

# Price-setting behaviour in Belgium : what can be learned from an ad hoc survey ?

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## Introduction

This article presents the results of an ad hoc survey on price-setting behaviour, conducted among some 2,000 Belgian firms active in industry, construction, trade and business services. The sectors covered by the survey together represent 60 p.c. of GDP. The survey was conducted by the Bank in February 2004 and is the Belgian section of an initiative concerning the entire euro area, within the scope of the Eurosystem Inflation Persistence Network (IPN). This research network of the Eurosystem examines the degree, causes and consequences of inflation persistence.

Intuitively, inflation persistence refers to the time which the inflation process takes to return, after a shock, to its equilibrium value. This equilibrium value corresponds to the level at which inflation tends to settle in the long term, after all the shocks have produced their effects, and is in principle dictated by the current monetary policy regime and the inflation target used, whether that is explicit or not. The monetary policy strategy of the euro area stipulates in this respect that annual inflation must not exceed 2 p.c. in the medium term, but should remain close to that threshold. In practice, however, the inflation rate deviates from that target in the short term. For a given variance in the shock-generating process, these deviations will be greater and more long-lasting the greater the inflation persistence.

The questions which the IPN intends to answer primarily concern the extent to which the inflationary process is persistent in the euro area. The IPN also wants to verify the existence of asymmetries here. The potential asymmetries may consist in the fact that the inflationary process is more persistent after an upward shock than after a downward shock, or that inflation persistence varies according to the nature or size of the shock.

A second set of questions concerns the causes of inflation persistence. One possible explanation is the rigidity of the labour and product markets. If it takes time for wages and prices to adapt to a change in the economic context and/or if adjustments to wages and prices do not always take full account of changes in the economic reality, there is a degree of inertia in the price adjustment process and the inflation process. Inflation persistence may also result from the way in which expectations are formed. As a rule, rational expectations – which are, by definition, forward-looking – lead to low persistence. On the other hand, if the expectations imply a substantial backward-looking element, persistence is greater since, in that case, past inflation automatically becomes a determinant of future inflation.

As regards the causes of inflation persistence, the IPN intends to find out to what extent the observed persistence is an intrinsic characteristic of the inflationary process or how far it depends on the current monetary policy regime and its credibility. In the former case, inflation persistence is an exogenous factor for monetary policy and therefore constitutes a kind of structural

(1) The authors wish to thank the approximately 2,000 firms for their kind participation, the section Short-term Indicators of the NBB for conducting the survey, and the participants to the IPN for their comments.

handicap which one must not attempt to change and which monetary policy needs to take into account in all circumstances. The latter case, on the other hand, is more favourable in that it offers the prospect of the monetary policy regime helping to determine the degree of inflation persistence, and can therefore reduce that persistence if price stability is set as a credible target.

The IPN also aims to verify the implications of inflation persistence for economic policy. The implications for monetary policy proper are the first point to be examined. A persistent inflationary process is in fact harder to control than a less persistent process. Next, the other implications are examined in turn. Thus, if it were found that inflation

persistence is largely attributable to frictions in the operation of the labour market and/or the product markets, that could lead to recommendations for structural reforms on those markets. The implementation of those reforms could then reduce inflation persistence and ease the monetary policy trade-offs.

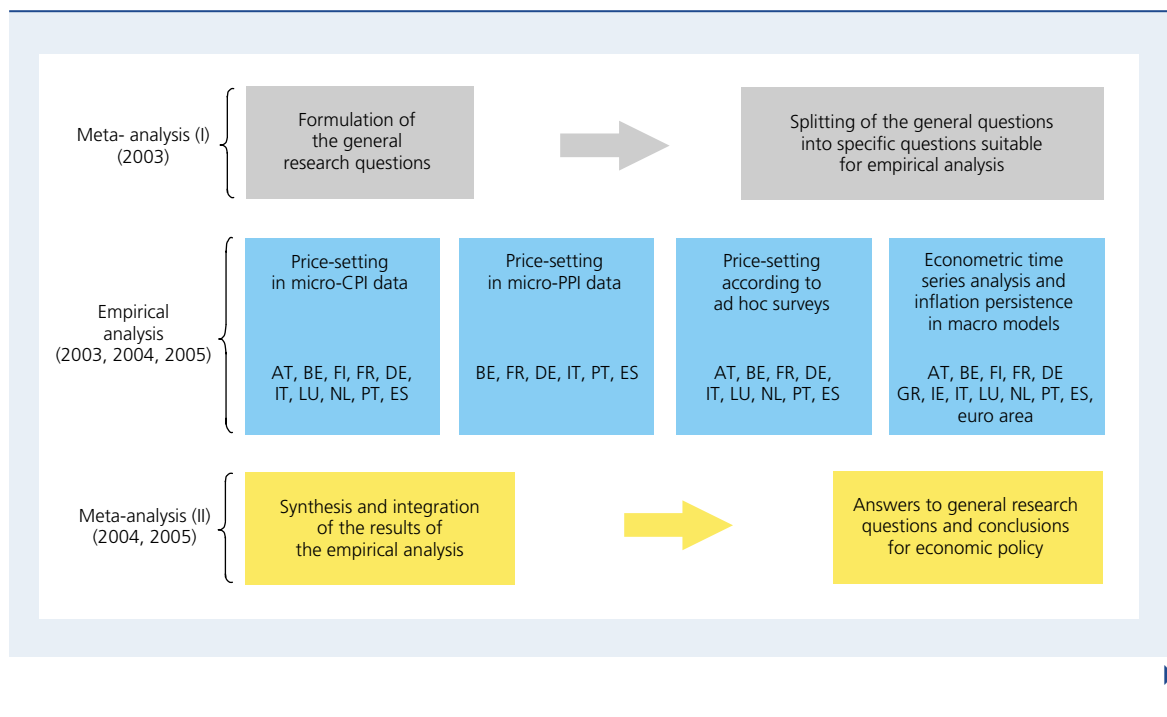
In order to answer some of these questions, the IPN considered it appropriate, in parallel with other forms of empirical analysis (cf. box 1), to conduct a survey in the various euro area countries to obtain a better understanding of the firms' price-setting behaviour. This survey is based on Blinder et al. (1998), who conducted a similar survey of American firms in the 1990s.

### Box 1 – The Eurosystem Inflation Persistence Network (IPN)

The IPN is a network of researchers from each of the twelve NCBs in the euro area, the ECB and universities; its task is to examine inflation persistence in the euro area.

The overall output of the IPN consists of research projects on certain specific aspects – empirical analysis – and “meta-analysis” which aims to incorporate the detailed research results. The network commenced its activities in 2003 and will complete its work during 2005.

#### IPN WORKING METHOD



The meta-analysis comprises two phases. During the first phase, the research field was defined and relevant research questions formulated. These general questions were then subdivided into more specific questions which could be addressed by empirical analysis. The first phase of the meta-analysis took place mainly in 2003. On the basis of the results of the detailed analysis, it was possible to launch the second phase of the meta-analysis in 2004. This phase aims to synthesise the mass of detailed results and incorporate them in a global approach, which should provide answers to the research questions raised and enable to deduce the relevant economic policy implications.

Overall, the empirical analysis concerns four types of data, the first three being databases which can be used to study pricing behaviour at the microeconomic level. One of the benefits of the IPN is that it has produced the necessary impetus for microeconomic data concerning price-setting to be made available for the research project in many euro area countries. This aspect of the study aims to give a detailed presentation of the microeconomic factors underlying the macroeconomic phenomenon of inflation persistence. This point is essential not only to arrive at a quantitative estimate of the degree of persistence, but also for a qualitative understanding of the factors behind the phenomenon. Such an analysis is more particularly important to determine whether or not inflation persistence is an intrinsic characteristic of the inflationary process.

First, the microeconomic data available are those from the detailed databases used to compile the consumer price indices (CPIs) of the various countries. These are generally very rich databases covering a fairly long period and containing information on a wide range of product categories as well as on numerous individual observations within each product category. These data files are available in ten euro area countries.

Next, six countries have microeconomic data which can be used to study how producers set their prices. These may be qualitative data taken from the monthly business surveys or quantitative microeconomic data. The latter are used to compile the producer price index (PPI).

A third source of microeconomic data on price-setting behaviour consists of the ad hoc surveys conducted by nine NCBs in the euro area. As will become clear later on in this article, the comparative advantage of this type of survey is that it permits exploration of the underlying reasons for the price-setting behaviour observed; that is more difficult with the quantitative databases mentioned above.

Finally, the network measures the degree of inflation persistence by means of econometric analysis of time series and simulations on the basis of macroeconomic models. These are generally based on sectoral or macroeconomic time series, which are often public, both for euro area countries and for the euro area as a whole.

Where Belgium is concerned, data are available for each of these fields, and the Bank is closely involved in each facet of the analysis.

This article analyses the results of the ad hoc survey conducted in Belgium on the price-setting behaviour of firms, but without prejudging the overall results relating to the euro area, which will not be published until some time in 2005. The rest of this article comprises three chapters. Chapter 1 deals with the design of the survey. Chapter 2 presents the main results. Finally, the third and last chapter summarises the main conclusions of the survey.

## 1. Survey design

### 1.1 Creation of the survey

The Bank took on the task of designing the questionnaire and organising the survey. The content of the questionnaire is based to a large extent on the content of similar surveys conducted in the United States (Blinder et al., 1998), the United Kingdom (Hall et al., 2000), Sweden (Apel et al., 2001) and Italy (Fabiani et al., 2004). However, the questionnaire was adapted to the specific context of Belgium by adding questions concerning price-setting behaviour on foreign markets.

In addition, the staff responsible for the survey endeavoured to take account of the latest developments in the economic literature in two areas. First, a long list of factors which might explain price rigidity, in both nominal and real terms, was drawn up. Next, a question about the information used in the price-setting process was added, since the type of information (backward- or forward-looking) may be a supplementary cause of persistence. This is probably the first survey to cover that subject.

An initial draft questionnaire was sent out in December 2003 to twenty industrial firms. Fourteen firms took part in this pilot study. They were then all contacted by telephone to obtain their impressions of the survey. On the whole, these were favourable. At the same time, they were asked why they had omitted certain questions. The questionnaire was then adjusted. The final survey form takes account of the comments made by the firms taking part in the pilot study. The questions which did not generate an adequate response rate or those which appeared to be ambiguous were reworded.

In February 2004, the final questionnaire (cf. in Annex 1 the questionnaire for industrial firms) was sent to all firms in the sample. The firms had previously received a letter explaining the importance of the survey. They had three weeks in which to reply.

## 1.2 Sample

The ad hoc survey sample is the same as that for the Bank's monthly business survey. It comprises 5,600 firms active in industry, construction, trade and business services. The sample does not cover the sectors comprising agriculture, energy, public and financial services, post and telecommunications, and services offered directly to consumers (hotels and restaurants, health care by etc.) (cf. Annex 2 for an exhaustive list). The sectors covered represent 60 p.c. of GDP.

