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Macroeconomic Price Adjustment:
Survey Evidence from
Swedish Firms

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Micro Foundations of Macroeconomic Price Adjustment: Survey Evidence from Swedish Firms^{*}

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Abstract

This paper reports the results from a survey on price-setting behavior of a large random sample of Swedish firms. Prices are found to adjust only infrequently; the median firm adjusts the price once a year. State-dependent pricing is found to be more common than is usually assumed and at least as important as time-dependent pricing. The paper sums up the evidence from this and two similar large-scale surveys on UK and US data. Notably, and suggesting directions for further research, four of the theories of price rigidity are ranked by the respondents among the top-five places in all three studies.

Keywords: Nominal rigidity; Price-rigidity; Price-setting; Real rigidity; Time-dependent pricing; State-dependent pricing.

JEL classification: D40; E30; L11.

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1. Introduction

The behavior of prices is a crucial determinant for macroeconomic phenomena such as the impact of monetary policy on output and employment and the magnitude of the business cycle. The micro evidence on price adjustment that can be used to guide macroeconomic modeling is however remarkably limited (Wynne (1995) and Taylor (1999) provide surveys). A few studies examine price setting by a single firm or in a single market (for instance cover prices of magazines in Cecchetti, 1986; prices in mail-order catalogs in Kashyap, 1995 or gasoline retail prices in Asplund et al, 2000). These studies typically find that prices are quite rigid and that fixed costs of adjusting prices are a workable description of price adjustment, but they also document a number of inconsistencies with fixed adjustment costs. A somewhat broader data set is found in Carlton (1986), where prices of industrial commodities are examined, with similar findings. The fact that the number of studies is modest, and that the markets that are investigated are determined mostly by data availability, make them a rather weak foundation for macroeconomic modeling. It is symptomatic that the study of Cecchetti (1986) on newsstand prices of magazines is one of the most cited pieces of evidence of price stickiness, despite the trivial fraction of GDP that it represents.

Partly as a reaction to this, an alternative empirical approach has recently been adopted in Blinder et al (1998) on US data (in part reported in Blinder (1991, 1994)) and Hall et al (2000) on UK data. The idea is to ask a large sample of firms direct questions, expressed in laymen's language, on how they reason and act when they set their prices.¹ Given the patchy evidence from research techniques more commonly used by economists, this approach, albeit not uncontroversial, appears well worth pursuing.

This paper investigates different aspects of price setting behavior based on more than 600 questionnaire responses from a random sample of Swedish firms. In comparison with Blinder et al (1998) and Hall et al (2000), the set of theories of price rigidity that we confront the respondents with is somewhat updated and includes theories that have emerged, or been better understood, in the last decade. In particular, the list of theories is mainly based on the presentation in one of the leading graduate textbooks, Romer (2000). We have also tried to distinguish more clearly than Blinder et al (1998) and Hall et al (2000) between nominal and real price stickiness since these concepts are at the centre of much of the

¹ A number of older antecedents exist, typically using smaller non-random samples, see Blinder et al (1998) and Hall et al (2000) for references. A Swedish antecedent is a study by Assarsson (1989) in which 48 manufacturing companies were interviewed. A parallel literature uses similar methods to investigate reasons for wage rigidities and other aspects of the labor market, see for instance Agell and Lundborg (1995) and Campbell and Kamlani (1997).

academic discussion. Furthermore, in contrast to Hall et al (2000), we study a random sample, which allows us to draw inference about the behavior in the whole population of firms.

Since this study is, to our knowledge, the third major study with similar design it may be worthwhile to sum up the evidence so far in order to see whether it is possible to extract a “core” of fairly generally applicable results. All three studies suggest that prices are indeed quite rigid, although the estimated frequency of price change differs somewhat. In this study the median firm adjusts the price once a year. The perhaps most notable result is that four of the theories of price rigidity are ranked by the respondents among the top-five places in terms of importance in all three studies. Since the surveys are conducted in three different countries using different procedures and somewhat differently framed questions this is likely to give a fairly reliable indication of fruitful directions for further research. One respect in which the results from this study differs from those in Blinder et al (1998) and Hall et al (2000) is that it finds a more common occurrence of state-dependent pricing.

The plan of the paper is as follows. In Section 2, the sample is presented briefly, Section 3 addresses the questions of how rigid prices are and when they change. Section 4 examines different theories of price rigidity and the following section reports how important different causes for changing the price are. The perceived impact of new information technology on price setting decisions is presented in Section 6. Section 7 provides some concluding remarks.

2. Macroeconomic background and survey design

After going through a severe recession in the early 1990s, Sweden at the time of the survey, spring 2000, presents an essentially stable macroeconomic environment, with an average budget surplus of 1.4 percent of GDP, an annual GDP growth of 3.3 percent, and an annual inflation of around 0.5 percent during the period 1997-1999. Monetary policy is conducted under a floating exchange rate and with a 2 percent inflation target.

When planning the survey, particular care was taken in assuring that we would be able to draw inferences about as large share of the population of Swedish firms as possible and not just make statements about the sample. The population from which this sample was drawn consists of all Swedish firms with more than 5 employees and excludes the sectors where price setting would be fully decided by political means and sectors whose product do not have a price.² Since the vast majority of firms are small, a random draw would run the risk

² The reason for not considering firms with fewer employees is that a large number of these companies exist mainly because of tax reasons and do not run any specific business. Examples of excluded companies are non-

of resulting in a sample with only small firms. To remedy this, and to be able to at later stage compare behavior across groups, the population was stratified according to size and whether it was in the manufacturing or the service industry. The total number of firms sampled was 1300. The total response rate of the questionnaire was 48.7 percent, which left us with a little more than 600 responses.³

The survey, which due to the large number of firms in the sample was sent out as a questionnaire, contains two types of questions, one where respondents are asked to indicate the extent to which they agree with a given statement (regarding for instance reasons for not adjusting price). The alternatives were "agree totally", "agree to some extent", "agree only to a small extent" and "do not agree at all". These were converted into a numerical scale where 4 was "agree totally" and 1 "do not agree at all". The mean rank that we report in the paper is the weighted average (with share of stratum in population for estimated population average and with stratum share and domestic turnover for the turnover weighted figures) of these 4 alternatives. Firms also made use of the alternative "can not answer/not applicable" or of not marking anything on the particular question. These firms are rejected in the calculation of mean rank.

The second type of question asked firms to answer more specific questions where firms may be sorted into groups. An example is "how many times per year does the price of your main good/service usually change?" where respondents were asked to choose between alternatives "less than once per year", "once per year", "twice per year" and so forth. Here answers are typically reported as estimated proportions of the population (weighted by the share of stratum in population for estimated population share and with stratum share and domestic turnover for the turnover weighted proportions). The firms who answered that they had no influence over the price were excluded when calculating these estimated proportions.

To calculate an estimate of the population mean we need to weigh stratum means with the share of the stratum in the total population. Furthermore, the pricing decisions of very large firms are more important for the economy than are those of a local supermarket. In addition we therefore use figures of turnover from domestic sales to weigh the results. We will generally focus on the turnover-weighted results when analyzing the answers to the

profit organisations, residents' associations, public service and defense, social services, education and health (in contrast to practices in some other countries, these are publicly funded in Sweden).

³ As shown in Appendix A, the response rate was lower for smaller firms as well as for service-producing firms. The fact that the sample mean is constructed by weighing stratum means with the shares of the stratum in the total population is likely to mitigate possible selection problems due to underrepresentation of small and service-producing firms, provided that the respondents are representative within each stratum. Unfortunately, we have not been able to investigate this latter assumption.

questions. These results should give a fairly accurate view of the importance of firms' price-setting policies for the Swedish price level (see Appendix A for details on how the survey was conducted and how the results are computed).

