THE PRICE SETTING BEHAVIOUR OF SPANISH FIRMS: EVIDENCE FROM SURVEY DATA

2005

Luis J. Álvarez and Ignacio Hernando

Documentos de Trabajo
N.º 0537

BANCO DE **ESPAÑA**

THE PRICE SETTING BEHAVIOUR OF SPANISH FIRMS: EVIDENCE FROM SURVEY DATA

THE PRICE SETTING BEHAVIOUR OF SPANISH FIRMS: EVIDENCE FROM SURVEY DATA(*)

Luis J. Álvarez and I. Hernando

BANCO DE ESPAÑA

Abstract

This paper reports the results of a survey carried out by the Banco de España on a sample of around 2000 Spanish firms to deepen the understanding of firms' price setting behaviour. The main findings may be summarised as follows. Most Spanish firms are price setters that use predominantly state-dependent rules or a combination of time- and state-dependent rules when reviewing their prices. Changes in costs are the main factor underlying price increases, whereas changes in market conditions (demand and competitors' prices) are the main driving forces of price decreases. The degree of price flexibility is directly related to the share of energy inputs over total costs and to the intensity of competition, whereas it is inversely linked to the labour share. The three theories of price stickiness that receive the highest empirical support are implicit contracts, coordination failure and explicit contracts.

Non-technical summary

This paper reports the results of a survey carried out by the Banco de España between May and September 2004 on a sample of 2008 Spanish firms. Its main purpose is to contribute to the knowledge of the price setting behaviour of Spanish companies, complementing the quantitative evidence obtained from micro price data. Firms were asked about a number of features of their pricing behaviour such as the time-dependent or state-dependent nature of their pricing rules, the frequencies of their price reviews and changes, the main driving factors of their price changes and the reasons that led them to delay their price adjustments. The main results may be summarised as follows:

- Around 80% of Spanish firms are price setters.

- State-dependent pricing rules are used by around 38% of Spanish firms, whereas around one third of the companies follow purely time-dependent pricing rules. Some sectoral heterogeneity is observed. The use of state-dependent rules is more common among manufacturers of intermediate and of capital goods. By contrast, the fraction of firms following a purely time-dependent rule is higher in hotels and restaurants and also in energy, where many prices are regulated.

- There are notable differences in the information set used in the process of price revision. Around one third of the companies apply a rule-of-thumb when resetting their prices and the remaining follow some type of optimising behaviour. The share of forward-looking price setters is 27%. This share is higher for largest firms, manufacturing companies and firms operating in very competitive environments.

- The median firm changes its price once a year. There are substantial differences across industries in the frequency of price changes. This frequency is higher in the trade sector, in particular among traders of energy and food.

- Price discrimination is a common practice of Spanish firms. Around two thirds of companies use some form of price discrimination. Uniform pricing is significantly more common in trade and in hotels and restaurants.

- Changes in costs are the main factor underlying price increases, whereas changes in market conditions (demand and competitors' prices) are the driving forces behind price reductions. Moreover, prices seem to be more flexible downwards than upwards in response to demand shocks, while the opposite result holds in the face of cost shocks.

- Among the theories proposed in the economic literature to explain nominal price stickiness, the highest empirical support is obtained for: 1) the existence of implicit contracts or long-term relationships with customers that firms want to preserve by keeping stable their prices as long as possible; 2) the theory of coordination failure according to which firms are

reluctant to raise prices if their competitors´ price remains unchanged to avoid loosing customers and 3) the existence of explicit contracts that sets the price until the contract is re-negotiated.

- The degree of price flexibility, proxied by the frequency of price changes or by the speed of reaction after shocks, is affected by the firms' cost structure. In particular, prices tend to be more flexible the higher is the share of energy inputs over total costs and the lower is the share of labour costs over total costs.

- The higher is the degree of competition faced by firms and the more importance they attach to demand conditions, the faster is the reaction of their prices to cost and demand shocks.

- Finally, we find that prices tend to be more sluggish for smaller companies, for firms setting prices in attractive terms and when the government intervenes in the price setting process.

1   Introduction

This paper reports the results of a survey on price-setting behaviour carried out by the Banco de España between May and September 2004 on a final sample of 2008 industrial and services firms. This survey is part of a euro area-wide project within the framework of the Inflation Persistence Network (IPN). Within this general project, surveys were conducted for nine euro area countries.[1] The design of these surveys has heavily drawn on similar initiatives developed by Blinder et al. (1998) for the US, Hall et al. (2000) for the UK and Apel et al. (2005) for Sweden.[2] The main purpose of these surveys is to deepen the understanding of price setting behaviour of European companies, complementing the evidence obtained in other studies[3] based on the use of quantitative price databases.

A rich characterisation of the periodicity and magnitude of price changes is obtained from quantitative consumer and producer price micro databases. However, this quantitative characterisation of price dynamics is not enough to understand the underlying rationale of the behaviour of price setters. There are certain aspects of firms' pricing polices that can only be investigated on the basis of qualitative information such as the information set used in revising prices or the reasons justifying delays in price adjustments. Moreover, survey results are also useful in cross checking and extending the evidence obtained from quantitative databases.

Along these lines, this paper complements the recent empirical evidence on price setting behaviour in Spain based on micro CPI and PPI data,[4] and its purpose is threefold. First, we explore the main features of the pricing policies of Spanish firms. Specifically, we investigate the degree of autonomy in charging prices, the time or state dependent nature of pricing policies, the information set used in making pricing decisions, the frequency of price reviews and changes, and the use of some form of price discrimination. Second, we analyse the main factors driving price changes and the speed with which firms react to different shocks. Moreover, we explore the underlying factors (cost structure, degree of competition, among others) that explain the differences across products that are observed in the frequency of price changes and in the speed of reaction to alternative shocks. Third, we investigate the empirical support of the different theories proposed in the literature to justify delays in price adjustments.

The remainder of this paper is organised as follows. Section 2 presents the sample and the structure of the questionnaire. Section 3 describes the environment in which the firms operate. Section 4 summarizes the results on pricing policies of the companies, while Section 5 analyses the main factors underlying price changes. Section 6 explores the relevance of different theories on price stickiness. Section 7 investigates the potential role of a number of factors to explain differences in the degree of price stickiness across firms. Section 8 summarises our conclusions.

---

1. See Fabiani et al. (2005) for a comparative summary of results for all countries. The references for the other country-specific studies are the following: Belgium [Aucremanne and Druant (2005)], Germany [Stahl (2005)], France [Loupias and Ricart (2004)], Italy [Fabiani et al. (2004)], Luxembourg [Lünnemann and Mathä (2005)], the Netherlands [Hoeberichts and Stokman (2005)], Austria [Kwapil et al. (2005)] and Portugal [Martins (2005)].
2. Results for a similar survey conducted in Canada are reported in Amirault et al. (2004).
3. For consumer prices see Dhyne et al. (2005) and references therein.
4. See Álvarez and Hernando (2004) for evidence based on micro CPI data and Álvarez et al. (2005) for evidence based on micro PPI data.

2   The survey design: sample and questionnaire

The survey was carried out by a private company (Dephimatica, S.A.) between May and September 2004 on the basis of a questionnaire and a sample provided by the Banco de España. The questionnaire was sent on paper via traditional mail. Firms were offered different possibilities to answer: traditional mail, telephone, fax, and the Internet. An attempt was made to direct the questionnaire to firms' top managers.

2.1   The sample

The population from which the sample was drawn consists of firms with more than 5 employees belonging to the following sectors: manufacturing (NACE 15 to 37), energy (NACE 40 and 41), trade (NACE 50 to 52), hotels and restaurants (NACE 55) and transport and communications (NACE 60 to 64). A more detailed list is provided in Table A1. As seen in Table 1, the sectors covered by the survey represent 51.3% of Spanish Gross Value Added (GVA).This coverage is complete for manufacturing and energy and represents 52.3% of market services GVA.