**TABLE 1** SAMPLE: NUMBER OF FIRMS

	Population size <sup>(1)</sup>	Sample size <sup>(2)</sup>	Number of respondents	Response rate (p.c.)	Weighting based on turnover
Total	394,339	5,600	1,979	35	100.0
Industry	44,439	2,000	753	38	30.9
Construction	70,685	1,200	384	32	5.0
Trade	132,292	1,400	478	34	36.7
Business services	146,923	1,000	364	36	27.4
Industry					
0-49 employees	42,603	n.	433	n.	6.3
50-199 employees	1,363	n.	211	n.	5.2
200 employees or more	473	n.	109	n.	19.4
Construction					
0-49 employees	70,211	n.	330	n.	3.5
50-199 employees	403	n.	45	n.	0.9
200 employees or more	71	n.	9	n.	0.6
Trade					
0-49 employees	131,565	n.	429	n.	23.1
50-199 employees	585	n.	31	n.	6.5
200 employees or more	142	n.	18	n.	7.0
Business services					
0-49 employees	145,893	n.	291	n.	20.5
50-199 employees	822	n.	54	n.	3.5
200 employees or more	208	n.	19	n.	3.5

Source: NBB.

(1) Firms liable for VAT, belonging to the sectors covered by the survey; 2001 data.

(2) The sample is the same as that for the monthly business survey.

1,979 firms replied to the survey. This represented a 35 p.c. response rate, spread evenly among the sectors and ranging from 32 p.c. in construction to 38 p.c. in industry. Since the response rate was considered satisfactory, no reminders were sent out to firms failing to reply to the survey.

In view of the method of composing the sample, which was done in close collaboration with the business federations, large firms are over-represented. In order to make the survey results representative of the population of firms as a whole, stratification was subsequently carried out for the ad hoc survey. For this purpose, the population was divided into twelve strata according to the sector of activity and size class in terms of the number of employees. Next, weighting coefficients were calculated per stratum on the basis of turnover. These coefficients were used to weight the survey results. Of course, results on a level of aggregation below stratum level were not weighted. That applies particularly to the results per sub-sector.

### 1.3 Questionnaire

The questionnaire is in three sections. Section A contains questions on the main product and the main market to which the answers should relate. It also contains questions on the level of competition and questions aimed at finding out to what extent the firm has market power or, conversely, sets its prices according to those charged by its competitor(s). Firms are also asked whether they set their prices independently. Participating firms which do not set their prices themselves need not answer a large part of the questionnaire.

Section B covers price adjustments. It concerns how frequently and at what point in time prices are reviewed and changed, and the information used for the purpose of setting prices. The questions in section B also make it possible to determine whether the price-reviewing process is time-dependent or state-dependent, and whether the response of prices to shocks is asymmetric, according to the nature and direction of the shock. Numerous factors explaining price rigidity, in both nominal and real terms, are also examined.

Finally, section C only has to be completed by industrial firms which are active in more than one market. It aims to find out whether the method of price-setting varies between markets, in other words whether the firm engages in pricing-to-market.

It was deliberately decided not to mention any reference period – e.g. last year, in this case 2003 – in order to eliminate the effect of events specific to that period. Moreover, the absence of any reference year makes it possible to obtain some idea of adjustments made less than once a year, in the case of the questions on price adjustments.

The questionnaire in Annex 1 is intended for the industrial sector. The questionnaires for firms in construction, trade and business services are almost identical. Since firms in those sectors are almost exclusively active on the Belgian market, the questionnaires designed for them do not contain any details concerning the market, whereas the responses by industrial firms have to relate to their main market. Section C was also dropped in the case of non-industrial firms.

The questionnaire contains three types of question. In the first type of question, participants are asked to indicate the importance of a particular statement by selecting “1 = unimportant”, “2 = of minor importance”, “3 = important”, “4 = very important” or “? = I don’t know”. This article gives the average scores for the first four options, disregarding question marks and non-responses. In the second type of question, participants had to tick just one answer in a list. In the third type of question, they had to enter exact figures. The number of questions of this type was kept to a minimum in order to make the task easier for the participants.

A response rate was calculated for each question. All of these response rates were considered satisfactory (over 90 p.c.), except for one. Over half of the participants failed to answer the (difficult) question A6 on the price elasticity of demand. The fact that question B4 contained a long list of factors explaining price rigidity did not affect the rate of response to this question. Similarly, many firms answered the relatively difficult questions (B2a and B2b) concerning the information used to review prices.

In each case, the article presents the results for the participants as a whole. Where appropriate, a subdivision into sectors and sub-sectors is added. The sub-sector breakdown is based on the NACE-BEL A31 classification. However, it was necessary to rearrange some of the groups to obtain a sufficient number of participants in each sub-sector every time (cf. Annex 3). Moreover, the retail trade was deliberately taken as a separate sub-sector. However, a breakdown of the variance of all the survey results showed that the variance is attributable mainly to the dispersion within the strata, and only partly to the dispersion between sectors or sub-sectors. The dispersion according to firm size is always negligible, which is why the breakdown of the results by firm size was not

included in the article. For that reason, the differences between the weighted results used in this article and the initial, unweighted results are minimal.

## 2. Main results

The results are divided into six main topics: To what extent is the survey representative of price-setting behaviour? What is the context in which the firms work? Are prices flexible or rigid? What are the causes of price rigidity? What factors encourage price adjustments? Finally, in conclusion, the characteristics of firms with a flexible approach to price-setting are compared with the characteristics of firms with a rigid approach.

### 2.1 Representativeness of the survey for price-setting behaviour

The overall representativeness of the survey in terms of participating sectors and response rates has been examined above. However, this section deals additionally with the question of the representativeness of the results for price-setting behaviour. The first point examined was whether the participating firms – in fact, the persons questioned – actually had any information to provide on the price-setting process, as the survey sample had been designed for other purposes, namely the business survey. The next point checked was whether the specific products concerned in the replies were sufficiently representative.

**TABLE 2** QUESTION A8: WHO SETS THE PRICE?  
(Percentages)

	The firm	Government	The parent company or group	Others	<i>p.m.</i> Response rate
Total	82.3	1.1	7.1	9.5	99.7
Industry	85.8	1.1	8.2	4.9	99.8
Construction	96.9	0.3	0.3	2.5	99.4
Trade	75.1	1.3	9.0	14.6	100.0
Business services	88.0	1.0	4.0	7.1	99.3
Food industry	90.8	1.4	2.8	4.9	99.3
Textiles and leather	94.4	0.0	2.2	3.3	98.9
Wood	93.1	0.0	3.4	3.4	100.0
Paper and publishing industry	93.2	0.0	1.4	5.5	100.0
Chemical industry	78.0	3.4	11.9	6.8	100.0
Rubber and plastics	86.7	0.0	13.3	0.0	100.0
Other non-metallic mineral products	82.7	2.9	14.7	0.0	100.0
Metallurgy and metalworking	90.0	0.0	6.4	3.6	100.0
Machinery and equipment	96.8	0.0	1.6	1.6	100.0
Electrical and electronic equipment	82.6	2.2	8.7	6.5	100.0
Manufacture of transport equipment	70.8	0.0	20.8	8.3	100.0
Other manufacturing industries	86.4	0.0	0.0	13.6	100.0
Wholesale trade, motor vehicle trade and repairs	77.9	2.7	13.3	6.2	100.0
Retail trade	71.0	0.4	7.9	20.6	100.0
Transport and storage	85.6	3.2	4.0	7.2	100.0
Real estate, rental and other business services	89.5	0.0	4.6	5.9	99.2

Source : NBB.

### 2.1.1 Who sets the price ?

The majority of firms set their prices independently (82 p.c.), while in the case of the other participants the price is fixed by the government (1 p.c.), the parent company or group to which the firm belongs (7 p.c.) or others (10 p.c.). The parent company or group plays a key role in pricing in the sub-sectors comprising the manufacture of transport equipment, other non-metallic mineral products, rubber and plastics, wholesale trade, motor vehicle trade and repairs, and the chemical industry. In the retail trade, many firms (21 p.c.) state that the price is set by "others". The participants marking this reply were asked to specify who set the price in that case. A frequent response was the supplier. It is in fact common practice for the producer to stipulate the price to be charged by the retailer for certain branded goods.

The fact that 82 p.c. of firms set their prices independently means that, for the majority of firms, the decision-making process associated with pricing takes place entirely within the firm itself. These firms were therefore able to answer the whole of the questionnaire, including all the questions on the qualitative aspects of price-setting. The other firms were only able to answer a shorter list of questions focusing mainly on the frequency of price changes. That information can in fact always be supplied, even if the price is not actually set by the firm.

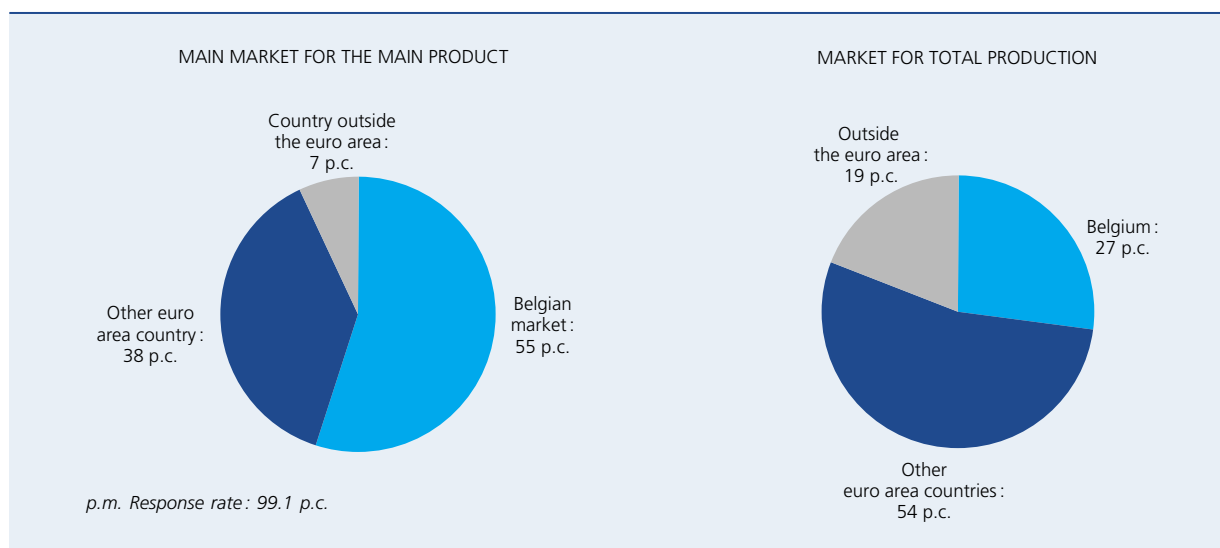
### 2.1.2 Main product

Since the participants were asked to answer the questions by considering their main product, it matters whether that product is representative of the firm or not. That is so since, on average, 69 p.c. of turnover is generated by the main product. However, that percentage varies considerably between sectors. It is highest in the business services and construction sectors (almost 90 p.c.), a little lower in industry (68 p.c.) and lower still in trade (53 p.c.). Firms active in this last sector, and particularly in the retail trade, offer a wide range of products for sale, and it is often difficult for them to define a "main product". The usefulness of this aspect of the survey lies in the fact that the firms have to concentrate on a specific product in order to give reliable answers to the questions concerning the frequency of price adjustments, but at the same time there must be no doubt about the representativeness of the product for the firm as a whole. Placing the emphasis on the main product makes it possible to take account of representativeness while ensuring sufficiently specific responses.

### 2.1.3 Main market

Over half of the industrial firms replied that the Belgian market is the main market for their main product. This is only apparently at odds with the openness of the Belgian economy – over 70 p.c. of the turnover of participating

**CHART 1** QUESTION A3: MAIN MARKET FOR THE MAIN PRODUCT IN INDUSTRY



Source : NBB.