When asking about prices we have to deal with the fact that most firms sell many types of goods, at home and abroad, with and without rebates and perhaps with different service content. In the introduction to the questionnaire we ask firms to have the actual Swedish transactions price of their main good to their main type of customers in mind when answering the questions.⁴ Typically in the paper we will not give the full wording of questions or alternatives, but refer the reader to the questionnaire, which is included as Appendix B. Also note that an overwhelming majority of the firms indeed have the possibility of setting prices; 90.6 percent of respondents answered that "the company can set the price itself" rather than picking the alternative "the price is entirely decided by parent company/company group or otherwise outside of our company". The firms who chose this latter alternative were asked to skip the sections of the questionnaire that specifically dealt with the decision to adjust prices.

3. How rigid are prices and when do they change?

How often do prices change?

Consistent with previous research prices adjust only infrequently. The firms were asked how often the price of their main product changes in a typical year. The estimated proportion of firms in the population that adjust the price of their main product once per year was 49.6 percent and an additional 20.6 percent adjust prices less than once per year. The corresponding turnover-weighted proportions are 40.3 and 27.1 percent respectively. The median firm adjusts price once a year, which is well in line with previous micro studies of price rigidities - indeed, in his summary of findings on price adjustment Taylor (1999) notes that prices change on average once a year. Compared to the survey studies by Blinder et al (1998) and Hall et al (2000) the price changes somewhat less frequently. In Blinder et al (1998) about half of firms changed prices once per year or more seldom whereas the corresponding figure in our study is close to 70 percent. In Hall et al (2000) the median firm

⁴ Firms are specifically asked whether their answers, which refer to the main product (defined as the one with the highest turnover), are representative of their other products. 90.2 percent of firms either agreed to this or reported that they only sell one product.

changed price two times in the year preceding their study (conducted in September 1995). One reason for the somewhat divergent results may be that in the sample of Hall et al large firms and manufacturing firms are over-represented.⁵ In our sample, firms with these characteristics tend to change their prices somewhat more frequently. Further, we expect the frequency of price changes to be correlated with inflation, which was only slightly above one percent on an annual level at the time of our study, whereas it was around four percent at the time of the studies of both Hall et al and Blinder et al.

Price reviewing: Time versus state-dependent pricing rules

The stability of prices indicates that there are costs associated with changing them. The two main strands of literature that model price adjustment when it is costly to change prices, time-dependent and state-dependent rules, have different implications for *when* prices adjust. A firm is said to follow a *time-dependent rule* if it changes its price at certain time intervals. These intervals may be fixed as in the original staggered contract model developed in Taylor (1979, 1980) or, in order to simplify the mathematics, stochastic as in Calvo (1982, 1983). Under a *state-dependent rule*, on the other hand the price is adjusted when the deviation between the current price and the optimal price has become large enough to make the gain in profit from adjusting price outweigh the cost of adjustment.⁶ Thus, a fundamental difference between the two types of rules is that when events motivate a price change, a state-dependent rule predicts an immediate response, provided the shock is sufficiently large, whereas under a time dependent rule firms will wait until the "time has come".

While models based on time-dependent pricing rules tend to be fairly tractable and generate well-behaved dynamic adjustment paths of the price level to innovations in nominal money, the impact in models based on state-dependent pricing is in general considerably more complex and allows for a wide range of outcomes. The extreme case being the neutrality result of Caplin and Spulber (1987), where a small number of firms making large adjustments leads to money being completely neutral.⁷

Also under a time-dependent rule the price will change only if this is indeed motivated by changed economic conditions (a price change will always occur on an

⁵ Blinder et al (1998) also study larger firms; their sample excluded firms with less than USD 10 million in sales.

⁶ The seminal paper is Barro (1972). Later examples of studies that model state-dependent pricing are Sheshinski and Weiss (1977, 1983), Caplin and Spulber (1987), and Caplin and Leahy (1991, 1997).

exogenous date, but not necessarily on *all* such dates). Thus, the relevant question in the survey concerns the reviewing of prices rather than actual changes. The respondents were asked to report if they review their prices: "with certain time intervals" (which we interpret as time-dependent price setting), "in response to a particular event" (which we interpret as state-dependent price setting) or "daily or more often" (which we also interpreted as state-dependent pricing since an alternative and more literal interpretation of state-dependent pricing is that price reviews are made continuously). We also provided the alternative "mainly with certain time intervals but at times in response to a particular event" (which we interpret as normally time-dependent, with a switch to state-dependent pricing if sufficiently important events occur).

The results indicate that 18.2 percent of Swedish firms practice time-dependent reviewing while 22.6 percent use state-dependent reviewing and a further 11.6 percent review prices daily or more often. An estimated 40.7 percent of firms agree with the statement that reviewing was normally time-dependent but may shift to state-dependent reviewing if motivated by special events.

Hence, under normal conditions a majority of the companies, 58.9 percent, adopt time-dependent reviewing. This is in line with the results in Blinder et al (1998) and Hall et al (2000) where 60 percent and 79 percent, respectively, report that they use time-dependent rules. However, the picture alters considerably when we allow for a shift of rules. Some 40.7 percent of the firms that normally follow a time-dependent pricing rule will shift to state-dependent pricing in case of a significant event. Hence, a state-dependent rule is adopted by 74.5 percent of the firms while merely 18.2 percent continue to review the price at certain time intervals. The result that firms will deviate from time-dependent pricing when shocks are sufficiently large is intuitively reasonable, but has, to our knowledge, not been documented before.⁸

⁷ See Caplin and Spulber (1987), also explained in the textbook by Romer (2000). Other examples of studies that under certain assumptions find that money does have effect within a state-dependent framework are Tsiddon (1991, 1993) and Conlon and Liu (1997).

⁸ In Hall et al (2000), 10 percent of the companies said that they did a mixture of time and state-dependent pricing. However, in Blinder et al (1998) and Hall et al (2000), the questions on time and state-dependent pricing are not framed in a way that allows for a change of price-setting rule in the case of significant events. Hall et al note, however, that it is hard to believe that time-dependent price-setters "would not review or change prices in response to an event, if that event was associated with a dramatic enough change in the state or the environment." (p. 432, footnote 12).

Table 1. Rules for reviewing prices. Estimated proportion of firms following time vs. state-dependent price setting (turnover weighted proportions in parenthesis)

	Normal conditions	Significant events
Time-dependent price setting	58.9 (44.8)	18.2 (23.1)
State-dependent price setting	33.8 (47.2)	74.5 (68.9)

If we use turnover weighted proportions, state and time-dependent price setting rules are of more or less equal importance under normal conditions. Nevertheless, the dominance of state-dependent price setting when significant events occur is somewhat less pronounced since the proportion that switch to state-dependent pricing is smaller, 21.7 percent

While time-dependent price setting thus is very frequently observed our results point to a more important role of state-dependent pricing than previous survey studies. One could speculate that the low-inflation environment, with little need for recurrent inflation-driven nominal price adjustments, helps explain this pattern.

What was the chosen time interval and why was this length chosen?

For the firms that did use time-dependent price reviewing, a yearly interval was the most frequently used with a turn-over weighted proportion of 66.0 percent. The second most chosen frequency was quarterly price reviews which was indicated by 15.3 percent of the turnover weighted observations. We also asked the firms who followed a time-dependent rule to rank various explanations for the chosen time interval of reviews. The results are reported in Table 2.

