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# **Price Setting and Inflation Persistence: Some Policy Conclusions from a Central Bank's Perspective**

*Panel Discussion*

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## **1. Introduction**

The empirical findings on price stickiness and inflation persistence presented at the workshop “Price Setting and Inflation Persistence in Austria”, organised by the Oesterreichische Nationalbank (OeNB) in Vienna on 15 December 2005, raise a number of issues both for monetary and structural policies.

Prices were shown to be stickier in the euro area than in the United States. Most economists would agree that flexible prices are a desirable feature for an economy, since, for instance, sticky prices entail that after a demand shock deviations of an economy from potential output take longer. This notion is confirmed by the empirical observation of more pronounced output gap persistence in the euro area as compared to the U.S.A:

Structural reforms in the context of the Lisbon Agenda which enhance competition in goods and services markets make prices more flexible. Labour market reforms which make wages more flexible and, where still applicable, abolish wage indexation reduce inflation persistence. In short, structural reforms not only serve the aim of enhancing long-term potential growth but should also have beneficial consequences in terms of smoother business cycles.

This contribution to the panel discussion on policy conclusions focuses on two issues. First, it summarizes tentative conclusions for the euro area's monetary policy. Second, it performs a brief “benchmarking exercise”, comparing Inflation

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Persistence Network (IPN) findings for Austria with those for other euro area countries.

## 2. Some Tentative Policy Conclusions for the Euro Area

The rich research findings from the IPN will take some time to be grasped fully in the academic and policy discussion. A number of preliminary and tentative conclusions for the euro area's monetary and economic policies emerge, some of which with relevance for the definition of price stability, some for the optimal design of the monetary policy strategy, some for the ongoing implementation of monetary policy, some for structural policies in the context of the Lisbon Agenda. Bearing in mind the preliminary nature of any conclusions at the present juncture, eight issues are ventured here.

### *1. Micro Price-Setting Behaviour and the Optimal Inflation Rate*

The IPN research showed that price reductions are frequent and sizeable and that prices are frequently cut in response to low demand. The case for pursuing an inflation objective well above zero due to downward price rigidity is weakened by this finding. However, two important qualifications need to be born in mind: First, services prices in the euro area, which have a substantial weight in the consumer price basket, do show significant downward price rigidity. This may be due to various reasons.

For instance, it may simply reflect the higher service price inflation over the observation period, which would – almost by definition – reduce the number of price cuts in the service sector. It may also reflect the higher labour input content in services prices. Research conducted in the context, for example, of the International Wage Flexibility Network (see e.g. Stiglbauer, (2002), Dickens et al., forthcoming) shows that wages in the euro area do exhibit real and/or nominal downward rigidity. Thus, at least for the time being, downward nominal wage rigidity continues to provide a rationale for the central bank to pursue an inflation objective above zero. This is not to say that downward wage rigidities need to persist for all future. It is quite possible that a monetary regime of long-lasting and credible price stability, possibly combined with stiffened international competition in goods and labour markets, also changes wage setting.

### *2. Price Stickiness and Wage Rigidity*

This point about the link between price setting and wage setting is reinforced by research conducted in the context of the IPN. Survey results (Fabiani et al., 2005) and research on the New Keynesian Phillips Curve (Rumler, in this volume) have shown that input costs drive producer prices. In other words, “extrinsic inflation persistence” was found to be the main driving force for inflation persistence, while intrinsic persistence (dependence of inflation on its own past values) as well as

“expectational persistence” (arising from the formation of inflation expectations) were found to be of minor importance. Sectors with a high labour share were found to change prices less frequently than others. Also, the higher price flexibility found in the U.S.A. coincides with more flexible wages. Thus, increased wage flexibility in the euro area might be expected to support higher price flexibility, not least in the service sector.

### *3. Price Stickiness and Competition*

The IPN showed that the outlet type (hyper markets versus corner shops) influences the frequency of consumer price changes (Dhyne et al., 2005). It was also found that producer prices change more often in a more competitive environment; sectors more exposed to imports change prices more frequently (Vermeulen et al., 2005). Also, surveys confirmed that firms in more competitive sectors change prices more frequently (Fabiani et al., 2005). Thus, it could be expected that liberalisation and the opening up of markets should enhance price flexibility, both at the producer and retail levels, and particularly on services markets.

