Price-setting behaviour in Germany

A market economy is based, to a great extent, on an efficient pricing system. Prices should indicate relative shortages and thus guide resources to their best use. In order to perform this key function, the relative prices have to be sufficiently flexible. Otherwise, the wrong signals would be sent. Price rigidities reinforce cyclical problems if prices fail to respond and bring macroeconomically undesirable quantity adjustments in their wake. Finally, prices that have little flexibility may lead to inflation persistence, thus making the job of monetary policymakers more difficult.

Owing to the importance of a well-functioning pricing system for the development of the economy as a whole, the Eurosystem central banks made an in-depth study of price flexibility and inflation persistence in a joint research project. In its November 2005 *Monthly Bulletin*, the European Central Bank reported on the results for the euro area.[1] Major findings for Germany, some of which are based on new micro datasets, are presented in this article.

Bundesbank's contributions to the IPN

The Bundesbank contributed four empirical studies to the work of the Eurosystem's Inflation Persistence Network (IPN). At the level of (industrial) producer prices, (anonymised) microdata from the Ifo business survey for

1 European Central Bank, Price-setting behaviour in the euro area, Monthly Bulletin, November 2005, pp 63 – 74.

the period from January 1980 to November 2001 were analysed. In addition, the Ifo Institute, on behalf of the Bundesbank, conducted a one-off survey among the enterprises taking part in the business survey concerning their price-setting behaviour. Furthermore, (anonymised) individual price data from the producer price statistics of the Federal Statistical Office were analysed for the period from January 1997 to January 2003. In addition to industrial producer prices, which were the main focus of the contribution made by the Bundesbank, price formation at the consumer level was investigated. Here, (anonymised) micro price data for 52 selected products, which may be regarded as adequately representative of the overall basket of goods, were available for the period from 1998 to 2003. The relevant studies have been or will be published as Bundesbank discussion papers.[2]

The studies have a dual purpose. Firstly, statistical data on price-setting behaviour in Germany is presented for the first time in this breadth. Secondly, an attempt is made to explain the price-setting behaviour of the producers and of the retail trade.

How often and how much are prices changed?

Frequency of price changes

In Germany, one in four prices is changed on average each month at the industrial producer level. At the consumer level, one in ten prices is changed.[3] Nevertheless, these averages conceal major differences. Typically, both producer and consumer prices of refined petroleum products change at least once a month.[4] Much the same applies to some fresh food products.[5] By contrast, prices of other goods are adjusted less often. New prices are encountered relatively often in the case of processed food and intermediate products but less frequently in the case of durable goods. This is as true of the respective producer prices as it is of the consumer prices. Changes in the prices of services, data for which are available only at the consumer level, are even rarer. This includes housing rents, which are adjusted only at very large time intervals.[6]

Direction of price changes

Remarkably, prices are reduced almost as often as they are increased. Price reductions

2 H Stahl (2005), Time-dependent or state-dependent price setting? Micro evidence from German metal-working industries, Deutsche Bundesbank Discussion Paper Series 1: Economic Studies, No 25/2005 and H Stahl, Price setting in German manufacturing: new evidence from new survey data, Deutsche Bundesbank Discussion Paper Series 1, Economic Studies No 43/2005. Forthcoming Deutsche Bundesbank discussion papers are H Stahl, Producer price adjustment at the micro level: evidence from individual price records underlying the German PPI; J Hoffmann and J-R Kurz-Kim, Consumer price adjustment under the microscope: Germany in a period of low inflation.

3 To obtain these mean values, the frequency of price changes was calculated as an average of their importance in domestic industrial sales and private consumption respectively. An unchanged housing rent is therefore included in the average with a far greater weight than, say, a change in the price of bananas. Product changes accompanied by a (quality-adjusted) change in price, such as the changeover from summer to winter fashions, are treated as "pure" price changes.

4 In both the producer and consumer price statistics, prices are recorded only once a month. These sources therefore contain no information on how often prices have changed within a given month.

5 In the breakdown into unprocessed and processed food, fruit and vegetables as well as fish and meat – irrespective of whether they are processed or not – are assigned to the category of unprocessed food. This category therefore shows a noticeably lower figure.