Table 2. The importance of different explanations for the chosen interval of price reviews (turnover weighted rank).

Motive	mean rank	std dev	nobs
The price could not change more often without disturbing customer relations	3.48	0.73	309
Factors influencing the price do not change often enough to motivate more frequent price reviews	3.03	0.74	313
Costs of preparing and discussing price changes	1.97	1.07	295
Interval decided by parent company or government agency	1.70	0.68	270

A two-sided t-test rejects that explanations have the same mean rank at the one percent level of significance. Fear of disturbing customer relations and low frequency of shocks were clearly the most important reasons for the chosen time intervals. These findings are consistent with the ranking of different theories of price rigidities that we turn to later in the paper.

Synchronization of yearly price reviews

Given the prevalence of yearly price reviews their specific timing is of interest: do most firms review prices in a certain month or are price reviews evenly spread across the year? There turns out to be a considerable bunching of the price reviews over the year; 44 percent of the firms that specified a month reviewed prices in January or December. 16 and 11 percent reviewed in October and November, respectively, with the rest of the months receiving more or less equal shares, except July that no one specified.⁹ While there is thus considerable synchronization among the firms that use yearly price reviewing, it should be kept in mind that the importance of synchronization is tempered by the fact that many firms use state-dependent price setting or review quarterly. Nevertheless, the concentration of price reviews to the turn of the year is visible in the monthly changes in the consumer price index, the mean absolute change in the consumer price index in January, 1980-2001, was 1.25 percent, compared to 0.52 in an average month.

Synchronization within firms

Another aspect regards synchronization within firms. Here results point to a wide range of practices. The turnover weighted proportion of firms that review one price at a time was 41.4 percent while 38.3 review the prices of all their products, or most of their products, at the same time. So a large extent of synchronization and no synchronization are about equally prevalent. The proportion of firms that reviewed most prices at the same time was much larger among smaller firms. This fits well with the findings of Lach and Tsiddon (1996) who in their study of price changes in grocery stores find high synchronization within firms.

4. Why are prices rigid?

4.1 Theories of price rigidity

The survey also contains a section where the respondents are confronted with different theories on price rigidity and asked how well these theories describe the situation in their firm. Of course, conveying central aspects of theories by translating them into laymen's language is a difficult task. Nevertheless, as argued at length by Blinder et al (1998), if a particular theory for rigid prices is important we expect price setters to recognize the chain of reasoning associated with that theory.

We found it useful to make a distinction between nominal and real price stickiness since these concepts are at the center of much of the academic discussion. This, in turn, is because the two types of rigidities have different macroeconomic implications. In short, some kind of cost for changing the nominal price is necessary for money to have real effects. These nominal rigidities may not have to be large if there also is a sufficient amount of real rigidity, by which basically is meant that the firm's profit-maximizing real price does not change much when aggregate output changes.¹⁰

The respondents were asked to rank how relevant each of the statements meant to capture the respective theory are in explaining why prices might be sluggish. The average, turnover weighted results are reported in Table 3.

⁹ Unfortunately the response to this question was not coded so that we can identify the responding firm. The answer to this particular question thus refers to the sample proportion only, the pattern of a heavy concentration of reviews to late fall and the turn of the year would doubtlessly survive weighting however.

¹⁰ See, for example, Romer (2000).

Table 3. The importance of different theories on price stickiness (turn-over weighted rank)

	Type of stickiness		std dev	nobs
	Nominal	Real		
	Mean rank			
Implicit contracts ^a	3.00	3.00	0.82	523
----- "Sluggish costs" -----		2.45	0.81	463
Explicit contracts	2.27		1.10	460
Kinked demand curve		2.17	1.00	486
Countercyclical cost of finance		2.08	0.76	461
----- Liquidity constraints		1.85	0.75	471
Pricing thresholds	1.85		1.05	467
Shifting customer clientele		1.75	0.87	450
Deviation from implicit collusion		1.68	0.88	460
Thick-market (supply-side)		1.60	0.75	454
Physical menu costs	1.54		0.68	475
Thick-market (demand-side)		1.50	0.75	475
----- Information-gathering costs	1.40		0.70	491

Note: ^a Since it is not clear whether implicit contracts in the form implied by the question in the survey is best characterized as a nominal or a real rigidity it is reported in both columns.

The dashed lines indicate that a two-sided t-test rejects the hypotheses that the explanations immediately above and below the line have the same mean rank at the 5 percent level of significance. We can thus reject that the second ranked explanation, sluggish costs, are deemed as important as our top candidate - implicit contracts in explaining price rigidity. In turn we reject that explicit contracts, the third explanation is as important as sluggish costs. We can also reject that the fifth ranked explanation, countercyclical costs of finance are equally important as its downstairs neighbor, liquidity constraints. For the rest of the explanations we can typically not reject that neighboring explanations have the same rank. The exact ordering of the alternatives should therefore not be given to much weight, for convenience we nevertheless go through them in order of their rank in the table. Before proceeding we may note that the results look very similar for the estimated proportion of firms (not turnover weighted) that follow a specific policy; the five highest ranks are then given to 1) implicit contracts, 2) explicit contracts, 3) sluggish costs, 4) kinked demand curve and 5) pricing thresholds. The appearance of pricing thresholds on the top-five list is not so surprising when one notes that retail firms, for which we believe this explanation may matter, are going to be relatively more important when results are not weighted by turnover. After going through the individual theories we sum up the general lesson that we derive from this and compare our results to those of Blinder et al (1998) and Hall et al (2000).

According to the theory of *implicit contracts*, transaction costs induce firms and customers to enter into implicit agreements that stabilize prices when demand fluctuates. This

idea is closely related to work by Okun (1981) on what he called “the invisible handshake”, which, in turn was based on work aimed at explaining wage rigidity.¹¹ Even though Okun appears to have intended the implicit contract theory to apply to nominal rather than real prices, this is by no means obvious.¹² In Table 3 we therefore report the theory in both columns. Typically, customers are assumed to care about real, or relative, prices and not nominal ones. However, in our survey, the exact formulation was: “Customers prefer a stable price and a price change risks disturbing customer relations, *even if competing firms also change their prices*” (emphasis added). The addition was made primarily as a way of separating this motive for price stickiness from the theory of the kinked demand curve where a price increase results in a substantial loss of sales due to a higher relative price. Thus, firms appear to believe that customers appreciate that the price itself is stable and that they may be discontent even if the price relative to that of competitors are unchanged. One reason why this version of implicit contracts still may not be accurately regarded as a nominal stickiness is that even if the relative price with respect to the closest competing firms does not change, the price relative to other products and services may.

The theory that we have chosen to call *sluggish costs* is represented by the statement “the costs of the firm’s inputs do not vary much over the business cycle which imply that the price of the firm’s output does not change much either”. Thus, it embodies two hypotheses: that the cost of inputs is an important determinant of the firm’s price setting decision and that these costs do not tend to fluctuate very much with changes in aggregate demand. In one way this is no explanation to price stickiness; it basically argues that some prices are sticky because other prices – those of inputs – are. Nevertheless, it points to that input-output linkages among firms along a multi-stage production process may play an important role in explaining aggregate price rigidity.¹³

The third highest score is given to renegotiation costs of *explicit contracts*, which clearly can be regarded as a nominal rigidity. Of course, explicit contracts explain nominal price stickiness in a trivial way and beg the question why such contracts are used in the first place. The use of explicit contracts seems in any case to be widely spread and since we asked some additional questions on this issue, it is dealt with further in a separate subsection.

