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**Article**

## Prices, Wages and Inflation after the Euro - What Europeans Shoud or Should not Expect

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## PRICES, WAGES AND INFLATION AFTER THE EURO – WHAT EUROPEANS SHOULD OR SHOULD NOT EXPECT

### 1. More Trade and Fewer Price Differences

The disappearance of European national currencies is likely to bring about a number of important changes in the cross-border economic relations within Europe. Recent empirical research, for instance, has documented that creating a currency union tends to have a sizeable impact on the amount of cross-border trade – the impact ranging from a 50 to 300 per cent increase in trade flows. The introduction of the euro should then lead to strong intensification of exchanges across countries in the Euro area, fostering economic integration.

By the same token, a vast empirical literature has documented that differences in the price charged for identical goods tend to be larger when comparing market locations using different currencies, relative to market locations within a single-currency area. It is quite plausible that the euro will lower price differences across countries – as crossing a European border will no longer imply switching currencies. Although language and other barriers may still be at work, the prices for goods and services will be somewhat less dispersed across countries in the Euro area.

There are strong arguments suggesting that larger trade flows and a reduced variability of prices are good news for the European economy. To the extent that they result from the elimination of barriers to trade and transaction costs – due to switching currencies across countries – these phenomena are bound to increase efficiency in both production and consumption. However, they may also be costly for some groups, as reduced market segmentation can erode the monopoly power of producers, and bring about shifts in production patterns and the relative price of labor and capital.

It is difficult to forecast the magnitude and timing of these effects with any precision. It is nonetheless useful to address a number of basic questions on what is likely to happen when the introduction of euro bills and coins will make differences in price and wage levels clearer and more transparent. Some may wonder whether wage differentials in euros for similar jobs (perhaps in the same company) are to be considered unfair. Others may expect a quick convergence of prices towards common levels – the argument is sometimes made that prices of individual goods will converge downward to their lowest level in the euro area.

A few related questions have already become a political issue in the first two years in the life of the new currency, as national inflation rates have not converged completely. One question that has been hotly debated is whether inflation differentials are a destabilising phenomenon, so that governments should be required to fight them in all circumstances by using fiscal instruments. In what follows we will examine these questions in detail.

### 2. Will Differences in Prices Disappear?

The euro will surely foster convergence of prices to common levels, but only up to a point. The main idea here is that introducing a common currency is equivalent to reducing transaction costs, since a single currency removes the cost of exchanging currencies, the computational costs of making price comparisons across different currencies, as well as the risk associated with exchange rate volatility. Lower transaction costs mean more opportunities to arbitrage across markets. This should clearly reduce the scope for price differentials in the markets of goods that can be shipped from one market to another at low costs.

This view is correct but, unfortunately, there are many barriers to trade other than switching currencies. For instance, there may be substantial differences in taxes and regulation; more crucially, many final goods come to the consumer together

with services (such as technical assistance), which are provided only in specific locations. Hence, after adopting the common currency, even accounting for progress in market integration and fiscal harmonisation, *we should not expect complete convergence of prices.*

This conclusion should not come as a surprise, once we think about the importance of wholesale and retail trade services in bringing goods from producers to consumers. Based on input-output tables for the United States and Europe, for instance, the *average* margin of these accounts for 50 per cent of the price to consumers. In some cases these margins are as high as 80 per cent. A large fraction of distribution margins consists of services that employ local inputs intensively – including rents of office and store space, wages of local employees, fees of local professionals and the like. To the extent that the price of these services varies across locations, cost differences related to distribution services are not going to disappear with a common currency.

Moreover, firms with market power will charge a markup on top of the above costs. Unless the degree of competition is very high, firms will take advantage of impediments to arbitrage due to distribution and transportation costs. Thanks to these impediments, firms can increase their profits by charging different prices (and therefore adjusting their profit margins) according to local market conditions.