**TABLE 3** QUESTION A5: MAIN CUSTOMERS

(Percentages)

	Industry	Construction	Trade	<i>p.m.</i> <i>Retail trade</i>	Business services	Total
Divisions and companies in your group . . . . .	18.5	4.1	7.8	7.9	9.8	10.8
Companies not forming part of your group . . . . .						
with which you have a long-term relationship . . . . .	45.2	16.4	19.3	2.6	46.0	32.7
with which you do not have a long-term relationship . . . . .	19.4	9.3	6.0	1.8	17.0	12.4
Consumers . . . . .	14.2	48.7	64.6	86.8	23.3	40.2
Government . . . . .	2.7	21.6	2.3	1.0	3.9	3.8
Total . . . . .	100.0	100.0	100.0	100.0	100.0	100.0
<i>p.m. Response rate</i> . . . . .	93.5	97.7	91.8	90.1	93.1	93.8

Source : NBB.

industrial firms comes from foreign markets – since the question is concerned with a single specific market for the main product. This is generally the Belgian market, since exports are spread among a number of foreign markets and the importance of one particular export market rarely exceeds that of the home market. The survey puts the emphasis on the main market for the same reason as that justifying the choice of the main product, namely the desire to achieve sufficiently specific responses.

The participating firms from the sub-sectors comprising textiles and leather, machinery and equipment and manufacture of transport equipment are geared more towards exports: almost 90 p.c. of their turnover comes from foreign countries. The firms from the sub-sectors other manufacturing industries, food industry, wood, and the paper and publishing industry are more active than the average on the home market.

## 2.2 Context of the firms' activity: market structure and competition

The market structure and level of competition are crucial external factors for price-setting behaviour. Thus, a certain level of market power is necessary for a firm's decisions on price to make sense, because without market power (perfect competition) the price always corresponds to the marginal costs and no mark-up is applied. In such an environment, price rigidity does not exist. At present, the

New-Keynesian models with sticky prices are therefore often based on a monopolistic competition situation in which the price corresponds to the marginal costs plus a mark-up.<sup>(1)</sup> It is this mark-up that leaves firms some margin not to adjust their prices when the costs change. The survey therefore assesses these external factors in depth.

### 2.2.1 Main customers

In industry and business services, around 60 p.c. of turnover comes from customers with whom there is a long-term relationship of some kind (either the customer is a group company or it does not belong to the group but the participant explicitly states that there is a long-term relationship). Conversely, trade is geared more towards direct sale to consumers (65 p.c.). It was assumed that there are not generally any long-term relationships in that case. However, this was not verified by the survey, in order to keep the questionnaire as short as possible. The retail trade is the sub-sector particularly geared to consumers (87 p.c.). Construction also obtains a large proportion of its turnover from consumers (49 p.c.). The surprisingly high percentage of sales to consumers in the case of business services (23 p.c.) is found mainly in motor vehicle rentals, insurance brokers, IT activities, lawyers and notaries. These are in fact services which are offered to a varied public (firms and individuals).

(1) Blanchard and Kiyotaki (1987) are a classic reference here.



**TABLE 4** QUESTION A4: HOW MANY COMPETITORS DO YOU HAVE ON YOUR MAIN MARKET FOR YOUR MAIN PRODUCT?  
(Percentages)

	Industry	Construction	Trade	Business services	Total
None .....	3.1	1.9	2.2	4.9	3.1
Less than 5 .....	31.1	10.9	24.2	21.8	24.7
Between 5 and 20 .....	49.8	43.6	47.6	28.3	43.1
Over 20 .....	16.0	43.6	26.1	45.0	29.1
Total .....	100.0	100.0	100.0	100.0	100.0
<i>p.m. Response rate</i> .....	96.9	89.4	89.4	90.0	93.3

Source : NBB.

### 2.2.2 Level of competition

The level of competition is measured at various points in the survey.

Question A4 is intended to find out the number of competing firms. Around 43 p.c. of participants operate on a market comprising between 5 and 20 competing firms, while some 30 p.c. have fewer than 5 competitors and another 30 p.c. have over 20 competitors. Firms with over 20 competitors are least numerous in industry,

where they total only 16 p.c., against almost 45 p.c. in construction and business services. The main implication of this is probably that the industrial firms taking part in the survey as well as their competitors are mainly large firms, rather than implying that the actual level of competition is lower in industry. Overall, the results in terms of the number of competitors deviate clearly from a situation of perfect competition as well as from the monopolistic competition situation used in modern macroeconomic models. These results tend to indicate an oligopolistic market structure.

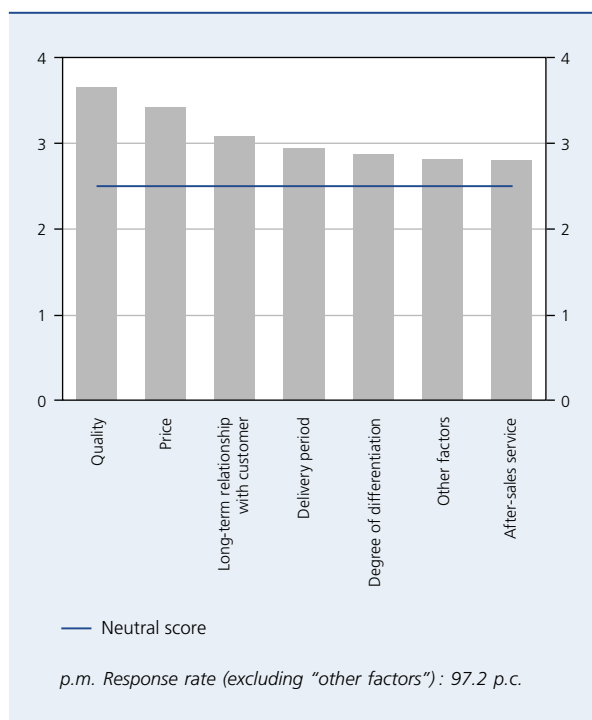
**TABLE 5** QUESTION A6: IF YOU WERE TO INCREASE THE PRICE OF YOUR MAIN PRODUCT BY 10 P.C., BY WHAT PERCENTAGE WOULD THE TURNOVER OF YOUR MAIN PRODUCT FALL?  
(Percentages)

Percentages reduction in turnover	Industry	Construction	Trade	Business services	Total
0-10 .....	12.0	10.6	24.7	33.9	22.7
11-25 .....	19.5	11.2	26.6	18.1	21.6
26-50 .....	26.9	30.0	32.2	27.8	29.4
51-75 .....	14.7	11.6	5.4	12.0	10.1
76-100 .....	26.9	36.6	11.2	8.1	16.2
Total .....	100.0	100.0	100.0	100.0	100.0
Average .....	50.2	57.8	32.6	34.9	39.9
Median .....	50.0	54.9	26.8	25.0	34.9
Standard deviation .....	33.2	33.0	26.3	29.8	31.1
<i>p.m. Response rate</i> .....	53.3	49.9	43.7	46.2	47.1

Source : NBB.

**CHART 2** QUESTION A7: FACTORS DETERMINING COMPETITIVENESS

(Average scores)



Source : NBB.

The price elasticity question (question A6) may provide additional information on the level of competition. However, under half of the participants answered this question, which appears to have been the most difficult in the survey. Furthermore, 23 p.c. of participants reply that a 10 p.c. price increase would cause a less than 10 p.c. reduction in their turnover; this represents a price elasticity of less than 1 – the lower limit in theoretical models. That is probably due to the differing time horizons that participants considered; the short-term effect of a relative price increase is probably less important than its long-term effect. Overall, some caution is therefore called for in interpreting the information obtained from this question.

On average, a 10 p.c. price increase causes turnover to fall by 40 p.c.; after conversion to quantities, this implies an average demand elasticity of 4.5. The average mark-up to be deduced from that is 29 p.c.<sup>(1)</sup> These figures do not correspond to a perfect competition situation either (infinite price elasticity and no mark-up). Elasticity is highest in construction and industry and lowest in trade. On that basis, the first two sectors seem to be the most competitive, but the deviations found do not appear significant in the light of the usual statistical levels.

In a perfect competition situation, all firms sell at the unique market clearing price, and the price is therefore the sole determinant of competitiveness. However, if other factors prove to be important for competitiveness, that is an additional indication that the firms are able to gain some market power. Question A7 looks at these factors.

Product quality seems to be more important than price as a determinant of the competitive position of firms. Competitiveness is also determined by the existence of long-term relationships with customers, delivery periods, the degree of differentiation, other factors (often defined as innovation, personal contact with customers, marketing, etc.) and after-sales service. The scores recorded for these factors are all higher than the neutral average score of 2.5. Firms therefore appear to have some scope, at various levels, for distinguishing their products from those of the competition and thus developing a degree of market power.

The ability of firms to determine their profit margin entirely independently also gives some indication of their market power. The ability of firms to act in this way is addressed by question A9.

In this question, a score has to be given to two statements, namely “We set our prices fully according to our costs and a completely self-determined profit margin” and “We set our price according to the price of our main competitor(s), meaning that we do not determine our profit margin ourselves”. The average score for the first option is 3.0, slightly higher than that for the second option (2.8). As one might expect, the scores obtained for the two statements show a negative correlation in the individual responses. The correlation is –0,29 and is, given the large number of firms, significantly different from zero from a statistical point of view. This correlation is, however, relatively low in economic terms, indicating that a non-negligible number of firms had difficulties in clearly expressing a preference in favour of one of either statements. Nevertheless, the results obtained tend to suggest that, on average and to a small extent, Belgian firms are rather price-makers than price-takers, except in industry, where both statements receive the same average score.

(1) If  $\epsilon$  represents the price elasticity of demand, profits are maximised if the price is set as follows:  $p = \epsilon/(\epsilon-1) mc$ , where  $mc$  represents the marginal cost and the factor  $\epsilon/(\epsilon-1)$  is the mark-up in multiplier form. The survey results give an average factor of 1.29. The actual mark-up is therefore 29 p.c.

**TABLE 6** QUESTION A9: WHAT METHOD IS APPLIED WHEN SETTING PRICES – PRICE-MAKER OR PRICE-TAKER?  
(Average scores)

	Industry	Construction	Trade	Business services	Total
We set our prices fully according to our costs and a completely self-determined profit margin . . .	2.9	3.5	3.0	3.1	3.0
We set our price according to the price of our main competitor(s), meaning that we do not determine our profit margin ourselves . . . . .	2.9	2.6	2.8	2.7	2.8
<i>p.m. Response rate</i> . . . . .	95.5	82.0	89.6	93.3	91.8

Source : NBB.

### 2.2.3 Pricing-to-market

In view of the openness of the Belgian economy, the main market is probably not the only market for industrial firms. Section C was added to the ad hoc survey in order to find out about pricing practices on other markets.

