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On December 15, 2005, the Oesterreichische Nationalbank (OeNB) held a workshop on “Price Setting and Inflation Persistence in Austria.” The aim of this workshop was to discuss the OeNB’s recent research results in the field of price dynamics and inflation¹ with policymakers and the scientific community. The papers presented at the workshop analyzed the price formation process and the determinants of inflation persistence in Austria from different perspectives and on the basis of various data sources. The first session addressed the degree and determinants of price rigidities at the micro level. Session 2 provided an analysis of inflation persistence in Austria at the aggregate and sector levels, while session 3 dealt with Austrian consumers’ inflation perceptions. A policy panel discussion concluded the workshop.

JEL classification: D40, E31

Keywords: price rigidity, price setting, price perception.

In his introductory statement, Ernest Gnan (OeNB) presented a paper co-authored with Jesús Crespo Cuaresma. He argued that empirical studies of price stickiness and inflation persistence can be useful for monetary policy design and implementation, for designing structural policies which facilitate shock absorption by euro area economies, and for achieving better-informed inflation and growth forecasts. Summarizing findings from the Inflation Persistence Network (IPN), he argued, inter alia, that inflation persistence in the euro area fell to moderate levels in the course of the 1990s – similarly as in the United States. Inflation persistence is mostly driven by wages and other input prices. Prices are stickier in the euro area than in the U.S.A., but there is no evidence of general downward consumer price rigidity in the euro area, with the exception of the service sector. According to Gnan, heterogeneity in the frequency of consumer price changes across products is more relevant than across countries. Perceived inflation should be taken seriously by monetary policymakers for two reasons: First, public satisfaction (or discontent) with the central bank’s performance hinges on perceptions of –

rather than facts about – its credibility as a guardian of price stability. Second, inflation expectations are likely to be influenced by perceived inflation, rather than official current or past inflation rates. Inflation perceptions are thus also likely to influence wages and actual inflation as well as sacrifice ratios. Within the past 200 years, there was never a time in Austria when inflation reached levels persistently and significantly different from zero until the 1960s.

In the first session, which dealt with microdata, Alfred Stiglbauer (OeNB) presented a paper co-authored with Josef Baumgartner (WIFO), Ernst Glatzer and Fabio Rumler (OeNB). The paper analyzed stylized facts on price changes in Austria based on individual price records collected for the Austrian CPI. On average, consumer prices in Austria are constant for 11 to 14 months with strong heterogeneity across sectors and products. Prices for energy products and unprocessed food change more often than e.g. service prices. Stiglbauer further argued that price increases occur slightly more often than price decreases, the average size of price increases being 11% and that of price decreases 15%. The probability of a

¹ Most of the papers presented at the workshop were prepared in the context of the Eurosystem Inflation Persistence Network, a research network with participating researchers from euro area NCBS and the ECB which was established to study the patterns and determinants of inflation persistence in euro area countries.

price change increases, the longer a price quote has been unchanged and the higher the inflation rate in the relevant product category has been since the last price change. In his discussion, *Johannes Hoffmann (Deutsche Bundesbank)* referred to evidence which indicates that shops with greater price variability also show higher prices. Thus, more frequent price adjustments need as such not necessarily be preferable. He emphasized that studies on price-setting behavior should differentiate between regular and temporary price changes, as done in the presented paper.

In his joint work with Jerzy Konieczny (Wilfrid Laurier University, Ontario), *Fabio Rumler (OeNB)* investigated why decision-makers choose to act on a “time-regular” basis (e.g. adjust every six weeks, etc.) or on a “level-regular” basis (e.g. change interest rates by 25 basis points, etc.), even though such behavior appears sub-optimal. In their paper the authors attribute time-regular and level-regular behavior to adjustment cost heterogeneity. They show that, given cost heterogeneity, the likelihood of adopting time- or level-regular policies depends on the shape of the benefit function: the flatter it is, the more likely is regular adjustment. The empirical results provide strong support for the model: the lower the conditional frequency of price changes is in a given market, the higher is the incidence of time- and state-regular adjustment.