Table 1 - The sample

	Share of Gross Value Added (1)	N° of firms in the sample	Response rate
Economic activity			
Manufacturing	19.2	829	73.5
Energy	4.1	59	67.4
Services	28.0	1120	66.4
Size			
Up to 49 employees		850	65.6
50-199 employees		463	68.6
>200 employees		695	73.2
Total	51.3	2008	69.1

(1) Shares in terms of Spanish Gross Value Added (GVA) of sectors covered in the survey. These sectors represent 100% of manufaturing and energy GVA and 52.3% in market services GVA.

An initial sample was selected using a stratified random sampling. The sample is stratified in terms of branch of activity and size class in terms of employment. Within each stratum, firms were randomly selected. At the end, an initial sample of 2905 firms was chosen.

Once the field work was completed, 2008 valid questionnaires were obtained.[5] The response rate of 69.1% has to be considered high given the complexity of some of the

---

5. Some questionnaires were discarded due to the inconsistencies detected in the validation process.

questions involved[6] and is actually higher than for the rest of euro area countries. As Table 1 shows, response rates were quite similar both across sectors and size classes. Despite the high homogeneity of response rates, we have post-stratified the answers according to the original data weights. These are based on the share of gross value added for each sector and the share in total employment within a given sector for each size class. All descriptive tables refer to weighted data.

2.2 The questionnaire

The design of the questionnaire draws upon those developed by Blinder et al. (1998), Hall et al. (1997), Apel et al. (2005) and those prepared in the context of the Eurosystem Inflation Persistence Network (IPN), particularly Fabiani et al. (2004), Aucremanne and Druant (2005), Kwapil et al. (2005) and Loupias and Ricart (2004).[7] The questionnaire was phrased in plain Spanish so that it could be understood by a wide range of managers of very heterogeneous companies.[8] A slightly different version of the questionnaire was sent to retailers and restaurant and bar owners to accommodate some of their particularities. The questionnaire is organised in four parts containing a total of 22 questions. An English translation of the questionnaire can be found in Appendix B.[9]

Part A collects information on the main product sold by the firm and on the markets in which it operates. This part of the questionnaire asks for information on the geographical destination of sales (inquiring on the existence of pricing to market), the degree of competition in the main market and the type of customers and the kind of relationships with them.

Part B includes information on the pricing policies of the company. First, firms are asked about the actual price setter –the own company, the parent company, the main customers, government sector or other agents–. In addition, this part provides information on whether the firm follows time-dependent or state-dependent pricing rules, the frequency of their price reviews and price changes, the information set considered when reviewing the price and whether there is price discrimination across customers.

Part C analyses the main driving factors explaining price changes. In particular, we investigate which are the main factors underlying price changes and whether they differ between price increases and price decreases. Moreover, we check whether the speed of adjustment of prices differs both in terms of the origin (cost or demand) and direction (increase or decrease) of the shock.

Finally, in part D firms are asked on the importance attached to different theories on price stickiness. For this purpose, companies have to asses the relative importance of each of a list of nine factors that may lead to a delay in price adjustment.

---

6. In this respect, several details may contribute to explain the high response rate: 1) the questionnaire was accompanied by a cover letter signed by the Governor of the Banco de España underscoring the importance of the survey to understand the price setting mechanism in the Spanish economy; 2) firms had the possibility to respond using four different channels: traditional mail, telephone, fax and the Internet; 3) as a part of the field work, firms were repeatedly contacted by telephone using the computer-assisted telephone interviewing (CATI) system and 4) a call centre was available to help firms in completing the questionnaire.

7. The questionnaires of the surveys conducted in the context of the Eurosystem IPN shared several common features, which allow for a meaningful cross-country comparison. Fabiani et al. (2005) summarises the evidence on firms price setting behaviour in the euro area based on the results of comparable surveys conducted in nine euro area countries.

8. In this respect, a pilot survey conducted in May 2004 among 10 companies was very helpful to redraft some questions.

9. Appendix B contains the questionnaire sent to firms in the industrial sectors as well as to companies in the sector Transport and Communications. A slightly different version of the questionnaire was sent to firms in Trade, Hotels and Restaurants sectors.

3 Main characteristics of the market in which the firm operates

For the purpose of summarising the basic features of the environment faced by firms, part A of the questionnaire collects information on several characteristics of the markets in which the firms operate. In particular, firms are asked on the geographical location of their markets, the degree of competition they face and the characteristics of their customers. All these features are key determinants of the firms' pricing policies.

We explore whether there are differences in these characteristics by industry and size. To properly identify cross-industry differences in the pricing behaviour, we report results using a detailed sectoral classification. In particular, we distinguish 12 sectors: four groups of manufacturing industries (food, consumer non-food, intermediate goods and capital goods), energy, three trade groups (food, energy, other goods) and four aggregates of other services (Hotels and travel agents, Bars and restaurants, Transport and Communications). The correspondence between the classification used and 3 digit NACE is found in A2.

3.1 Geographical scope /Location of the main market

The questionnaire includes two questions related to the firm's market from a geographical perspective. First, firms are asked for the geographical distribution of their sales (question A2), distinguishing between sales in Spain, other euro area countries and the rest of the world. Firms are also asked about the geographical scope of their main market (question A5): local, regional, national or international.

As Table A3 shows, firms mostly operate on the domestic market. In fact, most of their turnover (86.6%) is generated in Spain. Sales to the euro area account for 9.2% and the rest of the world for 4.2%. The fraction of turnover due to exports is higher among large companies (17.4%) and manufacturing firms (20.1%). Foreign markets seem to be particularly relevant for manufacturers of capital goods, as 30.1% of their turnover is due to exports. In turn, external sales are almost negligible for firms in the energy, non food trade, bars and restaurants and communications sectors.

As regards the main market, most firms (89.7%) referred to the domestic market as the main one. Around 40% of companies declare its main market to be the national one, whereas 22% and 26%, respectively, declare that their main market is the regional or local one (see Table A4). As expected, regional and local markets are significantly more relevant for smaller firms and for companies operating in the trade sector and restaurants. As regards the degree of openness, the responses to this question show a similar picture to the answers to the question on the geographical distribution of turnover. Thus, the fraction of companies indicating that their main market is an international one is highest in manufacturing, particularly, for producers of capital and intermediate goods.

3.2 Degree of competition

The degree of competition in the markets in which a firm operates is a crucial factor in determining its price setting behaviour. In highly competitive markets, firms are more likely to adjust their prices in response to any relevant shock, since the opportunity cost of not adjusting the price to the optimal one is very high. By contrast, the opportunity cost of

not setting the optimal price is smaller for firms enjoying significant market power.[10] There is some empirical evidence on the link between price stickiness and the degree of competition. Geroski (1995) finds that price responses to both supply and demand shocks are faster in more competitive industries. Similarly, Hall et al. (2000) and Carlton (1986) find that companies in competitive markets tend to adjust their prices faster than companies facing a less elastic demand.

Figure 1 - Degree of perceived competition (Question C2_8)
Importance of changes in competitors' price to explain price decreases

The questionnaire included two questions directly related to the degree of competition faced by the firm. Specifically, firms were asked to report on their market share (question A6) and the number of competitors (question A7). Obviously, these two measures have important shortcomings. First, both measures are highly subjective in the sense that, when asked on these two issues, companies may use different criteria to define the relevant market or to identify what is a potential competitor. Second, in some oligopolistic markets with a small number of big companies (with very large market shares), there might be a very high degree of competition between them (e.g. telecommunications). Third, some sectors may have a large number of competitors but still maintain local market power (e.g. bars).