### *4. Sticky Prices, Inflation Persistence and Optimal Monetary Policy*

Sticky prices and inflation persistence have a bearing on the optimal design of monetary policy. If prices are sticky, inflation responds less to output gap variations. After shocks, relative prices take longer to adjust to a new equilibrium. Sticky prices also raise inflation persistence, as can be illustrated, for instance, with the New Keynesian Phillips Curve. Inflation variability is more costly if inflation persistence is high. It takes longer periods of negative output gaps to bring inflation back to target once it has risen. Thus, it can be argued that, to avoid the need for protracted periods of disinflation, in an economy with higher inflation persistence (which can, in turn, be the result of higher price rigidity), the central bank should put greater weight on inflation stabilisation (relative to output growth stabilisation) in its policy reaction function (Levin et al., (2005)).

### *5. Endogeneity of Inflation Persistence: Learning and Optimal Monetary Policy*

Under the assumption of rational expectations, inflation expectations do not by themselves contribute to inflation persistence. If, by contrast one assumes that agents have less-than-perfect information, e.g. about the structure of the economy or about the nature of shocks, their expectations may be formed through “learning”. This may lead to more persistent responses of inflation to shocks.

It also implies that the monetary policy regime, in particular the central bank’s inflation track record and its credibility to maintain price stability, can affect agents’ learning about inflation. Thus, monetary policy would itself influence price setting and inflation persistence, it becomes conditional on the successful

anchoring of inflation expectations and on any perceived risks of failure to do so (Gaspar et al., (2005a), (2005b)).

This has several implications. First, the relatively low inflation persistence measured for the euro area may be the result of a sustained track record of maintaining price stability, which has managed to anchor inflation expectations firmly in line with the ECB's definition of price stability. Second, one may argue that as long as inflation expectations are well anchored, stable and low, the central bank can take a "wait and see" attitude in the face of adverse supply shocks, in line with a "medium term perspective to price stability". However, inflation expectations can also become unanchored if "undesired learning" occurs: for instance, a series of supply shocks results in inflation exceeding the target for an extended period of time; or, second-round effects at the wage front perpetuate a rise in inflation; or, a change in the institutional set-up within which the central bank operates raises inflation expectations. To prevent such undesired learning, the central bank may have to raise interest rates substantially and for a sustained period.

#### *6. Monetary Policy under Inflation Persistence Uncertainty*

Estimates of inflation persistence are highly uncertain (see also table 1 below). They depend heavily on estimation methods (see e.g. Robalo Marques, (2004)), inflation measures and price samples (e.g. time periods covered; including or excluding sales prices), and are surrounded by sizeable confidence bands.

Given this uncertainty, one may argue (Moessner, (2005)) that a robust monetary policy should rather err on the side of higher inflation persistence: If the monetary policy maker overestimates inflation persistence, the economy adjusts flexibly to the mistaken monetary policy. This error would thus imply a relatively low welfare loss. If, by contrast, the central bank underestimates inflation persistence, it will take rather long for inflation to return to its target value, implying a comparatively higher welfare loss.

#### *7. What if Price Stickiness Differs across Countries/Sectors?*

Empirical findings from the inflation persistence network have shown that inflation persistence differs considerably between sectors, and also (albeit less so) between euro area countries. Non-processed food and energy prices are little persistent, while services and industrial goods prices are highly persistent.

The argument has been made (see e.g. Goodfriend et al., (1997)) that in this case, monetary policy should place greater weight on developments in the sectors or countries with more rigid prices, since these sectors or countries bear higher welfare costs during their (slower) adjustment to shocks. This argument can be extended to justify the use of core inflation measures rather than headline inflation as the central bank's measure for the price stability objective.

There are a number of counterarguments, though: First, it would by no means be straightforward which sectors or countries should be excluded, when measuring inflation for monetary policy purposes. How should the central banks in practice derive such alternative weights? Second, from a utility maximization perspective, consumers care about overall inflation, rather than some truncated or partial measure of inflation. Third, accommodating those sectors or countries with more rigid prices would perpetuate behavioural and structural inefficiencies by discouraging reforms which facilitate market-based adjustment to shocks.

