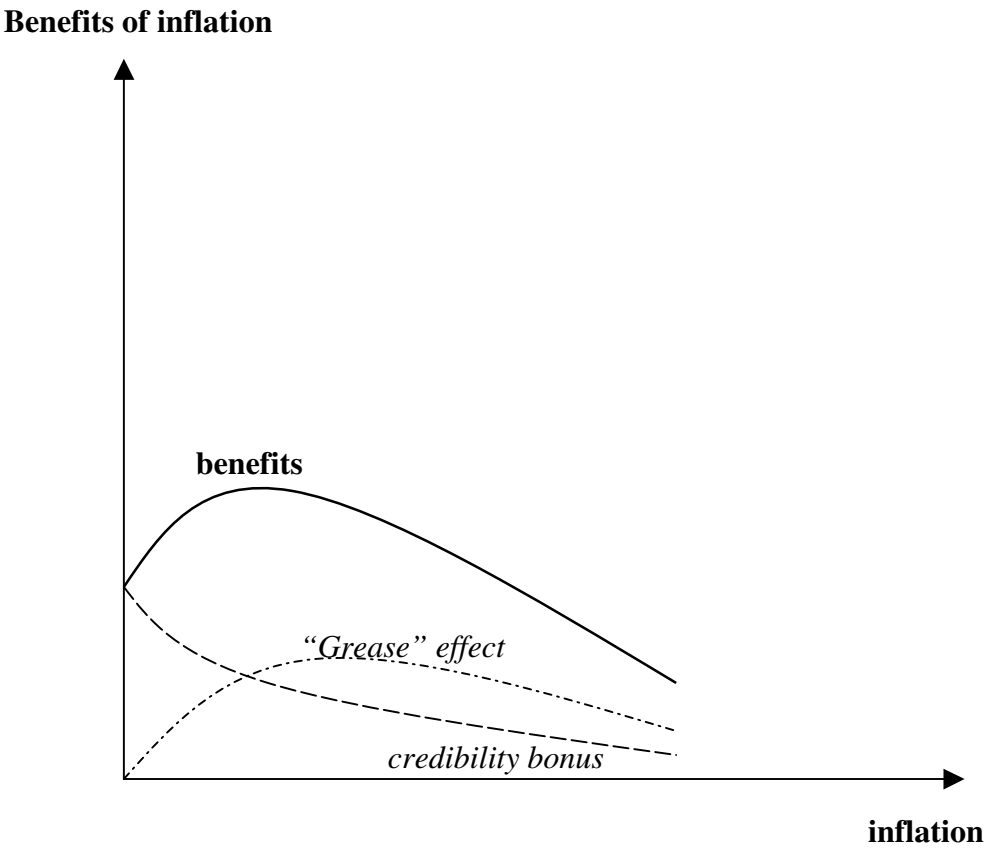

Figure 2. Benefits of inflation: grease and credibility

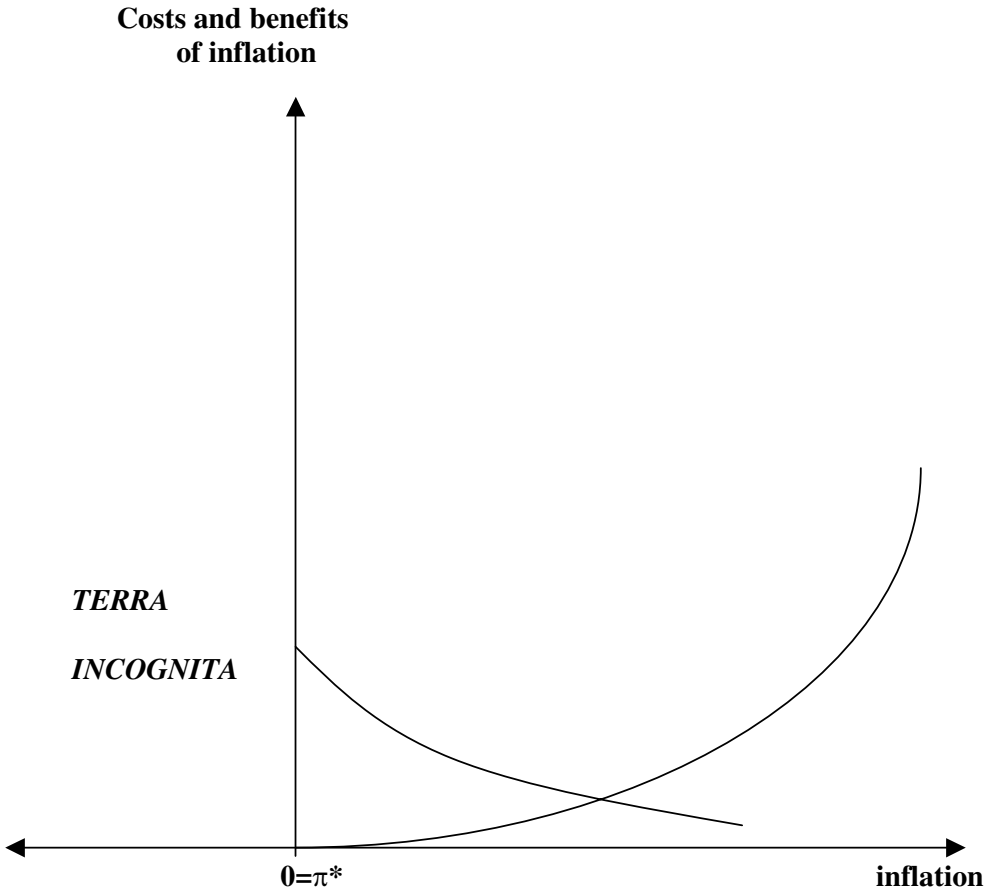

Figure 3. ECB-NNC view

this view. We represent this alternative view, called the ECB-New-NeoClassical Synthesis view in figure 3. The main difference is that in figure 3 the existence of a grease effect is denied. As a result the benefit curve declines exponentially, so that the optimal rate of inflation is zero. One remarkable aspect of this view is that its proponents rarely advocate a zero inflation target. Not only because there could be a statistical bias in the measurement of inflation, but also because there is a zone, called "terra incognita" of deflation about which we know very little except that it is very unpleasant, possibly catastrophic. For the proponents of the ECB-NNS view there is some feeling that it is safer to keep some distance from this danger zone.

Let me summarise what we know and what we do not know about the costs and benefits of inflation.

First, we know that very high inflation is very bad, not only for economic growth but also more generally for social and political stability.

Second, deflation is also very bad, although we understand the deflationary dynamics less well. But horror stories of the 1930s are strong enough to make us fear deflation, and rightly so.

Third, we know very little about the intermediate zone of low inflation. There are conflicting theories about the shape of the benefit curve, and the empirical evidence if it exists, is not very reliable. In addition, although we are sure that with high inflation the costs become substantial, we know very little about the question of when these costs start to matter. Do these costs become visible when inflation exceeds 2%, or 5% or 7%. Nobody knows for sure, because the empirical evidence for this low inflation range is simply not available.

The extreme uncertainty about what the optimal inflation rate is leads to a number of implications for monetary policies.

First, it implies that we should not pursue too much precision in setting the target for the inflation rate. When knowledge is imprecise it is generally not a good idea to pretend we possess precise information. Such an attitude can lead to a situation where systematic errors are made, and we would not even be aware of it.

Second, some flexibility is called for. When we do not know with much precision what the optimal inflation rate is, it is generally a good idea to keep one's options open by being flexible about the target.