As is now well understood, producers and wholesalers “price to market”. Striking evidence of this behaviour is, for instance, provided by the reaction of firms to movements of the exchange rate. As documented by recent studies, only a fraction of exchange rate movements is translated into price movements, and this fraction is between 50 and 80 per cent at import-price level, depending on the market.

Pricing to market is key to understanding why, contrary to a popular view, *prices of individual goods will not converge to their lowest level in the Euro area.* When barriers to arbitrage are removed or reduced, firms with market power will likely respond by adjusting their mark-ups and profits in all markets. They will increase prices in some locations, while decreasing them in other markets. There is no particular reason to take the lowest price as the benchmark. These decisions will ,of

course, have distributive effects. Some consumers will be worse off, others will be better off with these price changes.

The regulation of firms with market power is a key area for EU-wide and national policymaking with large potential welfare gains for European citizen. To the extent that they reduce market segmentation, policies in favour of competition, especially in the distribution sector, can provide a sizeable push to price convergence in Europe.

Yet one should not conclude that a strong price convergence is always desirable. European consumers may be worse off if they are not charged the same price for an identical good everywhere. In fact, a single price can hide massive cross-subsidies from consumers in locations with low distributive costs to consumers in locations with high costs. These cross-subsidies may not be efficient, let alone acceptable to European consumers.

### **3. Will the Price Level be the Same Everywhere?**

Effective international arbitrage in the goods markets cannot guarantee by itself convergence in the price level as measured by the consumer price index. This is because only a small fraction of goods are traded internationally. Due to transportation costs, most goods are produced and consumed locally: they are nontradables.

Price divergences for nontradables are usually explained in terms of productivity differentials, according to the theory attributed to Balassa and Samuelson (henceforth BS). In a nutshell: consider two economies, integrated in the world markets, with the same level of productivity in the sector producing nontradables. In the sector producing tradables, however, productivity is higher in one economy than in the other. Now, if international markets of capital and goods are competitive, the rate of profits and the price of tradables will be the same across these countries. What will be different is the real wage – which must be higher in the economy in which workers in the tradable sector are more productive. But higher wages in this economy also mean that local producers need to charge a higher price for nontradables – as there is no productivity advantage in this sector. Clearly, international arbitrage can do nothing to prevent price differentials for goods that are not traded across

borders. The overall price level – combining the prices of both tradables and nontradables – will therefore be higher in the economy with higher productivity.

There are several variants to this story. Since a high level of income is usually associated with high productivity in the tradable goods sector, the price of nontradables should be higher in richer countries. Moreover, to the extent that governments spend proportionally more than the private sector on nontradable goods, economies with a larger government sector may have higher nontradable prices because of a stronger demand for these goods.<sup>1</sup>

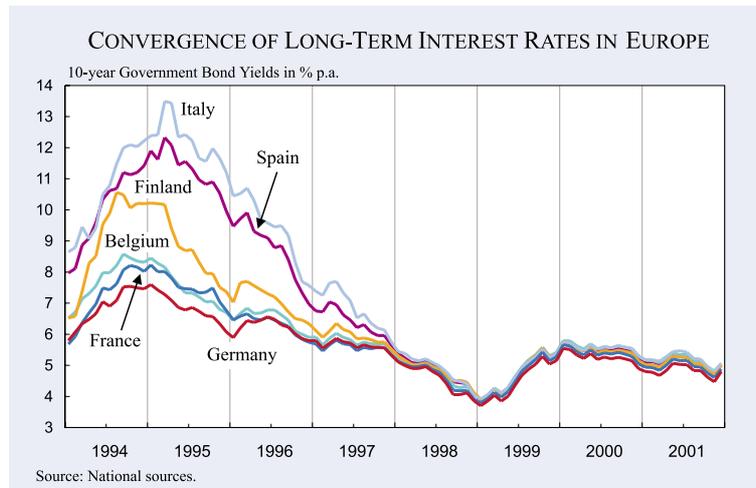
Finally, higher productivity of national exportable goods may imply a fall in their international prices, as producers with a cost advantage will try to sell more abroad. In this case, a higher price of domestic nontradables (because of the considerations above) may be offset by a fall in the price of national tradables. In principle, the effect on the CPI can translate into a depreciation of the real exchange rate (see Corsetti and Dedola 2001).

