The Price Setting Behavior of Austrian Firms: Some Survey Evidence*†

Claudia Kwapil‡ Johann Scharler§ Josef Baumgartner¶

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Abstract

This paper explores the price setting behavior of Austrian firms based on survey evidence. Our main result is that customer relationships are a major source of price stickiness in the Austrian economy. We also find that the majority of firms in our sample follows a time-dependent pricing strategy. However, a substantial fraction of firms deviates from time-dependent pricing in the case of large shocks and switches to a state-dependent pricing strategy. In addition, we present evidence suggesting that the price response to various shocks is subject to asymmetries.

Keywords: Price setting behavior, Price rigidity

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‡Oesterreichische Nationalbank, Economic Analysis Division, Otto-Wagner-Platz 3, POB 61, A-1011 Vienna, Austria, E-Mail: Claudia.Kwapil@oenb.at.

§Oesterreichische Nationalbank, Economic Analysis Division, Otto-Wagner-Platz 3, POB 61, A-1011 Vienna, Austria, E-Mail: Johann.Scharler@oenb.at.

¶Austrian Institute of Economic Research (WIFO), Arsenal Objekt 20, POB 91, A-1103 Vienna, Austria, E-Mail: Josef.Baumgartner@wifo.at.

1 Introduction

Nominal rigidities play a key role in most macroeconomic models used for the analysis of monetary policy. In what appears to be the workhorse model for monetary policy evaluation, the fact that prices are sticky gives the central bank leverage over the real interest rate which allows monetary policy to influence economic activity via aggregate demand.[1]

Although the importance of rigidities for the monetary transmission mechanism appears to be well accepted, a better understanding of the nature of the frictions that lead to monetary non-neutrality in the short run seems to be crucial for the conduct of monetary policy since the optimal macroeconomic policy depends on the sources and the characteristics of these rigidities. Moreover, the analysis of nominal frictions is particularly relevant in the case of a monetary union, since different degrees of price stickiness in the member countries might give rise to cross-country differences in the transmission mechanism.

In this paper we investigate price stickiness in Austria. We follow the seminal work of Blinder et al. (1998) and analyze survey evidence focusing on the price setting behavior of Austrian firms.[2] Conducting a survey has the advantage that it allows to confront actual decision makers with the chain of reasoning that a specific theory of price stickiness describes. This appears to be an important advantage over assessing theories according to whether or not their testable implications are consistent with the data, since most theories share virtually the same prediction, namely that prices are sticky.[3]

The purpose of this paper is threefold. First, we present some stylized facts on price setting in Austria. In particular, we study the question whether firms follow a time-dependent or state-dependent pricing policy.

[1] See for instance Clarida et al. (1999).

[2] For similar studies focusing on other countries see Apel et al. (2001), Aucremanne and Druant (2004), Fabiani et al. (2004), Hall et al. (1997), Loupias and Ricart (2004), Hoeberichts and Stokman (2004), Wied-Nebbeling (1985).

[3] See Blinder (1991).

Second, we try to discriminate between different explanations of price stickiness advocated in the literature. This appears to be an interesting and important issue since the sources of price stickiness matter for the conduct of monetary policy. And finally, we analyze how firms react to shocks that hit the economy.

We find that time-dependent and state-dependent pricing strategies are prevalent among firms in our sample. Approximately 70 percent of the firms follow a time-dependent pricing strategy under normal circumstances. However, around 50 percent of these firms deviate from time-dependent pricing in the case of large shocks. Moreover, firms tend to react asymmetrically to shocks. While more firms adjust their prices in reaction to increasing costs than to decreasing costs, it is the other way around in the case of large demand shocks. More firms react to receding demand than to increasing demand. Overall, the average time lag between a shock to either demand or costs and the price adjustment lies in the range between four and six months. Finally, we find that the main explanation for sticky prices is the customer relationship. Firms shy away from price adjustments (especially in response to demand shocks) because they do not want to jeopardize their customer relationships. Firms that sell mostly to regular costumers are less likely to react to shocks by adjusting prices.

The remainder of the paper is organized as follows: Section 2 briefly discusses the conduct of our survey. Section 3 focuses on price reviews and price changes while Section 4 investigates the explanatory content of various theories of price stickiness for our data set. Section 5 deals with time lags relevant for price adjustments after shocks and Section 6 summarizes and concludes the paper.

2 The Survey

2.1 The implementation of the survey

When writing the questionnaire we drew upon the experience of Blinder et al. (1998) for the U.S., Hall et al. (1997) for the U.K., Apel et al. (2001) for Sweden, Wied-Nebbeling (1985) for Germany and Fabiani et al. (2004) for Italy. However, the empirical designs of these studies show some differences. Blinder et al. (1998) used a sample of 200 private firms, which were asked in face-to-face interviews. The other studies used (much) larger samples with fill-in type of questionnaires. The Austrian survey was carried out as a fill-in type of questionnaire as well, and was sent as a supplement program to the monthly WIFO Business Cycle Survey (BCS) in January 2004.[4] In total, we contacted a sample of 2427 firms from the sectors manufacturing and industry-related services (for short services hereafter) by mail and 873 firms participated in the survey.[5] Thus, we obtained an overall response rate of 36 percent which can be regarded as high given the complexity of the issue and the length of the questionnaire.[6]

As shown in Figure 1 and Table A1 in the Annex, the response rates vary considerably across sectors and firms' size. Manufacturing firms participated more often in the survey than service sector firms, and small firms (with less than 100 employees) participated above average whereas very large firms tended to refuse to answer the questionnaire.

When asking about price setting one has to deal with the issue that many firms sell several types of goods in different markets (domestic or foreign). In order to operationalize this issue we asked the respondents to think of

[4]See Appendix B for an English version of the questionnaire sent to manufacturing firms. We sent a slightly different version of the questionnaire to service sector firms. This, as well as the original German versions of the questionnaires, can be obtained form the authors upon request.

[5]We mailed the questionnaires to the decision makers of the firms (firm owners, CEOs or assistants of CEOs). In the first week of February a remainder letter was sent to approximately 1800 firms which had not responded till the end of January.

[6]The questionnaire consists of 13 sets of questions adding up to 79 detailed questions.

their main product or service (in terms of turnover) on their main market. This should avoid the problem that the respondents loose the focus and switch between different products when answering the questionnaire. We also decided to exclude some sectors a priori because the concept of a main product was less suitable for them (e.g. construction, retailing), as pointed out by Hall et al. (1997). In addition, some sectors had to be disregarded because they are not included in the WIFO-BCS sample. Overall the included sectors represent 42 percent of Austria's value added in 2001.[7]

The WIFO-BCS sample was established as a stratified sample in the 1970s and has been re-stratified several times since then. As can be seen from Figure 1 the sample and the response show a bias: industrial (intermediate goods producing) and large (well established and successful) firms are over-represented in terms of number of firms and employees, which is a common characteristic in longitudinal data sets of this kind.[8] To correct for these effects we post-stratify the answers according to the sector of activity and the size class each firm belongs to (see Table A1 in the Annex for details on the post-stratification weights).

The questionnaire collects different types of information about the participating firms. In the first part, Questions A1 - A8 enquire several characteristics of the responding firms (e.g. main product, turnover shares, market and client structure).[9] The price setting process is the focus of Questions B1 to B7. To asses the importance of different theories about sticky prices eleven theoretical concepts were translated from economic terminology to questions in everyday language (Questions B8 and B9). In Question B11 we ask about the reasons for price changes (e.g. labor costs, intermediate good price changes). Finally, the issues of asymmetries of price adjustments (in-

[7]The following sectors are covered in our survey: Manufacturing (15, 17 to 36) and some industry-related services (60, 63, 70 to 74, 90). Codes in parenthesis correspond to the NACE-2-digit classification.

[8]In the sample no newly founded firms are represented. In addition firms which did not respond four times in a row (e.g. because of bankruptcy) are excluded form the BCS.

[9]A selection of these results is reported in Appendix A, Tables A2 - A5.

creases vs. decreases), price reactions to different kinds of shocks (demand vs. cost shocks) and the influence of the size of a shock (small vs. large shocks) are addressed in Question B10.

According to the answers to Question B1, about 82 percent of the respondents are able to set prices by themselves. We restrict the analysis discussed in the following sections to these 715 firms.[10]

2.2 The economic conditions

When answering the questionnaire, the respondents were asked to answer either in a general way (i.e. how they usually react) or how they acted in the last years. Thus, their responses are a snap-shot depending among other things on the economic situation in Austria at the time the survey was conducted.

In the following we briefly sketch the macroeconomic conditions at that time (for details see Table A6 in the Annex). Caused by an international business cycle downturn, economic growth in Austria lost its momentum after 2000. From growth rates (in real terms) well above 3 percent a marked slowdown to rates below 1 percent occurred. Inflation was on a rise until May 2001 (3.4 percent) and declined afterwards to 0.8 percent in 2003.

3 Price setting behavior of Austrian firms

3.1 Time-dependent versus state-dependent pricing rules

In this section we investigate the price setting strategy of firms. The idea that economic agents cannot or do not want to change prices and wages instantaneously after shocks was introduced in the economic literature in different ways. Fischer (1977) as well as Taylor (1979, 1980) use the idea of nominal long-term labor contracts in order to inject an element of stickiness into the behavior of nominal wages. Blanchard (1983, 1986) for example

[10]The alternative answers were e.g. the parent company, the main client or a regulatory authority determines the price.

applies the idea of monopolistic competition in the goods and labor markets creating an adjustment process of wages and prices that takes some time. This enables them to model nominal shocks having an effect on the short-run behavior of output. Consequently, they argue that monetary policy can affect real output in the short-run, rational expectations notwithstanding. Modelling the timing of wage and price changes is crucial to the real effects of nominal disturbances and is thus one of the cornerstones in New Keynesian macroeconomics.

The time interval of the nominal contracts modelled e.g. by Fischer (1977) and Taylor (1979, 1980) is fixed exogenously and the length is known in advance. Calvo (1983) introduces a stochastic element in the price setting behavior by assuming that each price setter is allowed to change his or her price whenever a random signal is lit-up. These models have in common that the agents cannot change their prices whenever they like, but have to hold prices constant for a (known or unknown) period of time. They are using a time-dependent pricing rule, where the time between successive price revisions cannot be chosen by the firm.

