# HAS PRICE FLEXIBILITY CHANGED?

During the 1990s, growth in many industrialised countries was unusually high and inflation unusually low. This has been taken to indicate that the relationship between demand and inflation changed.<sup>13</sup> In that monetary policy's impact on inflation is channelled to a high degree through the effect of interest rates on demand, such a change may be relevant for the formation of monetary policy.

In the past decade the average rate of inflation in the OECD area moved down by around five percentage points and is currently about two per cent. To a large extent this was a consequence of price stability being enshrined as one of economic policy's primary objectives. Economic models incorporating nominal rigidities show that a lower rate of inflation normally leads to an increased degree of price rigidity. Under such circumstances, moreover, the duration of contracts may become longer because there is less need or reason for firms to adjust prices.<sup>14</sup> It is therefore reasonable to suppose that in the past decade price flexibility has decreased. This hypothesis is studied here by calculating the time it takes for prices to adapt to a nominal change. Decreased price flexibility means that nominal changes have larger short-run effects on the real economy.

The nominal change can be decomposed into a price and a quantity component. The method also makes it possible to investigate whether or not the degree of price flexibility has changed in the past decade. The calculations follow Gordon (1981).<sup>15</sup> The estimated equation is:

$$\Delta \pi_{\tau} = \alpha_0 + \sum_{i=0}^{N} \alpha_i \Delta \hat{y}_{t-i} + \varepsilon_t ,$$

where  $\alpha_0$  is a constant,  $\Delta y_{i,i}$  is the nominal shock, defined as the difference between the nominal and the potential GDP growth rate,  $\varepsilon_i$  is a random term and  $\alpha_i$  represents the extent to which the shock affects inflation. By including a number (n=8) of lagged nominal shocks, the equation also measures the time required for complete price adjustment. From the definition of the nominal shock it follows that the output gap is

<sup>13</sup> See Inflation Report 1999:3, box on pp. 52-55.

<sup>14</sup> Cf. also the box on pp. 17-21 in this issue.

<sup>15</sup> Gordon, R.J. (1981), Output fluctuations and gradual price adjustment, J. of Economic Literature, 19, pp. 493-530.

 $(1-\sum_{i=0}^{N} \alpha_i) \Delta \hat{y}$ . In the long run the output gap is zero, which in the equation above implies that  $\sum_{i=0}^{N} \alpha_i = 1$ , which corresponds to a vertical Phillips curve. Potential GDP is estimated with the HP filter technique.

## EMPIRICAL RESULTS

The study comprised the following countries: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States in the periods 1963-89 and 1990-99. The results of a calculation that includes all these countries are shown in Table B4.

#### Table B4. Price adjustment coefficients

Period	Adjustment after 1 year	Accumulated adjustment after 2 years
1963–89	0.87 (0.03)	1.00 (0.02)
1990–99	0.55 (0.05)	0.92 (0.04)

Note. The table shows the means for 17 countries (1=full price adjustment); the figures in parentheses are the standard error.

The table shows the proportion of the nominal changes that affects prices after one and two years, respectively. In the earlier period the adjustment after one year is 87 per cent as against only 55 per cent in the later period, a difference of 32 percentage points. It follows that in the earlier period the effect of the nominal change on real GDP (measured as the deviation from potential GDP) amounts to 13 per cent in the year one. After two years GDP has returned to its equilibrium level, which implies full adjustment. During the lowinflation regime, on the other hand, full adjustment has not been achieved after two years; about 92 per cent of the shock has shown up in higher prices, leaving 8 per cent as a continued effect on the real economy. A statistical test rejects the hypothesis that the degree of price adjustment, measured in this way, after one year is the same in both periods.

Corresponding calculations were made for individual countries. The results showed that, measured in this way, prices in most countries have become more rigid but that countries differ both in the degree of price flexibility and in the extent to which this has changed between the two periods. In most cases the difference between the periods is statistically significant.

## RELATIONSHIP BETWEEN PRICE FLEXIBILITY AND INFLATION

The calculations suggest that the change from high to low inflation has decreased the degree of price flexibility. In order to bring out the link between the degree of price flexibility and inflation, a calculation was done where the degree of price flexibility in each country and period is dependent on the rate of inflation in the same country and period. The results indicate that a one percentage point reduction in the rate of inflation curtails the degree of price adjustment in year 1 by about five percentage points. In other words, lowering the rate of inflation by five percentage points would retard the price adjustment in year 1 by around 25 percentage points, that is, the price adjustment after a nominal shock would be markedly more protracted.

### CONCLUSIONS

The results suggest that prices have become more rigid. This may be due to more stable and lower inflation expectations on account of the monetary policy realignment. The lower inflation may have made longterm contracts more attractive and price adjustments less rewarding for the firm. Support for this is to be found, for example, in the study reported in the box on pp. 17-21 in this issue as well as in tendencies for the duration of labour market contracts to lengthen. The results of the study must be interpreted with great caution because one cannot tell for certain whether it really is just the lower inflation that lies behind the increased price rigidity.