It is worth stressing that the BS explanation of price differentials works in the medium and long run. Not only does it depend on emerging productivity differentials – which are, of course, associated with technological change and new investment; it also crucially relies on high labour mobility across sectors, or some other mechanism keeping wages in line in the whole economy. If labour mobility across sectors is imperfect and/or low in the short run (due, for instance, to the need for retraining or a mismatch of workers' skills), and productivity differentials lead to wage differentials, the BS mechanism does not work. Indeed, there are reasons to believe that the short-run dynamics of nontradable prices are strongly influenced by other forces.

The main point stressed by the BS theory is that price levels will be different among countries whose pro-

<sup>1</sup> But note that the theoretical basis for the latter argument is not strong: in the simple version of the Balassa-Samuelson hypothesis presented above, goods demand plays no role at all.

Figure 4.1



ductivity levels are different. As an implication, we may expect price levels to converge to the extent that productivity levels also converge across countries. Is there any reason to expect the introduction of the euro to affect productivity differentials in Europe? We have already noted that a common currency is supposed to promote market integration and efficiency, enhancing trade flows in the medium and long run. But there could be much more to this issue.

As shown in Figure 4.1, interest rates have converged dramatically in recent years.<sup>2</sup> The announcement and introduction of the euro eliminated all expectations of depreciation of traditionally weak currencies – virtually wiping out exchange rate risk – in the Euro area. The process greatly benefited the countries that had to pay the highest risk premia in the past, such as Italy, Spain and Finland. Given these changes in the relative cost of capital, it is plausible that the introduction of the euro has raised capital accumulation in the high-interest rate countries above what would have been had the EMU project failed – in part reallocating resources away from countries with the lowest pre-euro risk premium, such as Germany. As high capital accumulation generates productivity gains and wage

<sup>2</sup> Note that the convergence of nominal interest rates is an important efficiency criterion in a currency union. It is sometimes argued that real rates should converge, where real rates are defined as nominal rates minus the respective national inflation rates. This claim is unwarranted, however, since a country's relative rate of price increase is part of this country's "own rate of interest". In an efficient capital market the marginal value product of a country's capital plus this country's inflation rate should be equal across all countries, and nominal interest convergence ensures that this condition will be met. If convergence of real interest rates is postulated, the real rates would have to be defined in such a way that the rate of increase of a common price index is subtracted from the national nominal rates. Obviously, real rates defined in this way would show the same perfect convergence as the nominal rates depicted in the figure.

growth, a faster price convergence towards the German level is the likely consequence.