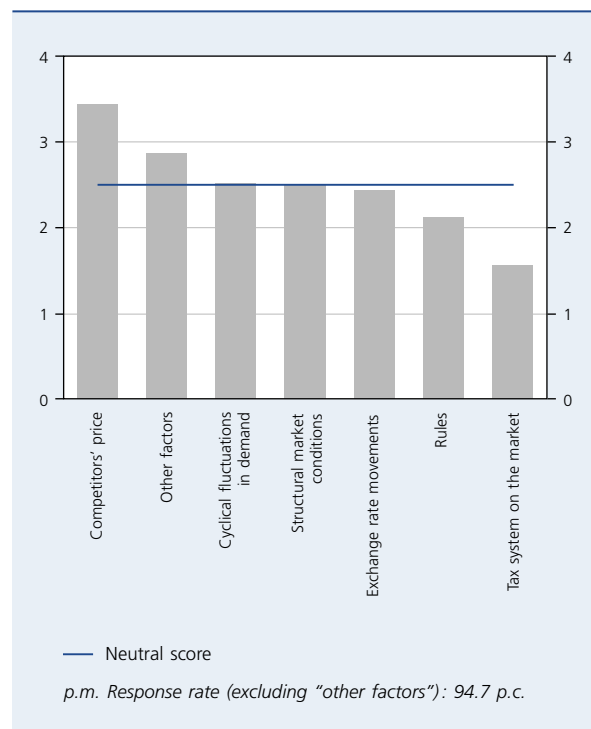
Almost 60 p.c. of firms in industry practise pricing-to-market. That is a very high percentage, given that payments within the euro area are effected in a common currency and the bulk of Belgian exports is destined for euro area countries. In industry, 73 p.c. of turnover comes from other countries, namely 54 p.c. from the euro area and 19 p.c. from elsewhere.

The strategy of pricing-to-market is most prevalent in the sub-sectors comprising the chemical industry, wood, other non-metallic mineral products and the food industry, and is least common in the sub-sector machinery and equipment, although the proportion here is still close to 40 p.c.

The primary reason for setting prices specific to a particular market is to take account of competitors' prices. Next come the other factors, often specified as transport costs, insurance costs, commission, etc. After that come cyclical fluctuations in market demand, structural conditions on the local market – such as tastes and standard of living – and exchange rate movements, which all get more or less the same average score. Differences in regulations are a little less important, while the system of taxation on the market ranks lowest. This essentially concerns indirect taxes, which are only a cost factor for consumers. Firms selling more directly to consumers therefore attach greater importance to the tax system as a factor encouraging pricing-to-market.

Finally, section C of the questionnaire asked whether competition is keener on the foreign market. Over 60 p.c. of participants said that it was. Firms in industry appear to have some kind of "home advantage", and have greater market power, on average, on the home market. The survey arrived at this conclusion despite the openness of the Belgian market, which is reflected in the absence of trade barriers and the presence of a substantial number of foreign firms.

**CHART 3** QUESTION C2: FACTORS ENCOURAGING PRICING-TO-MARKET IN INDUSTRY  
(Average scores)



Source : NBB.

To sum up, it seems that the context in which firms operate in the sectors industry and business services features many long-term relationships with customers. In contrast, construction and trade are more geared towards direct sales to consumers. Although Belgian firms face high competition, the results are different from a perfect competition situation. Nor do they indicate a monopolistic competition situation, although that forms the basis of the majority of macroeconomic models. The market structure appears to be more oligopolistic. To a small extent, firms seem to be rather price-makers than price-takers, and apart from their product quality they have a whole range of ways of acquiring market power (such as long-term relationships with customers, product differentiation, etc.). The majority of industrial firms applies pricing-to-market. The results indicate that industry faces the fiercest competition. The price elasticity of demand is greater there, and industrial firms are more price-takers than the average. They also state to have less market power abroad than on the home market.

### 2.3 Flexible or rigid prices? Timing and frequency of price adjustments

The frequency of price adjustments is a key determinant of inflation dynamics and plays an important role in modern monetary and macroeconomic theory. According to the theory, the fact that prices are not all adjusted in line with changes in the economic context at all times – in other words, the presence of price rigidity – explains why monetary policy influences real interest rates, and hence economic activity, in the short term. Price rigidities are therefore a factor which monetary policy must take into account, and they have a significant influence on the way in which the monetary policy makers should make the trade-off between the aim of price stability and the importance which they attribute more generally to real economic developments.

At microeconomic level, price rigidities have a major influence on the way in which households and firms adapt to shocks. At macroeconomic level, they may lie behind the persistence of fluctuations in inflation, output and employment. The survey therefore accords great importance both to measuring price rigidity and to identifying possible explanations for it.

The price adjustment process generally takes place in two stages. In the first, called the review stage, the firm examines its scheme for maximising profits in order to determine the price that it would like to charge. As this process entails costs, firms are unlikely to assess their prices continuously; it is therefore useful to check how

often this review process is launched. If the optimum price arrived at by this process is different from that actually charged, the price may be altered, but not necessarily. Price reviews and changes are not necessarily carried out simultaneously, and reviews are probably more frequent, since supplementary specific costs are associated with an actual change of price. It is therefore important to check the frequency of actual price changes as well, separately from the price reviews. This phased method also implies that it is more likely that price reviews will take place at regular intervals than price changes. That means that it is appropriate to investigate in the first phase of the adjustment process – in other words, the price reviews – whether the price-adjustment process is time-dependent or state-dependent. For these reasons, the two aspects of price adjustment are dealt with separately in section B of the questionnaire.

In this respect, the survey has a comparative advantage in relation to quantitative databases containing CPI or PPI micro data. In these, the analysis has to be confined to the frequency of actual price changes.

#### 2.3.1 Time-dependent or state-dependent price reviews

The literature on the subject often distinguishes between time-dependent and state-dependent price-setting behaviour. If price-setting is time-dependent, the timing of the price adjustment is exogenous; in other words, it does not depend on the economic situation. For example, a firm adjusting its price at the beginning of each year is practising purely time-dependent price-setting. Conversely, if price-setting is state-dependent, the timing of the price adjustment depends on the economic situation: the price will be adjusted if, following shocks, the difference between the price charged and its new optimum level has become sufficiently large to offset the costs of adjustment. In a state-dependent context, prices will therefore react immediately if the shocks are big enough, whereas in a time-dependent context firms will continue to wait for the time that they have determined in advance, even in the case of large shocks. The majority of macroeconomic models are based on a time-dependent adjustment process, because it is easier to model.

The survey participants were asked to specify when they review their prices, and were offered the following options: “at specific time intervals” (interpreted as time-dependent), “in reaction to specific events” (interpreted as state-dependent) and “mainly at specific time intervals, but also in reaction to specific events” (interpreted as essentially time-dependent, but possibly state-dependent if a sufficiently significant event occurs).

**TABLE 7** QUESTION B1a: TIME-DEPENDENT AND STATE-DEPENDENT PRICE REVIEWS  
(Percentages)

	Normal situation	Specific events
<b>Time-dependent price review . . .</b>	<b>65.7</b> <b>(48.7)</b>	<b>25.7</b> <b>(25.1)</b>
Industry . . . . .	65.9	23.5
Construction . . . . .	53.4	17.1
Trade . . . . .	63.9	29.4
Business services . . . . .	70.8	24.6
<b>State-dependent price review . . .</b>	<b>34.3</b> <b>(51.3)</b>	<b>74.3</b> <b>(74.9)</b>
Industry . . . . .	34.1	76.5
Construction . . . . .	46.6	82.9
Trade . . . . .	36.1	70.6
Business services . . . . .	29.2	75.4

Sources: Apel et al., NBB.  
(...) Swedish results.  
p.m. Response rate in Belgium: 94 p.c.; in Sweden: 92 p.c.

Price review which is purely time-dependent (meaning in all cases, i.e. even if a particular, sufficiently significant event occurs) concerns 26 p.c. of firms, while 34 p.c. of them use purely state-dependent reviewing (meaning in all cases, i.e. even when the situation is normal). For 40 p.c. of firms, the price review process is normally time-dependent, but may be state-dependent if a particular, sufficiently significant event occurs. This means that if the situation is normal, the majority of firms (66 p.c.) adapt time-dependent reviewing. However, if a sufficiently significant shock occurs, 40 p.c. of them will shift to state-dependent price-reviewing, so that altogether 74 p.c. of firms behave in this way while 26 p.c. continue to review their prices at regular time intervals. The existence of a combination of time-dependent and state-dependent price-setting was also observed in the examination of micro prices used as the basis for the Belgian consumer price index (Aucremanne and Dhyne, 2004). Furthermore, the above figures are very similar to the Swedish results of the survey by Apel et al. (2001). They therefore shed new light on the macroeconomic models currently used, which are generally based on time-dependent price-setting.

### 2.3.2 The information used for the price review process

This article has already mentioned a question concerning the information forming the basis of the price review process (questions B2a and B2b). In principle, when setting its prices, a firm takes account of all the relevant information for maximising its profits, thus including expectations concerning the future, since – in the case of price rigidity – the new price will remain in force for some time. However, a firm may behave in a different way, because there is a cost involved in collecting all the relevant information. In that case, the pricing is no longer “optimum” from a macroeconomic point of view, and – as the price setting becomes less forward-looking, it gives rise to additional inflation persistence.

As regards the information used, the survey gives firms a choice between two options, namely the application of a rule of thumb (e.g., change equal to a fixed amount or percentage, indexation on the basis of the consumer price index, etc.) or consideration of a wide range of information (demand, costs, competitors’ price, etc.) relevant for profit maximisation. Firms choosing the second option had to state whether this information concerns the present context or both the present and future context the firm operates in. Only this last pricing method, which uses the fullest set of information, is associated with totally optimising behaviour.

This question refers more particularly to the last time that the price was reviewed, as the test showed that it was not easy to ascertain the general behaviour of the firms on this issue. It is in fact entirely possible that they may apply a rule of thumb during a particular period and, after a certain time, switch to an optimum form of behaviour when they realise that the price is too far away from its optimum level. In consequence, although this question may give an indication of the importance of rules of thumb in price-setting in general, it does not permit any clear distinction between firms for which the use of a rule of thumb is important and those for which it is optimum pricing that counts.

When reviewing their prices last time, 34 p.c. of firms optimised their prices. Another one-third of firms adopted an intermediate position by taking account of a wide range of information, but only in relation to the current economic situation. Around 37 p.c. of firms applied a rule of thumb. This means that, to a large extent, the pricing behaviour is not optimum and this friction in price-setting may be a significant source of inflation persistence. Industry achieves the highest score in terms of totally optimising behaviour (45 p.c. of firms consider a wide range of information which also takes account of the future)

**TABLE 8** QUESTIONS B2a AND B2b: HOW DID YOU REVIEW THE PRICE OF YOUR MAIN PRODUCT LAST TIME?  
(Percentages)

	Industry	Construction	Trade	Business services	Total
We applied a rule of thumb . . . . .	28.7	35.8	35.0	46.1	36.6
We have considered a wide range of information related to the present context . . . . .	26.6	38.5	34.6	22.9	29.4
related to the present and the future context	44.7	25.7	30.4	30.9	34.0
<i>p.m. Response rate</i> . . . . .	95.3	97.1	94.0	98.0	95.7

Source : NBB.

and the lowest score as regards the use of rules of thumb (only 29 p.c.). This sector in fact faces greater competition and is therefore more inclined to adopt an optimum pricing approach than the other sectors, because a “miscalculated” price here has a greater impact on demand. The use of a rule of thumb, such as simple price indexation based on the consumer price index, is most common in the business services sector.

### 2.3.3 Frequency of price adjustments

The firms applying time-dependent price-reviewing (regardless of circumstances or when no specific event occurs) were asked to specify how often they review their prices (question B1b). All the firms were also asked to indicate how often they actually change their prices (question B5). The two questions give an idea of the frequency of price adjustments and permit calculation of the average implicit duration between two successive price reviews and between two successive price changes. This average duration is expressed in months.