¹¹ See Azariadis (1975), Baily (1974), and Gordon (1974).

¹² See Blinder et al (1998, p. 150).

¹³ This idea is explored in, e.g., Blanchard (1983) and Basu (1993).

Among the theories that more explicitly involve interactions between firms, the *kinked demand curve* gets the highest score. It is represented by the statement “the price is sticky because the firm loses many customers when raising the price but gains only a few new customers when cutting it”. The argument is basically that the firm assumes the worst when considering which price to set. If it raises its price, it expects that other firms will not follow suit and that it hence will lose market shares. If, on the other hand, it cuts its price, it assumes that competitors will promptly do the same. Even substantial changes in marginal costs may then not induce a change in price. A suggested explanation to the kinked demand curve is imperfect information among customers that make existing customers more responsive to price increases than prospective new customers to price decreases; see, for example, Stiglitz (1979) and Woglom (1982).

The fifth highest rank is given to *countercyclical cost of finance*. The idea is that capital market imperfections make the cost of finance higher in recessions, when firms’ cash flow and credit worthiness are lower; see, for example, Kiyotaki and Moore (1997). This contributes to keeping marginal costs, and thereby prices, up in a downturn. The relatively high score given to this explanation may be partly explained by the credit crunch that Sweden suffered in the early 1990s, which is likely to still be in fresh memory.

A closely related reason for the firm to keep prices high when demand is low may be *liquidity constraints*. This theory combines the assumption that the stock of customers that a firm has responds only gradually to price changes, with an assumption that capital market imperfections create liquidity constraints. A reduced cash flow during a recession may cause a firm to keep its price up, sacrificing future customer stock because liquidity constraints make today's revenue extra valuable; see, for instance, Gottfries (1991) or Chevalier and Scharfstein (1996).

Pricing thresholds is a theory based on consumer psychology. Firms, especially in the retail business, often price at, for example, SEK 49.95 instead of SEK 50. Apparently, they assume that the product they offer will sell considerably better to a price marginally lower than some specific, presumably psychologically significant, figure. Hence, they may be reluctant to change the price, even in the face of an increase in demand. While hard to reconcile with the standard versions of rational behavior, the explanation nevertheless appears to carry some weight as an explanation of price rigidities.

The theory we have called *shifting customer clientele* suggests that the elasticity of demand is procyclical because the composition of customers differs over the business cycle; see, for example, Bils (1989). The assertion in the questionnaire is based on a model in

which firms have both loyal customers with low price elasticities and occasional customers with higher price elasticities. The loyal customers tend to stay put even during a cyclical contraction, which implies that the price could be kept relatively high.

The theory called *deviation from implicit collusion* suggests that it is more tempting to defect from a collusive agreement when demand is relatively high - in consequence markups have to be kept lower in booms to maintain sufficient incentives for collusion; see, for instance, Rotemberg and Saloner (1986) and Rotemberg and Woodford (1991, 1992). Of course, it may be problematic to ask firms straightforward questions related to collusion. In the questionnaire we hence used the rather subtle formulation “price wars are more common in periods of high demand, which contributes to keeping prices down”, which we believed to be fairly uncontroversial.

Price stickiness may also emanate from so-called *thick-market effects*, both on the demand side and the supply side. On the *demand side*, the idea is that consumers tend to increase their search activity when they shop more intensively, that is, during periods of high economic activity; see Warner and Barsky (1995). A reason may be that there are economies of scope in search. As a result, the elasticity of demand is greater in peak period, which tends to keep prices down. On the *supply side*, it is assumed that when economic activity is high, it is easier for the firm to sell its products and to find suitable subcontractors. This tends to keep costs, and hence prices, down in booms.¹⁴

Low scores are given to two menu-costs theories of the more traditional type. *Physical menu costs*, such as printing of new price lists and notifying retailers, gets a mean score between "does not matter at all" and "matters only a little". An often suggested alternative, *information-gathering costs* (see, e.g., Ball and Mankiw (1994)), scores even lower.

4.2 Additional issues regarding why prices are sticky

The importance of regular customers

Implicit contracts as the most popular explanation of price rigidity rhymes well with the responses to background questions, indicating that regular customers are of great importance to the firms. The respondents were asked to state the share of sales that went to regular

¹⁴ The classic reference is Diamond (1982).

customers with which one could expect to do business again. The turnover weighted proportion of firms that indicated having 90 percent or more of sales to regular customers was 59.3 percent. Almost all firms had at least half of their sales to regular customers, the turnover weighted proportion was 96.1 percent. Against this background it is not surprising that fear of disturbing customer relationships is an important consideration when setting prices.

The properties of the adjustments costs

In addition to the ranking of different theories of price stickiness, an attempt was made to obtain information on the functional form of the adjustment costs associated with a price change. More specifically, we were interested in investigating if firms in general perceive these costs as a lump sum, that is independent of how much the price is changed, or if they rather would describe them as increasing in the size of the price change. The former would correspond to a menu-type of cost while the later would be more in line with the convex adjustment costs suggested by Rotemberg (1982). The respondents were asked to choose among three different alternatives: (i) A cost arises as soon as the price is changed but this cost does not depend on the size of the price change; (ii) If the price is changed with just a small amount, the cost is negligible but it becomes larger the larger is the price change¹⁵; (iii) A cost arises as soon as the price is changed and it becomes larger the larger is the price change. The third alternative hence allows for a mix between the two functional forms of costs, as investigated by Slade (1998). In turnover weighted terms 43.7 percent of firms indicated that they "don't know/not relevant", suggesting that the question was considered rather abstract. Still, it is interesting to note that a crushing majority of those who did answer, 90.5 percent in turnover weighted terms, chose fixed adjustment costs. This is perhaps what we would expect given that it is hard to think of examples of explicit costs of price adjustment that are increasing in the size of the adjustment. Rather, as argued by Rotemberg (1982) convex adjustment costs may be seen as a way of capturing a fear of disturbing customer relations by large price changes - it would not be surprising if firms had difficulties in interpreting such fears as "costs" of price adjustment.

Case studies of price adjustment (for instance Kashyap, 1995) are often broadly consistent with fixed costs of adjusting prices. However, it is frequently found that there are a number of small price changes. A model that would be consistent with much of the data is

¹⁵ We settled for this formulation since we found it difficult to describe the convex functional form suggested in Rotemberg (1982) without risking becoming overly confusing.

therefore one in which the adjustment costs vary over time (as in Caballero and Engel, 1993). To try to gain some input on this issue we asked about the variability of adjustment costs. The majority of firms answered that adjustment costs were stable over time (49 percent turn-over weighted) or, if they varied, varied too little to influence the pricing decision (a further 30.7 percent). Again the question appears to have been somewhat conceptually hard with 15.3 percent marking "don't know/not relevant".