---

10. See Martin (1993) for a theoretical model supporting this argument.

For this reason, we have opted to infer the degree of competition faced by the firm from the firms' responses to a different question. Since, as argued above, it can be expected that the more competitive is the environment faced by the firm, the more its pricing strategy is likely to be affected by the behaviour of its competitors, we proxy the degree of competition faced by a firm by the importance attached by the firm to changes in competitors' prices in explaining its own price decreases (question C1).[11] As it is shown in Hoeberichts and Stokman (2005), this measure is strongly correlated with the degree of perceived competition directly reported by firms.

More precisely, we consider that a firm faces intense competition if it reports that competitors' prices are important or very important in determining a reduction in its own price. According to this definition of perceived competition, around 55% of firms face intense competition (see Figure 1 and Table A5). Some noteworthy differences are found across industries. As expected, the degree of perceived competition is lowest in energy related sectors. At the other extreme, the share of companies facing intense competitive pressures is highest in communications (69%), hotels and restaurants (66%) and food trade (65%). Significant differences are also found by size. Thus, 61% of large companies operate in a highly competitive environment, whereas the corresponding fraction for smaller firms is 46%.[12]

3.3 Type of customers

To investigate the relationship between firms and their customers, firms were asked about the distribution of their turnover by type of customer (question A8). The responses are summarised in Table A6. Around 58% of companies in our sample sell their products predominantly to other firms, while almost 40% of firms sell mainly to consumers. The public sector is the main customer for only 3% of companies. There are important differences across sectors in the typology of customers. Thus, manufacturing companies sell primarily to other companies. By contrast, consumers account for most of the turnover of firms in energy, trade and bars and restaurants. Finally, the public sector is the main customer for 11% of companies in the energy sector.

To determine the kind of relationship that firms maintain with their customers, companies were asked whether most of their customers are regular or occasional. The questionnaire defines regular customers as those with whom there is a stable commercial relationship. It has been often argued that the existence of long-term relationship with customers might delay the adjustment of prices in the face of a shock. Instead, firms might prefer to smooth price changes to keep their customers. The results show the relevance of long-term relationships with customers for Spanish companies (see Table A6). On average, 86% of the companies report that most of their customers are of a regular nature. This is especially the case in manufacturing and energy (where more than 90% of the companies indicate that the relationship with customers is essentially long-term). In trade and hotels and restaurants, the share of companies selling mostly to regular customers is lower, but still predominant. This finding is in line with the evidence reported in Fabiani et al. (2005), who indicate that around 70% of the companies in the euro area sell predominantly to customers with which they have a long-term relationship.

---

11. This measure is also used in Fabiani et al. (2005) as an indicator of the degree of competition.
12. Interestingly, using the number of competitors as a proxy for the degree of competition, a different picture arises: smaller firms seem to face stronger competition. Thus, while the fraction of firms reporting having more than 20 competitors is 43% for the whole sample, this fraction is 54% for smaller companies.

As expected, the share of firms with long-term relationships with customers is higher for those companies selling their products mainly to other firms (95%) than for those companies selling their products mostly to consumers (71%). In this respect, consumer-oriented firms undertake more often regular promotional activities and make a more intensive use of customer discount policies.[13] These results suggest that pricing strategies might differ depending on the type of customer.

---

[13] Question A10.1 asks firms whether they undertake regular promotional activities or not and question A.10.2 asks them whether they pursue habitual customer-discount policies. Whereas 61% of consumer-oriented companies report that they do promotional activities and 44% indicate that they use customer-discount policies, the corresponding shares for firms selling primarily to other companies are 45% and 39%.

4 Price setting behaviour

This section explores the main features of the pricing policies of Spanish firms. To this end, we investigate whether firms exhibit an independent price setting policy or whether the final decision on the price charged is taken by a different economic agent. Then, for price setting companies we try to identify the basic characteristics of their pricing strategies: whether they follow a time-dependent or a state-dependent pricing policy, the information set used to make their pricing decisions, the frequency of their price reviews and price changes, and the use of some form of price discrimination (including geographical price discrimination or pricing-to-market).

4.1 Who sets the price?

The first question of part B (question B1) addresses the issue of who sets the price of the company. The answer to this question unveils the extent to which firms display a certain degree of autonomy in their pricing decisions. Overall, although most firms face a non-negligible degree of competition and hence enjoy a limited market power (see section 3.2), almost 80% of companies declare having an autonomous price setting policy (see Table A7). This is also the typical case in the majority of sectors, the only exception being energy, where the public sector directly sets the price of one third of the surveyed companies. Moreover, most of the 40% of firms in the energy sector choosing the "other" option indicate that the price is jointly set by the company and a public administration.[14] Public intervention in the price setting process is also relevant, although to a lesser extent, in the transport sector. On average for all considered sectors, the share of firms whose prices are regulated amounts to 5%.

In 5% of the cases, the parent company determines the price of the company. This practice is somewhat more common among trade companies and manufacturers of capital goods. Main customers do not seem to directly set the prices of their suppliers. The fraction of companies whose price is determined by their customers is only around 2%. Finally, it is worth mentioning that around 9% of companies choose the "other" option. In some of these cases, firms indicate that the price is set by their suppliers. This is the case for instance of franchises. Nevertheless, in most cases where companies choose the "other" option, they specify that they follow a mixed strategy, i.e. the price is jointly determined by the company and another agent. As has been mentioned, for companies in the energy sector, this agent is typically the public sector. For firms in other sectors, it is not unusual that the price is bargained with the customers.

4.2 Time-dependent versus state-dependent pricing rules

The fact that individual firms do not always adjust their prices when there is a relevant change in the economic environment is uncontroversial. To model this fact, the economic literature has considered two alternative types of price setting behaviour: time-dependent pricing rules and state-dependent pricing rules. Under time-dependent pricing rules, companies review their prices at specific dates. The time interval between price revisions may be deterministic,[15] as in Taylor (1980), or stochastic, as in Calvo (1983), although it does not

---

14. This joint determination of the price includes different variations: for instance, the public administration establishes a price ceiling or the company makes a proposal that has to be approved by the public administration or the price is finally set after a bargaining process between the company and the public sector.

15. A fixed time interval between revisions is common for products with regulated prices.

depend on the state of the economy. These models allow for the realistic fact of discontinuous price adjustment, although they assume that companies are unable to adjust to any shock between pre-adjustment dates. Conversely, under state-dependent pricing rules, a firm will change its price whenever there is a large enough shock. An obvious justification for this individual behaviour is the existence of a fixed cost of changing prices as in Sheshinski and Weiss (1977).

Figure 2 - Time-dependent versus state-dependent pricing rules (Question B4)
When do you review the price of your main product?

To assess the empirical importance of both types of rules, a specific question was introduced (question B4). Firms were asked for the strategy they follow when reviewing their prices. They were offered four options: "At specific time intervals", "In response to specific events", "Mainly at specific time intervals, but also in response to specific events", and "Other, please specify". We associate the first option to a time-dependent rule; the second, to a state-dependent rule; and the third option to a mixed strategy, normally time-dependent but also state-dependent if an important shock occurs. The additional information provided by

those companies choosing the fourth option suggests that most of those companies also follow, to some extent, a state-dependent rule. Figure 2 and Table A8, which summarises the responses to this question, ignores these particular companies.[16]

State-dependent pricing rules are used by around 38% of the Spanish firms, whereas around one third of the companies follow purely time-dependent pricing rules. The remaining 30% of the companies use a "mixed" strategy that can be interpreted in the sense of using a time-dependent rule under normal circumstances and reviewing prices when a sufficiently large shock occurs. The overall picture arising form these results differs somewhat from that of other euro area countries. Thus, although Fabiani et al. (2005) report than, on average, 33% of euro area companies follow a purely time-dependent pricing rule, the fraction of firms using purely state-dependent rule is substantially larger in our case (38%) that the corresponding figure for the euro area (19%).