Does the ECB asymmetric inflation target (inflation should be at most 2%) correspond to these two principles? My answer is no. The ECB asymmetric inflation target imposes the wrong type of precision. By restricting the possible inflation rates to the 0%–2% range it denies that the optimal inflation rate could be higher, although the scientific evidence about this is unclear. In fact the range is even smaller since the ECB has acknowledged some statistical bias in measuring inflation. If this is, say, 0.5% then the target range is even smaller, i.e. 0.5 to 2%. This is an example of too much precision. We simply do not know enough to be sure that this is the correct range to aim for. At the same time the asymmetric target is too inflexible, and does not allow for the possibility that for certain shocks or after particular structural changes one may want to re-evaluate the target.

This call for less precision and more flexibility in setting the inflation target does not mean that anything goes. It is very much circumscribed. It leads to the conclusion that a mid-point target of say 2 to 3% with some flexibility on both sides of this target would be consistent with the two principles enunciated here.

Frederic S. Mishkin

Although there are many issues in Otmar Issing's excellent paper that I could focus on, the time limit given me (which I take very seriously because I am making this presentation in Germany) forces me to focus on one basic question: What does price stability mean? More specifically, I will address two subsidiary questions: Does price stability mean that central bank's should have a price level objective or an inflation objective? Which of these two objectives would result in better economic performance?.

There are two key advantages of a price-level target relative to an inflation target. The first is that a price-level target can reduce the uncertainty about where the price level will be over long horizons. With an inflation target, misses of the inflation target are not reversed by the central bank. The result is that inflation will be a stationary stochastic process, that is, integrated of order zero, I(0), while the price level will be nonstationary, an I(1) process. The result is that the uncertainty of where the price level

will be in the future grows with the forecast horizon. This uncertainty can make long-run planning difficult and may therefore lead to a decrease in economic efficiency. Although, McCallum (1999) has argued that the amount of long-run uncertainty about the future price level that would arise from successful adherence to an inflation target may not be all that large, it still complicates the planning process and may lead to more mistakes in investment decisions.

The second possible advantage of a price-level target is that in models with a high degree of forward-looking behavior on the part of economic agents (e.g., Svensson, 1999, Woodford, 1999, Svensson and Woodford, 1999, Clarida, Galí and Gertler, 1999, Ditmar and Gavin, 1999, 2000, and Vestin, 2000) it produces less output variance than an inflation target. However, empirical evidence (e.g., Fuhrer, 1997) does not clearly support forward-looking expectations formation, and models with forward-looking behavior have counterintuitive properties that seem to be inconsistent with inflation dynamics (Estrella and Fuhrer, 1998).

The traditional view, forcefully articulated by Fischer (1994), argues that a price-level target produces more output variability than an inflation target because unanticipated shocks to the price level are not treated as bygones and must be offset.[1] A price-level target requires that overshoots or undershoots of the target must be reversed and this could impart significantly more volatility to monetary policy and, with sticky prices, to the real economy in the short run.

Although the models with forward-looking price setting cited above do not find that this feature of a price-level target increases output variability, they do not focus on one particular problem with a price-level target that worries me: the fact that a price-level target may lead to more frequent episodes of deflation which can engender financial instability.

In my work on financial crises (Mishkin, 1991, 1997), a key factor that is found to promote financial instability in industrialized countries is deflation. Because debt contracts in industrialized countries frequently have long maturities, a deflation leads to an increase in the real indebtedness of firms and households, which leads to a decline in net worth and a deterioration in their balance sheets. Irving Fisher (1933) aptly named this phenomenon debt deflation and saw it as a major factor promoting the economic downturn during the Great Depression.[2] With less net worth, adverse selection and moral hazard problems increase for lenders and so they cut back on lending. The decline in net worth leads to a decline in the amount of collateral a lender can grab if the borrower's investments turn sour, and the reduction in collateral therefore increases the consequences of adverse selection because in the case of a default losses from loans are likely to be more severe. In addition, the decline in net worth increases moral hazard incentives for borrowers to take on excessive risk because they now have less to lose if their investments go sour.

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[1] This view is supported by simulations of econometric macro models with backward-looking expectations which typically find that a price-level target leads to greater variability of output and inflation than an inflation target. E.g., see Haldane and Salmon (1995).

[2] Technically, this debt-deflation mechanism requires that the deflation be unanticipated: i.e., it is a surprise *after* the debt contracts have been written. Because in industrialized countries, many of these contracts are so long, even a deflation that becomes anticipated after a period of time, still is unanticipated from the point of view of many debt contracts and the debt deflation story still holds. Clearly, if debt contracts are of very short duration, as is typically the case in emerging market countries, then deflations, even when they occur, are less likely to be unanticipated and so the debt deflation mechanism is inoperative (see Mishkin, 1997).

This reasoning indicates that deflation can promote financial instability in industrialized countries through the debt-deflation mechanism, a recent example of which is what has happened in Japan in the last decade (Mishkin, 1998). My concerns about the ability of deflation to promote financial instability, with potentially large costs to the economy, tends to make me more skeptical about theoretical results which indicate that price-level targets are able to reduce output variability. Indeed, price-level targets which lead to more episodes of deflation may be more dangerous than their proponents have realized.

Another problem with price-level targets that is not often mentioned in the literature is that they may make it more difficult to conduct monetary policy. With more frequent periods of deflation resulting from a price-level target, it will become more common that short-term interest rates will hit a floor of zero during deflations as occurred during the Great Depression and in Japan recently. One argument that some economists make is that when the interest rate hits a floor of zero, monetary policy becomes ineffective.[3] I believe this argument is a fallacy for the reasons outlined in Meltzer (1995) and in Mishkin (1996). Monetary policy works through many other asset prices besides those of short-term debt securities, and so even when short-term interest rates hit the floor of zero, monetary policy can still be effective, and indeed was so during the Great Depression (see, Romer, 1992).

Nonetheless, monetary policy becomes more difficult during deflationary episodes when interest rates hit a floor of zero because the usual guides to the conduct of monetary policy are no longer relevant. In recent years, much of the research on how central banks should optimally conduct monetary policy focus on so-called Taylor rules, in which the central bank sets the short-term interest rates at a level which depends on both output and inflation gaps. The Taylor (1999) volume is an excellent example of this type of research. However, once the interest rate hits a floor of zero, all of the research on optimal monetary policy rules represented by work of the type in the Taylor (1999) volume is no longer useful because manipulating short-term interest rates is no longer an effective tool of monetary policy. In such a deflationary environment, central banks do have the ability to lift the economy out of recession by pursuing expansionary policy and creating more liquidity, but it becomes much less clear how far they need to go. This rightfully makes central bankers quite uncomfortable. Therefore, an important disadvantage of a price-level target is therefore that it makes it more likely that deflationary environments will occur in which central bankers will be more at sea without the usual knowledge to guide them, making it harder for them to get monetary policy exactly right.

Another problem for a price-level target that has also received little attention in the literature is the presence of measurement error in inflation. Most research on measurement error takes the view that it is *inflation* that is measured with error rather than the *price level* and this was the approach taken by the Boskin Commission.[4] This implies that the measurement error in the price level is I(1) that a price-level target results in growing uncertainty about the true price level as the forecast horizon grows. Thus

[3] Summers (1991) is one prominent example, and recently officials of the Bank of Japan have used this argument to indicate that expansionary monetary policy is likely to be ineffective in promoting Japanese recovery.

[4] See Boskin et al. (1996), Moulton (1996), and Shapirio and Wilcox (1996), for example.

many of the arguments that a price-level target results in lower long-run uncertainty about the true price level may be overstated.