Some additional aspect on explicit contracts

As found above explicit contracts are an important reason for why prices are rigid. The use of written contracts appears widely spread, the turnover weighted proportion of firms that had at least three quarters of their sales specified through written contracts was 48.2 percent. At the same time, an important proportion of firms made little use of written contracts however, 18.7 percent did not sell through written contracts at all and a further 16.8 percent had only 1-25 percent of their sales through written contracts. Of the firms that did use written contracts 65.5 percent used contracts which specified both price and quantity and a further 32.1 percent used contracts which only specified price. Most firms respond that their typical contract is valid for a maximum of one year - the turnover weighted proportion that was valid half a year or less was 36.2 percent and a further 46.0 percent were valid 7-12 months. Only some two percent of firms responded that a contract covered two years or more. Finally we note that even though the common use of contracts appears to be an important source of price rigidity it need not imply that prices are unchanged during the contract period; 29.5 percent of firms (turnover weighted proportion) responded that the price specified in a contract was typically indexed to inflation or some cost index.¹⁶

On the cyclical nature of the mark-up

The test of theories above draws on two related literatures - one looking at reasons for sticky prices (such as the kinked demand curve) and the other focusing explicitly on how markups develop over the business cycle. Of the theories above three in particular (all ranked in the middle of the field) are often mentioned as reasons for why markups would be

¹⁶ The wording of the question was: "is price in the contract usually indexed to inflation, a cost index or something similar? Example: Tyre Co. commits to sell 500 tyres to Car Co. at a unit price of SEK 100, given

countercyclical; liquidity constraints, shifting customer clientele and deviation from implicit collusion. Procyclical markups would tend to dampen fluctuations in economic activity whereas countercyclical markups would amplify fluctuations. The results from the test of the theories above do not give us any conclusive evidence on the cyclical behavior of markups. In anticipation of this, the respondents were asked to rank how well a number of statements regarding markups described their behavior. A two-sided t-test rejects the hypotheses that the alternatives have equal rank at the 5 percent level of significance. The most common practice seems to be to use a constant mark-up, changing the price proportionally when costs change. Second came procyclical markups and interestingly, countercyclical markups was given the lowest mean rank, in the middle between "agree only to a little extent" and "don't agree at all".

Table 5. The importance of statements regarding the mark-up (turnover weighted)

	Mean rank	std dev	nobs
Constant markup	3.01	0.74	497
Procyclical markup	2.52	0.85	466
Mark-up varies over time but not in any systematic way w. r. t. demand	2.38	0.80	465
Countercyclical markup	1.55	0.71	466

There exists a sizeable literature that finds that markups are procyclical or independent of the business cycle (see for instance Domowitz et al, 1986, Machin and Van Reenen, 1993 or Ghosal, 2000). In particular there is evidence that markups are more procyclical in concentrated industries (Schmalensee, 1989). Nevertheless, the low rank of the countercyclical markup surprised us; in their survey Rotemberg and Woodford (1999) interpret the evidence as generally supporting countercyclical markups. We refrain from speculation of why the survey responses give such a markedly different view than Rotemberg and Woodford's (1999) reading of the evidence, and merely note that this is an important issue that is still far from fully understood. Let us now turn to the conclusions about the causes of price rigidities that we make.

that the world market price of rubber is less than USD 1. Should world market price rise to between USD 1 and 1.5 Tyre Co. commits to sell at a unit price of SEK 120".

4.3 The conclusions that we draw

Real versus nominal rigidities

The detailed run-through of theories was preceded by a question aimed at finding out, on a more general basis, whether real or nominal stickiness is the most important. The respondents were asked to choose the typically most important of three arguments for letting the price be unchanged in face of an increase in demand: i) that there are costs associated with the price change itself, ii) that it is important not to diverge from the prices of competitors, and iii) that it is better to leave the price unchanged as long as the costs do not change. An overwhelming majority chose one of the latter two, real-rigidity, alternatives, relating prices to either other prices or costs with more or less equal shares given to each of these explanations. In fact, the turnover weighted estimate of the proportion that gave actual costs of changing prices as the most important was 0.2 percent! This result appears to be somewhat inconsistent with the result from the more detailed “test” of theories where costs associated with renegeing on contracts is judged to be comparatively important. A plausible explanation to this seemingly inconsistent result may be that in the preceding question, specific examples were given of merely traditional physical menu costs, namely “change price tags, print new price lists, etc.”. These particular sources of stickiness were given the low scores among the theories and if they were the types of costs that the respondents had in mind when answering the question, the result is not puzzling and well in accordance with Table 3.

The low importance of menu-type costs of changing price is, as argued by Blanchard (1994), in accordance with the new Keynesian view where menu costs appear to be relatively small to individual price setters, yet may cumulate to have large macro effects (as indicated for instance by the title of Mankiw, 1985, "Small menu costs and large business cycles"). Of course, if the actual reason for leaving the price unchanged is the result of a combination of a nominal and a real rigidity, it might still be that the real rigidity is perceived by the firm as the primary (and possibly only) determinant for the decision. Note also that the questions regarding the factors that influence price adjustment asks about relative importance in the price setting decision, not about their absolute size. Even though menu costs are judged relatively unimportant in the price change decision they may be non-trivial, as indeed found in a study of supermarket pricing by Dutta et al (1997). Thus, it seems wise not to conclude that

a low score for a particular nominal stickiness necessarily imply that it is unlikely as an contributing explanation to monetary nonneutrality.

A comparison with Blinder et al and Hall et al

Both Blinder et al (1998) and Hall et al (2000), comprised a corresponding “test” of theories on US and UK firms, respectively. A comparison with these studies is somewhat impeded by our choice to omit some of the explanations that we felt were less pertinent and add some that we found to be more relevant.¹⁷ Nevertheless, it is worth investigating if results point in the same direction. If so, since data is collected in three different countries using different procedures and somewhat differently framed questions, it may be possible to draw some conclusions of fairly general applicability regarding the causes of price rigidity.¹⁸ Table 6 displays how firms ranked the theories in the three studies.

Interestingly, the four most highly ranked theories in our study are found within the top five places in all three studies. Implicit and explicit contracts, sluggish costs and the kinked demand curve seem to be the main explanations for rigid prices. Together, these suggest a general picture of price rigidity that can be described as follows. Nominal price stickiness appears to be important, but not so much in the form of menu costs as in terms of different types of contracts fixing the price for a certain period (the use of such contracts remains, however, to be explained more thoroughly). The risk of disturbing customer relations by changing the price is an important source of price rigidity. This appears true even if close competitors also change their prices. In addition, interaction with competitors are important in that a single firm appears to be reluctant to raise its price ahead of other firms. Furthermore, costs appear to play a central role in price setting decisions. Hence, if contracts and the practice of glancing at other firms’ price setting decisions are common features at every level in a multi-stage production process, one may suspect that this will result in sluggish prices of inputs, which, in turn, will further contribute to overall price rigidity. Finally we note that financing costs and constraints, which were not included in the other studies, are deemed comparatively important for the price setting decisions.

¹⁷ Hall et al (2000) note that some of the suggested explanations in their and Blinder’s et al (1998) studies actually are symptoms rather than causes of price stickiness, e.g., the hypothesis that firms in the short run adjust stocks rather than prices. In the set of theories used in this study we have in particular included a number of potential sources of real rigidity from Romer (2000). Another difference is that we have tried to distinguish more clearly between nominal and real causes of price rigidity than Blinder et al (1998) and Hall et al (2000).

¹⁸ The study by Blinder et al is based on interviews while this study and Hall et al are based on mailed questionnaires.

Table 6. The placing of the different theories

	Apel et al (Sweden)	Blinder et al (US)	Hall et al (UK)
Implicit contracts	1	4	5
Explicit contracts	2	5	1
Sluggish costs	3	2, 9 ^a	2, 6 ^a
Kinked demand curve	4	1 ^b	3 ^b
Countercyclical cost of finance	5	-	-
Liquidity constraints	6	-	-
Pricing thresholds	7	8	4
Shifting customer clientele	8	7	9
Deviation from implicit collusion	9	-	-
Thick-market (supply)	10	-	-
Physical menu costs	11	6 ^c	11
Thick-market (demand)	12	-	-
Information-gathering costs	13	6 ^c	-

Notes: ^a The formulations capturing "sluggish costs" in Blinder et al and Hall et al, are "price increases are delayed until costs have risen" (called cost-based pricing) and "variable costs are roughly constant as production rises" (called constant marginal costs). Our corresponding question is more narrow in that it asks specifically about the costs of inputs, trying to infer whether the marginal cost curve is flat from other questions.