Some differences across sectors in the type of pricing rules used are observed. The fraction of firms following a purely time-dependent rule is higher in hotels and restaurants and also in energy, where many prices are regulated. By contrast, this share is lower among manufacturers of intermediate goods and of capital goods, where state-dependent rules clearly are predominant. In the trade sector, with the exception of energy trade, state-dependent rules also show a clear dominance. Finally, state dependent rules are more common both in the production and trading of food products than in the rest of consumer goods.

Interestingly, the higher (lower) is the degree of perceived competition the lower (higher) is the share of companies using purely time-dependent rules. As discussed in section 3.2, this result is consistent with the idea that prices of firms operating in more competitive markets are more likely to react to changes in their environment.

4.3 The information set used in the revision of prices

An important element of firms' pricing strategies that has relevant implications for the sluggishness in the response of prices to shocks is given by the information set used by companies when making their pricing decisions. In particular, the existence of forward-looking price-setters is a key ingredient of new Keynesian models increasingly used for monetary policy analysis [see, for instance, Galí and Gertler (1999)]. To address this issue firms are asked how they re-evaluate the price they would like to charge (question B6). Three potential responses are allowed: "applying a rule-of-thumb", "using a wide range of indicators related to the company's current operating environment" and "using a wide range of indicators related to the company's current and expected future operating environment". These three options reflect different degrees in the optimality of price setting strategies. Companies applying rules of thumb (for instance, changing prices by a fixed percentage, or following a CPI indexation rule[17]) may end up charging a price that is far from the optimal one if a large shock occurs. In this sense, these companies behave non-optimally.[18] At the other extreme, price reviews are addressed in an optimal way if companies use a wide set of indicators relevant for profit maximisation, including expectations on the future economic environment.

---

16. The share of companies choosing this residual option is below 5%, so results do not substantially differ if we consider them as companies using a state-dependent rule.

17. Christiano et al. (2005) and Giannoni and Woodford (2004) are examples of models incorporating partial or full indexation of prices.

18. Nevertheless, it can be argued that these companies behave in this way, because the cost of acquiring the relevant information for profit maximisation is too high.

Figure 3 - Information set used in the revision of prices (Question B6)
How do you recalculate the price of your main product?

The responses to this question are summarised in Figure 3 and Table A9. On the whole, around 33% of firms apply a rule-of-thumb when reviewing their prices. The remaining companies follow some type of optimising behaviour, in the sense of assessing different pieces of information on the economic environment when taking their pricing decisions. Slightly less than one third display some type of forward-looking behaviour, since they take into account expected future developments. This evidence is consistent with the results of the surveys conducted in Belgium, Luxembourg and Portugal [see, respectively, Aucremanne and Druant (2005), Lünnemann and Mathä (2005), and Martins (2005)] that include a similar question.

Interesting differences in the responses to this question arise by size, sector and degree of competition. Thus, rule-of-thumb price setters are more common among small companies, transport firms and bars and restaurants and firms facing a low degree of competition. On the contrary, the share of forward-looking price setters is higher among

largest companies, communications firms and firms operating in a very competitive environment.

4.4 The frequency of price reviews and of price changes

Firms following either a purely time-dependent rule or a mixed strategy were asked how often they reviewed their prices (question B5) and results are reported in Table A10. Around 70% of companies declare reviewing their prices once a year or less frequently.[19] Moreover, the median firm reviews prices once a year, 16% of companies review their prices two or three times a year and 14% of companies review their prices four or more times per year, that is, they review their prices quarterly or more frequently. Some differences are observed across sectors. Trade companies, especially those selling food and energy products, seem to review their prices more often, reflecting the existence of sizable changes in the cost of inputs and sales periods. All energy trade firms and around 75% of food trade companies review their prices more than once a year, as compared to 30% for the overall sample. At the other extreme, all companies in the energy sector reported at most one review per year and only 15% of manufacturers of capital goods declare to conduct more than one price review per year.

The frequency of price reviews is higher for large companies and for firms facing a high degree of competition. Thus, the share of companies reviewing their prices more than once a year is 39% among large companies compared to only 18% of small firms. Similarly, this share is 50% for those companies facing the highest degree of competition, whereas for companies facing low competitive pressures this share is only 12%.

Interestingly, among those companies declaring that they review their prices once a year, most of them (55%) do it in January and 9% in December.

In addition to the question on the frequency of price reviews (that applied only to those firms following a time-dependent or a mixed pricing strategy), all firms were asked how often they actually change their prices (question B7) and the responses are displayed in Figure 4 and Table A11. The share of firms changing prices four or more times a year is 14% and a similar fraction changes their prices two or more times. As in the case of price reviews, the median firm changes its price once a year. This result is consistent with that found in other euro area countries [Fabiani et al. (2005)], the US [Blinder et al. (1998)], Sweden [Apel et al. (2005)] and the UK [Hall et al. (1997)]. Some interesting differences are found across industries. The median number of price changes is equal to one for all sectors, with the exception of trade of food and energy products. In these two sectors the median number of0 price changes is higher than three. These results are consistent with the evidence obtained from the analysis of micro CPI data, where a higher frequency of price changes is typically found for food and energy products in euro area countries [Dhyne et al. (2005)], including Spain [Álvarez and Hernando (2004)]. All companies in the energy trade sector and around 73% of companies in the food trade sector change their prices at least twice a year, whereas the corresponding fraction for bars and restaurants is just 9% and that for manufacturers of capital goods is 16%. This low frequency of price changes for manufacturers of capital goods is consistent with the results in Álvarez et al. (2005) who find that the frequency of price changes is lowest for producers of capital goods, using micro

---

19. It must be noted that the high share of companies reviewing prices on a yearly basis might be driven by the wording of the question, which confronts respondents with three possible choices: more than once a year, once a year and less than once a year. Had the question been formulated with more possible choices, or even with an open format, a lower share of yearly reviews would have been observed.

producer price data. It is also observed that the frequency of price changes for manufacturers of food products is higher than for manufacturers of the rest of consumption goods, again in line with results with PPI data.

Finally, it is interesting to note that there are not substantial differences in the frequency of price changes by the nature of the pricing rule (see lower panel of Figure 4). If anything, those companies following a mixed strategy (i.e. normally time-dependent but also state-dependent if an important shock occurs) display on average more frequent adjustment.

When we compare the frequencies of price reviews and of changes, restricting the comparison to those firms that responded to both questions we observe that price changes occur only slightly less frequently than price reviews. The correlation between both frequencies is very high. For instance, among those firms reviewing their prices four or more times a year, 89% declare changing their prices at least four times a year, 4% change them two or three times a year, 6% once a year and 1% less than once a year.

4.5 Price discrimination

Finally, an additional feature characterising a firm's pricing policy is the use of some form of price discrimination. This is defined as the sale of two units of the same product at different prices either to the same consumer or to different consumers. Price discrimination may adopt several forms: the price of a product may vary *inter alia* on the amount sold, the type of customer, the geographical area or the distribution channel. In general, price discrimination practices denote, on the one hand, some market power to the extent that by discriminating prices firms are able to extract a higher fraction of consumer surplus than they would if they charged a uniform price. On the other hand, the use of price discrimination may be a signal of a more flexible pricing policy.[20]

We have explored the presence of some form of price discrimination by asking companies (question B3) whether they charge a uniform price to all their customers, or whether their prices differ depending on the amount sold, are decided on a case-by-case basis or differ depending on other criteria.

---

20. Nevertheless, this is not necessarily the case. A firm might negotiate different contracts with different type of customers but the terms of each contract might be fixed for a long time period.

Figure 4 - Frequency of price changes (Question B7)
How often do you usually change the price of your product?

The evidence obtained, summarised in Figure 5 and Table A12, shows that the use of uniform pricing schemes is not widespread, in line with the results of Fabiani et al. (2005) for euro area countries. Only around one third of firms charge the same price to all their customers. Moreover, around one fourth of companies indicate that their price depends on

the amount sold, 30% declare that the price charged is decided on a case-by-case basis and 11% mention other criteria[21] to justify differences in the price charged.