6 The results for housing rents are possibly biased downwards somewhat owing to the fact that the consumer price statistics sample includes a very large number of long-term rent contracts.

are thus by no means the exception and are, in fact, nearly as widespread as price rises. This applies especially to unprocessed food and to energy. In the case of services, however, and – albeit to a less marked extent – durable consumer goods, price increases are more prevalent – with the exception of products such as hi-fi equipment or television sets, which show a trend fall in prices. For these products, one price reduction is often followed by another. In certain product categories, prices are often lowered for special offers or end-of-season sales and then quickly raised again.

Scale of price changes

If prices are changed, they are normally changed substantially. As a rule, there are not many "small" changes but there are some very large ones. On average, producer prices are raised or lowered by 3½% at each step. The corresponding figure for consumer prices is no less than 9%.[7] A typical rise in the overall index of consumer prices (of approximately 0.1%) is therefore composed of a relatively small number of substantial changes (for 6½% of goods, prices are raised by 8½% on average, and for 4½% of goods, prices are lowered by 10% on average).[8] The scale of individual price adjustments thus stands in striking contrast to the level of the typical monthly overall rate of inflation. This applies – with qualifications – to producer prices as well.

Timing of price adjustments

The timing of price adjustments shows that price-setting behaviour is characterised by noticeable regularities at both the producer and consumer levels. Often, prices are changed precisely once every 12, 24 or 36 months. What is also striking is a concentration of price changes at the start of the year. This is found to be the case mainly for enterprises that do not adjust their prices so often. Other enterprises change their prices only for special reasons. In the period under observation, this is true of the increase in value added tax in April 1998 and – far more significantly – the conversion of prices in late 2001/early 2002 in connection with the changeover from Deutsche Mark to euro banknotes and coins. Prices were increased – but also lowered – in many cases. At the

Frequency of price changes *

Changed prices as a percentage of the monthly price reports

Item	Price changes	Price increases	Price cuts
Producer prices	23.0	12.3	10.7
Refined petroleum products	94.2	46.6	47.6
Processed food	26.1	13.8	12.3
Consumer goods (excluding processed food)	15.3	8.6	6.7
Durable goods	9.0	7.0	2.1
Inputs	26.6	13.8	12.8
Capital goods	10.0	5.6	4.4
Consumer prices	10.8	6.3	4.5
Energy	58.0	32.1	25.9
Refined petroleum products	91.2	48.9	42.3
Electricity, gas	11.8	8.8	2.9
Unprocessed food	29.1	15.3	13.9
Processed food	10.2	5.1	5.1
Industrial goods (excluding energy)	7.1	4.1	3.0
Services	3.4	2.7	0.7
excluding housing rents	4.8	3.6	1.2
Housing rents	1.8	1.5	0.2
Consumer prices excluding housing rents	13.5	7.7	5.8

* Weighted mean values. Calculations based on raw data of the Federal Statistical Office. Industrial producer prices, NACE 15 to 36, February 1997 to January 2003. Consumer prices for 52 selected products, February 1998 to January 2004.

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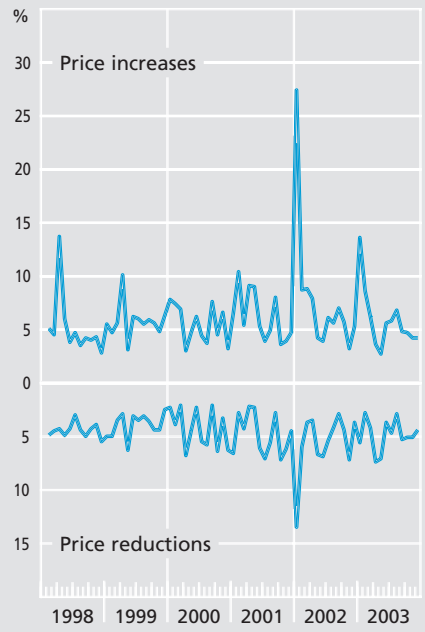
7 These arithmetical averages are biased upwards by some very large price changes. The median as a measure of the typical scale of a price change produces a somewhat lower figure for both producer and consumer prices.

