

Pricing behaviour of Dutch companies: main results from a survey

Marco Hoeberichts and Ad Stokman¹

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Abstract

Our paper analyses price setting policies at firms in the Netherlands on the basis of information from a survey commissioned by the Nederlandsche Bank in May 2004. This investigation has been conducted as a part of the Eurosystem Inflation Persistence Network (IPN).² Identification of price sticky companies and the reasons behind price rigidity is our main objective. What makes our survey particularly appealing is its broad coverage of the Dutch business community: next to manufacturing, we distinct 6 types of service sectors. Moreover, all company sizes, ranging from one-employee firms to large companies, are covered.

We find that the degree of competition is very important in shaping price setting behaviour in the Netherlands. With weak competition price setting becomes much stickier. Also size and sector are relevant. Small firms - particularly one person companies - adopt the most rigid prices. Prices for business-to-business services are more rigid than in wholesale and retail. Among the motives for not changing or delaying price changes, informal and explicit contracts are the most relevant. Menu costs and attractive prices are unimportant. Finally, there is clear evidence of asymmetries in pricing behaviour. Respondents report that the changeover of the euro had up to now little influence on their price setting.

Key words: nominal rigidity, price-setting, survey

JEL codes: E30, D40

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² For a summary of national surveys see Fabiani *et al* (2004).

1 Introduction

This paper analyses price setting policies at firms in the Netherlands on the basis of information from a survey commissioned by the Nederlandsche Bank in May 2004. Identification of price sticky companies is our main objective. Price rigidity has important implications for inflation dynamics and for monetary policy as it is an important source of non-neutrality of money in the short-term. Most empirical work focuses on price stickiness in the US, the UK and a few European countries. The ECB and the other European central banks have initiated the European Inflation Persistence Network (IPN), in which researchers come together, exchange results on different aspects of this topic. Final goal of this joint work is getting a better understanding of price setting and stickiness in EMU.

In our survey, Dutch firms are interviewed about several aspects of their own price setting, ranging from frequency of price changes and price reviews, to how firms set their prices and why they change them or not. We are particularly interested in identifying price-sticky sectors. Several theories of price stickiness will be tested. By our knowledge, this survey is the first dealing with this topic for a broad set of Dutch firms, from small to large ones, and for manufacturing and the service sector. In a recent study Jonker et. al. (2004) examines pricing behaviour in the Netherlands on the basis of monthly price data of 49 products included in the Dutch CPI. .

2 Survey set-up

The survey was carried out by a private company (TNS-NIPO) in May 2004 on the basis of a questionnaire provided by the Nederlandsche Bank (see Annex I). The sample of firms was drawn from a unique panel of 12.000 company owners, directors and high-level management responsible for marketing, sales or finance. The questionnaire was sent by email to almost 1900 selected businessmen, in most cases to their home@-addresses. This approach has the advantage that people can pick the right time for their reply. The questionnaire was pre-tested on a 'pilot'-sample of 200 firms. In total, TNS-NIPO received back 1246 replies. The response rate of 67% is high - especially for a specialists' survey like ours - reflecting the suitability of the business panel for our purpose.

Important feature of the panel is its broad coverage of the Dutch business community. For our investigation into price stickiness this is crucial. Table 1 summarizes the sample breakdown into company size and sector. The main part of our sample deals with the service sector. First of all, services are the dominant economic activity in the Netherlands. Secondly, we expected price stickiness to be especially relevant for certain types of services. The need of a broad spectrum also applies to company size, in our

survey measured by the number of employees. In a recent micro-based panel-study for the Netherlands, Jonker et.al (2004) provide evidence of price stickiness among small retail firms. Excluded from our survey are the government, construction, the financial sector, the energy sector and farming.

Table 1 Sample characteristics and response rates

Business sector	Number of respondents	Response rate (%)	Size	Number of respondents	Response rate (%)
Manufacturing	219	64	1 person	230	88
Services	1027	67	2-4 persons	292	87
- Wholesale	131	61	5-9 persons	198	84
- Retail food	84	62	10-19 persons	152	67
- Retail non-food	187	71	20-49 persons	141	57
- Hotel/restaurant	70	77	50-99 persons	86	56
- Transport/commun.	92	54	>100 persons	147	36
- Other business services	463	71			
Total	1246	67	Total	1246	67

3 Survey outcomes

3.1 Introduction

Broad scope survey

In our survey, respondents are requested to fill in the survey on the basis of the main product or one typical product sold by the company. Picking a specific product is convenient for the respondent, especially in cases a company adopts a variety of pricing strategies for different goods and services. Moreover, with this instruction we prevent - or at least intend to prevent - that a respondent switches from one product to another, thereby safeguarding internal consistency throughout the questionnaire.

In order to get an impression of the scope of our survey, respondents were asked whether their company adopts one pricing policy for its products or not. On average, 28% of the respondents reports that their price setting is basically the same for all products; 24% of the respondents adopt one pricing strategy for the greater part of their assortment and 44% states that price setting may vary substantially with the type of product. Not surprisingly, price setting by large companies is more diverse than for smaller companies

(53% against 37%). All in all, these figures suggest that the scope of the survey is broader than what might perhaps be expected from the single-product-approach.