Still, this discussion emphasizes that it is important for a central bank to use sectoral and regional information to better interpret shocks and forecast inflation and to design appropriate policy responses.

#### *8. Euro Area versus U.S.A.: Different Price Stickiness – Different Monetary Policy?*

It is a commonly held view that over the past decade U.S. monetary policy has been more “activist” than the euro area’s monetary policy. In the first place, one should not exaggerate such differences. Estimated Taylor rules for the euro area and the U.S.A., arrive at highly ambiguous results. Second, to the extent that there are such differences, the above findings and arguments can be useful to understand their rationale. The higher price stickiness in the euro area as compared to the U.S.A. implies that inflation responds less to changes in real marginal cost and in the output gap. Taking the example of cost push shocks, which were very prominent over past years, this has two consequences. On the one hand, food and oil price increases should have less of an impact on euro area inflation than on U.S. inflation. According to the above line of arguments, the higher price rigidity should allow the Eurosystem to “see through” temporary increases in inflation beyond the definition of price stability. This conclusion from theory is indeed mirrored both in the Eurosystem’s medium-term oriented monetary policy strategy and in its actual monetary policy so far. On the other hand, the higher price rigidity implies that deviations from the inflation objective, once they happen, are more costly to control in the euro area. Thus, the Eurosystem should put greater weight on maintaining price stability vis-à-vis output stabilisation. The Maastricht Treaty’s clear primacy of price stability as opposed to the multiple objective mandate of the U.S. Fed reflects this prescription.

### **3. Benchmarking Austria**

A major benefit from the joint and coordinated research effort of the IPN is that (to a large degree) comparable data on price setting were compiled and made accessible. Out of the many “benchmarking” exercises one could undertake between Austria and other euro area countries, four issues which seem particularly interesting are highlighted here.

### 1. Inflation Persistence in Austria is Comparatively High

While estimates for inflation persistence from various studies differ widely (which illustrates the point about inflation persistence uncertainty made above), all studies have in common that Austria ranges among the three countries with the highest inflation persistence (table 1). The reasons for this higher persistence are unclear at this stage; possible explanations might be fewer price shocks or smaller price effects of given shocks. Whatever the reasons for the higher inflation persistence in Austria are, monetary and incomes policies aiming at containing inflation seem to be particularly called for in Austria. The wage moderation pursued over recent years fits this recommendation well.

Table 1: Estimated Inflation Persistence in Euro Area Countries

Country	NKPC – $\gamma$		Reduced form – $\rho$		
	Rumler	Gadzinski & Orlandi	Cecchetti & Debelle	Lünnemann & Mathä	
BE	0.46	<b>0.32</b>	<b>-0.11</b>	<b>-0.33</b>	
DE	0.43	0.82	<b>-0.34</b>	<b>-0.16</b>	
GR	0.42	0.82		<b>0.51</b>	
ES	0.45	0.93	<b>0.23</b>	<b>-0.50</b>	
FR	0.40	0.54	<b>0.25</b>	0.49	
IE		0.79		<b>0.38</b>	
IT	0.67	<b>0.58</b>	<b>0.45</b>	<b>0.23</b>	
LU		<b>0.47</b>	<b>-0.62</b>	<b>-0.17</b>	
NL	0.30	<b>0.44</b>	<b>-0.02</b>	<b>0.28</b>	
<b>AT</b>	<b>0.54</b>	<b>1.03</b>	<b>0.33</b>	<b>0.43</b>	
PT		<b>0.49</b>	<b>0.45</b>	<b>0.31</b>	
FI	0.45	<b>0.47</b>	<b>0.30</b>	<b>0.07</b>	
Euro Area	0.49				

Rumler: inflation persistence is the parameter  $\gamma$  in the backward-looking term of a New Keynesian Phillips Curve; period covered: 1970:I-1998:IV. In all other estimates the parameter  $\rho$  serves as measure for reduced-form estimates of inflation persistence; figures for  $\rho$  in bold indicate that it is possible to reject statistically that  $\rho=1$ . Periods covered: Gadzinski & Orlandi (2004) 1984:I-2003:III; Cecchetti & Debelle (2005): data starts in 1990. Lünnemann & Mathä (2004): 1995-2003:12.