For all participants, the average duration between two successive price reviews is 10 months, against almost 13 months between two successive price changes. The lower frequency of price changes tends to confirm the existence of specific costs relating to the price change process. However, it is possible that the price review process showed that no change was necessary. Moreover, there is a positive correlation between the two phenomena: firms with a short period between two reviews generally have a short period between two changes, and vice versa.

These two findings are borne out at sub-sector level: the trend line which can be drawn for the observations slopes upwards (positive correlation), and all the sub-sectors are above the diagonal, i.e. in the part of chart 4 where the

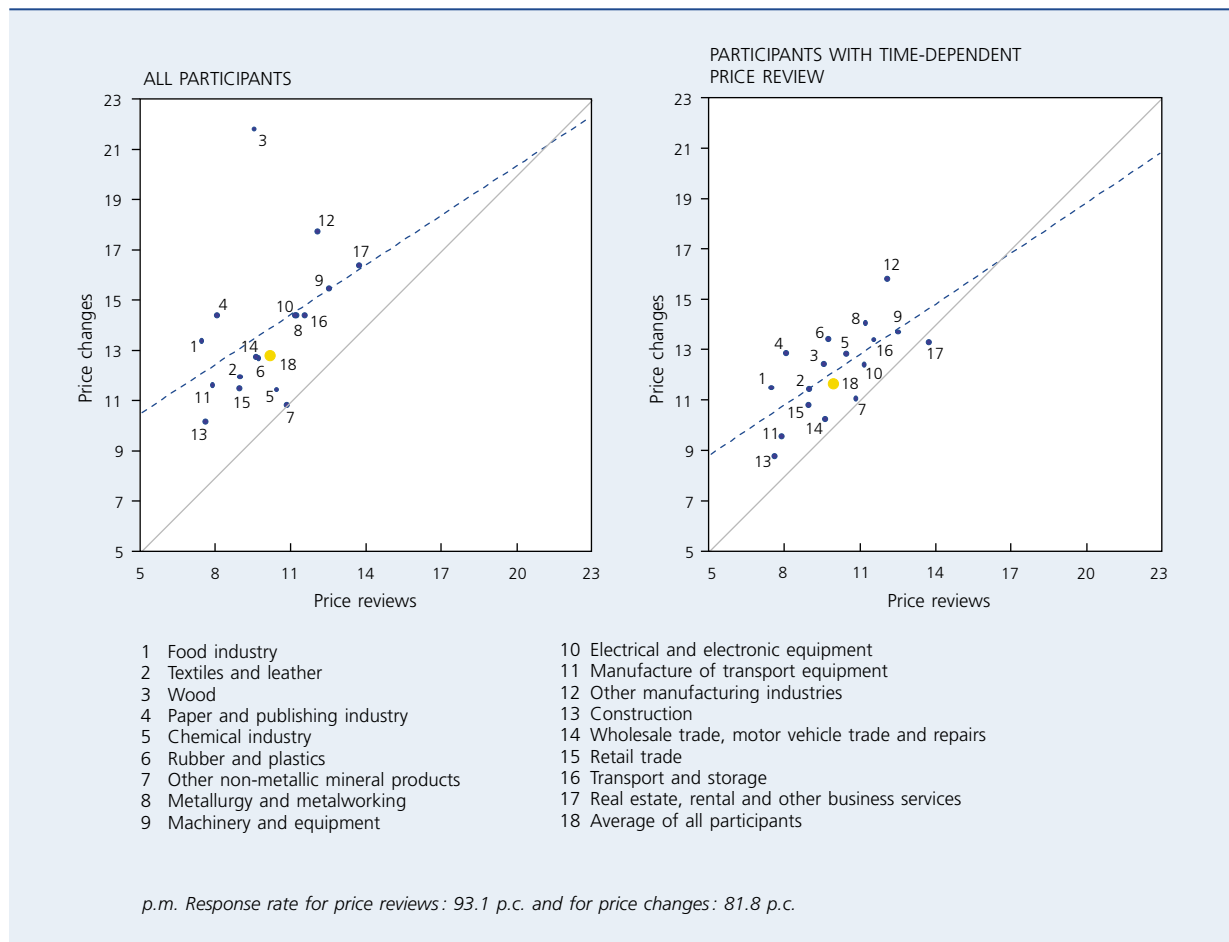
duration between price changes is longer than the duration between price reviews.

The sub-sectors which are farthest towards the upper-right-hand corner of the left-hand section of the chart have the longest average duration both between reviews and between price changes, and are therefore the most rigid. That applies in particular to the sub-sectors comprising transport and storage, and real estate, rental and other business services, which together form the more protected business services sector. Conversely, construction is the most flexible sector (bottom left-hand corner of the left-hand section of the chart). The majority of the sub-sectors in industry and wholesale trade adopt an intermediate position, while the retail trade has a slightly more flexible approach to pricing. The results for the wood sub-sector are surprising. Although prices there are reviewed at relatively frequent intervals, it appears that actual changes are rare. However, the average duration between two price changes here is greatly influenced by the responses of two firms which were not required to answer the question on the frequency of price reviews since they do not conduct time-dependent price reviews.

Once firms adopting state-dependent price-reviewing have been excluded, the same sample is used to compare the average duration between two price reviews and two price changes. The results are presented in the right-hand section of the chart. There is no fundamental change in the situation; the correlation as regards the average time lag between two price changes for all participants and for the reduced group of participants reviewing their prices on a time-dependent basis is thus 60 p.c. The only fundamental change in the situation occurs in the wood sector, where the average duration between two price changes is 12 months instead of 22 months. Leaving this sector aside, the correlation as

**CHART 4** QUESTIONS B1b AND B5: PRICE REVIEWS AND PRICE CHANGES BY SUB-SECTORS

(Average duration between 2 successive reviews or between 2 successive changes)



Source : NBB.

regards the average duration between two price changes for the participants as a whole and for the smaller group who review their prices on a time-dependent basis is 82 p.c. However, the average duration between two price changes generally becomes slightly shorter if only firms which review their prices on a time-dependent basis are taken into account.

The firms which generally make time-dependent changes and which also review their prices exactly once a year (i.e. around 40 p.c. of the total number of participants) were also asked to state the month in which the operation takes place. In 43 p.c. of cases (around 16 p.c. of all participants), the reviews are carried out in January, compared to 9 p.c. in December and 8 p.c. in March. The other months each have a share of less than 5 p.c. The most marked synchronisation of price reviews in January is found in business services.

Overall, these results show a considerable level of price rigidity. Furthermore, they are broadly in line with the results of the analysis of the Belgian micro data for the calculation of the CPI (Aucremanne and Dhyne, 2004). The great majority of prices change fairly infrequently: in 50 p.c. of cases, less than once every 13 months. However, for certain product categories (unprocessed food and petroleum products) price changes are much more frequent. In this analysis, service prices also seem to have above-average rigidity with price changes tending to be concentrated in January. This analysis also noted the characteristics of time-dependent and state-dependent price-setting.

## 2.4 Causes of price rigidity

The survey also made it possible to examine the reasons for rigid pricing. In this regard, it is probably an exceptional source of information. For this purpose, a fairly long list of fifteen possible explanations for price rigidity was included in the questionnaire, and participants were

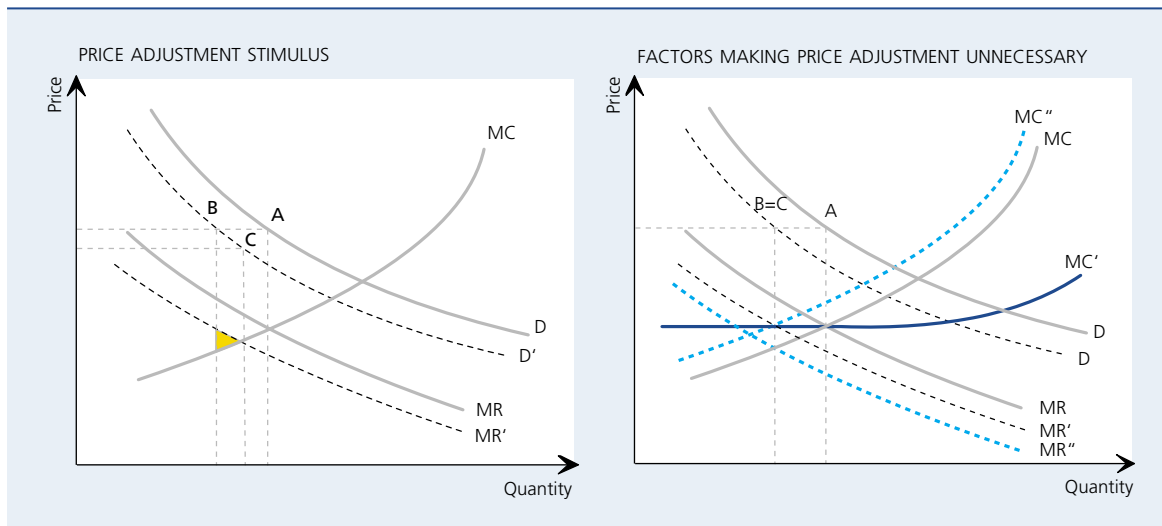
asked to indicate, by means of a score of 1 to 4, the importance of each of these explanations for their firm. This list concerns both nominal and real price rigidities (cf. box 2). The possible explanations had to be expressed intuitively in situations arising in the life of the firm. This was probably the most difficult part of the survey. Despite the difficulty, the response rate was very high (94 p.c.).

### Box 2 – Nominal and real rigidities as explanations for price rigidity

Price rigidity is due to both nominal and real rigidities. Nominal rigidities refer to the low frequency of price adjustments on account of the adjustment costs, while real rigidities refer to the fact that, even in the absence of price adjustment costs, the real or relative price does not change substantially if the aggregate output changes. This real or relative price can in turn be broken down into a real marginal cost and a desired mark-up. Each of these elements may be a source of real rigidity, as illustrated below, based on Romer (2001).

For this purpose, it is assumed (left-hand section of the chart) that a (representative) firm is initially in a state of equilibrium with flexible prices. Profit maximisation causes it to produce the quantity at which marginal revenues (MR) equal marginal costs (MC) and to charge a price which is equal to the marginal costs plus a mark-up. This corresponds to point A on the demand curve (D). When aggregate demand falls, the demand curve and the curve for the marginal revenues of the firm in question shift inwards. If the firm leaves its price unchanged, the quantity produced will be determined by the quantity of demand at that price. In this new equilibrium, in the case of price rigidity – corresponding to point B – the shift in the demand curve is fully reflected in a decline in the quantity produced.

#### REAL RIGIDITY



However, at this level of output marginal revenues exceed marginal costs, so that it is in fact in the firm's interests to cut its price in order to increase production to the point at which the marginal costs are once again equal to the marginal revenues. That is the case at point C, which is the new equilibrium at flexible prices. At this point, the shift in the demand curve is divided between a fall in the price and a fall in the quantity produced, so that the impact on the latter is less than in the case of price rigidity.



The area of the yellow triangle in the chart corresponds to the increase in profits accompanying such a price adjustment and therefore measures the benefit for the firm in adjusting its price. Of course, the firm will compare this increase in profits with the costs associated with the price adjustment and, depending on the outcome of that appraisal, it may or may not change its price. For a given level of price adjustment costs – i.e. for a given level of nominal rigidity – the probability that price rigidity will be compatible with a state of equilibrium increases as the triangle in question becomes smaller. Real rigidity is a generic term designating all the factors which lead to a smaller triangle. The right-hand section of the chart gives an illustration of what these factors may be.