The second strand of literature follows a different line of argument on price adjustments. Firms use state-dependent pricing rules, like the (s, S) price adjustment policy in the tradition of Barro (1972) developed further e.g. by Sheshinski and Weiss (1977). Whenever a price setter adjusts his or her price, he or she sets it so that the difference between the actual and the optimal price equals some target level S. The economic agent then keeps the nominal price at this level until the difference between the actual and the target level reaches the trigger level, s, inducing an adjustment in the nominal price level. In these models the intervals between price adjustments depend on the nature, the direction as well as on the frequency of shocks.

These two pricing policies have different consequences for price adjustments following an economic disturbance. Thus, they have different implications for the transmission of nominal shocks to the real economy. Under a state-dependent rule the firm changes its prices instantaneously after a shock (given that the shock is large enough), while with a time-dependent pricing policy it has to wait for the next opportunity. If one economy faces a higher share of firms operating time-dependent pricing rules than another economy, then - all other things being equal - this could mean a higher real effect of (large) nominal shocks in the short-run. Consequently, the effect of monetary policy on the real economy is sensitive to the share of firms using time-dependent and state-dependent pricing policies.[11]

These concepts of pricing rules are difficult to explain in a questionnaire. Especially, because it might be that firms are just able to adjust their prices at exogenous dates (like in the time-dependent rule described above) but because in the last years no shocks occurred that would have warranted a price change, the firms did not change their prices at these predefined time intervals. Thus, they might not agree on the statement that they change their prices regularly. That is why we did not ask whether they follow state-dependent and time-dependent pricing rules. Instead, we asked which strategy the firms follow when reviewing their prices (Question B6a). Following Apel et al. (2001) the respondents could choose among the following answers: (1) the firm reviews the price regularly, (2) the firm reviews the price at specific occasions, (3) in general the firm reviews its price regularly and also on specific occasions (4) for other reasons and lastly (5) the firm never checks prices without changing them. We interpret the answer-category (1) as a time-dependent rule, (2) as a state-dependent rule and (3) as normally time-dependent, with a switch to a state-dependent regime if sufficiently significant changes occur.

According to our results, which are presented in Table 1, price reviews

[11] In the case of shocks which are too small to guarantee that the difference between the actual price and the optimal price becomes large enough to trigger a price change for all firms following a state-dependent pricing strategy, it is not clear-cut whether a time-dependent or a state-dependent rule entails more flexible prices.

Table 1: Price reviewing strategies followed by Austrian firms

	Frequency	Percent
time-dependent	265.25	38.06%
state-dependent	178.73	25.64%
time- and state-dependent	210.24	30.16%
other reasons	28.45	4.08%
no review without change	14.33	2.06%
Total	697.00	100.00%

seem to be a common practice as part of the firms' pricing strategies. Nearly 98 percent of the respondents apply one of the above mentioned reviewing strategies without necessarily changing their prices. Furthermore, our results suggest that both, state-dependent and time-dependent strategies are practiced by Austrian firms. Under normal conditions (without major shocks occurring) approximately 68 percent of the firms do their price reviews at constant time intervals, while approximately 26 percent conduct their price reviews on specific occasions. This is very much in line with the results in Blinder et al. (1998) for the U.S., Apel et al. (2001) for Sweden and Fabiani et al. (2004) for Italy, who find that approximately 2/3 of the companies follow time-dependent and 1/4 state-dependent reviewing strategies under normal circumstances.[12]

However, the picture changes considerably when we allow for shifts in the reviewing policies. Approximately 30 percent of the Austrian firms will alter their behavior in response to specific events and will change to state-dependent reviewing. When significant changes occur 38 percent of the firms stick to their practice of checking their prices regularly, while nearly 56 percent apply state-dependent price reviews. Apel et al. (2001) and Fabiani et al. (2004) find that a much higher share of the firms will shift their

[12]The results in the literature mentioned above vary between 59 percent and 68 percent for firms following a time-dependent rule and between 23 percent and 30 percent following a state-dependent reviewing strategy. However, Hall et al. (1997) report that under normal circumstances nearly 90 percent of the firms in the U.K. follow a time-dependent rule and around 10 percent a state-dependent rule.

reviewing practices in response to shocks. While the share of firms applying state-dependent reviewing when they face exceptional circumstances is 56 percent in Austria, it amounts to 63 percent in Sweden and 90 percent in Italy. Following up our above considerations, these results would suggest that in response to major shocks prices should respond more flexibly in Italy than in Sweden and Austria.

In Question B11 we asked the firms what factors actually drove price adjustments in recent years. One of the twelve answer-categories the firms could choose from was, "We raise prices at regular intervals". Combining the answers from this question with the information about whether the firms follow a time-dependent or a state-dependent reviewing policy, gives the following picture: While 54 percent of the firms applying a time-dependent rule agree to the statement, "We raise prices at regular intervals",[13] this is just true for 23 percent of the firms conducting state-dependent reviews. This statistically significant difference (at the 1 percent level) suggests that there is a connection between time-dependent reviews and time-dependent price changes, as we assumed above.

To conclude, we find evidence that the firms' reviewing strategies can indeed be used as proxies for time-dependent and state-dependent pricing rules. The results indicate that both types of price setting strategies are prevalent among Austrian firms. Furthermore, we infer from the literature that the effect of monetary policy on the real economy is sensitive to the relative share of firms following time-dependent and state-dependent approaches. In Austria a relatively smaller share of firms (56 percent) apply state-dependent pricing rules in response to major shocks which suggests that the effect of significant monetary policy shocks on the real economy should be larger in Austria than in countries having a higher share of state-

[13]The respondents could choose among four different answers: (1) describes us very well, (2) applicable, (3) inapplicable and (4) completely inapplicable. We assume that firms ticking answer (1) or (2) agree with the statement, while the other firms are assumed to disagree.

Table 2: Frequency of price reviews

	Frequency	Percent
less frequently than yearly	4.09	0.8%
yearly	132.25	26.6%
half-yearly	91.66	18.4%
quarterly	125.53	25.2%
monthly	112.19	22.5%
weekly	23.72	4.8%
daily	8.56	1.7%
Total	498.00	100.0%

dependent price setters - all other things being equal.

3.2 How often do firms review their prices?

Those firms which indicated that they do periodic price reviews applying a time-dependent pricing strategy were asked at which intervals they review their prices (Question B6b). As shown in Table 2, 26.6 percent of the firms do their price reviews at a yearly frequency, 18.4 percent half-yearly and 25.2 percent quarterly. Thus, the median firm reviews the price of its main product quarterly, whereas the mode lies at a yearly frequency meaning that an annual review is the most typical practice.

Given the observed differences in the reviewing behavior, we look for a pattern explaining the divers frequencies of price reviews. However, a Chi-square test analyzing the equality of distribution over the frequency classes with respect to some firms' characteristics (like market share, export share, share of explicit contracts, etc) does not suggest any relationship at conventional significance levels. There are, however, two exceptions: the size of the firm and the industrial grouping the firm belongs to.[14] Comparing the

[14]We differentiate between small firms with less than 50 employees, medium sized firms with 50-199 employees and big firms with more then 199 employees. In distinguishing between the industrial groupings we follow the European Commission who splits the manufacturing sector into four groups: firms producing consumer non-durables, consumer durables, intermediate goods and capital goods. Furthermore, our sample comprises manufacturing related services which we add as a fifth category to our definition of industrial

share of firms in different industries that review their prices more frequently than monthly, we find that this share is 46.4 percent and 38.4 percent in the intermediate goods and capital goods sector, respectively, and below 25 percent in all the other sectors (consumer durables, consumer non-durables and services). A t-test analyzing the equality of proportions indicates a statistically significant difference in the reviewing behavior in these industries (at the 5 percent level), where firms in the intermediate goods and the capital goods sector review their prices more frequently. Moreover, we find that the size of the firm matters as an explanation for the frequency of price reviews. A Chi-square test for the equality of distribution clearly indicates (at the 5 percent significance level) that big firms review their prices more frequently than small and medium sized firms. Furthermore, we find a strong association between the size of the firms and the sectors,[15] showing that a high proportion of big firms operate in the intermediate and capital goods producing sectors. However, with this type of analysis we cannot tell which of the two characteristics is more important or whether both of them are important for explaining the difference in the reviewing behavior.

The majority of firms does not check prices continuously, instead they do it in discrete time intervals. This could have several reasons. One could be related to the (potentially lumpy) arrival of information. Thus, it might be possible that it does not make sense for firms to review their prices more often, as no additional information would be available.[16] Another reasoning could be that there are costs associated with price reviews. The finding that big firms review their prices more frequently could be an indication that the reviewing behavior is related to the costs of collecting information, as it

groupings.

[15]The test for association rejects the null hypothesis that there is no relationship between the size and the sector of a firm at the 0.1 percent level.

[16]Kashyap (1995) rejects this hypothesis. He observes different reviewing behavior also with regard to products having similar cost and demand characteristics. However, if products are alike then the arrival of the necessary information should be correlated as well.

Table 3: Frequency of price changes

	Frequency	Percent
0	112.95	23.6%
1	242.06	50.7%
2-3	72.13	15.1%
4-11	41.66	8.7%
12-49	5.92	1.2%
more than 50	3.28	0.7%
Total	478.00	100.0%

seems plausible that the structure of big firms allows for an easy access to information about costs and demand, while the collection of this information would produce higher additional costs in small and medium sized firms. If there are informational costs present then it might be optimal for firms to forego the most topical information instead of incurring these costs.

3.3 How often do firms change their prices?

The respondents were asked (Question B7), "How often do you change the price of your main product on average in a given year?" Table 3 reports that 23.6 percent of the firms answered that they do not change their prices at all, 50.7 percent change their prices once a year and 15.1 percent do it 2 to 3 times a year. Thus, nearly 90 percent of the firms adjust their prices less frequently than quarterly. The median firm changes its price yearly and also the mode of this distribution lies at the yearly frequency. Just around 10 percent of the firms change their price more often than 3 times a year. These results are in line with Apel et al. (2001), Blinder et al. (1998), Hall et al. (1997) and Fabiani et al. (2004) who also find that the modal number of price changes per year lies at the yearly frequency.