Competition and price setting

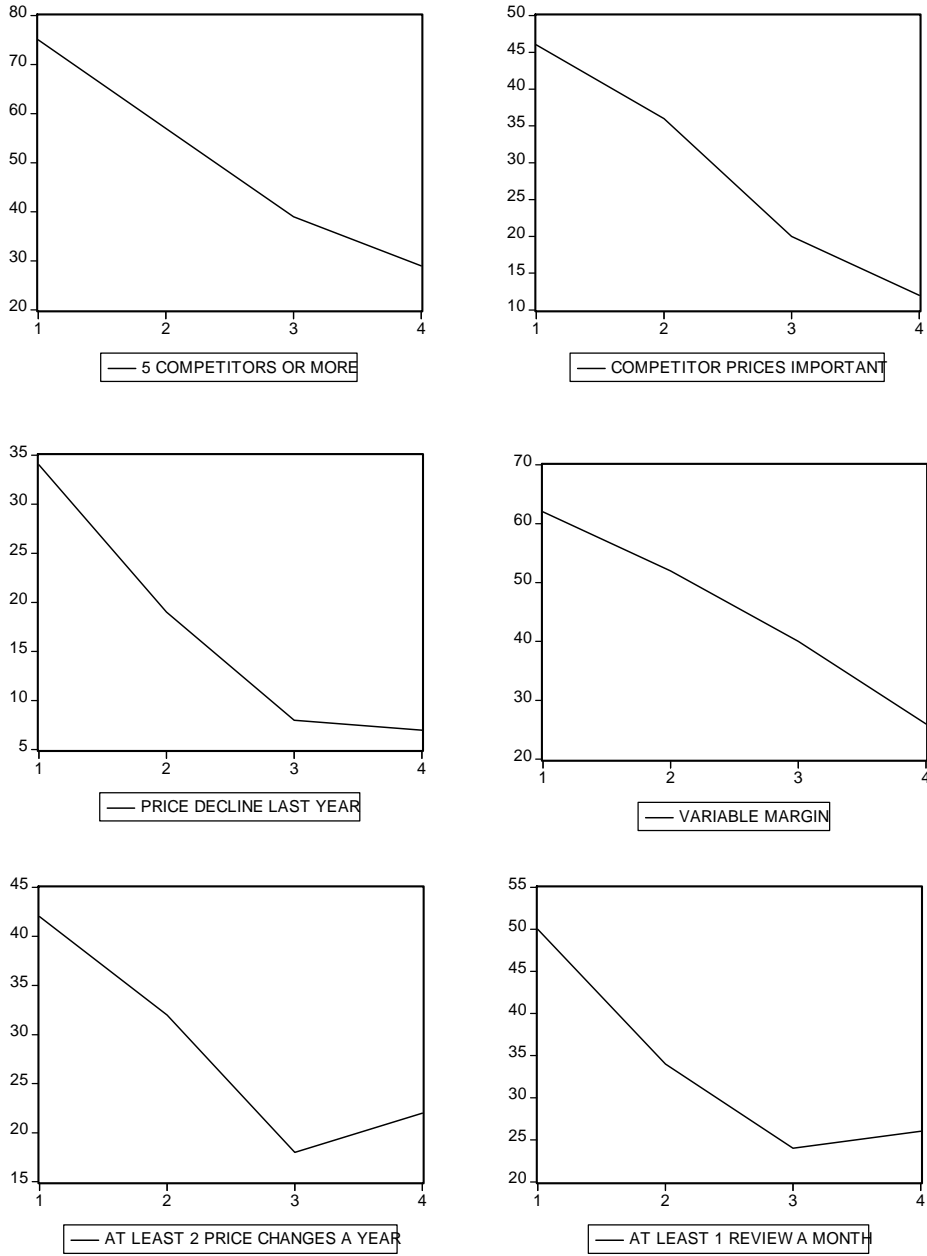
The degree of competition is fundamental in shaping price setting behaviour. In highly competitive markets, companies will change their prices more often in response to changing market conditions or price revisions by main competitors. In regulated or sheltered markets, price responses are expected to be more sluggish. Because of this central role of competition, we have added a couple of questions that relate to competitive pressure. The first is the number of competitors. A distinction is made between 5 categories: no competitors, 1, 2 to 4, 5 to 20 and over 20 competitors (see question 1.8). As a rule we expect competition to rise with the number of competitors. Of course, this measure may have its shortcomings. For example, in oligopolistic markets with a small number of big firms, competition may be strong as well. Therefore, we have also asked companies about the perceived degree of competition, with a distinction into severe, strong, weak and no competition (see question 1.9). The third and final measure of competition is a company's sensitivity to price changes by competing firms (questions 2.8 and 2.9).

What do these measures tell us? Do they point in the same direction? And what does the degree of competition tell us about crucial price setting features like frequency of price changes and reviews, downward nominal rigidity of prices and the choice between fixed or variable mark-ups in price determination? In the sections 3.2 and 3.3 we adopt a multivariate approach to answer these questions. Here we start shooting a two-dimensional picture taking perceived competition as our point of reference³. In our sample of 1246 firms, 21% experience severe competition, 47% strong competition and 23% respectively 5% weak and no competition. In Figure 1 perceived competition is labelled 1 tot 4 (from high to low competition).

³ It was Nobel Laureate Jan Tinbergen who advised his students to *draw first and calculate afterwards* ('Eerst tekenen dan rekenen').