A primary source of real rigidity lies in the fact that fluctuations in demand may have little or no influence on real marginal costs, because the marginal cost curve is flat (as in the case of curve MC') or because it is subject to counter-cyclical shifts. In the case of a negative demand shock, the curve then moves upwards (towards curve MC''). It may also be that the potential cyclical character of marginal costs (curve MC) is offset by counter-cyclical movements in the mark-up, reinforcing the inward shift in the marginal revenue curve (as in the case of the curve MR'). Each of these examples illustrates an extreme situation of real rigidity, giving rise in all cases to the total disappearance of the yellow triangle, so that the new flexible price equilibrium corresponds to the new rigid price equilibrium. In other words, the degree of real rigidity is so large, in this example, that no nominal rigidity is required for price rigidity to be an equilibrium. In practice, however, the two phenomena coexist to some extent, and it is actually their interaction that causes price rigidity.

The above is also true, *mutatis mutandis*, in the case of an increase in aggregate demand.

#### 2.4.1 Ranking of the possible explanations for price rigidity

A ranking was drawn up on the basis of the average scores obtained by each of the possible explanations for price rigidity. The first column in table 9 indicates the underlying theoretical concept and, in brackets, the corresponding code for the intuitive wording used in the questionnaire. The second column describes the type of rigidity, according to the classification explained in box 2.

Ranked at the top are two explanations with respect to nominal rigidity theories. The first of these is the *implicit contracts* theory, which is formulated as follows in the questionnaire: "our customers prefer a stable price and a change could damage customer relations, even if our competitors also change their price". The firms therefore want to avoid upsetting the customers and do not adjust their prices too often. The proviso "even if our competitors also change their price" is the factor permitting this explanation to be ranked among the nominal rigidities. It is in fact the expression of displeasure at price adjustments in general, unconnected with any change in the relative price. This explanation is immediately followed by another, offered by the *explicit contracts* theory whereby the existence of a written contract means that the price can only be changed if the contract is renegotiated. The predominance of the two theories is in line with the results already mentioned in regard to the main customers. They showed that a

large part of the turnover (over 40 p.c. on average) comes from customers with whom there is a long-term relationship. In industry and business services, where the score of implicit and explicit contracts is slightly above average, the share of this type of customer relationship is actually close to 60 p.c.

Ranked third is an explanation offered by the *flat marginal costs curve* theory, stated as follows in the questionnaire: "our variable costs do not change much over the business cycle, which contributes to the price of our product remaining roughly the same". The real marginal costs curve may be flat – which means that marginal costs do not show any pronounced pro-cyclical movement – because real wages are not very pro-cyclical or because the organisation of the production process is flexible.

Next come four explanations relating to counter-cyclical movements in the desired mark-up. The first puts the emphasis on the *importance of fixed costs and/or liquidity constraints*, which are grouped together in one theory. According to the theory, during a recession, when cash-flow is low, the price has to be maintained (which means increasing the mark-up) in order to continue to have sufficient liquidity. Two elements are in fact combined. First, it is assumed that customers only respond gradually to a price reduction and that it therefore takes some time for the reduction to generate an increase in turnover. Next, it is assumed that there are capital market

**TABLE 9** QUESTION B4: RANKING OF THE POSSIBLE EXPLANATIONS FOR PRICE RIGIDITY  
(Average scores)

	Type of rigidity	Industry	Construction	Trade	Business services	Total
Implicit contracts (244) . . . . .	N	2.6	2.5	2.4	2.6	2.5
Explicit contracts (241) . . . . .	N	2.9	2.9	1.8	2.7	2.4
Flat marginal costs curve (247) . . . . .	R/A	2.3	2.6	2.4	2.5	2.4
Importance of fixed costs/liquidity constraints (246) . . . . .	R/B	2.2	2.4	2.2	2.2	2.2
Kinked demand curve (245) . . . . .	R/B	2.4	2.0	2.3	2.0	2.2
Shifting customer clientele (251) . . . . .	R/B	1.9	2.1	2.2	2.1	2.1
Thick-market demand (248) . . . . .	R/B	2.0	1.9	2.3	1.8	2.0
Judging quality by price (254) . . . . .	N	1.7	1.9	2.1	2.0	1.9
Thick-market supply (249) . . . . .	R/C	1.7	1.8	1.9	1.7	1.8
Risk of having to readjust price in the opposite direction (253) . . . . .	N	1.8	1.6	1.8	1.7	1.8
Changing non-price elements (255) . . . . .	N	1.9	2.0	1.6	1.6	1.7
Counter-cyclical financing costs (250) . . . . .	R/C	1.6	1.8	1.7	1.7	1.7
Psychological price thresholds (252) . . . . .	N	1.4	1.6	2.0	1.6	1.7
Information-gathering costs (243) . . . . .	N	1.6	1.7	1.6	1.6	1.6
Physical menu costs (242) . . . . .	N	1.5	1.5	1.6	1.4	1.5
<i>p.m. Response rate</i> . . . . .		94.2	93.3	88.9	93.8	91.9

Source : NBB.

(...) Corresponding code in the questionnaire.

N : Nominal rigidity.

R/A : Real rigidity/flat real marginal costs curve.

R/B : Real rigidity/counter-cyclical movements in desired mark-ups.

R/C : Real rigidity/counter-cyclical shifts in the real marginal costs curve.

imperfections which lead to liquidity constraints. These are due to a reduction in cash-flow combined with the fact that a (major) part of the costs remains constant. During the last cyclical slowdown, for example, the emphasis was often on the fact that firms had to restructure their balance sheets and that this factor prevented them from lowering their prices (or increasing them by less than they eventually did); in the end, this limited the cyclical fall in inflation.

According to the *kinked demand curve* theory, firms are not tempted to be the first to change their prices. They are afraid that their competitors will not follow suit with a (relative) price increase and that they will thus lose market share. A (relative) reduction in price could spark a process prejudicial to all the market players. In both cases, firms prefer to wait for their competitors to act before then doing the same. Meanwhile, they prefer to adjust their mark-up downwards (or upwards) when marginal costs increase (or fall) during an upturn (or downturn) in economic activity.

The theoretical concept of *shifting customer clientele* suggests the existence of two types of customers. On the one hand, there are loyal customers with low demand elasticity, and on the other there are customers who are less loyal, presenting higher demand elasticity. Since the loyal customers remain customers during a recession, the price elasticity of demand is lower than during boom periods. Consequently, the mark-up can be increased during a recession, so that the price can remain unchanged or only a small reduction is needed. During a boom, the opposite happens: high elasticity, lower mark-up and prices unchanged or only slightly increased.

The last explanation concerning counter-cyclical mark-ups relates to *the thick-market on the demand side*. It is worded as follows: "when our customers buy a lot, they have more interest in comparing prices than when they don't buy a lot. They are more sensitive to price changes in booms than in recessions". This implies that the elasticity of demand is greater during periods of expansion,

which depresses prices by a reduction in the mark-up. During recessions, the elasticity of demand is less and the mark-up is higher, preventing prices from falling.

Ranked eighth is the theoretical concept of *judging quality by price*, which applies only in the case of a price reduction; according to this theory, if prices are reduced, customers may think that the product quality has declined. This could prevent price reductions.

Apart from the *thick-market effects* on the demand side, similar effects on the *supply side* may obviate the need to adjust prices. In a period of prosperity, the costs of attracting customers are reduced, keeping prices at a low level. This theory suggests the existence of counter-cyclical shifts in the marginal cost curve, caused by economies of scale.

Next come two concepts relating to nominal rigidities. The first shows the *risk of having to readjust the price in the opposite direction*. The firms therefore prefer to take no decision in order to minimise their price adjustment costs. The second suggests that an increase in demand can be absorbed by *changing non-price elements*, such as longer delivery times.

The explanation offered by the theory of *counter-cyclical financing costs* ranks twelfth. Owing to capital market imperfections, external financing becomes more expensive during recessions. This keeps marginal costs – and hence prices – at a high level. Of course, this explanation of price rigidity may also be applied – *mutatis mutandis* – to a boom situation.

Bottom of the list are three explanations relating to nominal rigidities. The use of *psychological price thresholds* may hamper price adjustments unless the firm can immediately switch to a new attractive price. This may be a price that is rounded off (ending in “0” or “5”) or it may be a “psychological” price (ending in “9”). This nominal price rigidity source gets, on average, low scores.

The low scores of the two explanations connected with the nominal rigidity theory with respect to the costs entailed in the price adjustment process are slightly surprising. The fact that the concept of *information-gathering costs* comes bottom of the list is at odds with the finding that the price review process is rigid – prices are only reviewed every 10 months, on average – and with the fact that this process is not always based on a full range of relevant information. The two results could be consistent if the relatively low score for information-gathering costs related to the limited information used for non-optimum price-setting. *Physical menu costs*,

which are often mentioned in the economic literature as an explanation for price rigidity, are right at the bottom of the list. This may be due to the literal way in which the term is interpreted, namely the presence of physical price adjustment costs such as those entailed in printing new catalogues, changing price labels, etc. In the macroeconomic literature, on the other hand, menu costs generally have a wider meaning and implicitly cover a broad range of (fixed) costs associated with price adjustments.

Two exceptions aside, the ranking differs little between sectors. In trade, far less importance is attached to the explicit contracts theory. On the other hand, firms in the trade sector give a higher score to the use of psychological price thresholds. The analysis of the sub-sectors reveals that these two characteristics are still more pronounced in the case of the retail trade. That seems logical, since the retail trade is far more geared towards direct sale to consumers: in their case, explicit contracts are probably rare but price thresholds are very widely used.

#### 2.4.2 International comparison

Although the similar surveys in other countries were conducted in different ways, the list of theories tested was different (the number of theories tested is indicated in brackets in the table) and the wording used was not identical, the explanations of price rigidity most frequently cited in Belgium also head the ranking in other countries. In all countries, price rigidities are essentially explained by implicit and explicit contracts, flat marginal costs curves, the importance of fixed costs or liquidity constraints and the kinked demand theory. The explanations connected with the theories relating to information-gathering costs and the existence of physical menu costs are universally ranked very low.

Calculation of the Spearman rank correlation coefficient confirms this finding. This test is used to compare the ranking of the price rigidity explanations common to Belgium and other countries. This coefficient is positive and relatively high, indicating substantial symmetry in the ranking between the countries. It is 0.83 for the Belgium-Italy comparison (6 theoretical explanations in common), 0.80 for the Belgium-Sweden comparison (12 theoretical explanations in common), 0.63 for the Belgium-UK comparison (9 theoretical explanations in common) and 0.46 for the Belgium-US comparison (10 theoretical explanations in common).

**TABLE 10** RANKING OF POSSIBLE EXPLANATIONS FOR PRICE RIGIDITY: INTERNATIONAL COMPARISON

	Type of rigidity	Belgium (15)	Sweden (13)	US (12)	GB (11)	Italy (6)
Implicit contracts (244) . . . . .	N	1	1	4	5	–
Explicit contracts (241) . . . . .	N	2	2	5	1	1
Flat marginal costs curve (247) . . . . .	R/A	3	3	2	2	–
Importance of fixed costs/liquidity constraints (246) . . . . .	R/B	4	6	–	–	–
Kinked demand curve (245) . . . . .	R/B	5	4	1	3	2
Shifting customer clientele (251) . . . . .	R/B	6	8	7	9	–
Thick-market demand (248) . . . . .	R/B	7	12	–	–	–
Judging quality by price (254) . . . . .	N	8	–	12	10	–
Thick-market supply (249) . . . . .	R/C	9	10	–	–	–
Risk of having to readjust price in the opposite direction (253) . . . . .	N	10	–	–	–	3
Changing non-price elements (255) . . . . .	N	11	–	3	8	–
Counter-cyclical financing costs (250) . . . . .	R/C	12	5	–	–	–
Psychological price thresholds (252) . . . . .	N	13	7	8	4	5
Information-gathering costs (243) . . . . .	N	14	13	6	–	6
Physical menu costs (242) . . . . .	N	15	11	6	11	4
Spearman rank correlation coefficient . . . . .			0.80	0.46	0.63	0.83
(number of explanations in common) . . . . .			(12)	(10)	(9)	(6)

Sources: Apel et al., Fabiani et al., Blinder et al., Hall et al., NBB.