Like in the case of price reviews, we are interested to find a pattern explaining the difference in the behavior of adjusting prices. Again the size and the sector the firms operate in explain some of the difference in

Table 4: Cumulated frequency distribution of price reviews and price changes

	Review	Price change
weekly or more frequently	6.48%	0.69%
monthly or more frequently	29.01%	1.93%
quarterly or more frequently	54.21%	10.64%
half-yearly or more frequently	72.62%	25.73%
yearly or more frequently	99.18%	76.37%

the frequency of price changes. A Chi-square test analyzing the equality of distribution over the frequency classes rejects the null hypothesis in both cases at the 5 percent level. This result points into the same direction as the result on price reviews. Big firms and firms in the intermediate and capital goods producing sectors change their prices more frequently.

3.4 The relation between price reviews and changes

Price changes occur considerably less frequently than price reviews. As shown in Table 4 nearly 30 percent of the firms review their prices monthly or more frequently, while just around 2 percent of the firms change their prices at that frequency. The median firm reviews its price quarterly and adjusts its price once a year. Furthermore, we find a strong association between the frequency of price reviews and changes. A firm that reviews its price more often is also more likely to change its price at smaller time intervals. A test for association is significant at the 0.01% level.

The results suggest that price setting takes place at two stages. Firstly, the firms review their prices to check whether they are at the optimal level or they need to be changed. They do that at discrete time intervals and not continuously. Thus, some kind of stickiness can already be observed at the first stage of price setting. Once the price review has taken place, firms might change their prices. However, they do so considerably less frequently than reviewing the prices. Prices are possibly left unchanged because there are no reasons to change them. But perhaps they are unchanged because, even once firms have decided to incur the informational costs of the review, they think that there are additional costs of changing the price, which prevents the price adjustment. We will discuss the possible sources of these costs in Section 4.

4 Why do firms prefer not to change prices?

4.1 Theories explaining price stickiness

In the economic literature we find manifold explanations for sticky prices. These range from physical menu costs to pricing points and implicit contracts, to name but a few. As Blinder (1991) points out, however, it is difficult to evaluate which of these theories come close to the real world's obstacles of changing prices (one problem being observational equivalence). Thus, Blinder started to apply the interview method as a new way of finding out about the empirical relevance of different theories. He explained selected theories in face-to-face interviews to managers and assumed that they will recognize the line of reasoning if it comes close to their way of thinking. We are applying Blinder's methodology to Austrian firms.

We confronted managers with eleven theories which we chose taking into account their relevance in the economic literature and their rankings in the surveys already conducted (Apel et al. (2001), Blinder et al. (1998), Fabiani et al. (2004) and Hall et al. (1997)). In the following we will give a short description of all eleven theories.[17]

1. Coordination failure It might not be attractive for a firm to change its price, since this change does not only affect customers but also competing firms. After a shock a firm might want to change its price, but only if the other firms will change their prices, too. If the firm is the only one to

[17] In the following description we stick to the sequence with which they appeared in the questionnaire.

increase its price it might stand to loose customers. On the other hand, a single-handed price reduction might spark off a price war, which could in the end be detrimental to the firm's profits.[18] Thus, it might be preferable to a firm to stick to its price as long as none of its competitors moves first. Blinder et al. (1998) call this "following the crowd". Without a coordinating mechanism, which allows the firms to move together, the prices might remain fixed.

2. Explicit contracts Some of the theories explaining price stickiness were first applied to the labor market, which is for example true for explicit contracts fixing wages (e.g. see Fischer (1977)). However, this idea can as well be applied to the product market. Firms have contractual arrangements with their customers in which they guarantee to offer the product at a specific price. An explanation why firms might engage in such agreements is that they want to build up long-run customer relationships. This should discourage customers from shopping elsewhere stabilizing the firm's future sales. Customers are attracted by a constant price because it helps to minimize transaction costs (e.g. shopping time). Thus, customers focus on the long-run average price rather than on the spot price. As will be described in Section 4.2, explicit contracts are indeed widely-used by Austrian firms.

3. Pricing points Some firms set their prices at psychologically attractive thresholds. Especially in the retailing sector we observe prices for example at 99.50 instead of 100.00 Euro. This suggests that there are non-continuities in the demand curve. Firms choose these pricing points, because increasing the price above these thresholds will decrease the demand disproportionately. Customer behavior of this kind can cause price stickiness. In the face of small shocks calling for small price changes firms might not want to react (at least immediately), instead they prefer to postpone price adjustments until new events justify a large price change to the next pricing point.

[18]This outcome depends crucially on the assumptions of the non-cooperative game. One example of such a set-up is described in Stiglitz (1984).

4. Price readjustments This explanation for sticky prices is based on the idea that firms regard the shock they are facing as temporary. Thus, they assume that the optimal new price will be short-lived as well, and they will have to readjust the price in the opposite direction within a short time period. This theory shares characteristics with the idea of explicit contracts as both assume that frequent price changes are detrimental to customer relationships.

5. Menu costs The act of changing prices might be costly. Sheshinski and Weiss (1977) motivate this idea with companies selling through catalogs, because printing and distributing new catalogs generates non-negligible costs. Thus, a company facing these costs will change its prices less frequently than an otherwise identical firm without such costs. Akerlof and Yellen (1985) and Mankiw (1985) show that even "small" costs of changing prices can lead to nominal rigidities having "large" macroeconomic effects. In the following we will use the term *menu cost* in a narrow sense focusing on the physical cost of changing prices, not in a broad sense as suggested by Ball and Mankiw (1994).

6. Cost-based pricing It is assumed that costs are an important determinant in the firm's pricing decision and that if costs do not change, prices will not change either. Basically, this means that prices do not change because other prices (costs of inputs) do not change. However, the argument goes further. As products pass different stages of production a (demand or cost) shock somewhere in the production chain will take some time until it is propagated further up the chain and finally to the consumers. Thus, even small lags in the adjustment process of a single firm can add up to long lags taking into account the whole chain of production.

7. Non-price competition Another possibility why prices are sticky is that firms prefer to react to shocks by changing other features of the product than the price. For example instead of increasing the price, they could extend delivery times and/or reduce the level of service.

8. Quality signal This question dealing with the quality of the product is related to the above question about *non-price competition*. However, it reverses the line of argument. It assumes that firms do not decrease the price of their product, because customers might wrongly interpret the price decrease as a reduction in quality. Thus, they prefer to hold their nominal prices constant.

9. Kinked demand curve The demand curve the firm faces has a break in the sense that the firm looses many customers when it increases the price. However, it will not gain many customers if it reduces the price. This theory - like the idea of *coordination failure* - is based on interactions between firms. The firm assumes that if it raises the price, no other firm will follow and it will loose market share. Moreover, it assumes that if it decreases the price all competitors will do so as well and it will not gain customers. Thus, it might prefer to hold its price constant.

10. Implicit contracts This theory is based on a similar line of reasoning as the explicit contract theory, however, it goes one step further. Both theories assume that firms want to build up long-run customer relationships in order to make their future sales more predictable. In contrast to explicit contracts, however, implicit contracts try to win customer loyalty simply by changing prices as little as possible. Okun (1981, p.151) puts it like that: "Continuity and reliability are vital to all these arrangements. But because firms are subject to cost increases that they cannot control, they cannot maintain and realistically pledge constancy of price over an indefinite horizon." That is why Okun (1981) distinguishes between price increases due to cost shocks and those that are due to demand shocks. He argues that higher costs are an accepted rationale for rising prices, while increases in demand are viewed as unfair. Consequently, firms hold prices constant in face of demand shocks, as they do not want to jeopardize customer relationships.

They only adjust prices in response to cost shocks.

11. Information costs As already mentioned above, Ball and Mankiw (1994) suggest to use the term menu costs more broadly, in the sense that it includes more than just the physical costs of changing prices. In particular they argue that "the most important costs of price adjustment are the time and attention required of managers to gather the relevant information and to make and implement decisions" (Ball and Mankiw, 1994, p. 142). In the following, we will call these costs *information costs*. The distinction between physical menu costs and information costs enables us to investigate their relative importance in pricing decisions.

4.2 How relevant are these theories in practice?

This section focuses on the insights we gain from confronting managers with the potential causes for sticky prices we described above. In Questions B8a and B9 we asked: "If there are reasons to increase the price of your main product, which of the following factors might prevent an immediate price adjustment?"[19] The list following this question contained the eleven theories mentioned above, explained as simple as possible in layman's language. For every theory the respondents could choose among four answer-categories (4 if they agree very much and 1 if they disagree very much with the statement). Table 5 ranks the theories according to their mean scores (in column 1) and gives their standard errors (SE in column 2).

According to our results implicit and explicit contracts are those explanations for sticky prices which were most recognized by the respondents. Both theories earned on average a grade of more than three and as their mean scores are very close, we should regard both theories as the winners of this contest. Column 3 and 4 give the results of testing the null-hypothesis that the theory's mean score is equal to the score of the theory ranked just

[19] In Section 4.3 we deal with the question about price decreases.

below it. This indicates that the mean scores of the two winners are too close to be - in a statistical sense - regarded as different from each other.

Looking closer to the mean scores of all theories, we can divide the participants of the contest into two groups. The first five theories earned average grades well above two, while the other six theories received a lower level of support with mean scores well below two. Column 5 contains an alternative way of ranking the theories reporting a measure of how many respondents agree to the respective theory. It gives the fraction of respondents rating the theory as "applicable" or higher (grades 3 and 4). This way of ranking distinguishes between the two groups of theories even clearer. While the first five theories are regarded as applicable by more than 50 percent of the respondents, the "tier two"-group of theories just got support from less than 15 percent of the firms.

This way of ranking the theories gives almost the same sequence of the theories' relevance as the ranking according to the mean scores.[20] Besides explicit and implicit contracts, the top group in the contest comprises cost-based pricing, kinked-demand curve and coordination failure.