8 This derivation of the median inflation rate from the average frequency and the average size of the individual price changes applies only as an approximation.

Frequency of price changes*



* Individual price data from the consumer price statistics, average across 52 products.

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producer level, the entry into force of negotiated pay rises often leads to a concentration of price adjustments.

Reasons why price changes are not made

Causes of price changes

There are a whole number of reasons why prices are adjusted rarely but, when they are adjusted, the change tends to be significant. Generally, price adjustments may be expected if there is a change in demand or costs. If costs are determined to a large extent by wages and if wages are adjusted once a year, a single price increase per year should not necessarily be construed as a reflection of price rigidity. Wages are only one component of costs, however. Materials and energy also play a part. Prices of materials and energy often fluctuate considerably and this may occasion further price adjustments. Moreover, market conditions also change on the demand side.

Costs of price changes

An ongoing review of price costing as well as the ensuing price changes are, however, input-intensive from a business perspective. Information has to be collected and expectations formed, the price has to be recalculated, announced and, possibly, justified. Firstly, price adjustments entail costs ("menu costs") and, therefore, it is often not worthwhile to set prices flexibly in response to disruptions that are regarded as temporary. Secondly, it pays to wait until the scale of the necessary price adjustment justifies the costs of changing prices. An "optimal" deferment of price adjustments not only results in rigidities, it also plays a part in any adjustments being comparatively large ones.

Survey on price-setting behaviour

These factors on their own show that it is hardly possible to conclude on the basis of price data alone that there are genuine rigidities in the sense of market imperfections or their causes. For this reason, in spring 2004, the Ifo Institute – following a suggestion by the Bundesbank – conducted a survey of around 2,500 manufacturing enterprises that may be regarded as representative in terms of their price-setting behaviour; 47% of the enterprises contacted responded to the survey. According to the survey, less than 10% of enterprises in the manufacturing sector routinely review their prices on a daily basis. One in every three enterprises does so only once every six months or every year. Nevertheless, one in two enterprises reconsiders its

pricing if this is suggested by certain events, such as abrupt rises in costs.

Content of the survey

Most economic explanations of price-setting behaviour assume that suppliers have a certain amount of leeway available. According to the Ifo survey, 80% of manufacturing enterprises take advantage of this. Such room for manoeuvre means that enterprises are not compelled to respond immediately to changes in the conditions of supply and demand. Moreover, strategic interactions between competing firms may lead to price inflexibilities. A price increase is often deferred or not made at all if an enterprise fears that it will isolate itself by raising prices, ie because of its competitors not following suit and the possibility of losing market shares as a result.

Forgoing a price cut is often explained by the fear of (cut-throat) competitive pricing. The resulting "coordination failure" (see table on this page) depends, among other things, on the price sensitivity of the customers. For an enterprise, a price increase is generally worthwhile only if the additional receipts from higher earnings per unit are greater than the losses in sales. Conversely, if a price is lowered, the increased sales have to exceed the reduced earnings per unit.

In the case of enterprises that do not have significant market power, price rigidities may occur if long-term contracts explicitly rule out changes. Moreover, the expected durability of shocks may affect the propensity to change prices. Temporary changes in costs or demand ("transitory shocks") often do not lead to price adjustments. Much the same is true if costs do not indicate a steady rise or fall ("no cost trend").

Furthermore, in the survey, enterprises were asked for information on whether they prefer to adjust their prices on a fixed date in the year or at a fixed interval of time. "Time-dependent price setting" of this kind likewise results in certain price rigidities. Another question was related directly to the importance of (narrowly defined) price-changing costs. Finally, the enterprises were asked to state whether they sometimes bring price adjustments forward in time, ie adjust prices in advance in the expectation of changes in costs or demand.