Figure 5 - Price discrimination (Question B3)
The price of your main product is:

Some interesting differences arise in a sectoral analysis. Uniform pricing is significantly more common in trade and in bars and restaurants. The shares of companies charging uniform prices to all their customers in these sectors are 50% and 79%, respectively. The use of price discrimination is particularly high among manufacturing companies, especially manufacturers of intermediate products and capital goods. Nevertheless, in most sectors there are significant fractions of firms discriminating prices both on the basis on the quantity sold and according to other criteria.

---

21. Among the criteria mentioned by the companies, the most common are the following: type of customer (firm/consumer, wholesaler/retailer, …), distribution channel, season and geographical area.

No significant relationship is found between the extension of price discrimination and the size of the companies. If anything, smaller firms seem to make a slightly more frequent use of uniform pricing, but this is mostly explained by the high share of trade companies among small firms. Finally, a weak relationship is found between the frequency of price discrimination and the degree of competition proxied by our preferred measure of competition (see section 3.2). In particular, the share of companies using uniform pricing schemes is highest among those companies facing a low intensity of competition, which is again consistent with the idea of less competitive firms using less flexible pricing policies.

4.5.1 PRICING TO MARKET

The setting of different prices in different geographical areas is a particular form of price discrimination usually known in the literature as "pricing to market". The existence of arbitrage costs between different geographical markets allows companies to price discriminate across countries. This issue is of particular importance since, as it is shown in section 3.1, there is a significant fraction of companies selling at least part of their production abroad. Price-setting behaviour of exporters is explored by means of the responses to a couple of specific questions in the survey (questions A3 and A4).

Firstly (question A3), firms that sell some of its products outside Spain are asked whether the price charged in different countries is the same or not.[22] The responses to this question suggest that, for the whole sample, around 53% of exporting firms do apply some form of pricing to market. Similar results are reported in Aucremanne and Druant (2005) and Lünnemann and Mathä (2005) for Belgium and Luxembourg, respectively. Price discrimination is even more frequent for firms selling outside the euro area. Almost 60% of companies exporting to non-euro area countries charge different prices across countries. Pricing-to-market is more common in transport and communications.

A second question directed only to export firms (question A4) refers to the importance of several factors in explaining differentiated price setting between markets. Table A13 reports the average scores of the different factors potentially explaining "pricing-to-market" behaviour. Competitors' prices on the market seem to be the most relevant determinant of price differences across countries. Cyclical fluctuations in country demand ranks immediately below. Exchange rate developments and structural market conditions have a moderate importance regarding the decision to apply pricing to market. Exchange rate movements receive a higher score for those firms exporting outside the euro area. Nevertheless, even for these firms this factor is ranked below competitors' price and demand. Finally, the tax system for the local market turns out to be the least important factor for explaining differences across countries in the price charged. This factor is somewhat more important for consumer-oriented firms[23], for which, as Aucremanne and Druant (2004) indicate, differences in indirect taxation are presumably more relevant.

---

22. Among those companies charging different prices across countries, three options are allowed: the price in euro in Spain differs from that set for the other euro area countries, the price in euro is the same in all euro area countries, but differs from the price in other countries, and the price in euro is different for each country.
23. The average score attached to this factor by consumer-oriented firms is 2.1 compared to 1.8 for the whole sample.

5 The determinants of price changes

This section deals with the main factors driving price changes. To explore this issue, two types of questions were included in the questionnaire. Firstly, firms were asked to assess the importance of several factors that could lead to price increases and decreases (C1). The responses to this question should reveal which are the main driving forces behind price changes. In particular, these responses might provide useful information to test whether the relative importance attached to the potential determinants of price changes differs for upward and downward adjustments. Secondly, firms are asked on the speed with which they react to different shocks (C2). The responses to this question are key to assess the degree of price stickiness. In fact, they provide complementary information to that obtained from studies based on micro price data. Álvarez and Hernando (2004) for the CPI and Álvarez et al. (2005) for the PPI report results on the average frequency of price changes and find that there is a high degree of heterogeneity in this frequency across types of products. Nevertheless, these results might reflect either a genuine difference across sectors in the degree of price stickiness or a different frequency of cost and demand shocks across sectors. The purpose of this question is to discriminate between these two possible explanations.

5.1 *Main driving factors of price changes*

As regards the question of the main determinants of price changes (question C1), respondents had to assess the importance of each of a list of factors in causing a price increase or decrease. The respondents should indicate the relevance of each factor by giving it a value from (1) unimportant to (4) very important. The list of potential driving forces includes changes in cost factors (labour, financial, raw materials, energy, and other costs of production), productivity changes, changes in demand, changes in competitors' price, improvement in quality and intention of gaining market share.

Tables 2 and 3 report two indicators of the relevance attached to each factor by the respondents to explain price increases and price decreases: the mean scores and the percentages of companies indicating that the factor is important or very important. Both types of indicators lead to the same ranking of factors. Cost of raw materials and labour costs are the main driving force underlying price increases. By contrast, the most important factors causing a price decrease are changes in competitors' prices, changes in the cost of raw materials and changes in demand. Financial costs and productivity changes are among the lowest ranked both for price increases and decreases.

Interestingly, for most factors the mean score and the share of firms reporting that the factor is important are higher for price increases than for price decreases. There are two exceptions: changes in competitors' prices and changes in demand seem to be more relevant for price decreases than for price increases. Overall, these results point to the existence of asymmetries in the behaviour of prices: changes in costs are the main factor underlying price increases whereas changes in market conditions (demand and competitors' prices) are the driving forces behind price reductions. This finding is consistent with the results reported in Fabiani et al. (2005), who report the same asymmetrical pattern for the different euro area countries analysed.

There are some interesting differences in the answers to this question by sector (Tables A14 and A154), size and degree of competition. Thus, cost of non-energy raw materials is the most relevant factor to explain price increases in most sectors with some exceptions: in energy and transport, energy inputs are the most relevant factors; competitors' price play the most important role in energy trade and communications; and changes in demand are the main driving factor of price changes for hotels and travel agents. As regards the size of the firm, cost of raw materials and labour costs are less relevant for large companies, while competitors' prices seem to be more influential for them. Finally, it has to be stressed that firms operating in more competitive environments attach less importance to changes in labour costs and more relevance to changes in demand, productivity, quality and design, and intention to gain market share.

Table 2 - Driving factors of price increases (Question C1)
Which factors may cause you to raise the price of your company's main product/service?

	Mean scores (1)	p-value (2)	% important (3)
A change in the cost of raw materials	3.12	0.000	72.6%
A change in labour costs	2.72	0.000	56.8%
A change in competitors' prices	2.54	0.000	52.1%
A change in demand	2.36	0.000	43.5%
A change in energy and fuel prices	2.20	0.003	35.3%
A change in other production costs	2.10	0.888	32.0%
An improvement in design, quality or the product range	2.09	0.000	34.0%
A change in productivity	1.91	0.000	27.3%
A change in financial costs	1.77	--	19.4%
The intention of gaining market share	--	--	--

5.2 The speed of price adjustment after shocks

Regarding the question on the speed of price adjustment after shocks (question C2), firms were asked to report the average time elapsed between the occurrence of a significant event and the corresponding price reaction. They had to consider each of four different events: an increase in demand, an increase in costs, a decrease in demand and a decrease in costs and for each of them, they had 6 available responses: (1) less than one month, (2) between 1 and 3 months, (3) between 3 and 6 months, (4) between 6 months and 1 year, (5) more than 1 year, and (6) the price is not changed.

Table 3 - Driving factors of price decreases (Question C1)
Which factors may cause you to lower the price of your company's main product/service?