FIGURE 1 PERCEIVED COMPETITION AND PRICING BEHAVIOUR

% of respondents within competition cluster



1: SEVERE COMPETITION
 2: STRONG COMPETITION
 3: WEAK COMPETITION
 4: NO COMPETITION

The figure shows that both the number of competitors and the sensitivity for competitor prices strongly correlate with perceived competition. For example, about three quarters of the respondents facing high competition report that they compete with 5 or more companies, against one third of the respondents in a low-competition environment (top left box). Replacing the category of ‘5 or more competitors’ by ‘20 or more competitors’ does not alter this observation (see also Table 5).

The two middle and bottom boxes show that price setting is much more flexible in highly competitive markets: firms operating in these markets change and review their prices much more frequently and adopt more often flexible mark-ups. With flexible pricing we expect to find higher shares of downward price-adjustment. Indeed, according to our survey, one third of the respondents experiencing strong competition has lowered the price of the main product last year. In markets with weak competition, on the other hand, price decreases were uncommon last year. This quick-and-dirty scan suggests that prices seem to be sticky for quite a number of companies. In Section 3, we will identify characteristics of sticky-price firms on the basis of a formal multivariate analysis.

3.2 Price reviews and changes

From other studies we know that price rigidities differ substantially between sectors. In Table 2 below, we show price changes and reviews for the different sectors.

Table 2: Frequency of price reviews and changes by sector

Sector	% of firms that review at least monthly		% of firms that change more than once a year	
Manufacturing	40.1 %		23.5 %	
Wholesale	53.7 %		45.0 %	
Retail food	68.0 %		67.5 %	
Retail non-food	52.0 %		44.3 %	
Hotel/rest.	33.3 %		27.5 %	
Transport/comm.	31.7 %		22.4 %	
Other services	21.3 %		19.1 %	

Sector	firms that increased prices in 2003		firms that decreased prices in 2003	
	% of firms	Median increase	% of firms	Median decrease
Manufacturing	40.8 %	5%	22.0 %	10%
Wholesale	45.7 %	6%	22.5 %	10%
Retail food	43.8 %	7%	30.0 %	10%
Retail non-food	48.1 %	5%	18.4 %	10%
Hotel/rest.	55.2 %	5%	6.0 %	12.5%
Transport/comm.	47.0 %	4%	13.3 %	10%
Other services	50.6 %	5%	17.0 %	15%

Price reviews are most frequent in wholesale and retail, especially food. These sectors also change prices most frequently. In manufacturing, 40% reviews at least monthly, but still only 24% changes more than once a year. In the hotel sector 55% has increased prices in 2003, whereas only 6% has decreased. Price decreases were most common in the retail food sector, where 30% has decreased their price. The median decrease is about twice as large as the median increase. The higher frequency of price reviews compared to price changes suggests that costs of collecting information are not decisive.

As can be seen from Table 1, our survey has a broad coverage of firm size categories. Compared to other surveys, we have very detailed information especially about small companies. In Table 3 we shows how the frequency of price reviews and actual price changes varies with firms size.

Table 3: Frequency of price reviews and changes by firm size

Firm size	% of firms that review at least monthly		% of firms that change more than once a year	
1 employee	19.8 %		23.0 %	
2-4	36.0 %		30.2 %	
5-9	37.9 %		33.9 %	
10-19	43.9 %		28.8 %	
20-49	37.7 %		25.8 %	
50-99	48.8 %		38.8 %	
100+	49.2 %		37.3 %	

Firm size	firms that increased prices in 2003		firms that decreased prices in 2003	
	% of firms	Median increase	% of firms	Median decrease
1 employee	41.9 %	6%	14.4 %	15%
2-4	44.4 %	6%	16.4 %	10%
5-9	47.7 %	5%	18.1 %	10%
10-19	48.7 %	5%	17.1 %	10%
20-49	62.1 %	4%	16.4 %	10%
50-99	48.8 %	5%	26.2 %	10%
100+	46.2 %	4%	29.0 %	10%

Clearly, small firms with only one employee have the most rigid prices. Only 20% of the firms reviews at least monthly and only 23% changes more than once a year. The frequency of price reviews really stands out: of firms that have 2-4 employees 36% reviews at least monthly. Very large firms tend to review very frequently (49% at least monthly), but still only 37% changes prices more than once a year.

Especially price decreases are relatively rare in the 1-employee firms. However, when they change, both the median increase and the median decrease are above average. In general, it is striking that the median size of a price decrease is about twice as large as the median size of an increase and that the frequency of price decreases is less than half of the frequency of price increases. These results suggest that frequent

price changes go hand in hand with small steps in price changes, and infrequent price changes with large steps.

Multivariate analysis of factors influencing the frequency of price reviews and changes

It seems very likely that firm size and sector are correlated. In order to distinguish between the size effect and the sector effect, we run an ordered logit regression. As Figure 1 shows, another important factor influencing the frequency of a price change or review is the level of perceived competition.