The results indicate that many firms refrain from changing their prices frequently, because they either have written contracts or implicit agreements to build up long-term customer relationships in order to safeguard tomorrow's sales. In line with this reasoning we find an association (at the 10 percent level) between the firms agreeing to the implicit contract theory (rating it with 3 and 4) and those having a high share of regular customers (which was enquired in Question A8). 85 percent of all respondents have a high proportion of regular customers accounting for more than 70 percent of their sales. Just 4 firms out of 703 having answered this question say that they do not have regular customers at all. It seems that regular customers are a common phenomenon preventing frequent price changes.

[20]There is just one exception, namely menu costs would rank sixth under this criterion and information cost would rank seventh.

Table 5: Relevance of theories explaining upward price stickiness

		(1) Mean	(2) SE	(3) t-Stat	(4) H_O	(5) Consent	(6) Blinder	(7) Fabiani	(8) Apel	(9) Hall
1	Implicit contracts	3.04	0.05	0.52		77.37%	4	-	1	5
2	Explicit contracts	3.02	0.06	4.05	***	73.42%	5	1	3	1
3	Cost-based pricing	2.72	0.06	0.77		67.56%	2	-	2	2
4	Kinked demand curve	2.69	0.05	3.47	***	62.77%	-	-	4	-
5	Coordination failure	2.47	0.06	12.86	***	52.86%	1	2	-	3
6	Information costs	1.61	0.04	2.00	**	12.21%	-	-	13	-
7	Menu costs	1.52	0.06	0.25		13.39%	6	4	11	11
8	Non-price competition	1.49	0.05	0.73		11.19%	3	-	-	8
9	Price readjustments	1.42	0.04	2.34	**	8.42%	-	3	-	-
10	Pricing points	1.32	0.04	-		7.98%	8	5	7	4
11	Quality signal	-	-	-						

Notes to Table 5: $^{***(**)[*]}$ stands for significant at the 1% (5%) [10%] level. The null hypothesis referred to in column 4 is that the theory's mean score (given in column 1) is equal to the score of the theory ranked just below it.

In Question B2 we asked the firms whether they have explicit contracts in place. We observe a very clear association between the firms with such arrangements and those agreeing to the explicit contract theory as an explanation for price stickiness (the test being significant at the 1 percent level). This indicates that the responses throughout the questionnaire seem indeed to be consistent. Approximately 75 percent of all respondents have written arrangements with their customers and the most typical practice is a contract-length of one year: 21 percent of the firms are having price agreements valid for less than a year, 68 percent for one year and 11 percent for more than a year.

Columns 6 to 9 in Table 5 report the ranking of the eleven theories in other surveys. (Column 6 refers to the results in Blinder et al. (1998) for the U.S., column 7 to Fabiani et al. (2004) for Italy, column 8 to Apel et al. (2001) for Sweden and column 9 to Hall et al. (1997) for the U.K.) There are, however, some difficulties when comparing these rankings. The questionnaires cover different theories and moreover the number of theories varies. Thus, rank 5 might be a mediocre result in Blinder's survey because they include twelve different theories. However, rank 5 might mean very little support in the Italian survey as they include just six theories. Furthermore, the other surveys contain theories which are not covered by the Austrian questionnaire. However, we tried to deal with this problem by including the four best performing theories of all other surveys in our questionnaire. Nonetheless, this comparison points out that all the theories ranked first or second in the other surveys are within our top group of theories.[21].

The theories ranking in our "tier-two"-group include prominent candidates like physical menu costs. Although they are a favorite explanation for price stickiness in the theoretical literature, they seem to be less important

[21]There is one additional explanation among our best-performers being the kinked-demand curve which was just considered by Apel et al. (2001).

in practice. It should be kept in mind that this survey only covers firms operating in the manufacturing industry and in the industry related service sector. Thus, it includes mostly firms dealing with other firms. Less than 10% of the respondents have final consumers as their main customers. This might be an explanation why theories like pricing points and non-price competition are not regarded as good explanations for the firms' pricing behavior.[22]

To conclude we want to go back to Section 3.4. There we discuss the possibility that price setting might take place at two stages. At the first stage the firms review their prices to find out whether they are still optimal, and at the second stage they decide whether the circumstances allow for a price change. In Section 3.4 we infer form our results that there seem to be impediments to price adjustments at both stages. However, we could not tell which obstacles are regarded as more relevant by the respondents. The explanation for price stickiness ranking sixth in Table 5 and labeled information costs might help to answer this question. This theory focuses on the costs associated with gathering information relevant for pricing decisions. In short this theory deals with the reviewing (first) stage of our two stage approach. Obviously these costs exist, as more than 12 percent of the firms regard these costs as relevant (see Table 5, column 5). However, as information costs just rank in the "tier-two"-group of theories, the majority of the firms regard other impediments as more important.[23] Thus, our results indicate that the main obstacles to adjust prices to their optimal level (implicit and explicit contracts) lie on the second stage of price setting and are related to the wariness of the firms to change prices in order not to jeopardize the relationships with their regular customers.

[22] A test for association clearly points out (at the 5 percent significance level) that firms dealing mainly with consumers and retailers prefer the theory of pricing points much more than the other firms.

[23] The theory of information costs was also considered by Apel et al. (2001). There the degree of recognition was very low and it ranked thirteenth (and last).

Table 6: Rank Correlations of motives for upward price stickiness by sector.

	Consumer durables	Intermediate goods	Capital goods	Services
Consumer non-durables	0.82	0.79	0.76	0.79
Consumer durables	-	0.93	0.94	0.96
Intermediate goods	-	-	0.87	0.90
Capital goods	-	-	-	0.94

4.3 More about price stickiness

In addition to the questions about theories explaining price stickiness in the upward direction, we also investigate the reasons for downward price stickiness. We posed two separate questions (B8a and B8b) according to the direction of the price change for all but four theories. One exception is the implicit contract theory which is just related to price increases (B9b). Furthermore, we explained the idea of the kinked demand curve in one question (B9a), as it is related to price increases and decreases at the same time. The question on information costs is related to price reviews in general rather than changes, thus we packed it into one question as well (B9c). Finally, the theory of quality signals is only relevant for price decreases (B8b).[24] The other seven theories were dealt with in two separate questions.

The ranking of the theories is surprisingly similar regardless of the direction of the price change. Also in the case of downward rigidity we find implicit contracts ahead of explicit contracts ranking first and second. The top group comprises exactly the same theories, all receiving mean scores well above two. Within the "tier-two"-group the rankings changed only slightly. The similarity of the ranking is also confirmed by the rank correlation coefficient which is 0.88. (For detailed results about the theories' ranking in the case of downward rigidity see Table A7 in Appendix A.)

Apart from the direction of the price change, we want to investigate

[24]This explains why Table 5 does not contain results about quality signals.

whether the rankings of the eleven theories vary across industrial sectors.[25] In all sectors implicit and explicit contracts rank first or second. Furthermore, the top group comprises the same theories in all sectors. In short, the main message is the same for all industrial groupings. Table 6 which displays the rank correlation coefficients between the five main industrial groupings supports the above conclusion that the rankings are indeed very similar. The correlation coefficients vary between 0.76 and 0.96 and are at large at a high level.

Referring to our finding in Section 3 that big firms review and change their prices more frequently than small and medium-sized firms, we also analyze the ranking of the theories with respect to different size-classes. However, also the size does not matter much with respect to the overall relevance of the theories. Implicit and explicit contracts rank first and second in all three size classes. Furthermore, the "tier-one" and "tier-two"-group comprise the same theories for small, medium-sized and big companies. However, there is one interesting difference which confirms our earlier suggestion that big firms might face smaller information costs. While information costs rank seventh with a score of 1.6 in small and medium sized firms, this theory ranks ninth in big firms with a mean score of 1.45. Thus, it indeed seems to be the case that information costs are less relevant for pricing decisions in big firms than in small and medium-sized firms. However, the overall conclusion that obstacles at the second stage of price setting (like implicit and explicit contracts) matter more than information costs (at the first stage) is valid for all firms regardless of their size.

[25] As the results are very similar for upward and downward price rigidity, we report just the findings with regard to impediments for price increases.

5 Price adjustments after shocks

5.1 Time lag of price reactions

The information about the frequency of price changes given in section 3.3 is interesting because it gives a feeling of how often firms actually change the price of one product. However, this is only part of the story about price stickiness as we do not know whether the firms were hit by shocks in the period under investigation. Thus we included another question in our questionnaire (Question B10) asking the firms, "If the demand for your main product rises slightly, how much time passes before you change prices?" We asked eight questions like this in order to distinguish between large and small, positive and negative as well as cost and demand shocks.[26] Firstly, the firms were asked to indicate whether they change prices in reaction to shocks or not. If they change prices in reaction to a specific shock, they were secondly requested to give us the number of months elapsing before the price change is executed.

The results are summarized in Table 7 which shows in the first column the fraction of firms holding their prices constant in response to a shock. Furthermore, the second column gives the mean of the number of months that elapse between the occurrence of the shock and the price reaction.

The average time lag of price reactions after shocks is four to six months. The answers range form a price adjustment within the same month to a time span of 24 months. The distribution is thus skewed to the right and the median firm waits for three to four months until it changes its price.[27] An adjustment process of one to two periods in macro models for Austria using quarterly data seems to be justified on the ground of our results. A comparison with the results from Blinder et al. (1998) - which are shown in column three - indicates that the mean lag with which Austrian firms react

[26] We did not, however, distinguish between temporary and permanent shocks.

[27] In reaction to a small positive demand shock the median firm's response time is four months. For all other shocks the time lag is three months.

Table 7: Price reactions after shocks

Type of shock	(1) Fraction of firms holding the price constant	(2) Mean lag of price reaction	(3) Blinder's Mean lag
Small positive demand shock	82%	6.1	
Large positive demand shock	63%	4.6	2.9
Small negative demand shock	82%	4.6	
Large negative demand shock	52%	3.6	2.9
Small cost-push shock	38%	4.8	
Large cost-push shock	8%	3.8	2.8
Small decreasing cost shock	71%	4.8	
Large decreasing cost shock	38%	4.2	3.3

to shocks seems to be slightly longer than the one of U.S. firms. Blinder's survey reveals that the average time lag is approximately three months.