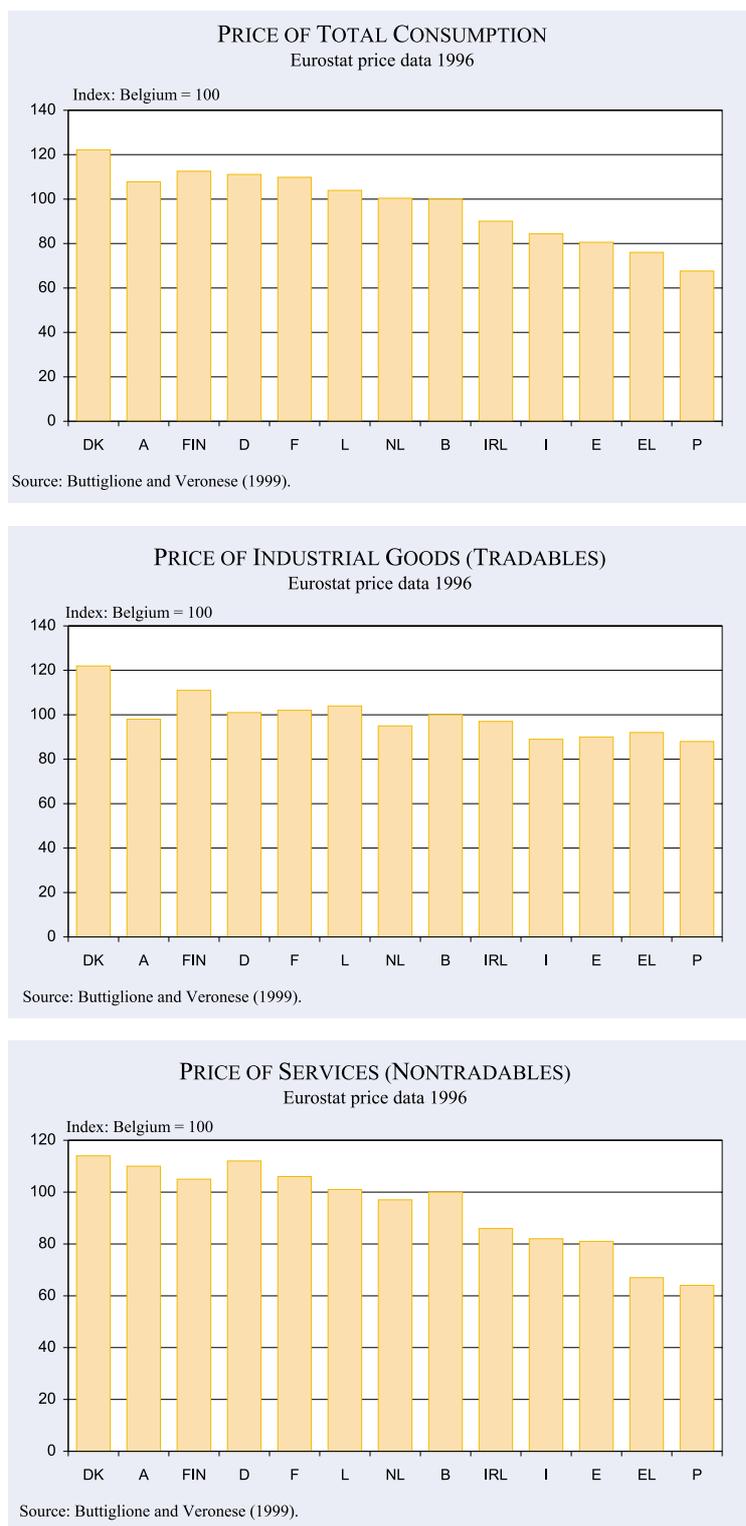
#### 4. How Large were Price Differences in Europe before EMU?

What was the gap in price levels across Europe before the euro? How strong an effect should the euro have to bring about convergence in prices and price levels? Addressing these questions requires the use of special datasets, including detailed information on prices of individual goods recorded simultaneously in different countries. Using exchange rates, one can then convert local prices into a common currency, and test whether a unit of this currency has the same purchasing power in different locations – i.e. test Purchasing Power Parity theory (henceforth PPP). One such dataset is produced by Eurostat.

Based on the Eurostat dataset, Figure 4.2 shows the prices of total consumption, industrial goods and services for the year 1996, well before European monetary unification. The first graph suggests a striking conclusion. A group of European countries have consumer prices that are actually quite close to each other. On average, deviations from purchasing power parity seem to be only minor for Austria, Belgium, Finland, France, Germany, the Netherlands, Luxembourg and Sweden – even allowing for differences plausibly due to higher tax rates in the Scandinavian area. The price of total consumption is lower, however, (by about 20 per cent) in Ireland, Italy, Spain and the UK. More distant are Greece and Portugal.

In the same area of the Euro zone where deviations from PPP are small, the average price of both indus-

**Figure 4.2**  
**Deviations from Purchasing Power Parity**



trial goods and services is also very similar across national borders – see Graphs b and c, which reproduce the calculations by Buttiglione and Veronese (1999). If we consider industrial goods as representative of tradables, this is evidence that markets are quite integrated, and disciplined by arbitrage.