Claudia Kwapil (OeNB) presented a paper co-authored with Josef Baumgartner (WIFO) and Johann Scharler (OeNB) which analyzes the price-setting behavior of Austrian firms based on survey evidence. The paper’s main result is that long-term customer relationships are a major source of price

stickiness in Austria. Companies refrain from price adjustments (especially in response to demand shocks) because they do not want to jeopardize their customer relationships. Kwapil furthermore presented evidence suggesting that the price response to various shocks is subject to asymmetries. In his discussion of the above paper *Thomas Mathä (Banque centrale du Luxembourg)* compared the Austrian results with those from other euro area countries and pointed out several more questions worth investigating.

In the second session, which dealt with inflation persistence on the sectoral and macroeconomic levels, *Josef Baumgartner (WIFO)* presented univariate autoregressive (AR) models in which the sum of the AR coefficients provides a measure of inflation persistence. He produced evidence for three structural breaks (in the mid-seventies, mid-eighties and mid-nineties) in the inflation process in Austria. If these structural breaks are taken into account, persistence measures decrease sharply. Baumgartner also investigated the influence of the data frequency, the treatment of seasonality, the estimation methods and the aggregation level of the CPI on both the evidence of structural breaks and the degree of inflation persistence. In his comments on Baumgartner’s presentation, *Markus Knell (OeNB)* emphasized the careful treatment of seasonal adjustment in the paper. Most other papers neglect this topic, although it can have an essential impact on results (as shown in the above paper). Moreover, he judged the univariate approach applied in the paper as a reasonable and useful instrument for gaining a first impression of the main properties of inflation and price index data. He added, however, that the estimates of the persistence parameter can be

biased because of the stickiness of real shocks in the economy. A multivariate approach could take care of this problem.

Fabio Rumler (OeNB) analyzed price stickiness at the macroeconomic level within the framework of an open-economy New Keynesian Phillips Curve (NKPC) model. He extended the existing literature by incorporating three different factors of production (domestic labor, imported and domestically produced intermediate goods) into a general NKPC model. According to his results, structural price rigidity is systematically lower in an open-economy specification than in a closed-economy version. This indicates that, when firms face more variable input costs, they tend to adjust their prices more frequently. However, when the model is estimated in its general specification including domestic intermediate inputs, price rigidity increases again compared to the open-economy specification without domestic intermediate inputs. In his discussion of Rumler's presentation, *Johann Scharler (OeNB)* compared the estimates of the model's structural parameters with estimates frequently found in the literature and questioned whether the differences matter economically. He argued that the different values for the parameters do not matter much for the response of the output gap to a monetary shock. However, depending on the specification used, the effect on inflation can change significantly.

In the third session *Helmut Stix (OeNB)* presented a study co-authored with Manfred Fluch (OeNB) on the discrepancy between actual inflation and the inflation perceived by the general public around the time of the euro cash changeover. Stix argued that this discrepancy can in part be attributed to

the fact that people's perception of inflation seemed to be based mainly on the prices of frequently purchased goods, which rose faster after the cash changeover than those of other goods. Furthermore, consumers perceive price increases more strongly than price reductions. This perception seems to have been reinforced by the fact that consumers expected prices to rise as a result of the euro cash changeover and that they used outdated schilling reference prices when comparing prices in euro. Thus, perceived inflation proved to be unexpectedly persistent: It was not before the beginning of 2005 that the gap between perceived inflation and actual inflation was more or less closed. *Erich Kirchler (University of Vienna)* argued that the lower nominal euro values (in all EMU Member States except Ireland) may have made products appear cheaper because of the low nominal values. Furthermore, the difference between cheap and expensive products may have seemed smaller and, therefore, the more expensive product was chosen more easily. Consumers, however, did not attribute this behavior to their own spending habits but externalized it and blamed it on the euro.