We draw the following conclusions which are all statistically significant at the 5% level (the results of all the tests are shown in the Tables A8-A13 in Appendix A):

- Comparing small and large shocks (pairwise according to the direction and the source of the shock), Table 7 reveals that more firms change their prices in reaction to large shocks than to small shocks. Moreover, the firms react faster to large than to small shocks.

- In the case of large *demand shocks* we find evidence that more firms adjust their prices in response to a drop in demand than to an increase in demand. We did not ask explicitly whether firms adjust their prices upwards or downwards. However, we assume that firms reduce their prices in response to shrinking demand and increase the prices in response to boosted demand. The answers to question B13 where we investigate how firms react to demand shocks (e.g. with price or with output changes etc) justify this assumption as not a single firm indicated that it would increase prices in the face of falling demand. Thus, we conclude that prices are on average more flexible downwards than upwards in the face of large demand shocks.

- With regard to *cost shocks* the opposite is true. In the case of cost shocks (regardless of the size) more firms react to a cost-push shock than to decreasing costs. Moreover, these firms react faster to an upward cost shock than to a downward shock. Thus, the results indicate that prices seem to be more flexible upwards than downwards in the face of cost shocks. We share this conclusion with Blinder et al. (1998) who find that, price decreases come with a half-month longer lag than to price increases.

- Finally, we observe that significantly more firms react to cost shocks than to demand shocks (regardless of the size and the sign of the shock).

To conclude, our results partly contradict the commonly held belief that prices adjust more rapidly upward than downward. In fact, the degree and direction of price rigidity seems to depend on the source of the shock. In the face of significant demand shocks prices are more sticky upwards, while they are more sticky downwards in the face of significant cost shocks. Moreover, prices are on average more rigid in response to shifts in demand than to cost shocks.

5.2 Factors explaining price reactions after shocks

In this section probit regressions are estimated to gain some additional insights on how firms react to shocks and thus on the sources of price stickiness in Austria. In particular, we try to link the reaction of firms to demand and cost shocks to various firm characteristics and answers from the questionnaire.

The dependent variable in our regressions records whether a firm has indicated in the survey that it reacts to shocks by adjusting prices or not (as described in section 5.1). We analyze the reaction of firms in our sample to positive and negative demand as well as cost shocks. Moreover, we also distinguish between small and large shocks. The different types of shocks will be dealt with separately in our analysis.

For all the estimations carried out in this section, the dependent variable, y_i, can take on two values. Let y_i be equal to unity if a firm has indicated that it changes its price in response to a given shock and zero otherwise. For this type of dependent variable, a probit model represents an appropriate framework. In general, the model can be written as

$$P(y_i = 1) = \Phi(x_i'\beta) \tag{1}$$

where β is a vector of coefficients, x_i is a vector of explanatory variables and $\Phi(\cdot)$ denotes the cumulative normal distribution function.

Following Small and Yates (1999), we start by including proxies for the overall degree of competitiveness such as the market share of the firm and the number of competitors as explanatory variables. We also include a variable that indicates the shape of the marginal cost curve, since a flat marginal cost curve can be an explanation for constant prices in response to demand shocks if we assume constant mark-ups. Since the relationship between firms and customers might be important, we include the percentages of sales to regular customers and to consumers. Customers may incur search and information costs to make optimal purchases, and these costs might in turn influence how producers set prices. Moreover, costumer relationships may be more important when dealing with consumers as opposed to other firms (or the government).

Pricing to market has also been emphasized as a potential source of price stickiness. If firms are active in foreign markets, they may price to market, that is, set a price that reflects foreign market conditions.

The variables are constructed as follows: For market share we construct a dummy variable (*market*) that takes on the value unity if the market share of the main product is above 30 percent and zero otherwise.

The number of competitors (*comp*) is also a dummy that takes on the value unity if a firm has at least five competitors and zero otherwise. The slope of the marginal cost curve is captured by the dummy *mc* that takes on the value unity if the firm has indicated that it faces a marginal cost curve that is flat and zero otherwise.

Furthermore, we include the fraction of sales achieved through regular customers (*regular*) and the percentage of sales that is generated by selling directly to consumers (*con*).

We also explore how the probability of a price change is influenced by explicit contracts and menu costs. For this purpose, we create the dummy variable *explicit* that takes on the value unity if firms make arrangements that guarantee a specific price for a certain period of time. Similarly, *menu* is a dummy that indicates whether respondents rated menu costs as applicable or higher (grades three or four) for preventing price increases and price reductions.

Finally, we include a set of dummies to capture industry and firm size effects. Firm size is continuous and measured by the number of employees, *emp*. The dummy variable *service* takes on the value unity for firms in the service sector and zero otherwise.

Table 8 shows the results for large demand shocks. From the included proxies for the overall degree of competitiveness, only the number of competitors turns out to be significantly different from zero. It appears that firms having at least five competitors are more likely to adjust prices in reaction to large demand shocks, regardless of the sign of the shock. We also find that firms with a large fraction of regular customers are less likely to adjust their prices, whereas firms with a large export share are characterized

Table 8: Results from probit regressions with the price reaction to large demand shocks as dependent variable

	$y = 1$ if firms react to a large increase in demand				$y = 1$ if firms react to a large decrease in demand			
Variable	Coef.		St. Err.	p-val	Coef.		St. Err.	p-val
market	-0.3396		0.2151	0.12	-0.0027		0.2179	0.99
comp	0.4472	**	0.2025	0.03	0.5658	***	0.2076	0.01
mc	0.0028		0.1687	0.99	0.0921		0.1725	0.59
con	-0.0017		0.0035	0.64	0.0017		0.0043	0.69
regular	-0.0120	***	0.0043	0.01	-0.0196	***	0.0051	0.00
export	0.0066	***	0.0027	0.01	0.0052	*	0.0028	0.06
explicit	0.2216		0.2024	0.27	0.0660		0.2085	0.75
menu	-0.1871		0.3046	0.54	-0.1246		0.2876	0.67
service	0.0123		0.1670	0.94	-0.1867		0.1726	0.28
emp	-0.0001		0.0004	0.73	0.0001		0.0004	0.77
constant	0.1675		0.4498	0.71	1.0596	**	0.4974	0.03

Notes to Table 8: $^{***(**)[*]}$ stands for significant at the 1% (5%) [10%] level.

by a higher probability of reacting to large demand shocks.

In the case of small shocks to demand the picture is somewhat different as can be seen from Table 9. The fraction of regular customers is still highly significant and negative for both, decreases and increases in demand. However, for small negative demand shocks, sales to consumers and the shape of the marginal cost curve are also significantly and negatively related to the probability of a price adjustment. Hence, we find some evidence in favor of asymmetries in the reaction to positive and negative demand shocks.

Next, Tables 10 and 11 show the results for cost shocks. For increases in costs, none of our explanatory variables turns out to be different from zero at conventional significance levels. For decreases in costs, however, we find that firms in the service sector are more likely to react by changing prices. Moreover, in case of large decreases in costs firms with a high share of sales to consumers are more likely to adjust their prices.

In short, we find that in case of demand shocks, a high share of regular

Table 9: Results from probit regressions with the price reaction to small demand shocks as dependent variable

	$y = 1$ if firms react to a small increase in demand				$y = 1$ if firms react to a small decrease in demand			
Variable	Coef.		St. Err.	p-val	Coef.		St. Err.	p-val
market	0.0787		0.2514	0.75	0.0331		0.2417	0.89
comp	0.4117		0.2541	0.11	0.1616		0.2174	0.46
mc	-0.1534		0.1870	0.41	-0.4064	**	0.1857	0.03
con	-0.0061		0.0042	0.14	-0.0080	**	0.0036	0.03
regular	-0.0144	***	0.0046	0.00	-0.0168	***	0.0042	0.00
export	0.0029		0.0031	0.35	-0.0016		0.0028	0.55
explicit	-0.1224		0.2181	0.58	0.1284		0.2151	0.55
menu	-0.1832		0.2959	0.54	0.0317		0.3199	0.92
service	-0.0373		0.1882	0.84	-0.0853		0.1807	0.64
emp	-0.0001		0.0004	0.69	-0.0001		0.0004	0.86
constant	0.0120		0.4945	0.98	0.5999		0.4330	0.17

Notes to Table 9: ***(**)[*] stands for significant at the 1% (5%) [10%] level.

Table 10: Results from probit regressions with the price reaction to small cost shocks as dependent variable

	$y = 1$ if firms react to a slight increase in costs				$y = 1$ if firms react to a slight decrease in costs			
Variable	Coef.		St. Err.	p-val	Coef.		St. Err.	p-val
market	-0.0151		0.2050	0.94	-0.1395		0.2238	0.53
comp	-0.0792		0.1979	0.69	0.0892		0.2278	0.70
mc	-0.1921		0.1681	0.25	0.2597		0.1767	0.14
con	-0.0034		0.0037	0.37	0.0022		0.0045	0.63
regular	-0.0045		0.0041	0.27	0.0048		0.0048	0.32
export	0.0013		0.0025	0.62	0.0007		0.0028	0.80
explicit	0.2213		0.1968	0.26	0.0433		0.1903	0.82
menu	-0.3542		0.2718	0.19	-0.0125		0.2651	0.96
service	0.1155		0.1670	0.49	1.3304	***	0.1785	0.00
emp	-0.0004		0.0003	0.29	-0.0005		0.0004	0.20
constant	0.7798	*	0.4265	0.07	-1.0175	**	0.4878	0.04

Notes to Table 10: ***(**)[*] stands for significant at the 1% (5%) [10%] level.

customers decreases the probability of a price change. This is true regardless of the size and the sign of the shocks, which makes it the most robust finding

Table 11: Results from probit regressions with the price reaction to large cost shocks as dependent variable

	$y = 1$ if firms react to a marked increase in costs				$y = 1$ if firms react to a marked decrease in costs			
Variable	Coef.		St. Err.	p-val	Coef.		St. Err.	p-val
market	-0.0525		0.2100	0.80	-0.3566		0.2228	0.11
comp	0.3405		0.2261	0.13	0.1586		0.2096	0.45
mc	-0.2853		0.2913	0.33	-0.0518		0.1879	0.78
con	0.0055		0.0048	0.25	0.0114	**	0.0037	0.00
regular	0.0044		0.0039	0.26	0.0098		0.0047	0.03
export	-0.0020		0.0036	0.58	-0.0023		0.0027	0.40
explicit	-0.3227		0.3113	0.30	0.1654		0.2339	0.48
menu	-0.4677		0.3420	0.17	-0.3212		0.3173	0.31
service	0.3175		0.2935	0.28	0.7369	***	0.1952	0.00
emp	0.0001		0.0004	0.84	0.0001		0.0003	0.65
constant	1.2206	**	0.3934	0.00	-0.4474		0.4611	0.33

Notes to Table 11: $^{***(**)[*]}$ stands for significant at the 1% (5%) [10%] level.

of our analysis. Since implicit contracts are likely to play an important role when firms deal with regular customers, this outcome is also consistent with the findings reported in Section 4 indicating that implicit contracts are a key explanation for price stickiness in our sample. In case of large demand shocks, a higher number of competitors increases the probability of a price adjustment. Furthermore, firms with a higher share of exports are more likely to change their price in response to big demand shocks. In the case of cost push shocks, there is no statistical evidence for any difference in the pricing behavior across the firms in our sample. This suggests that a rise in costs triggers a similar response by all firms in the economy. Note that this is in line with the result that 92 percent of all firms adjust their prices in response to a large cost-push shock as reported in Table 7. For a decrease in costs, we find that the service sector is more likely to react with a price adjustment.