Table 4: Ordered logit regression of the frequency of price reviews and changes

	Frequency reviews ⁴	Frequency changes
Firm size	0.19 (0.04)**	0.12 (0.04)**
Competition	0.35 (0.07)**	0.34 (0.08)**
Dummy retail food	1.57 (0.26)**	2.09 (0.28)**
Dummy retail non-food	0.77 (0.21)**	1.02 (0.23)**
Dummy wholesale	0.83 (0.22)**	1.02 (0.24)**
Dummy hotel/rest.	0.07 (0.26)	0.33 (0.30)
Dummy transport	0.12 (0.25)	-0.06 (0.29)
Dummy business services	-0.34 (0.17)*	-0.10 (0.19)
Dummy 1-person firm	0.10 (0.18)	0.04 (0.21)

Manufacturing is the base-sector

Std. errors in parentheses

** = significant at 1%-level, * = significant at 5%-level.

We use an ordered logit regression to estimate the relationship between an ordinal dependent variable (the category of the frequency of price changes or reviews that is reported in our questionnaire, see Appendix) and a set of independent variables that represent firms' characteristics.

The frequency of price reviews is significantly affected by firm size, competition and whether the company is in the wholesale, retail or food sector. Larger firms in a competitive environment and firms in the wholesale, retail or food sector review prices more frequently (Table 4).

As the frequency of price reviews, the frequency of price changes is significantly affected by firm size, competition and whether the company is in the wholesale, retail or food sector. Larger firms in a competitive environment and firms in the wholesale, retail or food sector change prices more frequently. Interestingly, if we would leave out companies with at most 19 employees from our logit regression, firm size does not significantly affect the frequency of price reviews and changes anymore. So in our search for price stickiness, small companies are important.

⁴ The signs of the parameters in this table and the following tables have been adapted to make interpretation logical. The parameter estimates can be interpreted as marginal effects on a score-function that translates into probabilities.

The variable “perceived competition” explains the frequency of price changes and the frequency of price reviews much better than the variable “Number of competitors”. Although, as can be seen from Table 5, the number of competitors explains for a large part the level of perceived competition.

Table 5: Perceived competition Ordered logit regression

Perceived competition	
Size	0.21 (0.03)**
# of competitors	0.89 (0.06)**
Dummy retail/wholes.	0.79 (0.13)**
Dummy transport	1.07 (0.25)**
Dummy manufacturing	0.49 (0.17)**

Std. errors in parentheses

** = significant at 1%-level, * = significant at 5%-level.

It is clear that perceived competition increases with firm size and especially with the number of competitors. Regarding the sector dummies, wholesale, retail, manufacturing and transport perceive more competition. This implies less perceived competition for hotel and other services.

3.3 Price determination

We have asked firms how they determine the price for their main product. In the appendix (question 2.7) all possible answers are listed. In the analysis, we focus on the five most important answer categories. As in the previous section, we distinguish by sector and by size (Table 6 and 7).

Table 6: Price determination by sector

Sector	Fixed markup	Variable markup	Competitors	Linked to e.g. wage	Depend on customer
Manufacturing	28.1 %	35.7 %	19.5 %	9.5 %	3.8 %
Wholesale	37.6 %	40.0 %	19.2 %	0 %	2.4 %
Retail food	40.0 %	26.7 %	26.7 %	2.7 %	2.7 %
Retail non-food	35.6 %	31.0 %	19.5 %	2.3 %	8.6 %
Hotel/rest.	36.2 %	25.9 %	17.2 %	8.6 %	6.9 %
Transport/comm.	22.2 %	25.9 %	21.0 %	16.1 %	13.6 %
Other services	16.7 %	26.7 %	26.7 %	19.8 %	6.8 %

It is clear that firms in the retail sector and in the hotel/restaurant sector have a preference for applying a fixed markup to their costs. The variable markup, depending on market conditions, is the most frequent way of determining prices in manufacturing, wholesale, transport/communication and other services.

Table 7: Price determination by size

Firm size	Fixed markup	Variable markup	Competitors	Linked to e.g. wage	Depend on customer
1 employee	21.9 %	19.4 %	35.3 %	9.0 %	10.5 %
2-4	32.7 %	28.0 %	18.6 %	10.6 %	6.2 %
5-9	35.0 %	29.6 %	17.7 %	10.8 %	5.9 %
10-19	27.9 %	36.4 %	15.0 %	14.3 %	5.0 %
20-49	20.6 %	35.9 %	26.7 %	9.2 %	3.1 %
50-99	26.8 %	30.5 %	20.7 %	15.9 %	4.9 %
100+	18.8 %	39.1 %	22.5 %	11.6 %	6.5 %

As with the frequency of price changes and reviews, the 1-employee firms stand out in the way they determine prices. Where the general picture shows that smaller firms tend to apply a fixed markup and large firms a variable markup, 1-employee firms appear to determine their price by looking at their competitors' prices. We apply a multinomial logit regression to analyze which factors influence the way a firm determines its price (Table 8).