Reasons for not making a price adjustment *

Average assessment on a four-step scale from (1) "unimportant" to (4) "very important"

		Type of firm			
Item	Total	1	2	3	4
Coordination failure (with price increase)	**2.6**	**2.5**	**2.6**	**2.9**	2.0
Coordination failure (with price cut)	1.9	1.9	1.8	**2.3**	1.6
Customers' price sensitivity	**2.1**	**2.2**	**2.2**	**2.4**	1.7
Long-term contracts	**2.4**	1.4	**3.5**	**3.2**	1.4
Transitory shock	1.9	2.0	1.8	**2.2**	1.6
No cost trend	1.8	1.8	1.9	2.0	1.5
Time-dependent price setting	2.0	1.5	1.4	**3.2**	**2.1**
Menu costs	1.4	1.3	1.2	1.6	1.3
Percentage of firms	100	28	28	23	21

* Results of a survey among 1,200 enterprises taking part in the Ifo business survey. Types of firm classified with the aid of a cluster analysis. Values greater than 2.0 in bold.

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Results of the survey

To answer these questions, the enterprises were given a four-step scale ranging from 1 (unimportant) to 4 (very important). The replies were subsequently averaged. Additionally, the percentage of responses with a score of either 3 (important) or 4 (very important) was formed.

According to the information supplied by the enterprises, fixed contracts are the strongest impediment to (short-term) price flexibility. Almost one enterprise in two (45%) considers this reason to be important (3) or very important (4). This is also reflected by the average score of 2.4. Fixed contracts are the norm especially in the manufacture of transport equipment (average assessment 3.0; rated at least as "important" by 73% of the enterprises), in the refined petroleum industry (3.2; 60%) and in the manufacture of basic metals (2.9; 69%).[9]

There follow, as further reasons, coordination failure (2.2; 42%) and customers' strong price sensitivity (2.1; 35%). Coordination failure plays a particular role in price increases (2.6; 58%). The sector most strongly affected by this is, again, the refined petroleum industry (3.2; 100%). Strong price sensitivity on the part of customers is found mainly in the textile industry (2.8; 57%).

Time-dependent price setting (2.0; 34%) achieved no more than a middle-ranking score. Prices are set at fixed intervals or at fixed dates mainly in the leather industry (2.9; 75%), in the manufacture of transport equipment (2.9; 37%) and in the manufacture of basic metals (2.8; 54%).

Generally, enterprises are relatively unworried by the prospect of a price change being followed, after no more than a brief period, by a price adjustment in the opposite direction (1.9; 27%). Exceptions are the refined petroleum industry (2.5; 56%), producers of office machinery and computers (2.4; 50%) and – with qualifications – manufacturers of basic metals (2.3; 28%). It is even rarer for prices to remain unchanged because the costs reveal no trend (1.8; 17%). Exceptions in this case are, again, producers of office machinery and computers (2.3; 45%) as well as manufacturers of basic metals (2.2; 32%). The least important among all the surveyed potential reasons for deferring a price adjustment is (narrowly defined) menu costs (1.4; 9%). It is only in the case of producers of office machinery and computers (1.9; 45%) and of furniture, jewellery, and games and toys (1.9; 21%) that these play any significant role.

However, there is also confirmation that price changes are not only deferred but also brought forward (2.7; 61%). This applies, in particular, to the refined petroleum industry (3.0; 80%), manufacturers of electricity and apparatus (3.0; 70%), and in communications equipment and apparatus (3.1; 80%).

... by type of enterprise

From such average figures, it is not possible, however, to ascertain whether the reasons for deferring price adjustments are complex

9 The assessment by enterprises in the refined petroleum industry that contracts restrict them in terms of their price flexibility is not inconsistent with above-average frequency of price changes in this sector. All it means is that enterprises would adjust their prices even more often in the absence of such contracts.

in the sense that all the factors are relevant – albeit to differing degrees – for all the enterprises, or whether there are differing types of enterprise for which individual factors predominate. Therefore, enterprises with similar price-setting behaviour were arranged into groups using a special statistical method, cluster analysis (for details, see the explanatory notes on p 22).

The first group consists of enterprises for which coordination failure in price increases and customers' price sensitivity represent the main problems. The second group is just as much affected by these two factors as the first group but long-term contracts are an additional consideration. In the third group, time-dependent price changes and transitory shocks are also important. A more autonomous, fourth type of enterprise changes its prices, as a rule, on a fixed date but generally feels itself to be subject to very little restriction. The reasons for a delayed price adjustment therefore seem to be quite complex for enterprises in the second and third groups. One in two enterprises belongs to these two groups.