Note however, that our results should be interpreted with some caution since the fit of our equations and the statistical levels of significance are not always overwhelming. This is particularly true for cost shocks.

6 Summary

We find evidence that the firms in our sample follow time-dependent as well as state-dependent pricing strategies. Under normal circumstances around 70 percent of the firms apply time-dependent pricing. However, in the face of major shocks almost half of the firms deviate from this strategy and set their prices according to the state of the economy. Comparing this share with evidence from other countries suggests that the share of firms following state-dependent pricing rules in response to large shocks (56 percent) is relatively small in Austria, suggesting that real effects of monetary policy should (ceteris paribus) be stronger.

Furthermore, our results suggest that price setting takes place at two stages. Firstly, firms review their prices to check whether they are at the optimal level or they need to be changed. Secondly, if firms find out that the price deviates from its optimal level, they need to decide whether to change the price or not. We find evidence that there are obstacles for price adjustments at both stages. However, the contest of the theories about price stickiness reveals that the main obstacles for price adjustment seem to lie at the second stage of price setting. In contrast to the suggestion of Ball and Mankiw (1994), informational costs which are important at the reviewing stage of price setting do not seem to be among the most important obstacles for price changes. The fear that a price adjustment could jeopardize customer relationships (expressed in the theories on implicit and explicit contracts) seems to be a much more important explanation for sticky prices. The implicit contract theory which was heavily recognized by our respondents suggests that customers regard price adjustments in response to cost shocks more fair than price adjustments in response to demand shocks. This finding points in a similar direction as suggested by Rotemberg (2002) who also argues that fairness is an important driving force in customers' decisions.

Finally, we investigate the reaction of prices to (cost and demand) shocks. The average time lag between a shock and the price adjustment is four to six months. Furthermore, we observe that firms react asymmetrically to cost and demand shocks. Prices are more sticky downwards than upwards in the face of cost shocks as more firms react faster to cost-push shocks than to decreasing cost shocks. In the case of large demand shocks, however, the opposite is true. Prices are more sticky upwards than downwards, because more firms react to receding demand than to increasing demand. If we interpret a monetary shock as a demand shock, it follows that monetary policy has an asymmetric impact on the Austrian economy. The price reaction after a significant contractive monetary policy shock should thus be more pronounced than after a significant expansionary monetary policy shock. Note, however, that although the number of firms reacting to a demand shock with a price adjustment differs significantly with respect to the direction of the shock, this does not necessarily mean that this translates into a meaningful difference in economic terms as well. It could be that the differences we are observing in our sample are too small in order to matter economically.

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A Tables and Figures

Table A1: Poststratification weights and response rates

Strata			Population		Respondents		Weights	Response rate
h	Sector	Size	Z_h	$(Z_h/Z)*100$	z_h^r	$(z_h^r/z_r)*100$	w_h	$(n_h^r/n_h^g)*100$
1	15	1	41,749	5.01	1,711	1.29	1.149	45.9
2		2	28,346	3.40	6,583	4.96	0.203	33.9
3	17-19	1	13,391	1.61	1,019	0.77	0.619	29.9
4		2	19,403	2.33	5,619	4.23	0.163	33.3
5	20	1	18,632	2.24	1,656	1.25	0.530	47.9
6		2	13,863	1.66	2,506	1.89	0.261	23.3
7	21-22	1	18,978	2.28	678	0.51	1.318	21.3
8		2	20,433	2.45	8,758	6.60	0.110	39.3
9	23-25	1	16,544	1.99	966	0.73	0.807	33.7
10		2	35,425	4.25	10,034	7.56	0.166	34.0
11	26	1	11,655	1.40	1,352	1.02	0.406	46.6
12		2	15,144	1.82	4,938	3.72	0.144	33.3
13	27	1	3,543	0.43	358	0.27	0.466	42.1
14		2	27,358	3.28	9,957	7.50	0.129	47.8
15	28	1	36,982	4.44	1,819	1.37	0.958	35.4
16		2	29,644	3.56	9,894	7.45	0.141	34.1
17	29	1	21,810	2.62	1,369	1.03	0.750	30.7
18		2	36,578	4.39	20,063	15.11	0.086	39.8
19	30-33	1	16,683	2.00	1,151	0.87	0.683	41.2
20		2	41,550	4.99	8,727	6.57	0.224	36.2
21	34-35	1	4,001	0.48	75	0.06	2.513	18.8
22		2	14,868	1.78	18,874	14.22	0.037	48.5
23	36	1	25,090	3.01	1,085	0.82	1.089	44.4
24		2	13,372	1.60	5,696	4.29	0.111	50.0

Notes to Table A1 see next page.

Table A1: Poststratification weights and response rates (continued)

	Strata		Population		Respondents		Weights	Response rate
h	Sector	Size	Z_h	$(Z_h/Z)*100$	z_h^r	$(z_h^r/z_r)*100$	w_h	$(n_h^r/n_h^g)*100$
25	60-63	1	63,696	7.64	906	0.68	3.311	32.9
26		2	24,370	2.92	695	0.52	1.651	35.7
27	70-73	1	30,682	3.68	739	0.56	1.955	27.4
28		2	11,515	1.38	1,337	1.01	0.406	38.1
29	74	1	117,488	14.10	2,185	1.65	2.532	36.8
30		2	54,767	6.57	1,751	1.32	1.473	14.8
31	90	1	4,345	0.52	149	0.11	1.373	18.9
32		2	1,307	0.16	110	0.08	0.560	33.3
			Z		z_r			
	Total		833,210	100.00	132,760	100.00	26.3	*36.0*

Notes to Table A1: Source: Social security accounts, WIFO-BCS and PSB-Survey. Sectors: NACE 2-digits sectors (or the sum of them). Size: 1 - Firms with less than 100 employees. Size 2 - Firms with 100 or more employees.
Z_h number of employees in the population in stratum h, Z number of employees in the population, z_h^r number of employees of the responding firms in stratum h, z^r number of employees of the responding firms.
$w_h = \frac{Z_h/Z}{z_h^r/z_h}\rho$ is the post-stratification weight for stratum h, with $\rho = 3.38$ being a constant re-scaling factor to assure that the total number of firms after post-stratification equals $N = 873$, the total number of respondents.
n_h^r number of firms that responded in stratum h, n_g^h number of firms in the gross sample in stratum h.

Table A2: Question A3. What share of your turnover is generated in Austria?

	Frequency	Percent
0%	9.93	1.44
1% - 19%	33.96	4.91
20% - 39%	38.23	5.53
40% - 59%	55.19	7.99
60% - 79%	66.73	9.66
80% - 99%	232.94	33.71
100 %	254.02	36.76
	691.00	100.00

Table A3: Question A4. What percentage of sales do you generate by selling your main product to...?

	Frequency	Percent
wholesalers	67.77	9.74
retailers	29.19	4.19
within group	32.80	4.71
other companies	381.09	54.75
government	35.05	5.04
consumers	51.89	7.46
no main customer	77.30	11.11
others	20.91	3.00
	696.00	100.00

Notes to Table A3: The main customer is defined as generating more than 50% of the sales of the company.

Table A4: Question A6. How many competitors do you have for your main product on its most important market?

	Frequency	Percent
none	10.46	1.47
fewer than 5	114.14	16.03
between 5 and 20	286.39	40.22
more than 20	301.01	42.28
	712.00	100.00

Table A5: Question A8. What percentage of sales do you achieve through regular customers?

	Frequency	Percent
0% - 20%	14.98	2.13
21% - 40%	24.99	3.56
41% - 60%	52.38	7.45
61% - 80%	254.57	36.21
81% - 100%	356.08	50.65
	703.00	100.00

Table A6: Macroeconomic indicators for Austria 1999 to 2003

	1999	2000	2001	2002	2003
	Yearly changes in percent				
Gross domestic product	3.3	3.4	0.7	1.2	0.8
Consumer price index	0.6	2.3	2.7	1.8	1.3
Real wages per capita	1.0	1.0	-0.8	1.0	0.5
Unemployment rate (in%)	4.0	3.7	3.6	4.2	4.3
Fiscal balance (in % of GDP)	-2.2	-1.5	0.3	-0.2	-1.1

Notes to Table A6: Source: WIFO Database

Table A7: Relevance of the theories explaining downward price stickiness

		(1) Mean	(2) SE	(3) t-Stat	(4) H_O	(5) Consent	(6) Blinder	(7) Fabiani	(8) Apel	(9) Hall
1	Implicit contracts	3.04	0.05	1.78	*	77.37%	4	-	1	5
2	Explicit contracts	2.94	0.06	2.92	***	70.53%	5	1	3	1
3	Kinked demand curve	2.69	0.05	2.60	***	62.77%	-	-	4	-
4	Cost based pricing	2.49	0.06	4.60	***	57.27%	2	-	2	2
5	Coordination failure	2.13	0.06	1.68	*	35.68%	1	2	-	3
6	Non-price competition	1.98	0.07	0.87		33.50%	3	-	-	8
7	Quality signal	1.88	0.06	2.94	***	23.42%	12	-	-	10
8	Price readjustments	1.70	0.06	1.15		21.33%	-	3	-	-
9	Information costs	1.61	0.04	2.04	**	12.21%	-	-	13	-
10	Menu costs	1.52	0.06	4.91	***	13.32%	6	4	11	11
11	Pricing points	1.24	0.03	-		5.27%	8	5	7	4

Notes to Table A7: $^{***(**)[*]}$ stands for significant at the 1% (5%) [10%] level. The null hypothesis referred to in column 4 is that the theory's mean score (given in column 1) is equal to the score of the theory ranked just below it.