Table 8: Multinomial logit regression of price determination

	Variable markup	Competitors	Linked to e.g. wage	Depend on customer
Size	0.15 (0.05)**	0.16 (0.06)**	0.20 (0.07)**	0.02 (0.10)
Competition	0.29 (0.11)**	0.52 (0.12)**	-0.32 (0.15)*	0.11 (0.17)
International	0.20 (0.08)*	-0.00 (0.09)	-0.15 (0.12)	0.17 (0.14)
Dummy transp/oth.ser.	0.44 (0.18)*	0.75 (0.19)**	2.23 (0.26)**	0.85 (0.29)**
Dummy 1-emp.	0.14 (0.29)	1.26 (0.29)**	-0.08 (0.40)	0.92 (0.42)*

Fixed markup is comparison group

Std. errors in parentheses

** = significant at 1%-level, * = significant at 5%-level.

Taking the price setting strategy where the firm simply puts a fixed mark-up on average unit cost as a benchmark, we find that larger firms tend to use a variable mark-up or focus on competitors' prices. More competition also makes competitors' prices an important strategy, but also the variable mark-up. Linking to other prices becomes less important with more competition. More international firms tend to shift to the variable mark-up. Finally, for firms in the transport sector or other services the fixed mark-up is clearly not popular, linking to other prices, e.g. wages is popular in these sectors. The dummy for 1-employee firms shows that they often follow competitors' prices or depend on their customers.

Table 9: Multinomial logit regression Time versus state dependent

	Daily ⁵	Time-dependent	Mixed time/state
Size	0.28 (0.07)**	0.20 (0.04)**	0.21 (0.04)**
Competition	0.69 (0.20)**	-0.07 (0.09)	0.25 (0.11)*
Dummy retail/wholes.	0.83 (0.35)*	-0.48 (0.17)**	0.07 (0.20)
Dummy food	1.06 (0.41)**	0.08 (0.34)	0.46 (0.34)
Dummy manufacturing	-0.32 (0.48)	-0.93 (0.20)**	-0.29 (0.23)

State dependent pricing is comparison group

Std. errors in parentheses

** = significant at 1%-level, * = significant at 5%-level.

Taking state-dependent changing of prices as a benchmark, large firms tend to move away from state-dependent to daily, time-dependent or mixed time/state dependent. More perceived competition makes that companies either adapt prices daily or combined time/state dependent (Table 9).

From the sector dummies, it is clear that wholesale and retail (especially food) mostly adapt prices daily, whereas manufacturing is mostly state-dependent

3.4 Reasons for price stickiness

Firms may have several reasons not to change prices immediately. These reasons have been investigated in several studies. Our results are reported in Table 10 and confirm earlier results that implicit and explicit contracts play an important role, whereas menu costs appear to be unimportant.

Table 10: Importance of theories of price stickiness

Reason not to change	Mean	Std. Dev
Implicit contracts	6.2	2.4
Explicit contracts	5.5	2.8
Lower price, lower quality	5.2	2.6
Next change in opposite dir.	5.0	2.5
Competitors don't follow	4.5	2.5
Prefer to change other cond.	3.9	2.5
Attractive pricing	3.5	2.5
Menu costs	3.0	2.3

In Table 11 we analyze the firm's characteristics that influence the importance it assigns to the several theories for price stickiness. We have performed an OLS regression of the score given to a certain theory of price stickiness (listed in column 1) on the firms' characteristics (size, perceived competition, the main market (question 1.6) and sector dummy). The most striking result is that for small firms the implicit contracts are, *ceteris paribus*, a more important reason not to adjust prices than for large firms.

Explicit contracts, however, are more important to large firms. Furthermore, implicit and explicit contracts are less important in the retail sector (compared to manufacturing), whereas attractive prices and menu costs are more important in retail (although still at a low level, see Table 10).

Table 11: Determinants of the importance of theories for price stickiness

Reason not to change	Size	comp.	intern.	Sector +	Sector –
Implicit contracts	--	+	+		Retail n-f
Explicit contracts	+++	+++	+++		Retail n-f, hotel
Lower price, lower quality					
Next change in opposite dir.		++			
Competitors don't follow	+++	+++			
Prefer to change other cond.	+++				Hotel
Attractive pricing			-	Retail f, n-f	
Menu costs	++	-		Ret, wholes., hotel	

+++, ++, + (---, --, -) means significantly positive (negative) effect on the 1, 5, 10% level sectors mentioned in Sector + (-) have a significantly positive (negative) sector dummy at the 5% level Manufacturing is the reference sector.

3.5 Asymmetries

In this section we discuss asymmetric price responses of Dutch firms to shocks. The literature provides a number of explanations for asymmetries. They might arise because of strategic interaction between firms (Rotemberg, Saloner, 1997), the presence of menu costs (Ball and Mankiw, 1994), search costs (Small, Yates, 1999) or capacity constraints (Finn, 1996). According to Ball and Romer (1990) nominal prices are stickier in a market where firms' profits do not change much in the face of shocks.

As we have seen in section 3.4, menu costs play a very limited role in pricing decisions. Unfortunately, we don't have information about search costs. Furthermore, as the economy had just started to recover from a recession at the time we surveyed Dutch firms, we don't expect capacity constraints to be particularly relevant. Rotemberg's, Ball's and Romer's argument, however, can be tested by means of a measure of competition. In the following, therefore, we take a closer look at asymmetries and the role of competition. Next, as the smallest firms are found to be the most rigid price setters and are well represented in our survey, we discuss asymmetries for the one-person companies in greater detail.