In Ireland, the UK, Italy, Portugal, Spain and Greece, the price of services (nontradables) is, however, considerably lower than in the rest of the sample. For some of these countries, it is realistic to assume that the productivity in the traded-good sector is lower than in the other countries in the sample (at least in 1996). Then the price differential for non-tradables would be consistent with the BS hypothesis. The price index of industrial goods is, however, not too different in the sample. The fact that industrial prices are slightly lower in the second set of countries may simply reflect the lower cost of services employed in producing and distributing tradable goods.

To the extent that we anticipate a reduction in the technological and productivity gap within Europe, we can also expect further convergence in the level of consumer prices – driven by convergence in the price of nontradables. Although there are different views on the strength of this effect, it will be by no means negligible. Some estimates show that the inflation rates in fast growing countries such as Ireland and Finland can be expected to exceed the German inflation rate by about 2.5 percentage points in the foreseeable future, and that the average Euro area inflation rates can be expected to exceed the lowest inflation rate by one percentage point.<sup>3</sup>

Looking into the different categories of goods in greater detail, recent empirical work has yielded a further striking conclusion. While there are no major deviations from the average price level of tradables in the Euro area, the *prices of individual identical goods* are actually quite dispersed. For each pair of countries in the Eurostat sample, Crucini, Telmer and Zachariadis compare the price of a large set of goods for each pair of countries. Comparing prices in say, France and Germany, it turns out that approximately one half of the goods in the sample are charged a higher price in France, while the other half are charged a higher price in Germany. Most interestingly, the same result holds for virtually every possible pair of countries (see Crucini, Telmer and Zachariadis (2001)).

Recall that in 1996, exchange rates in the Euro area were allowed to fluctuate within a wide band. If differences in prices were due only to exchange rate movements, goods should have been systemat-

ically under-priced in countries with a weak exchange rate, while systematically overpriced in countries with a strong exchange rate. The fact, that the evidence does not support this conclusion suggests that firms actively engage in pricing to market, offsetting exchange rate movements with location-specific pricing strategies.

With a strong caveat on the quality of information in the dataset, this result strongly points to market segmentation as a primary feature of the price landscape in the Euro area.

Additional important lessons can be learned by looking at price dispersion over time, and by comparing the Euro area with the United States. This is done by Rogers (2001), using a different dataset produced by the Economist Intelligence Unit. This dataset includes prices of 186 goods in 28 cities in 26 countries. His main findings are reproduced in the table below.

According to the evidence in the table, during the 1990s the Euro area experienced a significant convergence in the average price of tradable goods. The variability of these prices across locations has halved, from 1.2 to .6 (a similar conclusion is also suggested by the analysis of Buttiglione and Veronese, based on Eurostat data). It is reasonable to interpret such convergence as an effect of trade liberalisation within the Single Market. However, the table also shows that the variability of non-tradable prices slightly increased over the period. As a result, there is almost no convergence in the overall consumer price.

Comparing data from across the Atlantic, the variability of prices of tradables is lower in the United States than in the Euro area – although the difference is declining over time. A long history with a

**Convergence of prices: Euro area vs. United States**  
**Standard deviation of prices across locations**

Price index	1990	1995	1999
<b>Euro area</b>			
Overall	0.12	0.12	0.17
Tradables	0.12	0.08	0.06
Nontradables	0.27	0.33	0.31
<b>United States</b>			
Overall	0.16	0.15	0.17
Tradables	0.05	0.04	0.04
Nontradables	0.51	0.52	0.57

Source: John Rogers (2001).

<sup>3</sup> See Sinn and Reuter (2000).

common currency, integrated goods markets and high mobility of productive factors clearly helps to explain the lower price variability in the United States.

However, it should be stressed that, at the end of the 1990s, the Euro area was not too far from the United States: in 1999, the tradables' price dispersion coefficient is .6, as opposed to .4 for the United States. If we take the US economy as a benchmark for the future of the Euro area, the message from this study is quite clear: a large portion of the convergence process in the goods market of the Euro area may have already taken place.