(...) Corresponding code in the questionnaire.

N: Nominal rigidity.

R/A: Real rigidity/flat real marginal costs curve.

R/B: Real rigidity/counter-cyclical movements in desired mark-ups.

R/C: Real rigidity/counter-cyclical shifts in the real marginal costs curve.

The results show that both nominal and real rigidities play a role in the price adjustment process and that the interaction between the two is important for a good understanding of inflation dynamics. This finding is in line with both recent advances in theories on this subject<sup>(1)</sup> and with recent empirical tests conducted on the basis of general equilibrium models<sup>(2)</sup>.

### 2.5 Factors prompting price adjustments

It is also important to know how prices react to shocks and how the reaction differs in the case of a price increase or a price reduction. In question B3, participants were asked to indicate the importance of a series of factors prompting either a price increase or a price reduction. Cost factors, namely labour costs and other production costs, seem to be the main cause of *price increases* and their average scores are noticeably higher than those of other factors – often defined as exchange rate fluctuations – and higher than the score for a price

increase by the competitor(s). Variations in demand, financial costs and a decline in productivity receive the lowest scores.

Competitors' prices are the reason most frequently cited for *price decreases*. Next come three factors which receive very similar average scores, namely demand fluctuations, other factors – apart from exchange rate fluctuations, often defined as "at the customer's request" –, and other production costs. Labour costs, increases in productivity and financial costs receive the lowest scores.

To sum up, it can be said that firms react asymmetrically to shocks. Cost factors are the main cause of price increases, while competitors' prices and variations in demand are the most important reasons for price reductions. However, the significance of this asymmetry is

(1) Cf. Romer (2001), for example.

(2) Cf. Eichenbaum and Fisher (2004), for example.

**TABLE 11** QUESTION B3: FACTORS PROMPTING A PRICE INCREASE / PRICE REDUCTION  
(Average scores)

	Industry	Construction	Trade	Business services	Total
<b>Price increase</b>					
Labour costs	3.0	3.5	2.5	3.3	2.9
Other production costs	3.1	2.9	2.8	2.7	2.9
Other factors	2.3	2.6	3.2	2.2	2.6
Competitors' price	2.7	2.3	2.6	2.3	2.5
Demand	2.3	2.5	2.0	2.3	2.2
Financial costs	2.0	2.5	2.3	2.2	2.2
Productivity	2.1	2.4	1.9	1.9	2.0
<b>Price decrease</b>					
Competitors' price	3.1	2.6	3.0	2.5	2.9
Demand	2.7	2.8	2.5	2.4	2.5
Other factors	2.5	2.1	3.1	1.5	2.4
Other production costs	2.6	2.4	2.2	2.1	2.3
Labour costs	2.1	2.7	1.9	2.2	2.1
Productivity	2.2	2.4	1.9	2.0	2.0
Financial costs	1.6	2.1	1.8	1.8	1.8
<i>p.m. Response rate (excluding "other factors")</i>					
Price increase	92.8	94.1	87.7	93.7	91.1
Price decrease	87.9	89.5	79.3	83.9	83.4

Source : NBB.

uncertain, since the response rate was much higher for price increases (91 p.c.) than for price reductions (83 p.c.). Moreover, the average scores for price reductions are generally lower. This could imply that firms are not used to seeing prices fall, and therefore do not answer this set of questions, or they tend to class all the factors as not very important. It is also possible that a firm which has not recently encountered a reduction in costs is not inclined to state that this could lead to a reduction in prices. Since firms are more used to seeing a decline in demand, that may explain the higher score for the latter factor.

The most marked sectoral differences concern trade, where "other factors" score the highest for both a price increase and a price reduction. In industry, above-average importance is attached to changes in competitors' prices, and that is true of both price increases and price reductions. These results appear to confirm once again that industry is the sector most exposed to competition.

## 2.6 Characteristics of firms with flexible or rigid pricing

By crossing the answers to different questions, it is possible to reveal some characteristics of firms with flexible pricing and firms with rigid pricing. A firm for which the average duration between two successive price changes is 3 months or less is regarded as a firm with flexible pricing. The choice of that threshold is dictated by the fact that a quarter is the minimum frequency used in macroeconomic models, even though an average duration of 3 months between two price changes is not in itself a sign of great flexibility. A firm with rigid pricing is defined as one for which the average duration between two successive price changes exceeds 12 months. In principle, all firms which deviate from the criterion used for firms with flexible pricing – in this case, an interval of 3 months or less – must be regarded as firms with rigid pricing. However, it proved necessary to remove from the analysis the large group of firms which change their prices annually, otherwise the results would have been less clear. Firms in that group in fact have divergent characteristics, even if they all change their prices with the same frequency.

**TABLE 12** FIRMS WITH FLEXIBLE PRICING AND RIGID PRICING

(Average scores, unless otherwise stated)

	Firms with flexible pricing <sup>(1)</sup>	Firms with rigid pricing <sup>(2)</sup>
<b>Firms with flexible pricing face more competition</b>		
A4 – Over 5 competitors (p.c.)	82	67
A6 – Average fall in turnover (p.c.)	56	36
A9 – The price is set according to the price of the main competitor(s)	2.8	2.8
B3 – Importance of competitors' prices for a		
price increase	2.6	2.3
price reduction	3.0	2.6
C2 – Importance of competitors' prices in the pricing-to-market strategy	3.5	3.1
<b>Firms with flexible pricing have fewer long-term customer relationships (A5)</b>		
Over 50 p.c. of the main customers are		
group companies (p.c.)	6	8
companies outside the group having a long-term relationship (p.c.)	22	35
<b>Firms with flexible pricing are slightly more geared towards exports</b>		
Turnover achieved on foreign markets (p.c.)	46	38
<b>Optimum pricing (B2a/b)</b>		
We applied a rule of thumb (p.c.)	24	34
We have considered a wide range of information (p.c.)	76	66
concerning the present context (p.c.)	35	36
concerning the present and future context (p.c.)	41	30
<b>Firms with flexible pricing attach less importance to the possible explanations for price rigidity</b>		
Explanations for nominal rigidity	1.9	2.0
Explanations for real rigidity	2.1	2.1

Source: NBB.

(1) Firms for which the average duration between two successive price changes is 3 months or less.

(2) Firms for which the average duration between two successive price changes exceeds 12 months.

An initial conclusion drawn from the cross-analysis is that firms with flexible pricing seem to be more exposed to competition; 82 p.c. of firms with flexible pricing have more than 5 competitors, while that is true of only 67 p.c. of firms with rigid pricing. Moreover, demand elasticity is greater in firms practising flexible pricing. They also attach more importance to their competitors' prices in deciding to increase or lower their price, and in applying a pricing-to-market strategy. On the other hand, it is not possible to distinguish clearly between the two groups as regards the average score for the price-taker option, worded as follows: "we set our price according to the price of the main competitor(s)". These findings tend to suggest that competition fosters price flexibility.

Second, firms with flexible pricing have fewer long-term relationships with customers (companies in the same group or external companies with which they explicitly state that they have a long-term relationship). The existence of such relationships seems to enhance price rigidity.

Third, firms practising flexible pricing are slightly more geared towards exports. This conforms to the finding whereby they face greater competition, since the firms in section C of the questionnaire state that they have less market power on foreign markets than on the Belgian market.

The results concerning the extent to which pricing is optimal are hard to interpret. If a firm with rigid pricing adjusts its price, one would expect the new price to be optimum immediately, i.e. that all the available relevant information concerning the present and future context

will have been taken into account. Yet according to the survey results, it seems that firms with rigid pricing most often applied a rule of thumb, and that their pricing behaviour is less forward-looking than in the case of firms with flexible pricing. This disconcerting result may be due to the fact that the question concerns only the last price revision, and cannot measure the firm's structural characteristics in that respect.

Finally, firms with flexible pricing attach slightly less importance to the possible explanations for price rigidity, as their average score in respect of the nominal rigidity theories is slightly lower than for firms practising rigid pricing. In the case of the real rigidity theories, however, the average score is no different; but overall, this finding is in line with expectations based on the economic literature, namely that the nominal theories play a more crucial role in the overall degree of price rigidity. Without nominal rigidity, the real rigidities will generally lead to minor price adjustments, but not infrequent price adjustments.

### 3. Conclusion

Belgian firms evidently operate in a context different from a perfect competition situation. Firms do have some market power, and that is greater on the Belgian market than abroad. The majority of industrial firms apply a pricing-to-market strategy. It seems that all the conditions are met for the price decision-making process to be meaningful and for price rigidity to be an equilibrium (temporarily).

However, that does not mean that customer relationships and competitors' behaviour are not important for the price-setting behaviour of Belgian firms, since they class competitors' prices as a key factor determining their own price and prompting price adjustments; that applies more to price increases than to price reductions. Overall, competitors' prices play a slightly more important role in industry. Other survey results also suggest that the

environment in which industrial firms operate, is generally more competitive than it is for the other sectors. Costs also play an important role in price-setting behaviour, slightly more so for increases than for reductions, while demand fluctuations seem to be primarily a reason for cutting prices.

As regards the frequency and timing of price adjustments, the survey results indicate a relatively high degree of price rigidity. The average time elapsing between two successive price reviews totals 10 months, and between two successive price changes it is 13 months. The highest degree of price rigidity is found in business services, and the lowest in construction. In the majority of firms, price reviews are time-dependent when the situation is normal. If sufficiently significant economic shocks occur, however, the process becomes largely state-dependent.

The explanations for price rigidity concern both nominal and real rigidity. The former are essentially connected with the existence of implicit and explicit contracts, physical menu costs and costs related to the gathering of information relevant for the price-setting decision playing only a minor role. Real rigidities concern mainly: a) a flat cyclical marginal costs curve; b) various sources of counter-cyclical movements in the desired mark-up. These findings conform to the recent economic theory in which the interaction between the two types of rigidities is specifically proposed as an explanation for the inertia in the price-setting.

Moreover, only one-third of firms conducted their last price review on the basis of a full set of information which also incorporated expectations concerning the future, while the other firms base their decisions on more limited information or apply a rule of thumb. The approach to pricing focuses more on the future in industry, while business services make greater use of rules of thumb. The fact that a high proportion of firms practise pricing which is not geared to the future may be an additional source of inertia in the inflation process.

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**A5** How much per cent of your turnover do you generate by selling your main product to:

- |   |       |
|---|-------|
| - companies and divisions within your own group                     | ....% |
| - companies outside your own group with a long-term relationship    | ....% |
| - companies outside your own group without a long-term relationship | ....% |
| - directly to consumers   | ....% |
| - government  | ....% |
|   | 100%  |

**A6** If you decided to increase the price of your main product by 10%, all other factors remaining unchanged (including competitors' prices), by what percentage would the turnover of your main product fall?

by .....%                       I don't know

**A7** Different factors can determine your competitiveness. What is the importance in your company of the factors listed below?