In the concluding panel discussion representatives of Austrian research institutions and social partner organizations offered their reading of the findings presented at the workshop. *Karl Aiginger (Austrian Institute of Economic Research)* discussed some implications of the results for competition and structural policy. He emphasized that frequent price changes have both advantages and disadvantages. Price changes increase the uncertainty under which economic decisions are made, and uncertainty can reduce consumption and investment. On the other hand, price changes are important sig-

nals of changes in costs and productivity. Weighing the advantages and disadvantages of price flexibility, he argued that more frequent price changes than are currently observed in Austria would be beneficial, as, first, the average frequency of price changes – now once per year – is truly the minimum and as, second, price changes that become necessary after long periods of rigidity are relatively large. Companies' hesitation to adjust prices rapidly to changing cost or demand conditions reflects a lack of aggressiveness in seeking market opportunities. Moreover, as evidence shows, it is far more common among Austrian and European firms to react to cost developments than to take advantage of variations in demand. Therefore, Aiginger concluded, structural adjustments are delayed and innovations are less profitable than in the United States.

Günther Chaloupek (Austrian Chamber of Labour) argued that inflation persistence has decreased substantially since the first and second oil price shocks. This means that no or almost no second-round effects, which tend to prolong or even intensify the original inflation impulse, are to be expected. From his viewpoint, this suggests that the latest inflation developments should be watched calmly and that the ECB should not further increase interest rates. Chaloupek also pointed out that he doubts the neo-classical orthodoxy which states that perfect (upward and in particular downward) price flexibility is optimal under all circumstances. He cited Keynes who argued that falling prices can have serious negative consequences for companies and consumers. Therefore, Chaloupek suggested to devote more research effort to the problem of deflation. These efforts should, in particular, focus on deter-

mining the level of low inflation at which deflationary developments start to occur at the micro level (i.e. for individual firms).

Harald Kaszanits (Austrian Federal Economic Chamber) pointed out that, in Austria, prices are particularly sticky in the services, healthcare and education sectors, i.e. those sectors which are largely administered by public authorities. In order to induce more price flexibility in these sectors, he proposed to further liberalize and deregulate these markets by opening them up to private entrepreneurs and/or by encouraging public-private partnerships. Regarding the role of wages in the determination of prices, Kaszanits argued that wages usually increase at regular intervals and decrease only very rarely, which induces downward rigidity of prices in labor-intensive sectors such as services. To allow more (downward) price flexibility in these sectors he suggested to carry out labor market reforms aiming at more flexible payment schemes; he also emphasized the importance of wage restraints for favorable inflation developments.

Martin Zagler (Vienna University of Economics and Business Administration and European University Institute Florence) emphasized that the finding that there is downward flexibility in prices implies that there are no mechanisms to prevent a majority of prices to fall, and therefore to prevent periods of deflation. According to Zagler, monetary policy needs to react to this insight by also introducing a lower bound for inflation in its price stability objective. In this context, he interpreted the adjustment of the ECB's definition of price stability in 2003 – which before had been “below 2%” and now reads “below, but close to, 2%” – as an important policy change designed

to prevent periods of deflation. In Zagler's view the finding that prices react differently to cost and demand shocks requires a reassessment of monetary policy. For instance, in the case of a positive supply shock as triggered by the new economy and downward sticky prices, there would be ample scope for expansionary monetary policy. In the case of a business cycle upturn (which would represent a positive demand shock), prices – according to the research findings – should not react immediately to improved demand conditions and, thus, monetary policy could be accommodative without the danger of increasing inflation.

Ernest Gnan (OeNB) argued that structural reforms which enhance price flexibility and reduce inflation persistence not only serve the aim of enhancing long-term potential growth but may also have beneficial consequences in terms of smoother business cycles. Research findings which show that prices are frequently cut, particu-

larly in response to low demand, weaken the case for pursuing an inflation objective well above zero due to downward price rigidity. However, significant service price and wage downward rigidities are important qualifications. Increased wage flexibility and stronger competition in the euro area would support higher price flexibility, not least in the service sector. As inflation variability is more costly if inflation persistence is high, central banks should put greater weight on inflation stabilization in economies with higher inflation persistence. A central bank's inflation track record can itself influence price setting and inflation persistence. In the light of uncertainty about the degree of inflation persistence, robust monetary policy should rather err on the side of higher inflation persistence. Turning to Austria, Gnan summarized that inflation persistence is relatively high, that price flexibility is intermediate and that the frequency of price decreases in Austria is above the euro area average.