### 5. Should we Worry about National (or Regional) Differences in Inflation Rates?

The first three years in the life of the euro have already shown that different countries and regions in the Euro area need not have the same economic performance in terms of output, employment and inflation. Indeed, Figure 4.3 shows that, relative to the 1999–2001 average growth rate of output in the area, Germany and Italy have been growing at least half a percentage point more slowly, while Finland, Greece and Spain have been growing about one percentage point faster. Ireland has been an amazing outlier, surpassing the average growth rate by 7 percentage points.

Inflation rates have also differed markedly. As shown in Figure 4.3, over the 1999–2001 period, inflation was at least half a percentage point higher than average in the Netherlands, Portugal and Spain. It was 1.4 percentage points higher than the average in Ireland. Inflation in Austria, Finland and France was at least one percentage point lower than the Euro area average.

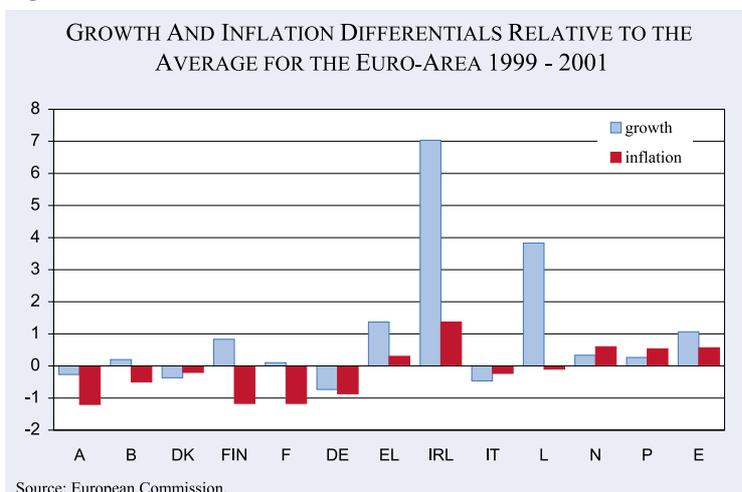
What explains these differences? In the long run, there is little doubt that growth differentials reflect technology and the accumulation of productive inputs. Fast growth stems from innovation, investment and the growth of employment. These topics will be analysed elsewhere in this report. Here we focus on inflation differentials.

As discussed above, the Balassa-Samuelson hypothesis reveals a link between technology-driven growth and inflation: countries with the highest productivity gains in the traded goods sector will also be the countries where the price of nontradables will increase the fastest. Hence, their inflation rate will be higher. This theory also suggests that the inflation rate will be systematically higher in lower-income countries than in higher-income countries, simply because the former are catching up with (thus growing faster than) the latter. But this is not the whole story.

Another important key to understanding inflation differentials, and the policy problems raised by them, is the way in which local economies in the Euro area can adjust to asymmetric demand and supply shocks *in the short run*. To clarify this point, suppose that a country or a region in the Euro area experiences a boom in the external demand for its products, and that this boom is regarded, at least in part, as *permanent*. Note that this is a positive and desirable macroeconomic scenario for the country, but in the short run it could produce overheating, pushing employment above the natural rate.

If prices and/or the exchange rate were flexible, an upsurge of demand would cause an immediate upward adjustment in relative prices – corresponding to an appreciation of the real exchange rate. By crowding out part of the boom in external demand, the real appreciation would reduce the risk of overheating for the domestic economy. However, without exchange rate flexibility, and with a limited degree of price flexibility, a real appreciation can only be obtained via a period of higher inflation relative to the rest of the euro zone.

Figure 4.3



How can we be sure that inflation differentials contribute to stabilising the economy? After all, for a given interest rate set by the ECB, higher inflation means a lower real interest rate and therefore additional stimulus to aggregate demand in the form of investment or consumption of durables. Clearly, lower interest rates do not “lean against the wind” of excessive demand – and, in the short run, may actually have some perverse effects. However, as the inflation differential persists, the level of domestic prices will keep rising, while the real interest rate will only respond to the anticipated rate of price increase. Over time, the *price level* effect will surely prevail over the *growth rate* effect as other European countries will not be willing to buy the nation’s products at any price!