The conflicting arguments above indicate that whether price level rather than inflation targets would produce better outcomes is an open question. Given this uncertainty about the benefits of price level targeting, it is not surprising that no central bank has decided to target the price level in recent years. However, the arguments made here for preferring an inflation target over a price-level target, do not rule out hybrid policies, which combine features of an inflation and a price-level target and so might provide the best of both worlds.

An inflation target could be announced with a commitment to some error correction in which target misses will be offset to some extent in the future. Recent research shows that an inflation target with a small amount of error correction can substantially reduce the uncertainty about the price level in the long run, but still generate very few episodes of deflation (e.g., Black, Macklem and Rose, 1997, King, 1999, and Battini and Yates, 1999). Furthermore, by putting a small weight on the price level error correction term, the trade-off between output and inflation fluctuations can be improved (e.g., see also Williams, 1999, Smets, 2000, Gaspar and Smets, 2000, McLean and Pioro, 2000). Evaluating hybrid policies of this type is likely to be a major focus of future research.

One issue that would have to be addressed if such a hybrid policy was adopted is how it could be explained to the public. As is emphasized in Bernanke and Mishkin (1997), Mishkin (1999), and Bernanke, et. al. (1999), critical to the success of inflation targeting is that it provides a vehicle for more effective communication with the public. The public will clearly not understand the technical jargon of error correction models. However, an error correction feature of an inflation targeting regime could be fairly easily communicated by not only announcing an intermediate-term inflation target, but also by indicating that there is a target for the average inflation rate over a longer period, say five years.

Another hybrid policy is to pursue an inflation target under normal conditions, but provide for an escape clause which puts in place a price level target only when the unusual condition of deflation sets in, particularly if interest rates near a floor of zero. The inflation target under normal conditions would not require that overshoots of the inflation target be reversed and so would not make episodes of deflation more likely. On the other hand, when deflation sets in, then putting in place a price level target to induce expectations of reflation of the economy would not only make it less likely that nominal interest rates would hit a floor of zero, but also would lead to higher inflation expectations which would lower real interest rates, thereby stimulating the economy, and would help induce a rise in the price level that would repair balance sheets. Given the success of a price level target in ameliorating the effects of the Great Depression in Sweden in the 1930s (Berg and Jonung, 1998), price level targets have recently been proposed to help jump start the Japanese economy (e.g., Bernanke, 1999, Blinder, 1999, Goodfriend, 1999, and Svensson, 2000).

The research on whether the goal of price stability means that we should target on the price level versus inflation is just now in its infancy. Although at the current time, no central bank targets the price level in its quest for price stability, this eventually may change with new research and further experience with price-stability oriented monetary

policy. I would not be surprised if some form of hybrid policies, which combine the best elements of price level and inflation targeting, are adopted by some central banks in the not too distant future.

References

Battini, N. and T. Yates (1999), "Hybrid Inflation and Price Level Targeting", mimeo., Bank of England.

Berg, C. and L. Jonung (1998), "Pioneering Price Level Targeting: the Swedish Experience, 1931–37", Sveriges Riksbank Working Paper Series 63, June.

Bernanke, B. (1999), "Japanese Monetary Policy: A Case of Self Induced Paralysis," Princeton University, mimeo.

Bernanke, Ben S., Laubach, Thomas, Mishkin, Frederic S. and Adam S. Posen (1999), *Inflation Targeting: Lessons from the International Experience*, Princeton University Press: Princeton.

Bernanke, Ben S. and Frederic S. Mishkin (1997), "Inflation Targeting: A New Framework for Monetary Policy?" *Journal of Economic Perspectives* 11, 2: 97–116.

Black, Richard, Macklem and David Rose (1997), "On Policy Rules for Price Stability", *Price Stability, Inflation Targets and Monetary Policy,* Proceedings of a Conference held by Bank of Canada, Ottawa, Canada: 411–61.

Blinder, Alan (1999), "Monetary Policy at the Zero Lower Bound: Balancing the Risks", presented at the Federal Reserve Bank of Boston Conference, Monetary Policy in a Low Inflation Environment," October 18–20, 1999.

Boskin, Michael J., Dulberger, Ellen R., Gordon, Robert J., Griliches, Zvi and Dale W. Jorgenson (1996), "Toward a More Accurate Measure of the Cost of Living", Final Report to the Senate Finance Committee, December.

Clarida, Richard, Jordi, Galí and Mark Gertler (1999), "The Science of Monetary Policy: A New Keynesian Perspective", *Journal of Economic Literature*, 37 (December): 1661–1707.

Ditmar, Robert, Gavin, William, T. and Finn E. Kydland (1999), "The Inflation – Output Variability Tradeoff and Price Level Targets", *Review*, Federal Reserve Bank of St. Louis: 23–31.

Ditmar, Robert, Gavin, William, T. and Finn E. Kydland (2000), "What Do New-Keynesian Phillips Curves Imply for Price-Level Targeting", *Review*, Federal Reserve Bank of St. Louis: 21–30.

Estrella, Arturo, and Jeffrey Fuhrer (1998), "Dynamic Inconsistencies: Counterfactual Implications of a Class of Rational Expectations Model", Federal Reserve Bank of Boston Working Paper No. 98–5, July, forthcoming in *American Economic Review.*

Fischer, Irving (1933), "The Debt – Deflation Theory of Great Depressions", *Econometrica*, Vol. 1: 337–57

Fischer, Stanley (1994), "Modern Central Banking", in Forest Capie, Charles Goodhart, Stanley Fischer and Norbert Schnadt, *The Future of Central Banking*, Cambridge University Press, Cambridge, U.K.: 262–308.

Fuhrer, Jeffrey (1997), "The (Un)Importance of Forward-Looking Behavior in Price Specifications", Journal of Money, Credit and Banking, 29 (3): 338–50.

Gaspar, Vitor and Frank Smets (2000), "Price Level Stability: Some Issues", mimeo., European Central Bank.

Goodfriend, Marvin (1999), "Overcoming the Zero Bound on Interest Rate Policy", presented at the Federal Reserve Bank of Boston Conference, Monetary Policy in a Low Inflation Environment, October 18–20, 1999.

Haldane, Andrew G. and Christopher K. Salmon (1995), "Three Issues in Inflation Targets", in Andrew G. Haldane, ed., *Targeting Inflation*, Bank of England, London: 170–201.

King, Mervyn (1999), "Challenges for Monetary Policy: New and Old", in *New Challenges for Monetary Policy*, Federal Reserve Bank of Kansas City, Kansas City, Missouri: 11–57.

McCallum, Bennet T., "Issues in the Design of Monetary Policy Rules", in John B. Taylor and Michael Woodford, eds. *Handbook of Macroeconomics*, North Holland, Amsterdam, forthcoming.

McLean, D. and H. Pioro (2000), "Price Level Targeting – The Role of Credibility", paper presented at the Bank of Canada Conference, Price Stability and the Long-Run Target for Monetary Policy, June 8–9, 2000.