Table A8: Comparison between small and large shocks with respect to the fraction of firms holding the price constant

Type of shock	Fraction of firms holding the price constant	t-Statistics	
Small positive demand shock	82%	7.52	***
Large positive demand shock	63%		
Small negative demand shock	82%	11.05	***
Large negative demand shock	52%		
Small cost-push shock	38%	10.09	***
Large cost-push shock	8%		
Small decreasing cost shock	71%	8.77	***
Large decreasing cost shock	38%		

Notes to Table A8: Ho = No difference between the fractions with respect to large and small shocks. ***(**)[*] stands for significant at the 1% (5%) [10%] level.

Table A9: Comparison between small and large shocks with respect to the mean lag

Type of shock	Mean lag	t-Statistics	
Small positive demand shock	6.1	5.22	***
Large positive demand shock	4.6		
Small negative demand shock	4.6	4.50	***
Large negative demand shock	3.6		
Small cost-push shock	4.8	5.86	***
Large cost-push shock	3.8		
Small decreasing cost shock	4.8	4.15	***
Large decreasing cost shock	4.2		

Notes to Table A9: Ho = No difference between the means with respect to large and small shocks. ***(**)[*] stands for significant at the 1% (5%) [10%] level.

Table A10: Comparison between positive and negative shocks with respect to the fraction of firms holding the price constant

Type of shock	Fraction of firms holding the price constant	t-Statistics	
Small positive demand shock	82%		
Small negative demand shock	82%	0.00	
Large positive demand shock	63%		
Large negative demand shock	52%	3.79	***
Small cost-push shock	38%		
Small decreasing cost shock	71%	-9.98	***
Large cost-push shock	8%		
Large decreasing cost shock	38%	-9.39	***

Notes to Table A10: Ho = No difference between the fractions with respect to positive and negative shocks. ***(**)[*] stands for significant at the 1% (5%) [10%] level.

Table A11: Comparison between positive and negative shocks with respect to the mean lag

Type of shock	Mean lag	t-Statistics	
Small positive demand shock	6.1		
Small negative demand shock	4.6	-1.48	
Large positive demand shock	4.6		
Large negative demand shock	3.6	0.61	
Small cost-push shock	4.8		
Small decreasing cost shock	4.8	-2.40	**(1)
Large cost-push shock	3.8		
Large decreasing cost shock	4.2	-5.05	***

Notes to Table A11: Ho = No difference between the means with respect to positive and negative shocks. ***(**)[*] stands for significant at the 1% (5%) [10%] level. (1) The mean lags reported in this table are averages over the whole sample. The t-tests, however, only take those firms into account that have answered both questions. Thus the means used for the t-test can deviate from the means reported in the table.

Table A12: Comparison between cost and demand shocks with respect to the fraction of firms holding the price constant

Type of shock	Fraction of firms holding the price constant	t-Statistics	
Small positive demand shock	82%	15.93	***
Small cost-push shock	38%		
Small negative demand shock	82%	4.03	***
Small decreasing cost shock	71%		
Large positive demand shock	63%	16.58	***
Large cost-push shock	8%		
Large negative demand shock	52%	4.06	***
Large decreasing cost shock	38%		

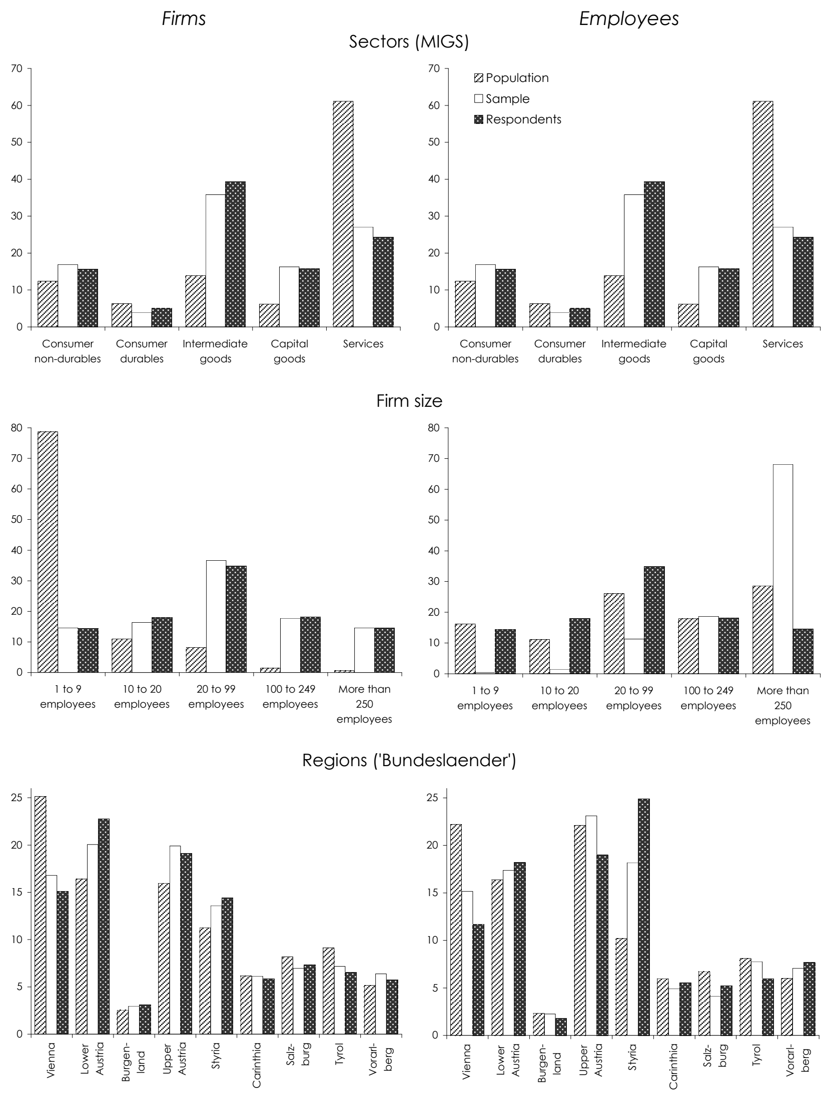
Notes to Table A12: Ho = No difference between the fractions with respect to cost and demand shocks. ***(**)[*] stands for significant at the 1% (5%) [10%] level.

Table A13: Comparison between cost and demand shocks with respect to the mean lag

Type of shock	Mean lag	t-Statistics	
Small positive demand shock	6.1	1.25	
Small cost-push shock	4.8		
Small negative demand shock	4.6	-0.67	
Small decreasing cost shock	4.8		
Large positive demand shock	4.6	4.39	***
Large cost-push shock	3.8		
Large negative demand shock	3.6	-2.08	**
Large decreasing cost shock	4.2		

Notes to Table A13: Ho = No difference between the means with respect to cost and demand shocks. ***(**)[*] stands for significant at the 1% (5%) [10%] level.

Figure 1: Comparison of population, sample and respondents characteristics



B Questionnaire

OESTERREICHISCHE NATIONALBANK

WIFO

THE PRICE SETTING BEHAVIOUR OF AUSTRIAN COMPANIES

General Indications

- This questionnaire is intended to inform us about your pricing policy. When answering the following questions, please reflect on the product that best represents your company. (You can, for example, choose the best-selling product of the year 2003.) This product will be referred to as "main product".
- Please relate all your data to the year 2003.

PART A – INFORMATION ABOUT THE MARKET IN WHICH YOU SELL YOUR PRODUCT

A1. What is your main product?.....................................|________________________________|

A2. What percentage of sales does your main product account for? .... |__|__|__|%

A3. What share of the turnover of your main product is generated in the following regions?	• in Austria.. |_|_|_|% • in the euro area (except Austria)..................... |_|_|_|% • in other EU countries / in EU acceding countries[1]............................ |_|_|_|% • in other countries.. |_|_|_|% Total 1|0|0%

NOTE 1: When answering the following questions, please reflect on the market which is most important for your main product. Thus, refer all your answers to the market with the highest percentage share in question A3.

A4. What percentage of sales do you generate by selling your main product...	• to wholesalers?.. |_|_|_|% • to retailers?... |_|_|_|% • within the corporate group?................................ |_|_|_|% • to other companies?.. |_|_|_|% • to the government?.. |_|_|_|% • to consumers (directly or via catalogues or the Internet)?.. |_|_|_|% • via other channels.. |_|_|_|% Which? |________________________| Total 1|0|0%
A5. What is the market share of your main product on its most important market?	• 1% - 5% .... • 6% - 10% .... • 11% - 20% .... • 21% - 30% .... • 31% - 50% .... • more than 50% ....

[1] Great Britain, Sweden, Denmark, Czech Republic, Slovakia, Hungary, Slovenia, Poland, Estonia, Latvia, Lithuania, Cyprus, Malta.