Policymakers could, of course, avoid inflation differentials by resorting to an alternative adjustment mechanism – that is a contraction of domestic demand using the instrument of fiscal policy. If they decide to do so, higher demand from abroad would be matched by lower internal demand, reducing the need for a real appreciation. But why should a country give up, say, public goods and government spending on useful public infrastructure because foreigners increase their demand for its national output? Or, why should a country increase tax rates, discouraging private consumption, in the same circumstance? It is quite reasonable to let the market bring the system into a new equilibrium, with a higher domestic price level.

The above argument shows that inflation differentials can actually perform a useful role in a currency union, as a mechanism of adjustment to a new equilibrium with different long-run real exchange rates. The crucial question is, however, under what circumstances it will be wise to let inflation rates ‘diverge’.

The argument is sometimes made that inflation differentials as an adjustment mechanism are not appropriate if the original shock to demand is an internal investment or consumption boom. Since the origin of the excess demand is internal – so the argument goes – policy makers should not let it modify the external price of domestic products. The appropriate action is a fiscal contraction. Yet again, one may wonder why good investment opportunities in the country, or preferences for current over future consumption, should cause a country to give up public goods, and increase taxes.

The main point is that, different from the effects of a permanent surge of external demand, the real appreciation associated with a surge of current investment and consumption is likely to be temporary. Over time, a higher capital stock and external debt will induce the country to export more. To the extent that selling more goods abroad causes a fall in their prices, more exports will have a negative effect on the country’s terms of trade and depreciate the real exchange rate. With a common currency, the real exchange rate can only depreciate via a fall in prices and wages. Thus, if prices and wages increase in the short run, they must then fall in the long run.

The problem therefore lies not in the origin of the shock, but in plausible asymmetries in the speed and cost of adjustment in nominal prices and wages. It is well understood that nominal prices and wages go up easily when demand is high but come down with some difficulty when demand is low. If inflation differentials fuel demands for higher nominal wages, national policymakers may be concerned about the cost of reverse adjustment in the future. Downward nominal rigidities may cause quite a bit of macroeconomic distress.

Note that the problem is not specific to domestic (as opposed to external) demand booms. Temporary, as opposed to permanent, external demand shocks will raise the same concerns, as they have a small impact on the long-run exchange rate. Domestic demand policies leaning against the wind are therefore preferable to adjustment through inflation when the required adjustment in prices and wages is temporary, and there are downward nominal rigidities.

Which macroeconomic shocks require a permanent appreciation of the real exchange rate? Asymmetric permanent productivity shocks may be expected to have the same effect on the real exchange rate as the catching-up of low-income countries with high income-countries: in either case, in the long run, relative prices should move according to the BS hypothesis. Also, to the extent that the conversion rates of domestic currency into the euro set at the end of 1998 were ‘out of line’, we may expect some real exchange rate adjustment to long-run equilibrium across different regions of the union. But asymmetric demand shocks, asymmetric implications of aggregate shocks to the Euro area, and aggregate productivity shocks (common to both tradables and nontradables) *do*

*not* require a permanent appreciation of the real exchange rate.

Even for shocks that do so, it is extremely hard, in practice, to target the new equilibrium real exchange rate – i.e. to determine the right size of inflation differentials in the adjustment period. One should keep in mind that upward adjustment in prices – whether or not towards equilibrium – may *per se* trigger additional shocks to aggregate demand. For instance, a high increase in nontradable prices may be associated with a boom in real estate prices. As the value of domestic collateral is inflated, firms and households may expand their spending ‘excessively’, planting the seeds of future financial troubles.

Many countries in the Euro area have experienced overheating as recently as the year 2000. The list includes Greece, Spain, Ireland, Luxembourg, the Netherlands, Portugal and Finland. For some of these countries, a key factor driving demand close to or above the natural rate of output has been an extremely weak euro, boosting external demand. To the extent that prices and wages are rigid downward, national inflation rates above the Euro area average are hardly to be recommended in this case.