Meltzer, Allan H. (1995), "Monetary, Credit and Other Transmission Mechanism Processes: A Monetarist Perspective", *Journal of Economic Perspectives,* 9: 49–72.
Mishkin, Frederic S. (1991), "Asymmetric Information and Financial Crises: A Historical Perspective", in R. Glenn Hubbard, ed., *Financial Markets and Financial Crises*, University of Chicago Press: Chicago: 69–108.
Mishkin, Frederic S. (1996), "The Channels of Monetary Transmission: Lessons for Monetary Policy", *Banque De France Bulletin Digest* No. 27: 33–44.
Mishkin, Frederic S. (1997), "The Causes and Propagation of Financial Instability: Lessons for Policymakers", *Maintaining Financial Stability in a Global Economy*, Federal Reserve Bank of Kansas City, Kansas City, MO.: 55–96.
Mishkin, Frederic S. (1998), "Promoting Japanese Recovery", in Kenichi Ishigaki and Hiroyuki Hino, eds., *Towards the Restoration of Sound Banking Systems in Japan – the Global Implications* (Kobe University Press and International Monetary Fund: Kobe 1998). 130–161.
Mishkin, Frederic S. (1999), "International Experiences with Different Monetary Policy Regimes", *Journal of Monetary Economics*, Vol. 43, #3: 579–606.
Moulton, Brett R. (1996), "Bias in the Consumer Price Index: What is the Evidence", *Journal of Economic Perspectives* 10 (4): 159–77.
Romer, Christine (1992), "What Ended the Great Depression?" *Journal of Economic History*, December 1992, 52, #4, 757–784.
Shapiro, Matthew D. and David W. Wilcox (1996), "Mismeasurement in the Consumer Price Index, An Evaluation", in Ben S. Bernanke and Julio J. Rotemberg, eds. *NBER Macroeconomics Annual,* MIT Press, Cambridge, Mass.: 83–154.
Smets, Frank (2000), "What Horizon for Price Stability", European Central Bank Working Paper 24.
Summers, Lawrence H. (1991), "How Should Long-Term Monetary Policy Be Determined?" *Journal of Money Credit and Banking*, 23: 625–631,
Svensson, Lars E.O. (1999), "Price–Level Targeting Versus Inflation Targeting: A Free Lunch", *Journal of Money, Credit and Banking*, 31: 277–95.
Svensson, Lars E.O. (2000), "The Zero Bound in an Open Economy: A Foolproof Way of Escaping From a Liquidity Trap", presented at the Bank of Japan's Ninth International Conference, The Role of Monetary Policy Under Low Inflation: Deflationary Shocks and Their Policy Response, July 3–4, 2000.
Svensson, Lars E.O., and Michael Woodford (1999), "Implementing Optimal Monetary Policy Through Inflation Forecast Targeting", Stockholm University, IIES, mimeo.
Taylor, John, editor (1999), *Monetary Policy Rules,* University of Chicago Press for the NBER, Chicago.
Vestin, David (2000), "Price Level Targeting Versus Inflation Targeting in a Forward Looking Model". mimeo., Stockholm University.
Williams, J.C. (1999), "Simple Rules for Monetary Policy", Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System.
Woodford, Michael (1999), "Inflation Stabilization and Welfare", mimeo., Princeton University.
Yates, A. (1995), "On the Design of Inflation Targets", in A.G. Haldane, ed., *Targeting Inflation,* Bank of England, London.

Lucas Papademos

The question defining the topic of this conference may seem rather rhetorical to a central banker. This is especially true for a central banker from a country which, after experiencing fairly high and variable rates of inflation over a period of almost twenty years, has finally succeeded in achieving a high degree of monetary stability through long and arduous efforts. To him the answer to this question is straightforward: the economic and social costs of inflation are various, pervasive and substantial. Moreover, policies leading to a departure from price stability are likely to produce only transitory benefit, and involve the risk of accelerating inflation, thereby entailing significant costs for a return to price stability. The benefits of price stability are appreciated by the pub-

lic, which has suffered the economic consequences of instability and regards inflation as a very serious economic and social problem. Life experiences after all shape the views of the public and of policy makers to a greater extent than theoretical or econometric analyses.

Nevertheless, the topic of this conference is both important and timely for several reasons. First, there is that old saying about success: "It is difficult to reach the top, but it is more difficult to stay there". Similarly for price stability: "It is difficult to reach the bottom – to achieve a low rate of inflation – but it may be even more difficult to sustain it, especially in an uncertain world". In an environment of price stability, the costs of inflation and disinflation can be forgotten, and policy-makers may be tempted to pursue policies resulting in a departure from stability, when other important objectives, such as faster growth and lower unemployment, seem hard to attain. A second reason is that in an environment of price stability, central banks face new challenges and have to address new issues, such as defining price stability more precisely, measuring the price level, choosing appropriate monetary policy indicators and responding effectively to financial market and supply shocks.

In a low-inflation environment there are two crucial questions. The first has been posed by Otmar Issing: "Why not price stability?". The other is: "How should monetary policy be conducted to maintain price stability in the presence of uncertainty and fairly high unemployment?". Otmar Issing has provided us with a comprehensive and insightful survey and assessment of theoretical arguments and the empirical evidence relating to these questions. I broadly agree with his assessment. Therefore, I would like to emphasise certain arguments and elaborate on a number of issues.

The first issue concerns the real effects and costs of inflation whose magnitude depends on whether inflation is fully anticipated or not and on the extent to which the economy is adapted to inflation. The so-called 'shoe-leather costs' (from the non-payment of interest on currency) and the 'menu costs' (from the frequent revision of prices) are relatively unimportant when inflation rates are low and will diminish over time as technological advances reduce the role of currency and facilitate price changes. The major real effects and costs of anticipated inflation are a consequence of its interaction with the institutional structure of the economy (that is the existence of nominal institutions and practices in both the government and the private sector). The interaction of inflation with nominal tax and social security systems can lead to very large welfare losses (in the order of 1–3% of GDP when inflation rises from zero to 10 per cent). But even at relatively low inflation rates (e.g. 5 per cent), these costs are significant, as they are permanent and accumulate over time.[1] Although such costs can be reduced through appropriate changes in the tax structure, the indexation of the economy to render it inflation-proof has been difficult in practice.

A point I would like to stress, however, is that unanticipated inflation and uncertainty about future inflation can also have substantial and pervasive effects, as they

[1] Fischer and Modigliani (1978) and Fischer (1994) offer a comprehensive listing of the real effects of inflation and emphasise the importance of the economy's institutional structure and the extent to which it is adapted to inflation for determining the magnitude of the effects of anticipated inflation. The estimates of the welfare costs resulting from the interaction of anticipated inflation with tax and pension systems, which are presented by Fischer (1994), Feldstein (1999) and Issing (2001), demonstrate the potential significance of these costs when the institutional structure is not adjusted to inflation.

impair the functioning of the price mechanism and result in a misallocation of resources, unwarranted aggregate output fluctuations, mistaken investment decisions and a decline in investment and long-term output growth. Moreover, unanticipated inflation and the existence of nominal contracts can have major wealth-redistribution effects and costs depending on the size and maturity structure of the outstanding stock of nominal debt.[2] It is not easy to measure the cost of unanticipated inflation, but it is important in order to obtain a more comprehensive assessment of the costs of inflation.

A second issue, widely debated in the past but still topical, concerns the implications of the relationships between inflation, output growth and unemployment for the choice of the inflation objective. Theory does not provide firm conclusions with regard to the long-term relationship between inflation and economic growth. "Equally plausible models yield fundamentally different results."[3] The empirical evidence presented by Issing, Fischer, Feldstein and others leads to the conclusion that, on the whole, there is a negative relationship between inflation and economic growth in the long run, particularly in countries with high inflation. It is true that empirical results, especially those based on large cross-country samples, are sometimes not very robust with respect to the methodology and specifications used, and should be considered suggestive rather than conclusive, while the causality of the inflation – growth relationship is difficult to establish. More recent studies, however, such as those included in Feldstein (1999), support the view that higher inflation is associated with slower economic growth, even in countries with moderate inflation. I should also point to the experience of my own country (admittedly a single case, but instructive as it was observed over a period of almost twenty years), which demonstrates unambiguously that high inflation was connected with and was largely responsible for a mediocre growth performance, while in recent years a determined disinflation policy leading to price stability was accompanied by steadily faster economic growth.