	Mean scores (1)	p-value (2)	% important (3)
A change in competitors' prices	2.66	0.08	57.2%
A change in the cost of raw materials	2.54	0.00	51.7%
A change in demand	2.43	0.00	48.1%
The intention of gaining market share	2.20	0.00	40.1%
A change in labour costs	1.96	0.00	29.3%
A change in productivity	1.85	0.01	25.9%
A change in energy and fuel prices	1.83	1.00	23.1%
A change in other production costs	1.83	0.00	23.5%
A change in financial costs	1.55	--	13.4%
An improvement in design, quality or the product range	--	--	--

(1) Respondents are asked to indicate the importance of each factor, the alternative scores being: (1) unimportant, (2) of minor importance, (3) important, (4) very important.
(2) The p-value in columns 2 and 5 refers to the null hypothesis that the factor's mean scores (reported in colums 1 and 4, respectively) is equal to the score of the theory just ranked below .
(3) % important denotes the fraction of firms rating the factor as important or very important.

Table 4 summarises the responses to these questions. The first column reports the share of companies not adjusting the price in response to a shock, whereas the second column indicates the fraction of firms reacting within three months. The third and fourth columns show the median and the mean response to the question. Although, for the four events considered, the median lags cluster in the 6 months to 1 year range, the comparison of the reactions to the different shocks provides some interesting patterns.

First, focusing on demand shocks, we find that the share of firms adjusting their prices within 3 months in response to a drop in demand is larger than to an increase in demand. Similarly, the fraction of firms holding their price constant after a drop in demand is lower than after an increase in demand. Moreover, the average response is significantly shorter after a demand contraction than after an increase in demand. Overall, prices seem to be more flexible downwards than upwards in response to demand shocks. This result is consistent with the evidence for France, Luxembourg, Austria and Portugal reported in Loupias and Ricart (2004), Lünnemann and Mathä (2005), Kwapil et al. (2005) and Martins (2005), respectively.

Table 4 - Price reactions after shocks (Question C2)

Type of shock	Share of firms not adjusting the price	Fraction of firms reacting within three months	Median lag of price reaction	Mean response (1)	p-value (2)
Increase in demand	32.6%	24.3%	6 months to 1 year	4.1	
Fall in demand	25.9%	32.3%	6 months to 1 year	3.7	0.00
Increase in production costs	13.3%	28.1%	6 months to 1 year	3.6	
Decline in production costs	24.7%	23.2%	6 months to 1 year	4.0	0.00

(1) Respondents are asked to indicate how long it takes to their company to change the price in response to a specific shock, the alternative responses being: (1) less than 1 month, (2) 1-3 months, (3) 3-6 months, (4) 6months-1year, (5) more than 1 year, (6) prices are not changed.
(2) The p-value in the last column refers to the null hypothesis that there is no difference between the mean responses with respect to positive and negative shocks.

Second, regarding the responses to cost shocks, we find that the fraction of companies changing their prices within 3 months in the face of an increase in costs is larger than in response to a fall in costs. Analogously, the fraction of firms not reacting to a cost increase is lower than to a cost decrease and the average response is faster in reaction to cost increases than to cost decreases. By contrast to the results related to demand shocks, prices seem to be more flexible upwards than downwards in the face of cost shocks. This result is consistent with the evidence found for the US in Peltzman (2000) and, again, with the results for other euro area countries reported in Fabiani et al. (2005).

In general, the responses to the questions on the determinants of price changes and on the speed of adjustment after shock suggest that cost developments are the most important factor underlying price increases while demand conditions are more relevant to induce price decreases.

According to the degree of perceived competition, we find quicker responses of firms that perceive a high degree of competition, especially in response to demand shocks. By sector, the main differences are that energy producers and bars and restaurants tend to be slower in reacting to shocks, whereas the trade sector, especially trade of food and energy products, is quicker in adjusting prices (see Table A16). By size, small firms typically show a more sluggish response, mainly in response to demand shocks.

6   Evidence on theories of price stickiness

The relevance of price stickiness has led to the development of many different theoretical models. To help discriminate between them we confronted managers with nine theories chosen according to their relevance in the economic literature and available empirical results for other countries [Apel et al. (2005), Blinder et al. (1998), Fabiani et al. (2005) and Hall et al. (1997)]. We first briefly describe the chosen theories and then present the empirical results.

1. *Coordination failure*: The notion is that firms might like to change prices, but they wait until other firms move first. If a firm is the only one to increase its price it might stand to loose customers. On the other hand, a single-handed price cut might spark off a price war. Thus, it might be preferable to a firm to stick to its price as long as none of its competitors moves first. Without a coordinating mechanism, which allows the firms to move together, the prices might remain unchanged.

2. *Temporary shocks*: This explanation is based on the idea that firms regard some shocks as temporary. If this is the case, the new optimal price will be short-lived as well and it will have to be readjusted shortly afterwards in the opposite direction within a short time period. This could be detrimental to customer relationships.

3. *Explicit contracts*: Firms have written arrangements with their customers in which they guarantee to offer a product at a given price. This helps to build up long-run customer relationships, which stabilize future sales and reduces customers' transaction costs (e.g. search time).

4. *Pricing points*: Many firms set their prices at attractive thresholds. These include both round prices and psychological prices. Firms choose these pricing points because increasing prices slightly above these thresholds greatly reduces demand. In the face of small shocks firms might not want to change prices immediately, but rather postpone price adjustments until a large price change to the next pricing point is justified.

5. *Menu costs*: The act of changing prices might be physically costly in terms of, for instance, printing and distributing catalogues or changing price tags. Thus, a company facing these costs will change its prices less frequently than an otherwise identical firm without such costs.

6. *Information costs*: This theory is a generalisation of the menu cost theory in the sense that the most important costs of price adjustment are the time and attention required of managers to gather the relevant information and to make and implement decisions.

7. *Change non-price factors*: The idea is that in the face of a demand shock, firms might react changing elements other than the price: for instance, delivery lags or auxiliary services.

8. *Implicit contracts*: The underlying argument is that customers prefer stable prices so that a price increase could imply losing customers, even if competitors also raise their prices.

9. *Quality signals*: This theory assumes that firms do not cut prices, because customers might wrongly interpret price decreases as a reduction in quality. Thus, they prefer to hold their nominal prices constant.

These theories were expressed in simple terms, by a series of statements. Managers had to indicate the relevance of each statement/theory by choosing among four options: (1) unimportant, (2) of minor importance, (3) important, and (4) very important. We asked our respondents on the relevance of these theories to explain both delays in price increases and delays in price decreases, with two exceptions. On the one hand, the theory on implicit contracts that it is only relevant for price increases and, on the other hand, the theory of quality signals that is just related to price decreases. For the other seven theories, two separate questions were introduced.

6.1 Main results

Table 5 summarises the empirical relevance attached by the respondents to the different theories. It ranks the different theories according to their mean scores (columns 1 and 4). On the basis of this ranking, three different groups of theories can be defined: the first three theories that received an average score above two, the last four theories with average grades below 1.5, and an intermediate group formed by two theories with mean scores between 1.5 and two. An alternative way of ranking the theories is given by the fraction of respondents rating the theories as important or very important. This alternative ranking (columns 3 and 6) provides a similar picture. The first group of three theories, which are considered as important by more than 35% of companies; the four theories in the bottom group that are considered as relevant by less than 15% of firms; and the two theories in the intermediate group that were considered as important by around 25% of the respondents.

Table 5 - Theories of price stickiness (Question D1)

Which factors may lead to a delay in the adjustment of the price of your main product/service?