Inflation differentials could nonetheless play a much larger role in the life of EMU if policymakers could effectively promote price and wage flexibility. Under the realistic assumption that wages are less flexible downward than prices, incomes policies could be targeted at insulating medium and long-term wage movements from temporary inflation differentials. Workers may be granted temporary income supplements at times of booms – like a temporary tax cut. The same goal may be achieved by promoting a flexible wage structure with bonuses indexed to productivity.

Aggregate demand will, of course, be stimulated by such measures which fuel rather than reduce, the short-run inflation differential. But this is intentional, as it is supposed to speed up the required adjustment in prices. Moreover, some of these measures will increase the budget deficit, contrary to the view that fiscal authorities should always lean against the wind, and contract it at times of high demand. Yet again, the meaning of these fiscal measures (such as a temporary tax) is to reduce the incentive of workers to demand a permanent increase in nominal wages, while letting relative prices do the adjustment.

One may argue that such policy strategies are ‘risky’ – as the economy may end up with both fiscal expansion (adding to any initial fiscal imbalance) *and* higher nominal wages. But it is not clear that the risk of high wage demands is lower when the government pursues a fiscal contraction. As is well known, redirecting the budget process take time (so that the required fiscal contraction kicks in too late), and may create social tensions vis-à-vis raising prices.

The real alternative faced by European countries is therefore between frequent use of contractionary fiscal policy, aimed at preventing overheating of the economy, and policies promoting wage and price flexibility in order to reduce the long-run costs of inflation differentials. The importance of this issue can hardly be overstated.

## 6. Price Stability and Inflation Differentials

The role of wages and inflation differentials in the macroeconomic adjustment within the Euro area will acquire increasing importance over time. Misunderstanding the basics of the adjustment process could easily lead to severe mistakes and unnecessary pain.

A potentially important issue is suggested by the fact that the price stability objective of the ECB is a time-invariant and asymmetric range of average inflation in the Euro area – to be kept below 2 per cent in the medium run. Based on the Balassa-Samuelson effect and the observation of previous productivity and inflation trends at national levels, this average is likely to coincide with large differences in national inflation rates. As it will be impossible for the ECB to reach the target inflation rate in each country of the Euro area, European monetary authorities will have to accept a considerable amount of inflation in some countries if they want to avoid the risk of pushing the low-growth countries into deflation.

An alarming picture is depicted by Sinn and Reutter (2000), who predict that keeping average inflation below 2 per cent will imply national inflation rates as high as 3.5 per cent in fast growing countries like Finland and Ireland, but as low as 1 per cent in Germany where productivity growth and inflation are the lowest in Europe. Note that a mere 1 per cent headline inflation for Germany

would be well below the inflation rate that had previously been pursued by the Bundesbank.

Once measurement errors in prices due to quality improvements are taken into account, implementing Euro-area wide policies implying a 1% inflation rate in Germany could easily push this country to the verge of deflation. Given that deflation is harmful for a multitude of reasons, the ECB may want to avoid policies that create a bias towards it in (important) regions of the union. In light of the current diversity of European price and productivity levels, a 2 per cent upper bound on inflation may simply be too tight.

Even if convergence in the level of productivity will make the above argument less compelling in time, the possible inflation implications of asymmetric shocks call for wisdom in the application of the monetary strategy of the ECB. To the extent that they help the adjustment to shocks in the short run, temporary hikes in national inflation rates could be safely ignored when setting the monetary policy for the Euro area as a whole, without reducing the nominal anchor to keep headline inflation within the 2 per cent range.

Domestic authorities, however, should take extra care to prevent inflation differentials from feeding into changes in nominal wages and prices that tend to be inflexible downward. The ECB would definitely be concerned with this development, pointing to future troubles. Yet again, reform of the labour markets and income policies are at the core of macroeconomic stabilisation in the Euro area.

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