Asymmetries and competition

We may distinguish two types of asymmetries: one depending on whether the shock has a price depressing or a price raising effect and one based on the origin of the shock. According to our survey, asymmetric

⁵ Daily price changes indicate flexible prices. For this reason, we have included it as a separate category instead of interpreting daily price changes as time-dependent.

responses to shocks are a general feature of price setting in the Dutch business sector (Table 12). Rising *costs* have a significantly larger upward effect on prices than declining costs in the opposite direction. Asymmetric responses are strongest for labour cost shocks. If we regroup firms according to the degree of competitiveness - from severe to weak competition - responses to cost shocks are strongest for the first group both in case of price raising shocks and price decreasing shocks. To put it differently, price setting is more flexible in a competitive setting and stickier for companies with little competition. This is in line with what theory tells us. Moreover, for firms perceiving weak competition reported cost asymmetries are significantly larger. Similar results are found in most other countries (see Hall *et al.* (2000) for the UK and Fabiani *et al.* (2004) for Italy).

Asymmetric responses are also relevant when *market conditions change*. In competitive markets, company prices respond stronger to price depressing conditions like weakening demand and lower competitor prices than to price raising conditions of strengthening demand or higher competitor prices. Under weak competition, asymmetric price responses vanish. These results are very interesting with important implications for monetary policymaking, but also for macro-economic model building in which asymmetries are often ignored.

Table 12 Survey evidence of (double) asymmetries

Average score (1 to 10)	All sample			Severe competition			Weak competition		
	As a cause of a price			As a cause of a price			As a cause of a price		
	rise	decline	Δ	rise	fall	Δ	rise	fall	Δ
<i>Cost factors</i>									
1 Raw materials	5.5	4.1	1.4	5.8	4.5	1.3	5.1	3.5	1.6
2 Labour costs	6.1	4.4	1.7	6.3	4.6	1.7	5.9	4.0	1.9
3 Other costs	5.8	4.2	1.6	5.7	4.5	1.2	5.8	3.9	1.9
Average	5.8	4.2	1.6	5.9	4.5	1.4	5.6	3.8	1.8
<i>Market conditions</i>									
4 Demand	4.9	5.5	-0.6	4.9	5.9	-1.0	4.9	5.4	-0.5
5 Competitor price	5.6	6.0	-0.4	6.2	6.7	-0.5	5.1	5.3	-0.2
Average	5.3	5.8	-0.5	5.6	6.3	-0.7	5.0	5.3	-0.3

Asymmetries and small companies

Compared to surveys in other countries, the Dutch survey on price setting contains detailed information about small firms, including the smallest 1-person ones. There are quite a number of 1-person firms in The Netherlands (around 40% of the business population). In terms of value added the share is smaller, but nevertheless significant. The share of the 1-person firms offering business-to-business services is 60%, 13% are active in retail non-food, 12% in wholesale or transport, 3% in retail food. In par 3.2 we presented evidence that companies with only 1 employee have the most rigid prices. For example, only 1 out of 5 of these firms changes prices more than once a year and price decreases are relatively rare.

Not only in comparison with large firms, but also within the group of small firms, 1-person companies are extraordinary. This is shown for asymmetries in Figure 2 and 3. Price responses by 1-person firms to cost shocks are by far the weakest, both in case of downward and upward pressure. The response to changes in demand or competitors' prices is stronger, however, especially under worsening market conditions, and is more in line with that of larger companies. What can explain this exceptional price setting behaviour? In over 80% of our sample, the employer and employee is one and the same person, which explains why they are relatively insensitive to labour cost shocks. Moreover, for many 1-person firms raw materials are of little importance. Finally, the weak responsiveness to financial costs can be explained by the fact that small companies rely to a great extent on internal financial resources.

To sum up: Most 1-person companies change their prices only occasionally, but when they do they set the prices in accordance with market conditions.

Figure 2 Price raising factors in small Dutch firms

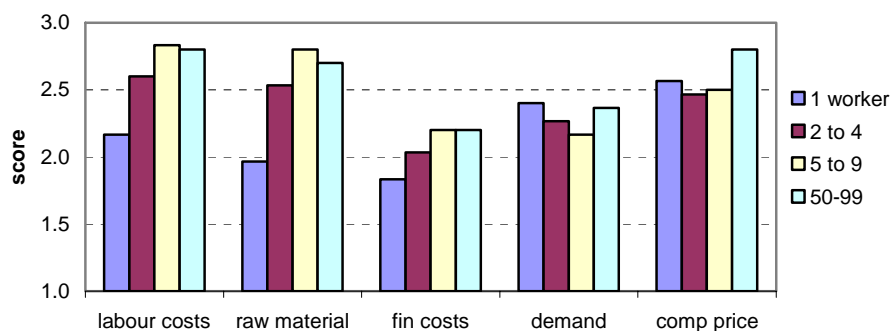
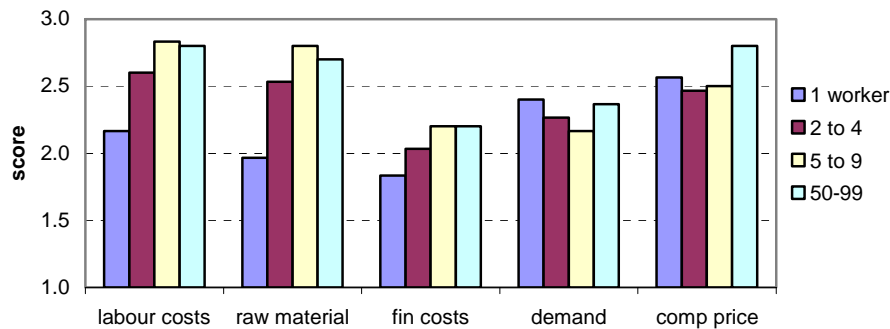