	Reasons for deferring					
	an increase			a reduction		
	in the price					
	Mean score (1)	p-value (2)	% important (3)	Mean score (1)	p-value (2)	% important (3)
Implicit contracts	2.56	0.000	57.8%	--	--	--
Coordination failure	2.42	0.003	47.6%	2.21	0.000	38.6%
Explicit contracts	2.25	0.000	42.3%	2.09	0.000	36.1%
Temporary shocks	1.82	0.000	23.5%	1.82	0.910	24.0%
Quality signal	--	--	--	1.82	0.000	23.9%
Pricing points	1.49	0.002	14.3%	1.42	0.317	11.8%
Menu costs	1.43	0.000	11.2%	1.39	0.008	10.7%
Change non-price factors	1.34	0.403	8.5%	1.34	0.061	8.5%
Information costs	1.33	--	8.2%	1.30	--	7.1%

(1) Respondents are asked to indicate the importance of each theory, the alternative scores being: (1) unimportant, (2) of minor importance, (3) important, (4) very important.
(2) The p-value in columns 2 and 5 refers to the null hypothesis that the theory's mean scores (reported in colums 1 and 4, respectively) is equal to the score of the theory just ranked below .
(3) % important denotes the fraction of firms rating the theory as important or very important.

The rankings of the theories to explain delays in price increases and in price decreases are remarkably similar. If anything, the average scores are lower in the case of price decreases, this being specially the case for those theories that are highly ranked.

The three theories that receive the highest support are implicit contracts, coordination failure and explicit contracts. The theory of implicit contracts obtained the highest average score (2.6) and almost 60% of the companies regarded it as important. The underlying idea behind this theory is that firms build up long-term relationships with their customers that want to preserve by keeping stable their prices as long as possible. This result is consistent with the abovementioned fact that a very high fraction of companies declare that most of their turnover is generated from regular customers. Moreover, the empirical support received by this theory is also consistent with the results of Zbaracki et al. (2004) who conclude that most of the overall cost of changing prices is due to costs of antagonizing customers.[24] The relevance of the long-term relationship with customers also explains the high scores obtained by the theory of explicit contracts which ranks third (with average scores of 2.3 for price increases and 2.1 and for price decreases) and is considered as important by around 40% of companies. The importance of this theory is higher for companies selling predominantly to other firms, which explains the high rank of this theory in our case, and especially for those companies whose main customer is the public sector.

The theory of coordination failure is ranked second (with average scores of 2.4 for price increases and 2.2 for price decreases). This theory is highly ranked by almost 50% of companies in the case of price increases and by almost 40% for price decreases. Firms are reluctant to raise prices if their competitors´ price remains unchanged to avoid loosing customers. Similarly, the possibility of triggering a price war prevents companies from reducing their prices. This theory obtains a higher score for those companies that operate in a competitive environment. Thus, this theory (for price increases) has an average score of 3.1 among firms with the highest degree of perceived competition and of 1.7 for the firms with the lowest degree of perceived competition.

There are two theories which are in an intermediate position: the theories labelled "temporary shocks" and "quality signals". In both cases, the average score is slightly above 1.8 and they are highly ranked by around 25% of the companies.

The remaining four theories (pricing points, menu costs, information costs, change non-price factors) cannot be considered as relevant to explain delays in the adjustment of prices. This is remarkable given that this group includes some of the theories (menu costs or information costs) that are among the most widely used in the theoretical literature to support price stickiness. Nevertheless, it is worth noting that, as expected, some of these theories received higher scores for companies selling predominantly to consumers. In particular, the theories of pricing points and menu costs receive average scores (for price increases) of 1.7 and 1.6, respectively, compared to mean scores of 1.5 and 1.4, respectively, for the overall sample.

It is worth noting that our ranking of theories is quite similar to the rankings reported in similar studies. Each of the three theories in the top group is highly ranked in the other studies. In particular, the theory of implicit contracts is ranked first in Apel et al. (2001) and in Fabiani et al. (2005), the theory of coordination failure is ranked first in Blinder et al. (1998),

---

24. See also Rotemberg (2005) for a model in which a threat of consumers' angry reactions to unfair price increases can lead to delay price adjustments.

and the theory of explicit contracts is ranked first in Hall et al. (2000). Moreover, some of the popular theories to explain price stickiness, such as menu costs or information costs, are also poorly ranked in the abovementioned studies.[25]

The comparison of the ranking of theories across sectors does not offer substantial differences (see Tables A17 and A18). The top three theories are highly ranked in all sectors, while the theories in the bottom group receive low scores in all sectors, with the exception of the theory of explicit contracts that is less relevant in trade and in bars and restaurants. Nevertheless, some differences may be singled out. Pricing points and menu costs receive higher scores in trade and in hotels and restaurants. The theory of explicit contracts ranks first in hotels, transport and communications. Finally, the theory of quality signals obtains a high score in hotels and bars and restaurants.

---

25. The only exception is the theory of pricing points which is ranked fourth in Hall et al. (2000).

7 Determinants of price stickiness

In this section, we explore the potential role of a number of factors to explain differences in the degree of price stickiness across firms. We mainly focus on the cost structure of the different industries and their prevailing competitive environments, as well as some other variables such as demand conditions, use of rules of thumb, firm size, the existence of government set prices and the use of attractive prices. We first analyse the influence of these factors on the reported frequency of price changes by means of a loglinear model and then estimate probit models to assess the incidence of these factors in the speed of adjustment to different shocks.

7.1 Determinants of the frequency price changes

To summarise the cost structure of the different sectors we consider the relevance of labour and the share of energy inputs in total costs.[26] Given that wage changes typically take place once a year we expect more (less) labour intensive industries to carry out price revisions less (more) frequently. On the contrary, given that oil products change their prices very often, firms which are highly (lowly) intensive in the use of energy inputs in the production process are expected to adjust their prices more (less) often.[27]

We also expect a higher frequency of price change by those firms operating in more competitive environments in line with the evidence by Geroski (1995), Hall et al. (2000) and Carlton (1986). To this end, we consider both direct measures of competition such as concentration indices or number of competitors in a sector and indirect measures such as the relevance attached by firms to changes in competitors' prices to explain their own price decreases[28] or import penetration.

An additional factor potentially explaining the frequency of price adjustment is the information set used by the firm in order to change prices. In particular, we expect those firms applying rules of thumb in price setting to be less flexible than firms that take into account a wide range of current and expected variables (e.g. costs, demand) to adjust prices.

Other variables which may help in explaining the frequency and the speed of price adjustment are the size of the firm, the existence of government set prices and the relevance of attractive prices.[29] The latter two factors are expected to result in more sluggish price adjustment whereas we expect a positive correlation between the size of the firm and the frequency of price adjustment.

In Table 6 we report the estimates for the frequency of price changes in a specification that also includes dummies for the type of good or service. Given that the frequency of price change is strictly positive we apply the natural log transformation and then estimate a linear model. In Appendix C we offer evidence on the robustness of our results.

---

26. The precise definition and source of the variables used is given in Table A19.

27. Álvarez et al. (2005) find that the labour share and the energy share have, respectively, a negative and positive impact on price flexibility.

28. Hoeberichts and Stokman (2005) show that this measure is strongly correlated with the degree of perceived competition directly reported by firms.

29. Álvarez and Hernando (2004) and Dhyne et al. (2005) find a negative impact on the frequency of price adjustment of attractive and government set consumer prices. Álvarez et al. (2005) find the same for industrial prices.