A6. How many (national and international) competitors do you have for your main product on its most important market? *Please count only those companies you directly compete with. If, for example, you run a restaurant, please consider only the restaurants in your vicinity (district or town).*	• none………………………………………………… • fewer than 5 …………..………………………… • between 5 and 20………..…………………….. • more than 20………………….…………………
A7. How many customers do you have with regard to your main product on its most important market?	Number of customers........|_|_|_|_|_|_|
A8. What percentage of sales do you achieve through regular customers (customers you have been doing business with for more than one year) and through occasional customers?	• Regular customers……………………..……….. |_|_|_|% • Occasional customers…………………………… |_|_|_|% Total 1|0|0%

Part B – PRICING IN YOUR COMPANY

B1. Do you determine the price of your main product within the company or is it set by somebody outside the company?	• We determine the price …………….............................. • The parent company determines the price…..…. • Our main customers determine the price………. • Public agencies determine the price……………. • Others……………………………………………… Please specify ___________________________
B2a. Do you make arrangements with your customers in which you guarantee to offer your main product at a specific price for a certain period of time?	No….. Yes. Transactions under such arrangements account for 0% - 25%....... 26% - 50%....... 51% - 75%....... 76% - 100%....... of the sales of our main product.
B2b. <u>If</u> you have such arrangements in place, for how long do you usually guarantee the price?	Number of months.......... |_|_|
B3. Do you allow a discount on the price of your main product? *You may check several boxes.*	No....... Yes. Please specify below. • Large quantity discounts…................................... • Discounts for regular customers.......................... • Cash discounts…………………………………… • Discounts depending on the market situation…... • Seasonal discounts (e.g. sales)…………………...... • Others: _________________________________

<u>NOTE 2</u>: The word "price“ refers to the <u>actual selling price of your main product</u>. Please refer your answers to the price you actually charge including discounts.

Production costs can be divided into fixed costs and variable costs. <u>Fixed costs</u> remain constant, no matter how much you produce (e.g. rental fee, acquisition costs of machines). <u>Variable costs</u> change with the production level (e.g. raw materials, labour costs).

B4a. How do you determine the price of your main product?

Please indicate the degree to which every statement applies to your company.

	describes us very well	applic-able	inapplic-able	comple-tely inapplic-able	don't know
We add a constant mark-up to the variable production costs per unit (mark-up pricing).					
Basically, we apply mark-up pricing. However, when we step up production, the variable costs increase to such a large extent that we cannot raise the price accordingly. As a consequence, we have to reduce the mark-up.					
Basically, we apply mark-up pricing. However, when we step up production, the variable costs decrease so that we can increase the mark-up.					
We set the price at the market level.					
We set the price (slightly) above the market level.					
We set the price (slightly) below the market level.					
We choose the price of our main product in a different way.	Please tell us how:				

B4b. Do you base your pricing decisions on data from previous years or on forecasts?

- On data from previous years…………………..
- On forecasts..
- An average of past data and forecasts………

B5. Suppose you produce at the normal production level and you would like to slightly increase production (within the given capacity limits). How would the variable production costs per unit change for the additional units produced?

Please check only one box.

- They increase strongly.................................
- They increase slightly..................................
- They remain constant..................................
- They decrease slightly.................................
- They decrease strongly................................
- Don't know…………………………….……..

B6a. We assume that companies check their prices from time to time, but that they do not necessarily change them.
Do you check the price of your main product…

- regularly?.. → *Continue with question B6b.*
- on specific occasions (e.g. when costs change considerably)?.......... → *Continue with question B7.*
- in general regularly and also on specific occasions (e.g. significant changes in costs or demand)?.................................. → *Continue with question B6b.*
- for other reasons?.. → *Continue with question B7.*
  e.g. ____
- We never check prices without changing them.................................. → *Continue with question B7.*

B6b. You check the price of your main product regularly. At which intervals do you check the price?

- daily……….…………….............………..
- weekly……..…………….….........………..
- monthly……….…………………....………
- quarterly…………………….....................….
- twice a year……………………………………
- yearly……………………………………..........
- less frequently than yearly..........................

B7. *This question does not deal with checking the prices but with actually changing them.*

How often do you change the price of your main product on average in a given year? |______| times

B8a. If there are reasons to raise the price of your main product, which of the following factors might prevent an immediate price increase?

	describes us very well	applic-able	inapplic able	completely inapplic-able	don't know
The concern that our competitors will not raise prices and that we will be the first to raise prices. We will wait until the competitors raise prices and will follow.					
We have arrangements with our customers, in which we guarantee to offer our main product at a specific price.					
The price we used up to now was a psychological price (e.g. 9.90); we would change this price only if the new price were also a psychological price.					
The concern that subsequently we will have to readjust the price in the opposite direction.					
Raising prices entails costs; we have to print new price lists (or catalogues), for example, or we have to modify our website.					
We will raise prices only if costs rise, but as a rule, we wait a bit before raising prices.					
We will do without price increases and will change other product parameters – e.g. extend delivery times.					

B8b. If there are reasons to reduce the price of your main product, which of the following factors might prevent an immediate price reduction?

	describes us very well	applic-able	inapplic able	completely inapplic-able	don't know
Concerns that our price reduction might trigger a price war with our competitors.					
We have arrangements with our customers, in which we guarantee to offer our main product at a specific price.					
Concerns that our customers could interpret the price reduction as a reduction in quality.					
The price we used up to now was a psychological price (e.g. 9.90); we would change this price only if the new price were also a psychological price.					
The concern that subsequently we will have to readjust the price in the opposite direction.					
Reducing prices entails costs; we have to print new price lists (or catalogues), for example, or we have to modify our website.					
We will reduce prices only if costs decrease, but as a rule, we wait a bit before reducing prices.					
We will do without price reductions and will change other product parameters – e.g. shorten delivery times.					

B9a. It could also be that you wish to keep the price of your main product constant because you stand to lose many customers if you raise prices, but do not stand to gain many new customers by reducing prices. Please indicate the degree to which this statement applies to your company.

describes us very well	applic-able	inapplic able	completely inapplic-able		don't know

B9b. Some customers consider price increases resulting from higher demand less fair than those resulting from higher costs. Do you keep prices constant despite demand fluctuations because you do not want to jeopardise your customer relationships.
Please indicate the degree to which this statement applies to your company.

describes us very well	applic-able	inapplic able	completely inapplic-able		don't know

B9c. Another reason for not adjusting prices (at least not immediately) is that gathering information relevant for pricing decisions is costly in terms of time and/or money.
Please indicate the degree to which this statement applies to your company.

describes us very well	applic-able	inapplic able	completely inapplic-able		don't know

B10a. If <u>demand</u> for your main product <u>rises slightly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B10b. If <u>demand</u> for your main product <u>rises markedly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B10c. If <u>demand</u> for your main product <u>drops slightly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B10d. If <u>demand</u> for your main product <u>drops markedly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B10e. If the <u>cost</u> for producing your main product <u>rises slightly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B10f. If the <u>cost</u> for producing your main product <u>rises markedly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B10g. If the <u>cost</u> for producing your main product <u>drops slightly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B10h. If the <u>cost</u> for producing your main product <u>drops markedly</u>, how much time passes before you change prices?

Number of months............... |_|_|
We do not change prices...............
Don't know...............

B11a. Please reflect on the price increases of your main product in recent years.

In recent years we have not raised the price of our main product. → *Continue with question B11b.*

Which of the factors below were relevant for the price increases?

	describes us very well	applic-able	inapplic-able	completely inapplic-able	don't know
Wage costs rose.					
Capital costs (loan interest) rose.					
Purchased goods and services or raw materials became more expensive.					
Taxes were raised.					
We improved the quality of our main product.					
The competitors raised their prices.					
We raise prices at regular intervals.					
Demand for our main product rose.					
A public agency (e.g. price regulator) authorised a higher price.					
We link our price to the general price level (indexation).					
Forecasts on inflation and/or business activity for the upcoming years changed.					

B11b. Please reflect on the price reductions of your main product in recent years.

In recent years we have not reduced the price of our main product. → *Continue with question B12a.*

Which of the factors below were relevant for the price reductions?

	describes us very well	applic-able	inapplic-able	completely inapplic-able	don't know
Wage costs fell.					
Capital costs (loan interest) fell.					
Purchased goods and services or raw materials became less expensive.					
Taxes were cut.					
We managed to produce the main product at less costs owing to our improved production process.					
The competitors lowered their prices.					
The competitors introduced new and better products to the market.					
We reduce prices at regular intervals.					
Demand for our main product fell.					
A public agency (e.g. price regulator) called for a lower price.					
We link our price to the general price level (indexation).					
Forecasts on inflation and/or business activity for the upcoming years changed.					

B12a. Did the introduction of euro banknotes and coins (at the beginning of 2002) have any effect on prices of purchased goods and services (e.g. intermediate inputs) in your industry?	No.....	Yes. Prices increased........ Prices decreased.......
B12b. Did the introduction of euro banknotes and coins (at the beginning of 2002) have any effect on prices of the products in your industry?	No.....	Yes. Prices increased........ Prices decreased.......
B13a. If the demand for your main product <u>decreased temporarily</u>, what would your first reaction be? *You may check several boxes.*	• We reduce prices... • We cut overtime and/or lay off people................. • We reduce investment and/or close down facilities... • We build up inventory rather than reducing output .... • We increase the funds for marketing……........... • We offer new products……………………………. • Other measures.. such as ________________________________ • We wait and see………………………………….	
B13b. If that the demand for your main product <u>decreased permanently</u>, what would your reaction be? *You may check several boxes.*	• We reduce prices... • We cut overtime and/or lay off people................. • We reduce investment and/or close down facilities... • We build up inventory rather than reducing output .... • We increase the funds for marketing……........... • We offer new products……………………………. • Other measures.. such as ________________________________ • We wait and see………………………………….	
B13c. If the demand for your main product <u>increased temporarily</u>, what would your first reaction be? *You may check several boxes.*	• We raise prices... • We do more overtime and/or hire more people………………………………...................... • We increase investment and/or buy new facilities.. • We reduce inventory rather than raising output………………………………………. • Other measures……………............................. such as ________________________________ • We wait and see…………………………………..	
B13d. If the demand for your main product <u>increased permanently</u>, what would your reaction be? *You may check several boxes.*	• We raise prices... • We do more overtime and/or hire more people………………………………...................... • We increase investment and/or buy new facilities.. • We reduce inventory rather than raising output………………………………………. • Other measures……………............................. such as ________________________________ • We wait and see…………………………………..	

Thank you for taking the time to complete this questionnaire!