^b Blinder et al and Hall et al essentially use the formulation that "firms tend hold back price changes, waiting for other firms to go first" in describing a theory called co-ordination failure. We assume that this hypothesis is approximately captured by the flat upper part of the kinked demand curve where "the firms will loose a lot of customers when raising the price".

^c Blinder et al use a definition, "costly price adjustment", which covers both of the hypotheses "decision-making costs" and "physical menu costs".

5. Why do prices change?

We also asked firms to rank the importance of different motives for actually changing the price. While not necessarily linked to price rigidity we felt that this was an important aspect for understanding the decision to adjust prices. The results are reported in table 7.¹⁹ As before the cases where a two-sided t-test rejects that two explanations have the same mean rank are separated by a dashed line. Overall the pattern that emerges is well in line with standard economic theory. Changes that affect demand or marginal cost get the highest scores. It is also notable that changes in the consumer price index per se have little importance. To the extent that consumer price index matters it does so predominantly through cost and demand channels. When interpreting the results it is worth noting that some of the suggested explanations only have bearing upon price changes in a specific direction. For example, sales

¹⁹ A special case is an alternative "other" which actually got the highest mean rank, 3.52. We chose not to include this in the table however since only very few firms answered this specific question, 79.9 percent of the firms in the sample skipped this question and a further 13.7 percent indicated not relevant/don't know.

campaigns are only associated with price reductions while a routinely upward adjustment obviously refers only to price increases.

Table 7. The importance of different causes for changing the price (turnover weighted)

	Mean rank	std dev	nobs
Price changes by competing firms	3.27	0.75	524
Changes in costs for imported inputs	3.05	1.01	476
Pressure from important customers	3.04	0.86	497
Changes in demand	3.01	0.87	518
Changes in costs for domestic inputs	3.00	0.95	507
Changes in taxes and charges	2.98	0.98	506
Changes in capital costs	2.76	1.08	521
Directions from parent company or govt agency	2.38	0.90	357
Exchange rate changes	2.24	1.09	485
Changes in wage costs	2.11	1.06	537
Sales campaigns	2.02	0.97	463
Changes in consumer price index	1.89	0.79	481
Routinely upward adjustment	1.52	0.63	290

Notably, changes in wage costs receive a relatively low rank. This stands in some contrast to the literature on the cyclical nature of markups over the business cycle which largely focuses on wage costs. We also note that the highest score was given to price changes by competitors. A background question on the number of competitors that the firm felt it had within its main line of business provides further input on this issue. The turnover weighted estimate of the proportion of firms that say they have no competitors is 4.3 percent, while the corresponding proportion that claimed to have 12 competitors or more was 27 percent. This leaves some two thirds of firms with 1-11 competitors, that is to say in markets which we may typically think of as oligopolistic. We should hence not be surprised that interaction with competitors is important for the decision to adjust prices.

6. What about information technology?

There is frequent speculation that recent developments in information technology, in particular the Internet, have substantially changed the conditions for firms' price setting decisions. Since Sweden is one of the countries where Internet has had the deepest penetration at the time of the survey, we found it interesting to confront firms with some common

conceptions of its impact.²⁰ There are several ways in which the new information technology can be expected to affect firms' price-setting decisions. One possibility is that it may reduce the administrative costs associated with a price change. One may also suspect that it may facilitate firms' comparisons of prices of different subcontractors (which may lower costs) as well as customers' comparisons of prices of different firms (which may make it more difficult to raise prices).²¹ Table 8 gives the mean rank of three statements regarding the role of information technology in changing prices.

Table 8. The importance of statements regarding information technology (turnover weighted).

	Mean rank	std dev	nobs
Less administrative costs when changing the price	2.27	0.93	521
Lower costs of inputs due to facilitated price comparisons between subcontractors	2.06	0.79	515
Higher competition since customers can more easily compare prices	1.83	0.94	521

In general, firms appear to regard information technology more as a useful tool than as a threat; they tend to agree to a larger extent to statements claiming that the firm is able to exploit information technology than to the suggestion that it has worsened the firm's own competitive situation. The perhaps most striking result is, however, that all statements are given fairly low scores, in the vicinity of "agree only to a little extent". Thus, the Internet does not yet appear to play a very significant role in the average firm's price setting decision, at least not in the sense investigated here.

7. Concluding remarks

The survey responses indicate that price rigidity is a quite complex phenomenon. For instance the decision to (not) adjust prices is decided largely by risk of disturbing long-term relations with customers and time- and statedependent price setting policies both appear important in the population of firms. The lesson that we feel should be derived from this is not necessarily that macroeconomic models should try to incorporate all these features - as noted previously menu costs or timedependent price setting may be convenient simplifications that allow the creation of tractable macroeconomic models. We feel that the main importance of the present research is to help guide our thinking about the way firms reason when they set prices. Since the behavior of both costs and competitors appear important the results point to the value of

²⁰ See, e.g., OECD (2000).

further case studies of price setting where data on both competitors prices and costs are included in the analysis.

We also like to view the present research as pointing out reasons for rigid prices that are relatively little researched, for instance the role of explicit contracts. To date there exists very little work that tries to explain why nominal contracts are signed (see Gottfries, 1992, for an exception applied to nominal wage contracts). Finally our results stress that long-term relations between firms and consumers are the norm - this should clearly affect the way we think about price adjustment.

In conclusion let us note that we have been impressed by the richness of material that the survey method yields. While it must be recognized that surveys have their deficiencies as methods for testing economic theory, it is clear to us that it provides a useful complement to more traditional methods and one in which the marginal returns to more work is high. In future work we plan to in greater detail document differences with respect to certain aspects of price setting behavior across groups.

²¹ See for instance Smith et al (2000) for some evidence of relatively low menu costs in e-commerce as evidenced by a large number of small price changes.

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Appendix A, methodological issues.

The survey was conducted by Statistics Sweden March- May 2000. The questionnaire was formulated by the authors with Statistics Sweden providing input on the design of questions. Data collection and sample design were handled by Statistics Sweden. The sample was stratified according to the number of employees and manufacturing/service industry, Table A1 illustrates. The total number of firms sampled was 1300 and the questionnaire sent to 1285 firms (15 of the sampled firms had no sales, merged or ceased to exist).

Table A1. The sample

<i>stratum</i>	<i>population size</i>	<i>sample size</i>	<i>response rate</i>
5-19 employees, manufacturing	7 803	200	45.5
5-19 employees, services	30 900	195	34.9
20-199 employees, manufacturing	3 817	198	50
20-199 employees, services	7 349	196	45.9
200-999 employees, manufacturing	467	198	63.1
200-999 employees, services	449	199	48.2
>999 employees, manufacturing	91	50	58
>999 employees, services	87	49	57.1
Total	50 963	1285	48.7

The questionnaire was sent out to firms on March 14 2000, accompanied by a cover letter signed by the governor of Sveriges Riksbank. A follow-up letter was sent after two weeks and a further follow up three weeks thereafter.