The analysis of the welfare costs of inflation and the empirical evidence about the long-term relationship between inflation and economic growth strongly corroborate the case for price stability as a medium-term objective of monetary policy. There are, however, other important issues which must be addressed: the operational definition of price stability and the potential conflict or trade-off between the price stability goal and the attainment of a low rate of unemployment. Alan Greenspan has defined price stability as a state when economic agents do not take account of the prospective change in the price level in their economic decision-making. But since expectations are not observable, this definition raises some operational and measurement questions. Otmar Issing's discussion of the possible alternatives, which can be employed in practice, highlights the role of nominal wage rigidities and of the possible existence of an inflation –

[2] The wealth redistributions due to unanticipated inflation are examined in some detail by Modigliani and Papademos (1978). These redistributions can be substantial, in the order of one per cent of GDP for every one per cent unanticipated increase in the price level.

[3] Issing recalls this conclusion reached by Stein (1970) and confirmed by Orphanides and Solow (1990) in their respective surveys of money, inflation and growth models. The empirical evidence available on the inflation – growth relationship is extensive and is reviewed effectively by Issing (2001) and Fischer (1994, 1996). The paper by Andres and Hernando in Feldstein (1999) provides relevant evidence for the OECD countries.

unemployment trade-off in choosing a low-inflation objective and the appropriate price stability definition.

In recent years, the consensus view of the 1980s that there is no inflation – unemployment trade-off in the long run, although it may exist in the short run, has been challenged at least in a low-inflation environment. It has been argued that as inflation approaches zero the short-term Phillips curve becomes progressively flatter and that the long-term Phillips curve displays a permanent trade-off for very low rates of inflation, though it becomes very steep or vertical when the unemployment rate is lower than some critical value. Thus "Keynes elbow" has reemerged and theories have been advanced to explain the existence of nominal and real wage rigidity in a low-inflation environment. The empirical evidence, however, surveyed by Otmar Issing and José Viñals, is mixed and inconclusive. Charles Wyplosz's interesting and intriguing results are difficult to interpret and his trade-off estimates may not be robust. This is perhaps not surprising as the samples employed do not include many observations of low inflation rates. It is very doubtful, however, that prices and nominal wages will not adjust downward during a long period of high unemployment. It is to be hoped that we will not experience such a period merely in order to test the validity of the wage rigidity hypothesis.

The empirical findings presented by Issing and others at the conference regarding the nature of the inflation – unemployment trade-off have the following implications for the choice of the inflation objective and for the operational definition of price stability: (1) These findings fail to uphold the view that a relatively higher inflation rate is preferable because it can help sustain a lower rate of unemployment permanently.[4] (2) On the other hand, the existence of nominal wage rigidities in the short run, due to staggered wage and price contracts and to imperfect information, together with the likelihood that measured inflation overstates actual inflation and the constraints imposed on monetary policy by the zero lower bound for nominal interest rates (and the potential need for negative real rates in a recession) support the case for choosing a low, positive inflation rate as a policy objective. This is consistent with the quantitative definition of price stability adopted by the ECB. (3) The existence of temporary nominal wage rigidities, which are reflected in the relatively flat slope of the short-term Phillips curve, strongly suggests that price stability should be defined in terms of the inflation rate rather than in terms of the price level. The benefits associated with the existence of long-term nominal contracts, from the greater certainty about the path of the price level in the long run, are likely to be outweighed by the costs connected with the increased output and inflation variability and potential disinflation and deflation costs (in terms of output lost) when the objective is defined in terms of the price level. In this case, positive inflation shocks would have to be offset by pursuing a policy which would induce lower average inflation (or even deflation, if the positive shock is strong enough). The arguments

[4] The empirical evidence regarding the nature of the long-term relationship between inflation and unemployment at very low rates of inflation is inconclusive. However, downward nominal wage flexibility has been observed during periods of low inflation, although the pace of adjustment can be slow [see Fischer (1996) and Yates (1998)]. Akerlof *et al* (1996) reach different conclusions and argue that real wage rigidity increases at low inflation rates, implying the existence of a long-term Phillips trade-off. Viñals (2001) discusses the available evidence regarding the degree of nominal and real wage rigidity in European countries and in the USA.

advanced by Frederic Mishkin, however, suggest that this issue requires further analysis.[5]

Finally, I would like to address an important question directly related to the topic of this conference but not dealt with explicitly in this meeting: Why should price stability be considered the primary objective of central banks? The answer to this question can only partly be explained with reference to the welfare benefits that price stability entails and the disinflation costs associated with restoring it if it is lost as a result of misguided policies. The main reason why central banks should focus on price stability is that monetary policy is the only policy which can effectively achieve and maintain it in the medium and longer run. For inflation is fundamentally a monetary phenomenon in the long run and central banks are the only institutions capable of providing the nominal anchor that can pin down the price level, regardless of the specific strategy they employ. Of course, other factors or policies may influence the course of inflation in the short run, while fiscal policy may place serious constraints on the conduct of monetary policy, both in the short and in the long run. Economic policies must therefore be compatible with and supportive of a stability-oriented monetary policy. Given such compatibility, monetary policy can establish conditions of price stability and it should therefore focus on an objective it can achieve and sustain effectively over time. Another reason for the adoption of price stability as central banks' primary objective relates to the empirical evidence I referred to earlier, which, by and large, suggests that monetary policy cannot help secure a higher rate of sustainable economic growth or a permanently lower rate of unemployment.[6] These important objectives should therefore be aimed at by employing other policy instruments, such as structural reforms, which can foster productivity growth and address the fundamental causes of unemployment. Thus, if there are no stable and exploitable relationships between inflation, output growth and unemployment in the long run, the monetary policy instrument should be assigned to a single target, namely price stability, which it can effectively attain.

Although the preceding arguments support the view that central banks should focus on securing price stability in the medium and longer run, they do not provide sufficient guidance regarding the role and conduct of monetary policy in the short run, especially when non monetary factors or various shocks may cause a departure from full employment. The nature of the inflation – unemployment trade-off in the short run has com-

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[5] Mishkin emphasises that a price level objective has some additional disadvantages because it increases the likelihood of a deflationary environment, which can lead to debt deflation promoting financial instability and can impair the effectiveness of monetary policy, as interest rates approach a floor of zero. On the other hand, a price level objective can reduce uncertainty about the price level in the long run, unless inflation measurement errors result in greater uncertainty about the true price level. Moreover, theoretical models incorporating forward-looking behaviour imply that a price level target will result in lower output variability than an inflation target. The realism of such models is, of course, the critical issue.