"Attractive" prices

Another reason for price rigidities, albeit one that is not a major factor at the producer level, is the aim of attractive pricing. In the retail trade, threshold prices such as €1.99 are often regarded as attractive, whereas a price of, say, €2.03 is felt to deter buyers. If a price of €1.99 is to be increased, the new price tends to be €2.05 or €2.09 rather than €2.03. Additionally, "even" prices are often chosen for reasons of convenience. This likewise implies certain price rigidities and relatively large price changes. In line with this, analyses of the individual price data from the German consumer price statistics show that suppliers with a preference for attractive prices change their prices less often than suppliers with more flexible pricing.

Regulation

A further finding of the analysis of consumer prices is that (partly) regulated prices, such as those for gas and electricity, taxi fairs and housing rents were adjusted comparatively rarely in the period under investigation. This is likely to be due to the fact that the procedure for changing such prices is relatively cumbersome and extends to some degree into the political sphere. The pronounced rigidity of housing rents could also be a result of the particular long-term nature of the rental contracts.

Reasons for price changes

Survey results for manufacturing

The enterprises were also asked about the most important reasons for price changes, again based on a four-step scale. The responses showed that the most important reason for a price increase in manufacturing is a rise in material costs (average score 3.4; rated as at least "important" by 89% of the enterprises), followed by a permanent rise in labour costs (2.7; 57%). By contrast, relatively minor importance was ascribed to changes in demand (in either direction; 2.2; 36%), and higher prices of competitors were considered even less important (2.1; 34%).

Price reductions present a slightly modified picture. In this case, too, a change in material

The cluster analysis method

Cluster analysis is a statistical method of classifying objects. In the present case, firms were to be arranged together in non-overlapping groups, known as "clusters". Kendall defines a cluster as "a group scattered around some central value, possibly condensing in a nuclear set, not necessarily spherical but not excessively elongated into a rod-like shape". [1] Objects within a cluster should be as similar as possible, while the focal points of the clusters, the "central values", should be as far apart as possible. Consequently, cluster analysis requires a measure for similarity or dissimilarity. In this instance, the sum of the residual squares was used. Here, "residual" is the distance of an object – in other words, an enterprise – from the centre of the cluster.

For the clustering itself, two alternative methods were used: Ward's method and the k-means method. As its starting point, Ward's method regards each observation as an autonomous group. The two groups which are nearest to each other are fused (ie the fusing of which results in the lowest increase in the sum of the residual squares). This process is repeated until, at the final stage, all objects belong to one and the same group. In this way, a tree of clusters is obtained. Ward's method is hierarchical: a cluster, once it has been formed, is not dissolved in any of the ensuing steps. This characteristic makes it easier to select the number of clusters, although other methods can produce less scattering.

One of these methods is the k-means method, in which the number of clusters has to be specified in advance. In an initial step, k different values are selected as centres of k clusters. Subsequently, each object is assigned to a cluster by minimising the sum of the residual squares. The new cluster centre is then computed. The process is repeated until none of the objects can be resorted. Since a cluster allocation can be revised subsequently, the k-means method allows more flexible adjustment than Ward's method.

In the present case, the number of clusters was therefore established in a first step using Ward's method. In a second step, the enterprises' allocation to the clusters was optimised using the k-means method. In contrast to Ward's method, this second step resulted in one firm in three being reallocated. Clustering was performed on the basis of the importance of the reasons for price adjustment and the importance of the reasons for deferring/not making a price adjustment. A major factor in deciding on four clusters was the interpretability of the individual clusters. The aim of assigning precisely one reason for price rigidity to each firm was not achieved, however.

1 Maurice Kendall (1980). Multivariate Analysis. Charles Griffin & Company Ltd. London and High Wycombe, p 32.

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costs is considered most important (2.8; 64%). The second-most important reason is, however, a price reduction by competitors (2.6; 55%). This is followed by higher productivity (2.4; 47%), a fall in demand (2.2; 44%), an increase in demand (2.0; 27%), and declining labour costs (1.9; 26%).