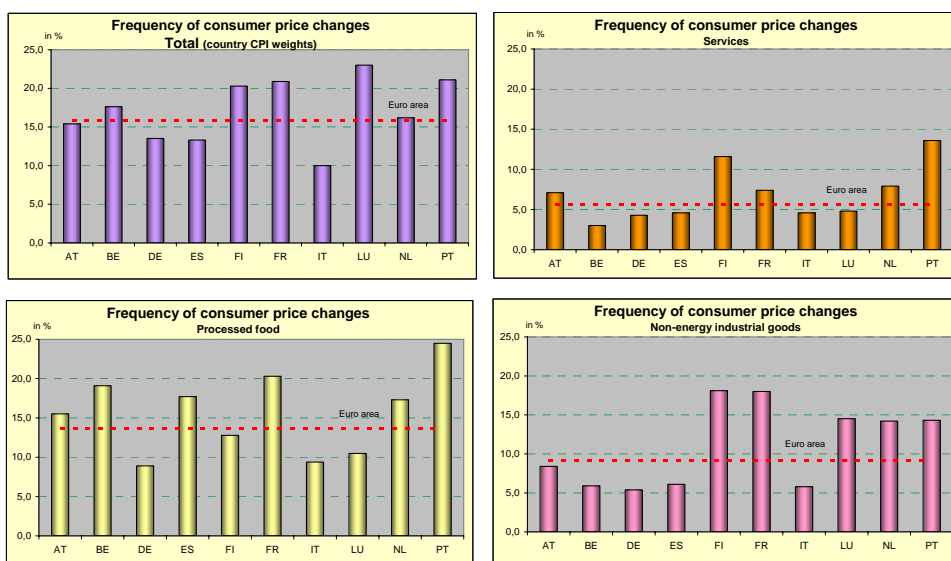
Source: Rumler (in this volume), Gadzinski et al. (2004), Cecchetti et al. (2005), Lünnemann et al. (2004).

## 2. Price Flexibility in Austria is Intermediate

The frequency of consumer price changes varies considerably across euro area countries (chart 1). Austria is very close to the euro area averages in terms of price flexibility of the total CPI. Prices for processed food and for services are changed slightly more frequently in Austria than in the euro area on average, while those for non-energy industrial goods are adjusted slightly less frequently. As in most other euro area countries, service prices are by far the most rigid, which may reflect, inter alia, the continued weaker exposure to (domestic and foreign) competition.

This intermediate price flexibility may be seen to be somewhat at odds with the high degree of inflation persistence described above. A tentative explanation might be that while individual prices are rather flexible, aggregate inflation moves rather little, reflecting the long-standing track record of a stability oriented monetary policy regime pursued under the hard currency policy (see, e.g. Gnan, (2005)).

Chart 1: Frequency of Consumer Price Changes in Euro Area Countries



Source: Dhyne et al. (2005).

## 3. Price Decreases in Austria Are More Frequent than in Other Euro Area Countries.

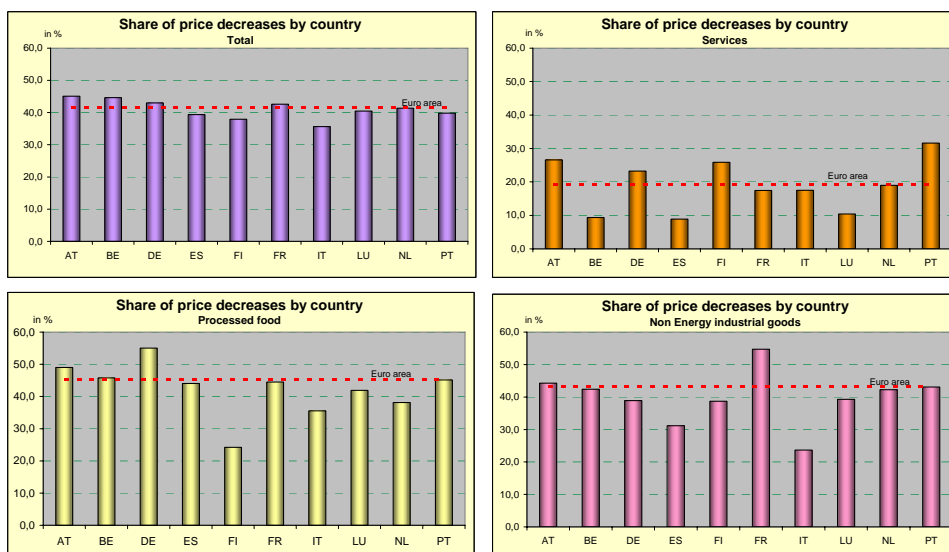
Interestingly, price cuts make up a larger share of total price changes in Austria than on average in the euro area (chart 2). The difference is most pronounced for services prices, where Austria ranges second, after Portugal, in terms of the share of price cuts in total price changes, and seven percentage points or one third above