[6] The hysteresis theory of Blanchard and Summers (1986, 1987) that the "natural" or nonaccelerating-inflation rate of unemployment (NAIRU) is partly determined by the history of the actual unemployment rate and thus by aggregate demand has underpinned different policy recommendations [e.g. Ball (1999)]. It has been argued that monetary policy should also aim at reducing the rate of unemployment and that such a policy can be sustained with only marginal effects on inflation. However, the theoretical model advanced by Ball (1999) to support this proposition is incomplete and not very convincing, while the empirical evidence he presented can be interpreted differently and consistently with the view that there is no stable long-term Phillips trade-off exploitable by monetary policy.

plicated policy-makers' decisions in the past, especially in the presence of supply shocks which have adverse effects on both inflation and output. The relatively flat slope of the short-term Phillips curve, which is observed in many countries, implies that the immediate inflationary consequences of an expansionary monetary policy are limited, even though they can be sizeable in the long run if such a policy persists. It also implies that a restrictive monetary policy aimed at restoring price stability can involve substantial costs in terms of lower output over a prolonged period. This feature of the short-term Phillips trade-off and the fact that the dynamics of inflation and output are partly determined by expectations of future inflation and of central bank actions clearly underscore the importance of being farsighted and prudent in the conduct of monetary policy. The effectiveness of monetary policy in maintaining price stability in the medium term is enhanced by the central bank's commitment to this objective and by firm action in response to shocks threatening price stability. Monetary policy can help anchor expectations to price stability, thereby favourably influencing the nature of the short-term output – inflation relationship and reducing fluctuations in output.

These arguments complement and support Issing's general conclusions and have a direct implication for the conduct of the ECB's monetary policy. At this critical juncture of rising inflationary pressures due to supply shocks and unwarranted volatility in the foreign exchange market, the commitment to the price stability objective, as operationally defined by the ECB, will help minimise the impact of the supply shocks and the transitional costs associated with the return to price stability. Moreover, it will help enhance the credibility of the ECB and improve its effectiveness and flexibility in dealing with such shocks in the future.

References

Akerlof, G., Dickens, W. and Perry, G. (1996), "The Macroeconomics of Low Inflation", *Brookings Papers on Economic Activity*, vol. 1, pp. 1–59.

Ball, L. (1999), "Aggregate Demand and Long-run Unemployment", *Brookings Papers on Economic Activity*, vol. 2, pp. 189–236.

Blanchard, O.J. and Summers, L.H. (1986), "Hysteresis and the European Unemployment Problem" in *NBER Macroeconomics Annual*, vol. 1, pp. 15–78.

Blanchard, O.J. and Summers, L.H. (1987), "Hysteresis in Unemployment", *European Economic Review*, vol. 31, pp. 288–295.

Feldstein, M., ed., (1999), *The Costs and Benefits of Price Stability*, University of Chicago Press, Chicago.

Fischer, S. and Modigliani, F. (1978), "Towards an Understanding of the Real Effects and Costs of Inflation", *Weltwirtschaftliches Archiv*, vol. 114, pp. 810–832.

Fischer, S. (1994), "Modern Central Banking" in Capie, F., Goodhart, C., Fischer, S. and Schnadt, N. (eds.), *The Future of Central Banking*, Cambridge University Press, Cambridge, U.K., pp. 262–308.

Fischer, S. (1996), "Why are Central Banks Pursuing Long-run Price Stability", in *Achieving Price Stability*, Proceedings of a Symposium sponsored by The Federal Reserve Bank of Kansas City, pp. 7–34.

Issing, O. (2001), "Why Price Stability?" in *this volume.*

Mishkin, F.S., "What does Price Stability Mean? Price level or Inflation Target?", in *this volume.*

Modigliani, F. and Papademos, L. (1978), "Optimal Demand Policies against Stagflation" *Weltwirtschaftliches Archiv*, vol. 114, pp. 736–781.

Viñals, J. (2001), "Monetary Policy Issues in a Low Inflation Environment", in *this volume.*

Wyplosz, C. (2001), "Do We Know How Low Should Inflation Be?", in *this volume.*

Yates, A. (1998), "Downward nominal rigidity and monetary policy", Bank of England, *Working Paper No. 82.*

Jean-Claude Trichet

Thank you very much Christian. I am tempted to say that I fully agree with Otmar Issing, and am very pleased to hear what Lucas Papademos has just said. It is quite a challenge to invent new ideas after having heard all that.

As far as I am concerned, I would like to air a few ideas in relation with the issue of communicating on price stability. In that regard, I cannot help thinking of Professor Bergson, a great philosopher who lectured at the Collège de France. He was quite surprised because, in the beginning, there were only a few philosophers in the audience and then a lot of people started attending; more and more came and he became extraordinarily popular. However, he had the feeling that something had gone wrong with his popularity when some very nice men and women came up to him and said: "Professor, it was absolutely wonderful; thank you so much for such an eloquent lecture. We understood absolutely everything". And then, they added: "Apart from the vocabulary".

We are speaking today about a subject which is of utmost importance for the general public: price stability. Price stability is something very clear for all citizens in our democracies, something which they judge every day. In my own institution, we feel this pressure of democracy very profoundly. Indeed, over a certain number of years, our policy has been strongly challenged. This is natural in a political democracy, especially a democracy in which opinion-makers play an important role. During that period, it was however both extraordinarily heartening and reassuring to receive the support of 75% of the general public, the men and women in the street. This was also quite surprising for us, given that the bulk of opinion-makers were against our policy. Thus the common sense of the general public so strongly favoured an anti-inflationary posture that we were supported, despite all these disputes, which once again are very natural and absolutely necessary in an opinion democracy. In that regard, we should never forget that, ultimately, we are accountable to the general public in modern democracies. We therefore have to pay attention to what the general public thinks. In the same vein, I have a survey here which some might find a little bit surprising, but which demonstrates clearly that today people consider that the present level of inflation in my own country, which is only very slightly above the 2% threshold, is too high. Much too high in their eyes, and particularly in the eyes of households. I am a little bit surprised myself to see to what extent the general public is so highly sensitive, at least in our European democracies, to price stability.

In passing, let me also say a few words on the famous threshold of not more than 2% which is, I understand, seen by some of you as perhaps a little bit too bold. It seems to me that this is more or less the converging criticism I have heard and Charles said that it is an extraordinarily bold concept. However, I also entirely share the views expressed by Otmar that price stability is favourable to growth. I computed what France, Germany, Austria, Belgium and the Netherlands had achieved since the beginning of Stage 2 of EMU up to the end of of 1999, that is to say over six years. During that period, all five countries recorded an average inflation well below 2%. France, for instance, had an average of 1.4, with Germany even slightly lower; Austria 1.5; Belgium 1.5; the Netherlands 1.75. The threshold of 2% was crossed in only two years out of six by three countries and one year out of six by two countries, that is to say on 8 occasions out of 30.

During the same period, the unemployment rate decreased in the Netherlands by 4.2 percentage points, in my own country by 1.7% as well as in Austria and Belgium. Actually, we did not invent something so extraordinary in Europe since, over the same six years, Switzerland and Canada also enjoyed also an inflation well below 2%, while their performances in terms of diminishing unemployment were quite flattering as well. Otmar said, we have been capitalising on the legacy of the policies implemented during the preparation of EMU. One also has to take into account that our countries and currencies had attained a high level of credibility. Let's not forget that EMU was based not upon a concept of weighted averages of merging currencies but on the concept of benchmarking towards the best performer. The euro is thus based not only upon the legacy of the founding currencies and the national central banks, but also on this legacy of benchmarking. And that of course is extremely important to understand the inspiration behind our strategy and decisions.

Let me now briefly try to reconsider three questions: why there is a need for price stability in a democracy, why *only* price stability and, finally, why stability over the medium and long-term.

As regards the need for price stability, I want to stress that, in all our democracies, we have to meet the criteria that are embedded in the legal framework constituted by the Treaty or national central banks' legislations and we are accountable to the general public since we are independent institutions. We are not accountable to political institutions, but we are certainly accountable to the general public. Furthermore, the people perhaps are more demanding in our own democracies than they might be elsewhere.