Changes in prices and demand

The ambivalent role of changes in demand – both increases and falls in sales can be motives for raising or lowering prices – is explained as follows. If production is burdened by a large block of fixed costs and if the marginal costs of production vary only slightly with output, full cost coverage, with increasing output, calls for higher prices (although it is doubtful whether these can really be maintained in the long term). Conversely, given rising output, the price can be lowered. On the other hand, if the variable cost components predominate and if the increase in such costs is disproportionately high when output rises, an increase in demand pushes up prices and a fall in demand lowers prices.

Analysis of actual price-setting behaviour in industry

Additional information on when enterprises actually change their prices may be found in the micro data of the Ifo business survey in manufacturing. Besides a wide variety of information on the order situation and capacity utilisation, this also contains data from the enterprises on whether they have raised or lowered their prices in the preceding month. However, the enterprises themselves are not surveyed directly on the development of major cost factors. For this reason, to analyse price-setting behaviour, use was also made of Federal Statistical Office data on input prices and wage costs as well as the Bundesbank's statistics on negotiated pay with regard to the timing and scale of negotiated wage and salary adjustments.

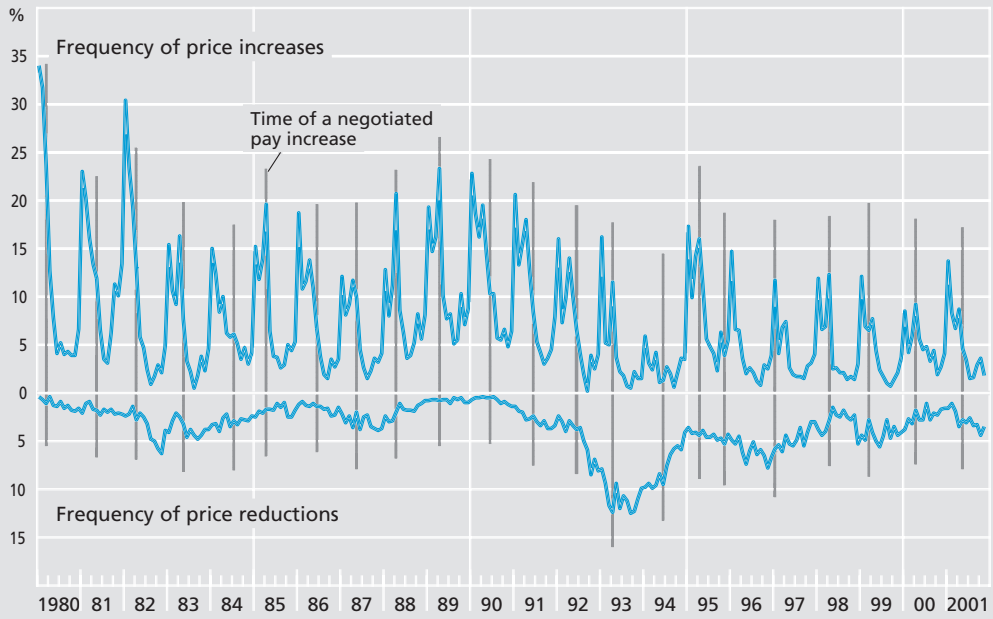
Differences between price increases and price cuts

The following comments are confined to the metal-working industry, which accounts for 43% of value added in German manufacturing. This sector includes the car industry as well as electrical and mechanical engineering. In these industries, price increases show a marked seasonal pattern. Price increases are also often made in months in which negotiated pay rises come into effect. The seasonal pattern suggests that at least some of the enterprises review and, if considered appropriate, change their prices at fairly long, regular intervals. This is also confirmed by the results of the survey on price-setting behaviour, which found that 28% of enterprises in the metal-working industry review their prices annually and that 11% do so twice a year. Finally, the fact that changes in negotiated rates of pay often coincide with price increases demonstrates that some enterprises do not raise prices at fixed intervals but rather when the occasion calls for it. By contrast, price cuts, which occur more often in periods of cyclical weakness, lack a regular seasonal pattern and do not coincide with changes in negotiated pay rates.

Case differentiation

Owing to the marked difference between upward and downward price changes, these will be discussed separately below. Additionally, a differentiation is made on the basis of the direction in which the price was changed previously, ie four different "transitions" will be analysed: a price increase followed by a reduction, a price reduction followed by a

Producer prices and negotiated wages in the mechanical engineering sector*



* Analysis of Ifo business survey micro data.