Figure 3 Price raising factors in small Dutch firms

4 Special topics

Price setting and EMU

One of the major economic advantages of EMU is increased market transparency. Prices between member countries can be better compared and price differentials are not disturbed anymore by exchange rate changes viz. a viz. other member-currencies. This will stimulate competition and affect pricing behaviour sooner or later. From our survey, it appears that EMU had no major impact on pricing policies up till now, but seems to be neither negligible. About 70% of the respondents operating in foreign markets report that their pricing policies have not changed: 10% expects EMU to affect their pricing policy in the near future. Interestingly, another 10% of the respondents report that price discrimination between countries has become more difficult because of the euro. Again, firms perceiving stronger competition or bigger companies report a larger impact of EMU. All in all, the survey suggests that changes in pricing behaviour in response to EMU are likely to be a gradual process⁶. Faber and Stokman (2004) draw the same conclusion on the basis of price dispersion developments within the EMU.

Pass-through of price stickiness in production chains

From the literature it appears that price stickiness might be an important macro-economic phenomenon, even if it is not widespread at the micro-level. An explanation for this is that price-stickiness in one part of the production chain may be passed through in the next. In our survey, we asked respondents whether they tune the timing of their own price changes to those of suppliers, and to what extent customers take respondents' timetables for price changes into account. About 22% of all respondents report that they do

this often or always, 37% say they don't, and another 35% occasionally. Differences between sectors are large: in wholesale and retail, tuning of the timing with suppliers is common practice for 1 out of 3 firms, compared with 1 out of 6 on average for other sectors.

According to the respondents, 9% of their customers follow their timing of price changes. Respondents from larger companies report substantial higher numbers (19%).

From these answers it appears that 'chaining' becomes more important upstream, but is not common practice. In the section 3.2 and 3.3 we concluded that, generally speaking, larger companies and the trade sector are flexible price setters. Therefore, we don't expect tuning to be important in explaining price rigidity, but can not exclude it either. No significant impact of tuning was found in our multivariate analysis.

A comparison with a recent micro-study for the Netherlands

In a recent paper, Jonker *et.al.* (2004) examine the degree of nominal rigidities of consumer prices in the Dutch economy using a large database with monthly price quotes of 49 articles during 1998-2003. Though the two studies are based on completely different sets of information, a number of interesting similarities arise. Both studies provide strong evidence, that prices are stickiest in small firms and most flexible in large firms. Furthermore, in the survey the median price duration is 12 months, against 9 months in the micro-study. The reason for this difference might be that our survey covers a broader set of prices (both consumer prices and business-to-business prices). From this survey study, we know that business-to-business prices change much less frequently than consumer prices (see table 2). Furthermore, both studies find that price increases occur more often than decreases and that the magnitude of price decreases is larger, but in the survey this difference is more pronounced. Finally, in both the micro-study and the survey, Dutch price setters follow time- and state-dependent pricing strategies. There are also differences. The micro-study concludes that 1 person businesses change prices almost as quickly as large firms, whereas we did not find such similarity in the survey. However, in our survey one person firms cover a much wider range of activities: whereas the micro study focuses on consumer goods and services, our study also deals with business-to business deliveries. Overall, the similarities strengthen the findings in both directions.

⁶ In a number of Dutch sectors operating in local markets, the euro changeover led initially to substantial price rises (see Folkertsma, Van Renselaar and Stokman, 2002), suggesting that short run price behaviour had changed in response to the introduction of EMU.

5 Conclusions

The main findings of our survey are:

- 1) The degree of competition is important in shaping price setting behaviour. With weak competition, price setting becomes much more sticky. About 28% of the firms interviewed report that they operate in a weak competitive environment;
- 2) Size of firms is also found to be important: on average, 1 person firms are by far the stickiest and large firms the most flexible price setters;
- 3) Next to size and competition, sector matters: the trade sector (wholesale and retail) adopts relatively flexible price policies. Prices for business-to-business services and catering are more rigid;
- 4) With flexible pricing, price changes are small in size, with rigid price setting price changes are much larger;
- 5) There is clear evidence of asymmetries in pricing behaviour. Asymmetries in response to cost shocks are largest for companies perceiving weak competition. Asymmetries in response to changing market conditions are largest for firms perceiving strong competition;
- 6) Among the motives for not changing or delaying price changes, informal and explicit contracts are the most relevant. Menu costs and attractive prices are unimportant;
- 7) The changeover to the euro had up to now no major influence on price setting.

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ANNEX I

Survey on pricing behaviour of Dutch companies

The European Central Bank (ECB) and the national central banks in EMU have launched a joint research project on price setting by European companies. Together, they are responsible for price stability in the euro area. Information about pricing behaviour is vital to the preparation and conduct of monetary policy. The Nederlandsche Bank (DNB) is involved in surveying Dutch companies on this topic. The information you provide will only be used for research purposes. TNS-NIPO does not deliver company specific information like respondent or branch names. DNB guarantees strict confidentiality of your answers. Answering the questionnaire will take you about 10 minutes. We are very grateful for your cooperation.