Why only price stability? My understanding of the reasoning in our democracies, in gradually granting us independence, was to allow us to focus on price stability as our primary goal – notwithstanding other goals – but nevertheless as the primary goal. It seems to me that, over and above the economic reasoning – for instance, reducing artificial distortions in the microeconomic decision-making process which you, Lucas, and others of course, mentioned-price stability is a pre-condition for growth, job creation, diminishing unemployment by preserving competitiveness in the productive sector and the purchasing power of households. This supports and reinforces confidence in the currency, which makes it possible to have low medium and long-term interest rates. In this respect, we enjoy currently long-term rates that are lower than the US rates. This was not the case for all constituting currencies before they started this convergence process towards the best performer that I have mentioned. We have therefore created an environment which is favourable to growth. That was very well understood by the legislators who adopted the concept of an independent institution ensuring price stability. But let me here float a somewhat philosophical argument: let's assume that we have two goals, firstly job creation and reducing unemployment and secondly price stability. Would you think it would be appropriate to request an independent institution to choose between growth and price stability as if they were contradictory goals? Do you think this would fit within a democratic framework? It seems to me that it would be very anti-democratic to embark on such a road and to entitle such an institution to take it upon itself to arbitrate between two goals. My understanding is that price stability and growth are not at all contradictory but rather complementary. In our own eyes and in the eyes of our democracies, ensuring price stability is conducive to higher growth, job creation and lower unemployment. I test this idea when I discuss these issues with the Parliament. It seems to me that they accept this reasoning as well-founded.

Now, something which is also very important: "Why a medium and long-term perspective?"; Here again, it seems to me that this question is closely connected to the most important element to understanding why we are independent. We are permanently called upon to arbitrate between present and future interests. Of course that goes without saying when you decide on interest rates which crystallise the arbitrage between present and future consumption. But as independent institutions, we have to make such a choice. The general public finds it very difficult to understand that the effects of our own decisions on the CPI are only visible after a time-lag of perhaps eighteen months to two years. If I may use this image, we are driving a car the wheels of which turn only two years after we have turned the steering wheel. It is quite difficult to understand that we reason permanently altogether in the short, the medium and long term in order to preserve confidence, and therefore, credibility.

General Discussion

Otmar Issing started off the general discussion with his reactions to several issues raised in the presentations by the panellists. Responding to Laurence Ball's concerns about the possibility of hysteresis giving rise to potential long-run effects of disinflationary monetary policy on unemployment he stressed that such effects, if anything, should actually strengthen the case for focusing monetary policy strictly on price stability. This would help avoid 'conflicting situations' when disinflation becomes necessary. He pointed to the periods of stagflation in the 1970s and 1980s as concrete examples of the 'worst of all situations'.

Turning to the criticism by Paul De Grauwe of the ECB's quantitative definition of price stability as being 'too precise' and 'too inflexible', Issing remarked that usually observers express the opposite criticism, i.e. that this definition was not precise enough. This suggested that perhaps the ECB had chosen a wise middle course on the degree of precision of its definition.

On the issue of the need for flexibility emphasised by Laurence Ball and Paul De Grauwe, among others, he recalled the conference on "Monetary Policy-Making under Uncertainty", which the ECB had co-organised in 1999. The main conclusion of that conference had been that flexibility was required in the sense that one could not rely on simple policy rules in the face of uncertainty. However, central banks would always have to remain 'inflexible' in not allowing inflation to rise, as had also been stressed by Lucas Papademos.

With respect to the discussion on price level targeting by Frederic Mishkin, Issing was wondering why this very old issue – going back at least to Irving Fisher – was being brought up again at this time. He thought that this was certainly an interesting academic topic involving very complex models, but that it was clearly premature to draw any concrete conclusions for monetary policy. He also thought that the relationship between monetary policy and financial stability was an area where 'we do not know much' but which could become an issue in the future as financial wealth was ever increasing.

Finally, Issing agreed with Jean-Claude Trichet's remarks on the importance of communicating with the general public. He thought that the 'Bergson syndrome' mentioned by Trichet appeared to be relevant for the ECB. As a new institution which needs to communicate in eleven different languages the ECB could not expect its 'vocabulary' to be understood immediately and everywhere. He considered effective communication to be more important but also more difficult in these circumstances. Moreover, in the absence of its own track record of good performance, the ECB could not take for granted that the public would simply 'have faith' and 'believe' in the central bank. How to gain trust was the key challenge for the ECB.

Frederic Mishkin referred to Paul De Grauwe's comments and argued that it was wrong to think that the need for flexibility would imply a lack of precision in describing

what monetary policy does. Good monetary policy should be one of 'constrained discretion'. A lack of precision would lead to poor communication with the public and reduced accountability. He was of the view that a precise number for the inflation goal should be stated as part of an agreement between the central bank and the government, so that the central bank can be held accountable in economic terms. This would help avoid the time inconsistency problem and for this purpose it did not matter much which number was chosen.

Obviously, the long run inflation goal could change if new research became available or if rigidities in the system were reduced. Mishkin stressed that even with a specific and explicit inflation goal a central bank could have a lot of flexibility to worry about other considerations besides just inflation, such as output stabilisation. He said that he was pleased when the ECB announced an inflation objective as part of its strategy and he thought that in the United States the nominal anchor was too much based on a single individual rather than on an appropriate institutional framework.

Paul De Grauwe re-iterated that the scientific evidence on the optimal inflation rate was extremely unclear at least within the range between 0 and 5% inflation. He stressed that one should be honest in acknowledging this uncertainty and avoid excessive precision. In the presence of great uncertainty too much precision could lead to foolishness. The fact that one was not sure about the optimal inflation rate did not mean that the number chosen did not matter. Therefore, precision could be bad. He also thought that the market had not criticised the ECB for a lack of precision with respect to the definition of price stability but rather on issues related to its monetary instruments and the refusal to publish its own forecast of inflation.

Christian Noyer returned to the argument put forward by Jean-Claude Trichet, namely that the people simply wanted inflation to be less than 2%. Unless academics could demonstrate that the general public was irrational and wrong, this would have to be taken into account.

Lucas Papademos emphasised the argument also stressed by Trichet and Issing that public aversion to inflation and the legacy of the institutions preceding the ECB pointed to inflation rates of up to roughly 2% as desirable as well as feasible, without undesirable side-effects in terms of unemployment. He acknowledged that one could, of course, argue about a few decimal points regarding the optimal, or maximum admissible, inflation rate, but he was not convinced, on the basis of the various arguments advanced, that the medium-term inflation objective should be above the ECB's 2% ceiling. Papademos wondered whether the very interesting graph by Paul De Grauwe – showing the intersection of the credibility effect curve and the grease effect curve – could be made operational in order to derive optimal inflation rates higher than 2%.

In response to the questions raised by Laurence Ball regarding the primacy of price stability as a central bank objective, Papademos elaborated on a number of related points. First, he believed that most economists would agree that inflation was fundamentally a monetary phenomenon in the long run and that monetary policy by itself could not have a significant long-term effect on economic growth or on the structural component of unemployment. Second, he noted that the monetary policy of the ECB was formulated and implemented within a medium-term framework, which allowed for

sufficient flexibility to mitigate the effects of supply and demand shocks. This approach was also consistent with the Treaty provision that the monetary policy of the ESCB shall support the general economic policies in the Community, provided that this would not jeopardise the attainment of price stability. It was important, however, that monetary policy should not be implemented in a way that could confuse markets and the public about policy priorities. Finally, he stressed that the adoption of price stability as the primary objective of many central banks was partly and indirectly an outcome of past, misguided attempts to exploit the short-term Phillips curve in order to achieve several policy goals at the same time. In particular, the relatively flat slope of the short-term Phillips curve had tempted policy-makers in some countries to pursue unemployment objectives by using inappropriate policies, without regard for their ultimate consequences. The nature of the inflation – output relationship implied that the inflationary effects of an expansionary monetary policy would only become visible with a time lag and that disinflation costs would be substantial.