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further reduction, a price reduction followed by an increase, and a price increase followed by a further increase. It seemed prudent to make this distinction since the reasons for a series of price changes in one direction are, notionally, different from those which lie behind a series of price changes in opposing directions. We examined what effect (actual or expected) changes in cost and demand factors as well as changes in the behaviour of competitors have on the probability of such transitions. Account was also taken of the period of time that had elapsed since the previous price adjustment.

Price increase and subsequent price cut

A price increase in the metal-working industry is often followed by a price reduction if demand has fallen in the interim or if demand is expected to decline during the next six months. One possible reason for this is that the enterprises, in making the earlier price increase, misjudged how their customers would react. This line of reasoning is suggested by the fact that the enterprises do not revise their prices immediately after the (perhaps ill-fated) price increase but do so quite soon afterwards.

Price reduction followed by a further price reduction

A price reduction is followed by a further price reduction if there has been a decline in demand or if one is expected. The behaviour of competitors is also a factor. Moreover, prices are all the more likely to be reduced, the greater the number of competitors that lower their prices. It is probable that enterprises fear losing their customers to their competitors if they do not lower their own prices as well. The interval between two con-

secutive price cuts is often no more than two months. After that, further price reductions become less likely.[10]

Price increase following a price cut

A price reduction is followed by a price increase if demand has increased in the interim or if competitors have raised their prices. Conversely, an upward price adjustment becomes less likely if demand is expected to fall or if competitors have lowered their prices.

Price increase followed by a further price increase

Interim change in demand is only of secondary importance for the decision to follow a price increase with a further increase. However, a price increase is more likely if demand is expected to be higher during the next six months and if competitors, too, are experiencing rising demand and/or adjust their prices in the same month.

Rising costs and price increases

Costs are generally of major importance in taking a decision to raise prices. A price increase becomes more likely if it is accompanied by a cumulative increase in (material and wage) costs since the previous price change. Moreover, prices are often adjusted upwards in months in which new pay agreements come into effect. In addition, many price increases take place in months immediately preceding such a pay rise. This means, firstly, that higher costs have a direct impact on prices, and, secondly, that wage increases under negotiated pay agreements help to coordinate price adjustments.

Time-dependent price setting

Furthermore, for upward – unlike downward – price adjustments, there are regularities that are not directly related to the behaviour of competitors or developments in costs or sales. There is, for instance, a preference for increasing prices in the first few months of the year. Furthermore, price adjustments after a period of exactly 12 months are more likely if the earlier price had likewise been applicable for 12 months. This reflects the time-dependent price-setting behaviour of some enterprises.

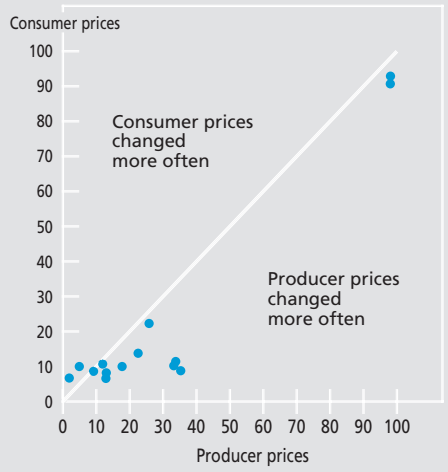
Reasons for asymmetries

The asymmetries between price increases and price reductions detected in the ifo business survey micro data are entirely plausible. Firms try to boost their profits by passing on higher costs and not passing on lower costs. Nevertheless, they find it more difficult actually to raise prices than to forgo price cuts. One of the reasons for this is that competitors often do not follow suit in making price increases. Enterprises therefore make use of certain times, such as the beginning of the year or pay rises under collective agreements, to effect price increases which are coordinated with those of their competitors. This results in higher profits with hardly any change in relative prices. However, the setting also has to be right, ie if possible, the enterprises should be able to count on rising demand even though prices have been increased. Other-

10 According to the analysis of the Ifo business survey micro data, cost changes have no major impact on the probability of price reductions in the metal-working industry. Lower costs do not make a price cut more likely and higher costs do not make a price cut less likely. In the direct survey on price-setting behaviour, however, the enterprises gave falling material costs as the most important factor in price reductions. This discrepancy may be explained partly by the fact that the cost indicators used in the business survey analysis capture not only material costs but also other costs such as wages, and represent averages rather than enterprise-specific values. This probably underestimates the impact of changes in material costs.