*please quote the relevant importance for each answer, by selecting one of the options:*

**1** = unimportant   **2** = of minor importance   **3** = important   **4** = very important   **?** = I don't know

- the price of our product
- the quality of our product
- the degree to which our product can be distinguished from that of our competitors
- delivery period
- long-term relationship with customers
- the after-sales service
- other factors; please specify .....

**A8** Does your firm have the possibility to set the price of the main product itself, or is it set by somebody else? (tick only one answer please)

- |   |                         |   |                         |
|---|-------------------------|---|-------------------------|
| <input type="checkbox"/> <sub>1</sub> we set our price ourselves                        | ☞ continue to <b>A9</b> | } | ☞ continue to <b>B5</b> |
| <input type="checkbox"/> <sub>2</sub> our price is set by the government                |                         |   |                         |
| <input type="checkbox"/> <sub>3</sub> our price is set by the parent company/group      |                         |   |                         |
| <input type="checkbox"/> <sub>4</sub> others set the price;<br>please specify who ..... |                         |   |                         |

**A9** There are various ways of setting the price of your main product. How well do the following methods apply to the situation in your company?

*please quote the relevant importance for each answer, by selecting one of the options:*

**1** = unimportant   **2** = of minor importance   **3** = important   **4** = very important   **?** = I don't know

- we set our price fully according to our costs and a completely self-determined profit margin
- we set our price according to the price of our main competitor(s), meaning that we do not determine our profit margin ourselves

**Part B - Price adjustments**

**B1a** When do you review the price you want to charge for your main product (this does not necessarily mean that the price actually changes)? (tick only one answer please)

- |   |   |                          |
|---|---|--------------------------|
| <input type="checkbox"/> <sub>1</sub> at specific time intervals  | } | ☞ continue to <b>B1b</b> |
| <input type="checkbox"/> <sub>2</sub> mainly at specific time intervals, but also in reaction to specific events<br>(e.g. a considerable change in our costs) |   |                          |
| <input type="checkbox"/> <sub>3</sub> in reaction to specific events<br>(e.g. a considerable change in our costs)   | } | ☞ continue to <b>B2a</b> |
| <input type="checkbox"/> <sub>4</sub> I don't know  |   |                          |

**B1b** If you review your prices at specific time intervals, how often does this occur (this does not necessarily mean that the price actually changes)? (tick only one answer please)

- |   |                                 |
|---|---------------------------------|
| <input type="checkbox"/> <sub>1</sub> more than once a year | ☞ how many times a year? .....  |
| <input type="checkbox"/> <sub>2</sub> once a year           | ☞ in which month? .....         |
| <input type="checkbox"/> <sub>3</sub> less than once a year | ☞ once in how many years? ..... |

**B2a** How did you review the price of your main product the last time? (tick only one answer please)

- <sub>1</sub> we have applied a rule of thumb (e.g. a fixed amount/percentage change, indexation based on the consumer price index, ...) ☞ continue to **B3**
- <sub>2</sub> we have considered a wide range of information (demand, costs, competitors' price ...) relevant for profit maximisation within our company ☞ continue to **B2b**

**B2b** If you considered a wide range of information the last time you reviewed the price, what was it related to? (tick only one answer please)

- <sub>1</sub> this range of information was only related to the present context in which our company operates
- <sub>2</sub> this range of information was related both to the present and to the expected future context in which our company operates

**B3** Which factors cause you to raise/lower the price of your main product?

*please quote the relevant importance for each answer, by selecting one of the options:*

**1** = unimportant   **2** = of minor importance   **3** = important   **4** = very important   **?** = I don't know

*The importance of each factor may be different from one column to the other.*

Factors causing a price increase

- an increase in our labour costs
- an increase in our financial costs
- an increase in our other costs
- an decrease in our productivity
- an increase in demand
- an increase in our competitors' price
- other factors  
please specify .....

Factors causing a price decrease

- a decrease in our labour costs
- a decrease in our financial costs
- a decrease in our other costs
- a increase in our productivity
- a fall in demand
- a decrease in our competitors' price
- other factors;  
please specify .....

**B4** There can be various reasons as to why a price is not (or only very slightly) changed during a certain period. Please indicate their importance in your company.

*please quote the relevant importance for each answer, by selecting one of the options:*

**1** = unimportant   **2** = of minor importance   **3** = important   **4** = very important   **?** = I don't know

- we have a written contract with our customers specifying that the price can only be adjusted when the contract is renegotiated
- price changes entail "physical" costs (e.g. printing new catalogues, changing price tags, adjusting the website, ...)
- it is costly in terms of time and/or money to collect relevant information for pricing decisions
- our customers prefer a stable price and a change could damage customer relations, even if our competitors also change their price
- there is a risk that competing companies might not adjust their prices and that we might be first. So we wait for our competitors to act, and then follow suit.
- in a recession, when cashflow is low, our price may need to be kept up in order to have sufficient liquidities at one's disposal. A substantial part of our costs is indeed fixed, whereas it takes some time before a price decrease results in a higher turnover.
- our variable costs do not change much over the business cycle, which contributes to the price of our product remaining roughly the same
- when our customers buy a lot, they have more interest in comparing prices than when they don't buy a lot. They are more sensitive to price changes in booms than in recessions.
- during economic booms the costs incurred by the company to reach customers decline. This contributes to keeping our price down.
- during an economic recession, it is more difficult to obtain external financing (e.g. bank loans). This contributes to keeping our price up.
- our customer mix changes over the business cycle, during a recession we lose our least loyal customers, while more loyal customers remain. As the latter are less price-sensitive, our price can be left unchanged during a recession.
- our price is set at an attractive threshold (e.g. 4.99 euro or 25.00 euro) and is only changed when it is convenient to move to a new attractive threshold
- there is a risk that we subsequently have to readjust our price in the opposite direction
- we are afraid that customers will interpret a price reduction as a reduction in quality
- an increase in demand for our product is met by elements other than a price increase, e.g. an extension of the delivery period

**B5** How often does the price of your main product actually change, including reductions, but excluding sales or sell-off? (tick only one answer please)

- <sub>1</sub> more than once a year ☞ how many times a year? .....
- <sub>2</sub> once a year
- <sub>3</sub> less than once a year ☞ once in how many years? .....

**Part C - Pricing behaviour on other markets than the main market**

(only to be filled out by companies for which the market mentioned in **A3** is not the only market)

**C1** You may have different prices according to the market on which you operate. Which of the following statements best describes your main product? (tick only one answer please)

- <sub>1</sub> the price denominated in euro is the same for all countries ☞ continue to **C3**
- <sub>2</sub> the price denominated in euro is the same for all euro area countries, but not for non-euro area countries  
☞ continue to **C2**
- <sub>3</sub> the price denominated in euro is different, both for euro area countries and for non-euro area countries  
☞ continue to **C2**

**C2** What is the importance of the following factors in a differentiated price-setting behaviour between markets?  
please quote the relevant importance for each answer, by selecting one of the options:

**1** = unimportant **2** = of minor importance **3** = important **4** = very important **?** = I don't know

- exchange rate movement of the currency used for payment
- tax system on the market (e.g. VAT-rate)
- structural market conditions on the market (e.g. taste, standard of living,...)
- cyclical fluctuations in demand on the market
- the price of the competitor(s) on the market
- rules on the market
- other factors; please specify .....

**C3** Is competition for your main product stronger on the foreign market than on the Belgian market? (tick only one answer please)

- <sub>1</sub> yes
- <sub>2</sub> no
- <sub>3</sub> our company does not operate on the Belgian market
- <sub>4</sub> I don't know

Name and phone number of the person who filled out this questionnaire:

NAME:

.....

Phone:

.....

**Thank you for taking part in the survey.**

## Annex 2

### SECTORAL COVERAGE (NACE CODES)

(Sectors outlined in bold are covered by the survey sample)

Code	Description	Sector
01	Agriculture, hunting and related service activities	
02	Forestry, logging and related service activities	
05	Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing	
10	Mining of coal and lignite; extraction of peat	
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying	
12	Mining of uranium and thorium ores	
13	Mining of metal ores	
14	Other mining and quarrying	
15	<b>Manufacture of food products and beverages</b>	Industry
16	<b>Manufacture of tobacco products</b>	
17	<b>Manufacture of textiles</b>	
18	<b>Manufacture of wearing apparel; dressing and dyeing of fur</b>	
19	<b>Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear</b>	
20	<b>Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials</b>	
21	<b>Manufacture of pulp, paper and paper products</b>	
22	<b>Publishing, printing and reproduction of recorded media</b>	
23	<b>Manufacture of coke, refined petroleum products and nuclear fuel</b>	
24	<b>Manufacture of chemicals and chemical products</b>	
25	<b>Manufacture of rubber and plastic products</b>	
26	<b>Manufacture of other non-metallic mineral products</b>	
27	<b>Manufacture of basic metals</b>	
28	<b>Manufacture of fabricated metal products, except machinery and equipment</b>	
29	<b>Manufacture of machinery and equipment n.e.c.</b>	
30	<b>Manufacture of office machinery and computers</b>	
31	<b>Manufacture of electrical machinery and apparatus n.e.c.</b>	
32	<b>Manufacture of radio, television and communication equipment and apparatus</b>	
33	<b>Manufacture of medical, precision and optical instruments, watches and clocks</b>	
34	<b>Manufacture of motor vehicles, trailers and semi-trailers</b>	
35	<b>Manufacture of other transport equipment</b>	
36	<b>Manufacture of furniture; manufacturing n.e.c.</b>	
37	<b>Recycling</b>	
40	Electricity, gas, steam and hot water supply	
41	Collection, purification and distribution of water	
45	<b>Construction</b>	Construction

SECTORAL COVERAGE (NACE CODES) (continued)

(Sectors outlined in bold are covered by the survey sample)

Code	Description	Sector
50	<b>Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel</b>	] Trade <sup>(1)</sup>
51	<b>Wholesale trade and commission trade services, except of motor vehicles and motorcycles</b>	
52	<b>Retail trade services, except of motor vehicles and motorcycles; repair services of personal and household goods</b>	
55	Hotel and restaurant services	
60	<b>Land transport and transport via pipeline services</b>	] Business services
61	Water transport services	
62	Air transport services	
63	<b>Supporting and auxiliary transport services; travel agency services</b>	] Business services
64	Post and telecommunication services	
65	<b>Financial intermediation services, except insurance and pension funding services <sup>(2)</sup></b>	] Business services
66	Insurance and pension funding services, except compulsory social security services	
67	<b>Services auxiliary to financial intermediation</b>	
70	<b>Real estate services</b>	] Business services
71	<b>Renting services of machinery and equipment without operator and of personal and household goods</b>	
72	<b>Computer and related services</b>	
73	<b>Research and development services</b>	
74	<b>Other business services</b>	
75	Public administration and defence services; compulsory social security services	
80	Education services	
85	Health and social work services	
90	Sewage and refuse disposal services, sanitation and similar services	
91	Membership organisation services n.e.c.	
92	Recreational, cultural and sporting services	
93	Other services	
95	Private households with employed persons	
99	Services provided by extra-territorial organisations and bodies	

(1) Except commission trade services, which are included in "Business services".

(2) Only financial leasing is included in "Business services".