Laurence Ball disagreed with the claim by Papademos that monetary policy could not influence output and unemployment in the long run. In his opinion the evidence simply did not support this, but rather showed a strong relationship across different countries between monetary policy actions and the long-term path of unemployment. He pointed to the role that the aggressive loosening of monetary policy by the Fed in the early 1980s played in helping to push unemployment back down in the US.

Opening a series of interventions from the floor **Lars Svensson** expressed support for the view taken by Mishkin. In particular, he claimed that, in practice, every central bank aiming at low inflation was doing flexible inflation targeting, in the sense of stabilising inflation but also attempting to stabilise the output gap with a small weight. In response to De Grauwe, he stressed that it was important to have a precise point target in order to co-ordinate inflation expectations, especially for wage settlements. He claimed that the important thing is to have a specific point target, and that it mattered less what precise number is chosen.

With respect to Mishkin's concern about temporary deflation arising as a consequence of price level targeting, he thought that, if the price level target was credible, this would prevent long term deflation expectations. Expectations of deflation lasting for short periods, say one or two years, would present no problem and even this could be avoided altogether by having an upward slope of the path for the price level target.

Frederic Mishkin replied that his problem with the upward slope of the price level target was mainly related to communication. If one wanted to build in some mean reversion this would have to be done in a way that was understandable for the public. In his view communicating this in terms of an average inflation rate over a longer horizon was a better idea than plotting an upward slope of the price level target. With respect to the credibility of a price level target he was concerned about the danger that central banks could be considered to be too much of inflation fanatics. If central banks thought they could have very different preferences from the public, then in the long run 'the public would get them'. So he did worry about central banks announcing that they would pursue deflation for a period of time, particularly if this was associated with some output loss.

Paul De Grauwe agreed that people were afraid of deflation because this was a 'terra incognita'. Maybe one should not be afraid of it and indeed some people argued that with price level targeting one could get around all problems. However, it still seemed to him that one knew too little about this to come 'too close to the cliff'. That was the reason why he felt more comfortable with an inflation goal of something like 2.5 to 3% and some symmetry around it rather than following a ceiling approach.

On the issue of symmetry or asymmetry of the price stability objective **Jean-Claude Trichet** remarked that, clearly, the concept of inflation-targeting was based on the idea of symmetry. There was a mid-point of the target and then some probability of being higher or lower. However, this simply was not the culture in most of Europe, rightly or wrongly. The notion that there was an in-built asymmetry in the dynamics of inflation was very deeply rooted in Europe. Taking up a concern raised by Svensson, he pointed to the importance of wage negotiations – which might, incidentally, be very different in Europe than in the US. In this context a probability of inflation turning out much higher than expected would get the central bank into uncharted waters, where there was a risk of wage-price spirals and accelerating inflation. This provided a good reason to be very cautious in that respect and to stick to the idea of a ceiling.

The second intervention from the floor came from **Bill White**. He cast some doubts on the dangers of deflation. Going back to long historical series most deflationary periods, for example the 1880s, had actually been accompanied by substantial positive real growth. The negative perception of deflation had really been generated by the experience in the years 1929 to 1933. However, other episodes in history showed that it was not always true that deflation had to be pernicious. On the other hand, when one considered the impact that deflation could have on financial stability and the functioning of financial markets today, a period of prolonged deflation might not be quite as benign as the historical experience suggested.

On the question of the precision of the price stability objective, White stressed that there was no right answer to it. In the framework of inflation targeting, there were a lot of decisions to be taken about the target, caveats, exemptions, bands, band widths and so forth. What really mattered was to be tough and obtain credibility up front. The tighter and more precise a central bank was on the inflation target, the lower the likelihood that it would be able to deliver on the target. So one could lose credibility ex-post. At the same time, it could be argued that some precision was needed to obtain credibility ex ante. For White, there simply was no right answer to this issue. Rather, it was a question of choosing between type 1 versus type 2 errors.

Frederic Mishkin disagreed with the reading of the historical evidence proposed by White. The worst business cycle contractions in the US history had always been associated with the phenomenon of debt deflation. This had been the case not only during the Great Depression, but also in 1907 and 1873, for example, when deflation created serious problems for the financial sector. It was true that one could sometimes experience some long period of very slight deflation accompanied by high growth but this happened only after the financial system had recovered. So he thought there were good reasons to be cautious about periods of deflation.

Additional scepticism with respect to price level targeting was expressed in a third intervention from the floor, by **Michael Wickens**. He took up a point raised by Mishkin concerning measurement errors in inflation, which (as a non-stationary component) could take the price level permanently away from where one wanted it to be. Wickens stressed that the same problem also existed in the opposite direction. Under price level targeting the measurement error in the price level would create an inflation measurement error which would be twice as big (in terms of its variance) as the measurement error for the price level. This meant that financial markets would be subject to much more uncertainty. He found this was another important reason not to go to a price level target.

With respect to ECB monetary policy Wickens argued that the ECB was not really strict in always hitting inflation but rather followed a more flexible approach. In his view the ECB did this for a very good reason. In fact, everybody would agree that one should not try to do anything about short-term fluctuations in inflation that disappear before 18 months or 2 years, for example due to food prices and other volatile components of the HICP. Finally, referring to the intervention on the foreign exchange markets announced by the ECB on the day of the conference, Wickens wanted to know – as a technical question – under what circumstance a central bank would use one monetary instrument, i.e. intervention, rather than another, i.e. interest rates.

Otmar Issing stressed that the medium-term orientation of the ECB's monetary policy was obvious from its announcement of the definition of price stability. The ECB's orientation at the medium term thus took into account the point made by Wickens. Issing also made clear that the ECB did not have the slightest intention to accord – in its arsenal of policy instruments – interventions the same weight or status as the main refinancing operation and the repo rate. Certainly, the ECB did not have in mind to turn to the use of the intervention weapon for conducting monetary policy in a regular way.

Christian Noyer added that he did not think that any central bank in the world had that in mind. He went on to thank all members of the panel for their contributions. When summing up the panel discussion, he stressed the importance that the ECB attaches to its definition of price stability as a way to provide a firm anchor for agents' long-term expectations. He pointed to a number of remarks made during the conference, which argued that the experience of an extended period of low inflation might influence the behaviour of economic agents and institutions, for example in the labour markets. This should reenforce a culture of stability. However, stability was not something that could be taken for granted but it could easily be lost if inflation were ever allowed to rise again.

Noyer recalled the main issues that had been discussed by the panel. These were, first, whether (or why) central banks should only focus on price stability. Second, different views were expressed on the question of the appropriate level and degree of precision of the objective of price stability. Third, the arguments raised for and against re-considering the meaning of price stability in terms of a price level target (rather than an inflation target), in particular in view of risks arising from prospects of deflation were discussed. Fourth, it was argued that the definition of the objective of price stability should also be seen as reflecting the importance of price stability to the general public and as providing a basis for public accountability of the central bank. The chairman finally concluded that overall the conference had provided a lot of food for thought and for further research, which could be of interest to both academics and central bankers.