Frequency of change in consumer and producer prices*

as a percentage



* Monthly average figures (from left to right) for animal feed, toothpaste, mineral water, electricity, sugar, beer, car tyres, gas, coffee, milk, processed vegetables, beef, fuels, heating oil. Producer prices: February 1997 to January 2003; consumer prices: February 1998 to January 2004.

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wise, price reductions are also taken into consideration.

Supplementary results for consumer prices

Price formation could not be analysed in comparable detail at the consumer level as the required information was unavailable. The consumer price statistics tell us only about the product type, the type of sales outlet and, as supplementary information, any product changes or changes in the reporting unit. However, there is no product-specific information on costs and sales. Nevertheless, for a small number of products, it is possible to make a direct comparison between price changes at the producer level and price changes at the consumer level. This shows that the product prices which are adjusted frequently at the producer level are often changed at the consumer level, too. Furthermore, it can be seen that there are frequent changes to the consumer prices of products for which the most important input prices – measured by product and sector-specific wage, producer and import price indices – are relatively volatile. These findings suggest that the major differences in the frequency of price adjustments in the retail trade and in services can be explained, at least in part, by the greater or lesser necessity of changes in response to price adjustments at the input stage.

Even so, it is striking how rarely many consumer prices are varied – despite the additional contribution of special sales, which are not of any great importance at the industrial producer level. In the case of the goods we studied, prices were, in most cases, changed more often at the producer level than at the consumer level. Prices in the services sector are also modified less often than wages, which are commonly the most important cost factor.

As in the case of industrial enterprises, it is apparent that the wholesale and retail trade as well as service providers prefer to change prices in the first few months of the year. Moreover, there are many suppliers at the consumer level that prefer to adjust prices after exactly 12, 24 or 36 months. Particular events are also a factor in synchronising price changes. The costs that were approximated by the most important relevant input price when analysing price setting in the wholesale and retail trade and among service providers likewise help to explain the occurrence of price changes. The lower the cost dynamics

are, the more rarely are prices raised and the more often they are lowered.

Summary

Price flexibility and competition

One major finding of the studies on price-setting behaviour in Germany is that most prices are not adjusted whenever there is a change in demand or in costs. A continuous review and adjustment of prices would take up additional resources. This does not apply just to sellers; frequent price changes create information costs for customers as well. In general, it may be expected that firms setting prices take account of the costs of price flexibility – their own and those generated for the customers. The observed degree of price flexibility could then be regarded as adequate for the necessary adjustment of the relative prices, provided the markets are sufficiently competitively organised. In the metal-working industry, which was analysed in greater depth for this study, there are a number of indications that strategic interactions between enterprises sometimes prevent rapid price adjustments. But this is likely to be a reflection more of the advanced degree of specialisation in this industry than of weak competition.

Germany in comparison with other countries

A cross-European comparison of the statistical frequency of price changes reveals that Germany occupies a median position in terms of producer price adjustments and is somewhat below the average at the consumer level.[11] The below-average position with regard to consumer prices is, however, probably due in large part to the fact that, in the past, end-of-season sales in Germany – unlike in other countries – were not reflected in the German consumer price statistics. Special offers probably play a lesser role generally than on a European average. Also, the general rate of inflation in Germany was lower. It is therefore not possible to conclude from this comparison that prices in Germany are less flexible than they are in other euro-area countries. Rather, along with the observed downward price flexibility, this is a reflection of a stability culture that has evolved over several decades – a stability culture in which the general purchasing power of money has been preserved to a very large extent and in which, at the same time, the necessary changes in relative prices take place.

11 According to Dhyne et al (2005), Price setting in the euro area, Some stylised facts from individual consumer price data, ECB Working Paper No 524, the frequency of price changes for a comparable basket of goods with identical weights was 15% per month in Germany and just under 16% on an average of the nine countries considered.