the euro area average. This result is surprising and at odds with general public perceptions about service price inflation, particularly in the wake of the changeover to euro banknotes and coins. The result should be treated with caution, since it conceals strong heterogeneity of price developments within the service sector. Tentative explanations are seasonal price effects in tourism.

Also for processed food and non-energy industrial goods Austria ranks second, after Germany and France, respectively, although the difference to the euro area average is less pronounced in these sectors. Findings by Fabiani et al. (2005) suggest that price cuts are more strongly motivated in Austria by competitors' prices or by situations of falling demand for firms with a high export share.

*Chart 2: Share of Price Decreases in Euro Area Countries*



Source: Dhyne et al. (2005).

#### 4. Austrian Firms Have Pricing Motives Similar to the Average of Other Euro Area Countries

Surveys conducted at euro area firms reveal a very high similarity of the motives for pricing decisions of firms across euro area countries (table 2). While results for Austria are rather similar to the euro area average, some minor divergencies from the average might be noted. Implicit contracts (i.e. long-established customer relations) and explicit contracts appear to be slightly more important in Austria. By contrast, temporary shocks were seen as less important than by other euro area firms.

*Table 2: Importance of Theories Explaining Price Stickiness (Mean Scores)*

	BE	DE	ES	FR	IT	LU	NL	AT	PT	<b>Euro area (1)</b>	U.S.	SW	GB	CA (2)
Implicit contracts	2.5		2.6	2.2		2.7	2.7	<b>3.0</b>	3.1	<b>2.7</b>	4	1	5	2/7
Explicit contracts	2.4	2.4	2.3	2.7	2.6	2.8	2.5	<b>3.0</b>	2.6	<b>2.6</b>	5	3	1	3
Cost-based pricing	2.4			2.5		2.7		<b>2.6</b>	2.7	<b>2.6</b>	2	2	2	1
Coordination failure	2.2	2.2	2.4	3.0	2.6	2.1	2.2	<b>2.3</b>	2.8	<b>2.4</b>	1	4	3	5/8
Judging quality by price	1.9		1.8			2.2	2.4	<b>1.9</b>	2.3	<b>2.1</b>	12		10	
Temporary shocks	1.8	1.9	1.8	2.1	2.0	1.7	2.4	<b>1.5</b>	2.5	<b>2.0</b>				
Change non-price factors	1.7		1.3			1.9	1.9	<b>1.7</b>		<b>1.7</b>	3		8	4
Menu costs	1.5	1.4	1.4	1.4	1.6	1.8	1.7	<b>1.5</b>	1.9	<b>1.6</b>	6	11	11	10
Costly information	1.6		1.3			1.8		<b>1.6</b>	1.7	<b>1.6</b>		13		10
Pricing thresholds	1.7		1.5	1.6	1.4	1.8	1.8	<b>1.3</b>	1.8	<b>1.6</b>	8	7	4	

Notes: (1) Unweighted average of countries' scores. Columns 11 to 14 report the ranking of the theories in Blinder et al. (1998), Apel et al. (2005), Hall et al. (1997) and Amirault et al. (2004), respectively. - (2) In the column for Canada, two figures are reported for the implicit contracts and coordination failure theories, because in the Canadian questionnaire there are two different statements related to these theories.

Source: Fabiani et al. (2005).

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