Mean Rank

Since sampling fractions differ across strata we need to adjust for this when estimating the population mean \bar{Y} , which is calculated as (see for instance Cochran, 1977)

$$\hat{\bar{Y}} = \frac{\sum_{h=1}^H \sum_{i=1}^{n_h} \frac{N_h}{n_h} * y_i}{N}$$

where $h=1,2,\dots,8$ equals the number of strata, N_h is the population size in stratum h , N is the total number of firms in the population, n_h is the number of responses in stratum h and y_i is the response given by firm i .

As discussed we also want to weigh the answers with a measure of firms' importance for the development of the price level. We use turnover from domestic sales as a weight, and thus estimate $\bar{Y}' = \bar{Y} \text{ domesticturnover}$. We do not have the total turnover from domestic sales for the population and this also has to be estimated, yielding the following expression for the estimated population mean,

$$\hat{\bar{Y}}' = \frac{\sum_{h=1}^H \sum_{i=1}^{n_h} \frac{N_h}{n_h} * y'_i}{\sum_{h=1}^H \sum_{i=1}^{n_h} \frac{N_h}{n_h} * \text{domesticturnover}_i}$$

Proportions

We are also interested in describing the proportion of firms that specified an alternative, such as 50 percent of firms adjusted price once per year. Here as well we need to adjust for the differential sampling fractions across strata so that the estimated proportion in the whole population that specified alternative k is

$$\hat{p} = \frac{\sum_{h=1}^H \frac{N_h}{n_h} * a_{hi}}{N}$$

where a_{hi} takes the value 1 if the firm has specified alternative k and 0 otherwise. We also estimate the proportion weighted by domestic turnover, specified as

$$\hat{p}' = \frac{\sum_{h=1}^H \sum_{i=1}^{n_h} \frac{N_h}{n_h} * a_{hi} * domesticturnover_i}{\sum_{h=1}^H \sum_{i=1}^{n_h} \frac{N_h}{n_h} * domesticturnover_i}$$

Appendix B - The questionnaire (translated from Swedish)

An explanation of some important terms in the survey!

Our intention is that this survey should be applicable to all types of companies. . However, some questions may apply more directly to certain companies than to others. It is also possible that certain terms take on a different meaning in different branches or types of company. To avoid any misunderstanding, and to enable the questions to be interpreted according to the conditions in your particular company, we have chosen to begin with an explanation of what we mean by various terms.

Company

Company in this survey refers to the work place to which the survey is addressed and to which the company registration number refers.

"Article" or "Service"

In this survey we would like you to consider the company's main article or service, i.e. that which best represents the company. Companies with a broad range of goods or services might find it simplest to choose the one with the largest turnover. If you have sales in both Sweden and abroad, we would ask you to bear in mind the main article/service sold in Sweden when answering our questions. It is solely in cases where the article/service is only sold abroad that you should interpret the questions as referring to the most representative product abroad.

Many companies, service companies in particular, provide "tailor-made" services according to the customers' wishes, and if this is the case in your company, we would ask you to regard the debited hourly cost as your "article or service".

Price

By "price" we mean the actual sales price. If, for instance, you have list prices, but for various reasons you usually apply a different price than the list price, the response given should reflect the price actually charged. If you have different prices for different types of customer, we would ask you to base your answer on the most common type of customer.

In other words,

Please try to bear in mind the article/service and the Swedish customer that best represent your company when you are answering the questions in this survey.

Question 1.

Can your main product be described as a "standardized article", "standardized service" or "non-standardized article or service"?

- Standardized article
- Standardized service
- Non-standardized article or service

Question 2.

Do you mostly have a fixed price for your main product or do you set the price for each individual transaction?

- Mostly fixed price (possibly combined with a fixed quantity discount or fixed discount to certain customer groups, e.g. student discounts)

- ☒ Set price individually for each transaction

Question 3.

Does the company have the possibility to set the price of the main product itself, or is it entirely set by, for instance, a parent company/group or otherwise outside of the company?

- ☒ The company can set the price itself
- ☒ The price is entirely set by a parent company/group or otherwise outside of our company
→ *Continue directly to question 10*

Question 4a)

How often do you actively review the price of your main article or service and consider whether it should be changed or not?

- ☒ Review daily (or more often) → *Continue directly to question 5*
- ☒ Review at specific time intervals
- ☒ Review mainly at specific time intervals, but also in connection with special events (e.g. a radical change in prices of(?)n inputs)
- ☒ Review made in connection with special events → *Continue directly to question 5*
- ☒ Other, namely.....
.....
.....→ *Continue directly to question 5*

Question 4b)

How often do you review prices according to a specific time interval?

- ☒ Every week
- ☒ Every month
- ☒ Every quarter
- ☒ Once a year, in the month of
- ☒ Every other year, in the month of
- ☒ Other, namely.....
.....

Question 4c)

Why have you chosen this particular time interval for reviewing prices? How well do the following statements agree with the situation in(?)your company?

Motive for chosen time interval for price review	Agree totally	Agree partly	Agree slightly	Do not agree at all	Cannot respond Not relevant
It would be too costly in time and/or money to gather relevant information and discuss price-setting decisions more often					
The factors influencing our prices do not change enough to warrant reviewing prices more often					
Prices could not be changed more					

often without risk of disturbing customer relations					
We do not determine the time interval ourselves; it is set by the parent company/group, an authority, etc.					
Other, namely					

Question 5.

Do you review the prices of several articles and services at the same time, when making the price review?

- Yes, we mostly review prices of **all** articles/services at the same time
- Yes, we mostly review prices of **most** articles/services at the same time
- Yes, we mostly review prices of **some** articles/services at the same time
- No, we review prices of **one** article/service at a time
- We sell only **one** article/service
- Don't know/Not relevant

Question 6.

Why does the price of the main article/service change? How important have the factors below, inside and outside of the company, been in setting prices in recent years?

Reasons for changing the price	Very important	Fairly important	Slightly important	Not important	Don't know Not relevant
Changes in wage costs					
Changes in capital costs					
Changed costs in (other) domestic inputs					
Changed costs for foreign inputs					
We routinely raise prices at regular intervals					
Changes in taxes and charges					
Changes in exchange rates					
Price changes by competitors					
Changes in demand for article/service					
Changes in consumer price index					
Sales campaigns					
Requests from one or more important customers					
Directives from parent company/ group, authority, etc.					

Other, namely					
---------------	--	--	--	--	--

Question 7.

Assume that you notice there has been a slight increase in demand for your main article/service.

What is normally the strongest argument for leaving the price unchanged?

Please choose only one alternative!

- It is too costly to change the price (re-labelling, new price lists, etc.)
- It is important that the price is at the right level in comparison with competitors, if they don't change it, we don't change it
- As long as costs are not affected, it is better to leave the price unchanged
- Other, namely.....

Question 8a)

There are a number of theories as to why companies sometimes choose not to change the price or only change the price slightly. Here are a number of theories presented in brief.

How important are these theories when it comes to explaining potential price inertia and price adaptation in your company during economic booms and economic recessions?