0 AVAILABLE BACKGROUND INFORMATION

0.1 Position of respondent in the company

0.2 Sector

- Manufacturing
- Business services
- Wholesale
- Retail (food/ non-food/catering)
- Transportation
- Other

0.3 Number of employees including owner

- 1 person
- 2-4 persons
- 5-9 persons
- 10-19 persons
- 20-49 persons
- 50-99 persons
- 100 or more persons

1 GENERAL INFORMATION

1.1 Are you in a position to provide information on the price setting within your company?

- Yes
- No (end of interview)

1.2 Does your company adopt one pricing policy for all of your products?

- Yes, is basically the same for all our products
- Yes, for the greater part of our assortment
- No, depends on the type of product
- Don't know/no answer

Please answer the following questions for the main product or one typical product sold by your company, in the questionnaire referred to as product X.

- 1.3 What product (X) do you have in mind?
- 1.4 What percentage of your turnover is accounted for by product X. A rough estimate suffices.
- 1.5 In what markets do you sell your main products? (more answers allowed)
- Local market
 - Regional market
 - National market
 - Foreign markets
- 1.6 What is your main market for product X? Please tick only one answer
- Local market
 - Regional market
 - National market
 - Foreign markets
- 1.7 If you sell your main product abroad, what percentage of your turnover is due to exports?
-%
 - Don't know / no answer
- 1.8 Could you roughly indicate the number of competitors for you main product on the Dutch market?
Please tick only one answer
- None
 - 1
 - 2 to 5
 - 5 to 20
 - 20 or more
 - Don't know / no answer
- 1.9 To what extent do you experience competition for product X?
- Severe competition
 - Strong competition
 - Weak competition
 - No competition
 - Don't know / no answer
- 1.10 Did you raise or lower the selling price of product X last year?
- Raised it
 - Lowered it
 - Left it unchanged
 - Don't know / no answer
- 1.11 With what percentage has your selling price been changed in 2003 compared to 2002?
-%
 - Don't know / no answer

2 PRICE SETTING BEHAVIOUR: TIMING AND DETERMINANTS

2.1 Do you decide on the price of prod X independently or are they prescribed by head-office or government rules?

- Determine prices myself
- Partially dependent on suggested prices/prices of head-office
- Fully dependent on suggested prices/prices of head-office
- Price is to a large extent regulated by government
- Other...
- Don't know/ no answer

2.2 Do you adjust the selling price of product X at fixed time intervals?

- Yes, daily
- Yes, periodically (e.g. once a week, month, year)
- Generally periodic, but occasionally in response to specific events (large shocks for example)
- No, depends fully on specific events

2.3 On average, how many times a year do you adjust your selling price of product X?

-
- Don't know / no answer

2.4 On average, how often do you check or review the adequacy of the price of product X?

- Daily
- Weekly
- Monthly
- Quarterly
- Once a year
- Other frequency ...
- Occasionally
- Don't know / no answer

2.5 Do you tune the timing of your own price changes to those of your supplier(s)?

- No
- Sometimes (e.g. in case of major price change by supplier)
- Often
- Always
- Don't know / no answer

2.6 Do customers tune the timing of their price changes to yours?

- No
- Sometimes (e.g. in case of major price change by you)
- Often
- Always
- Don't know / no answer

2.7 How do you calculate the price of your "main product"?

- a fixed mark-up is applied to unit variable costs (cost of labour and other inputs)
- a variable mark-up is applied to unit variable costs, depending on market conditions
- to a large degree on the basis of my competitors' prices
- link it to another price (like wages)
- dictated by our customer(s)
- linked to price index
- fixed by supplier
- differs per customer
- other

- don't know, no answer

2.8 Which factors would likely cause an increase in the price of your "main product"?

Attribute a value of 1 (irrelevant) to 10 (very important)

- An increase in the cost of labour
- An increase in the cost of raw materials
- An increase in financial costs
- An increase in other production costs
- An increase in demand
- An increase in competitors' prices
- An increase in quality of the product
- A cash-flow or financing problem

2.9 Which factors would likely cause a decrease in the price of your "main product"?

Attribute a value of 1 (irrelevant) to 10 (very important) to each

- A decrease in the cost of labour
- A decrease in the cost of raw materials
- A decrease in financial costs
- A decrease in other production costs
- A decrease in demand
- A decrease in competitors' prices
- A decrease in quality of the product
- Liquidity surpluses

2.10 Which of the following factors might delay carrying out price changes for product X?

Attribute a value of 1=irrelevant to 10=very important to each

- The presence of a formal contract: prices can only be changed when the contract is re-negotiated
- Our customers expect us to keep prices as stable as possible
- Lowering prices might mistakenly be interpreted as quality loss
- Fear that competing firms will not adjust their price
- Fear that one may need to revise the price in the opposite direction
- Prices are set at 'attractive' thresholds
- Presence of high menu costs of changing prices (e.g. printing new catalogues, costs of adjusting price tags ..)
- Instead of changing prices, prefer to change other conditions like terms-of-payment, service level
- Other (please specify if possible)

2.11 The introduction of the euro enlarges comparability of prices between EMU-member countries?

Has this affected your price setting policy?

- Had no or hardly any effect
- Not yet, but expect this to be the case in the future
- More difficult to differentiate prices across EMU-countries
- Less sensitive to exchange rate movements
- Other
- Don't know / no answer