Theories on price inertia	Very important	Fairly important	Slightly important	Not important	Don't know Not relevant
The price is regulated in formally-written contracts that are costly to renegotiate					
There are "physical" costs connected with price changes, e.g. printing of new price lists, cost of notifying retailers, etc.					
It is costly in terms of time and/or money to gather relevant information for pricing decisions					
Customers prefer a stable price and a change could damage customer relations, even if competing companies also change their prices					
The price is inert because the company loses many customers when it is raised, but seldom gains only few new ones when the price is reduced					
In a recession, when					

demand is weak and cashflow is low, the price may need to be kept up to cover costs and finance current investment projects					
When there is a high level of economic activity and customers buy a lot, they have a greater tendency to compare prices. Customers are thus more sensitive to price changes in booms than in recessions					
When there is a high level of economic activity, the company's costs for reaching customers and/or finding suitable sub-contractors decline. This contributes to keeping the price down during booms					
In a recession the costs of the company's external financing, e.g. bank loans, increase. This contributes to keeping the price up during recessions					
The cost of the company's inputs does not change much over the business cycle, which contributes to the price of the company's article/ service remaining roughly the same					
The customer mix changes over the business cycle so that when there is a recession, the company loses the least loyal customers, while more loyal customers remain. As the latter are less price sensitive, the price can be					

maintained during a recession					
Psychological "thresholds" for the price exist. The article/ service is assumed to sell much better at, e.g. SEK 49.95 than at SEK 50.05.					
Price wars are more common when demand in the economy is high, which contributes to keeping the price down during a boom					

Question 8b)

The company can experience different types of costs in connection with raising the price, e.g. because of factors listed under question 8a. These "adjustment costs" may imply that companies sometimes refrain entirely from raising the price or that they merely raise it slightly.

Which of the following statements best describes the way you see the "adjustment costs" with regard to a price rise on your main article/service?

- As soon as the price is changed a cost arises, but the cost does not depend on **how much** the price changes
- If the price is changed only a little, the cost is negligible, but the cost increases with the size of the change in price
- As soon as the price is changed a cost arises, and this cost also increases with the size of the change in price
- Don't know/Not relevant

Question 8c)

Are the "adjustment costs" for changing the price of your main article/service sometimes higher and sometimes lower? If so, are the variations so large that pricing decisions are affected?

- Yes, the "adjustment costs" vary so much over time that they can affect our pricing decisions
- The "adjustment costs" do vary over time, but not sufficiently to affect pricing decisions
- No, the "adjustment costs" do not vary appreciably over time
- Don't know/Not relevant

Question 9.

The price of an article/service can be expressed as a percentage increase, a markup, on the variable cost of producing an additional unit (the marginal cost).

How well do the descriptions below of the increase on the main product agree with circumstances at your company?

Description of increase	Agree totally	Agree partly	Agree slightly	Do not agree at all	Don't know Not relevant
The markup is relatively					

constant, when costs change, the price is changed to a corresponding degree					
The markup varies over time, but not in any systematic way in relation to demand					
When demand increases, the variable costs increase more than the price the company can charge for the article/service, i.e. the markup declines					
When demand increases, the variable costs rise less than the price the company can charge for the article/service, i.e. the markup increases					

Question 10.

How many times a year does the price of your main article/service change?

- | | | |
|--|---|---|
| <input type="checkbox"/> Less than once a year | → | Approximately how often? |
| <input type="checkbox"/> Twice a year | | <input type="checkbox"/> Every second year |
| <input type="checkbox"/> Three times a year | | <input type="checkbox"/> Every third year |
| <input type="checkbox"/> Four times a year | | <input type="checkbox"/> Every fourth year |
| <input type="checkbox"/> 5-8 times a year | | <input type="checkbox"/> Other, namely..... |
| <input type="checkbox"/> 9-12 times a year | | |
| <input type="checkbox"/> More than 12 times a year | | |
| <input type="checkbox"/> Other, namely..... | | |
| | | |

Question 11a)

Approximately how large a part of the sales of your main article/service are through contracts signed in advance that specify e.g. a particular quantity and/or particular sales price for a specific period of time?

Example: Tire & Co. undertakes to sell 500 tires to Car & Co. during the period August-October 2000 for SEK 100 per unit.

- | | | |
|---|---|--------------------------------|
| <input type="checkbox"/> 0 per cent | → | Continue to question 12 |
| <input type="checkbox"/> 1-25 per cent | | |
| <input type="checkbox"/> 26-50 per cent | | |
| <input type="checkbox"/> 51-75 per cent | | |
| <input type="checkbox"/> 76-99 per cent | | |
| <input type="checkbox"/> 100 per cent | | |
| <input type="checkbox"/> Cannot quantify/Don't know | | |

Question 11b)

What is normally specified in your written contracts for the main article/service?

- | | | |
|---|---|--------------------------------|
| <input type="checkbox"/> The contract specifies only price | | |
| <input type="checkbox"/> The contract specifies only quantity | → | Continue to question 12 |

- ☒ The contract specifies both price and quantity

Question 11c)

For how long a period is the price specified in a typical contract?

- ☒ Less than 7 months
- ☒ 7-12 months
- ☒ 12-24 months
- ☒ More than 24 months
- ☒ Not appropriate to specify the price for any particular period

Question 11d)

Is the price in the contract normally index-linked to inflation, CPI or similar?

Example: Tire & Co. undertakes to sell 500 tires to Car & Co. during the period August-October 2000 at a cost of SEK 100 per unit, given that the world market price for rubber does not exceed USD 1. If the world market price should rise to between USD 1 and USD 1.5, Tire & Co. will sell the tires at SEK 120 per unit.

- ☒ Yes
- ☒ No
- ☒ Not relevant

Question 12

Please give an approximate description of how the sales of your main article/service are distributed between households, companies and divisions within your own group, other companies and other types of customers(?).

Sales are largely distributed as follows:	Percentage
Households	
Companies and divisions within our own group	
Other companies	
Other types of customer	
Total per cent	100

Question 13.

Approximately how large a percentage of the sales of your main article/service is to regular customers, with whom you will do business again, and how large a percentage is to occasional customers?

Sales are approximately distributed as follows:	Percentage
Regular customers	
Occasional customers	
Total per cent	100

Question 14.

Approximately how large a percentage of the sales of your main article/service is in Sweden and how large a percentage abroad?

Sales are largely distributed as follows	Percentage
Sweden	
Abroad	
Total per cent	100

Question 15.

How many competitors does your company have within your main field of operations, in your opinion?

Please count only those companies with which you feel you are in direct competition. If your company is, for instance, a tobacconist, you should only count the companies within your region, town or district that you consider direct competitors!

- No competitors in main field of operations
- 1 competitor
- 2 competitors
- 3 competitors
- 4 competitors
- 5-8 competitors
- 9-11 competitors
- 12 or more competitors

Question 16.

Costs can be divided up into fixed costs and variable costs. Fixed costs remain the same regardless of the volume in demand (e.g. rental costs for factory or office premises), while variable costs vary according to production levels.

Approximately how large a percentage of your company's costs are normally variable costs?

- 0-25 per cent
- 26-50 per cent
- 51-75 per cent
- 76-100 per cent

Question 17.

Many claim that the developments in information technology, and particularly the Internet, in recent years have changed the conditions for pricing for some companies.

How well do the following statements agree with the circumstances at your company?

Statements on information technology	Agree totally	Agree partly	Agree slightly	Do not agree at all	Don't know Not relevant
The Internet and other new information technology have made it easier for our company to make price comparisons on input goods from different suppliers					
The administrative costs of changing the price of our main article/service have declined, as new information technology makes it cheaper to determine					

new prices and/or spread the information regarding the new prices					
We perceive an increase in competition with the advent of the Internet and other information technology, as the customers can more easily compare our price with the prices of our competitors					

Question 18.

You have responded to questions regarding your company's main article/service in this survey.

To what extent do you consider that the answers also represent your other products?

- The answers also mainly represent our other products
- The answers mainly do not represent our other products
- Not relevant, the company has only one product

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