Specifically, we first present results for two popular count data models, namely the Poisson and negative binomial regression models and then report estimates of two relative frequency models: the widely used log odds ratio model and the quasi maximum likelihood Papke and Wooldridge procedure (1996). Our results indicate the following:

Table 6 - Determinants of the frequency of price change

	Coefficient	p value
Labour	-0.67	0.00
Energy	0.03	0.01
Competition	0.12	0.05
Demand conditions	0.08	0.00
Rule of thumb	-0.15	0.00
Small sized firm	-0.01	0.00
Regulated price	-0.34	0.01
Attractive price	-0.03	0.02
Food	0.14	0.26
Consumer non food	-0.29	0.00
Intermediate	-0.32	0.00
Capital goods	-0.19	0.03
Energy	-0.40	0.04
Food trade	1.37	0.00
Energy trade	3.01	0.00
Hotels and travel agents	0.23	0.06
Bars and restaurants	-0.25	0.00
Transport	-0.35	0.00
Communications	-0.21	0.14
Constant	0.33	0.00
R-squared	0.28	
Number of observations	1869	
Log likelihood	-2568.01	
AIC	5176.01	
BIC	5286.68	

Notes

Dependent variable: log of the annual frequency of price changes
Huber-White robust standard errors

First, the cost structure is a determinant of the frequency of price adjustment. In particular, the coefficient of labour share is negative and that of energy inputs positive.

Second, we find that a higher degree of competition results in a higher frequency of price adjustment. Specifically, we find that the relevance attached by firms to changes in competitors' prices to explain their own price decreases is significant. Furthermore, we find an additional effect for the relevance attached by firms to changes in demand conditions to explain price changes. We have also considered alternative direct measures of competition such as the average mark-up, the cumulative share in employment of leading firms, Herfindahl, Rosenbluth, Hannan Khay or Gini indices or an enthropy measure, but their effect on the frequency of price change is never significantly negative. This probably reflects the fact that there are some competitive markets where a few firms have high market shares. On the contrary, there are also markets with a high number of firms with low market shares, which enjoy market power at the local level.

Third, we find that firms applying rules of thumb change their prices less often than firms that consider a wide range of current and expected variables to reset prices.

Finally, with respect to the other variables, we find that small firms tend to be more sluggish in price setting than bigger firms, that sectors where prices are set by the government are characterised by a lower frequency of adjustment and also that the use of attractive prices is associated with more sluggish price adjustments.

Table 7 - Determinants of the speed of adjustment after demand shocks. Probit estimates (1)

	Increase in demand				Fall in demand			
	Coefficient	p value	Marginal effect (2)	p value	Coefficient	p value	Marginal effect (2)	p value
Labour	-0.99	0.01	-0.25	0.01	-1.17	0.00	-0.37	0.00
Energy	0.03	0.01	0.01	0.01	0.03	0.01	0.01	0.01
Competition	0.08	0.31	0.02	0.32	0.26	0.00	0.09	0.00
Demand conditions	0.19	0.00	0.05	0.00	0.16	0.00	0.05	0.00
Rule of thumb	-0.24	0.00	-0.06	0.00	-0.12	0.10	-0.04	0.10
Small sized firm	-0.01	0.03	0.00	0.03	-0.01	0.03	0.00	0.03
Regulated price	-0.64	0.03	-0.12	0.00	-0.83	0.00	-0.19	0.00
Attractive price	-0.04	0.11	-0.01	0.11	0.02	0.43	0.01	0.44
Food	0.38	0.01	0.11	0.02	0.36	0.01	0.12	0.02
Consumer non food	-0.28	0.11	-0.06	0.07	-0.17	0.28	-0.05	0.25
Intermediate	-0.09	0.51	-0.02	0.50	0.06	0.64	0.02	0.64
Capital goods	-0.07	0.67	-0.02	0.66	-0.04	0.78	-0.01	0.78
Energy	-1.33	0.01	-0.17	0.00	-1.52	0.00	-0.25	0.00
Food trade	0.73	0.00	0.24	0.00	0.72	0.00	0.26	0.00
Energy trade	0.93	0.01	0.32	0.02	0.46	0.22	0.16	0.26
Hotels and travel agents	0.45	0.04	0.13	0.07	0.82	0.00	0.30	0.00
Bars and restaurants	-0.42	0.06	-0.09	0.02	-0.32	0.09	-0.09	0.06
Transport	-0.22	0.20	-0.05	0.16	-0.09	0.59	-0.03	0.58
Communications	-0.02	0.93	-0.01	0.93	0.26	0.26	0.09	0.29
Constant	-1.35	0.00			-1.24	0.00		
Number of observations		1861				1862		
Log likelihood		-798.61				-925.64		
AIC		1637.22				1891.27		
BIC		1747.79				2001.86		

(1) The dependent variable in the probit model takes a value of 1 if the firm declares that it changes its price in reaction to a shock within 3 months.
(2) Marginal effects computed at sample averages

7.2 Determinants of the speed of adjustment

As a complement to the regression analysis in the previous section, *probit* models[30] are estimated to obtain additional insights on the sources of price stickiness. We analyse the reaction of the firms in our sample to positive and negative demand as well as cost shocks. The dependent variable in our *probit* analysis is set to unity if the firm declares that it changes its price within a period of three months after the shock and zero otherwise.[31] We consider the same set of potential explanatory variables of the degree of price stickiness than in the analysis of the determinants of the frequency of price changes.

Table 7 reports the results for demand shocks whereas Table 8 shows the results for costs shocks. Our results indicate the following. First, the cost structure affects the speed of adjustment. In particular, the higher is the labour share, the lower is the price response to both types of shocks. Moreover, the higher is the share of energy inputs on total costs the higher is the probability of a fast price adjustment, although this effect is not significant in the case of costs shocks.[32]

---

30. Logit models show very similar results.
31. As a robustness check, additional results are reported in Tables C2 and C3, using an alternative definition of the dependent variable. It is set to one if the firm indicates that it changes its price within a period of six months after the shock.
32. The lack of significance is likely due to the fact that the share of energy inputs is measured at the NACE 2-digit level.

	Increase in costs				Fall in costs			
	Coefficient	p value	Marginal effect (2)	p value	Coefficient	p value	Marginal effect (2)	p value
Labour	-1.31	0.00	-0.40	0.00	-1.49	0.00	-0.41	0.00
Energy	0.01	0.24	0.00	0.24	0.01	0.19	0.00	0.19
Competition	-0.11	0.15	-0.03	0.15	-0.04	0.61	-0.01	0.61
Demand conditions	0.06	0.00	0.02	0.00	0.08	0.00	0.02	0.00
Rule of thumb	-0.10	0.17	-0.03	0.16	-0.02	0.78	-0.01	0.78
Small sized firm	0.00	0.29	0.00	0.29	0.00	0.25	0.00	0.25
Regulated price	-1.02	0.00	-0.21	0.00	-0.83	0.01	-0.15	0.00
Attractive price	0.03	0.12	0.01	0.12	0.04	0.09	0.01	0.09
Food	0.14	0.33	0.04	0.35	0.15	0.30	0.04	0.33
Consumer non food	-0.09	0.54	-0.03	0.52	-0.01	0.97	0.00	0.97
Intermediate	0.06	0.62	0.02	0.62	0.09	0.51	0.02	0.52
Capital goods	0.18	0.20	0.06	0.22	0.22	0.14	0.06	0.17
Energy	-0.26	0.53	-0.07	0.49	-0.21	0.62	-0.05	0.58
Food trade	0.60	0.00	0.21	0.00	0.61	0.00	0.20	0.00
Energy trade	0.49	0.18	0.18	0.22	0.73	0.04	0.25	0.07
Hotels and travel agents	0.04	0.85	0.01	0.86	0.33	0.12	0.10	0.16
Bars and restaurants	0.00	0.99	0.00	0.99	0.02	0.92	0.01	0.92
Transport	-0.16	0.34	-0.05	0.31	-0.12	0.50	-0.03	0.48
Communications	0.20	0.38	0.07	0.41	0.34	0.15	0.10	0.19
Constant	-0.66	0.00			-0.97	0.00		
Number of observations		1862				1862		
Log likelihood		-979.92				-882.93		
AIC		1999.84				1805.85		
BIC		2110.43				1916.44		

(1) The dependent variable in the probit model takes a value of 1 if the firm declares that it changes its price in reaction to a shock within 3 months.
(2) Marginal effects computed at sample averages

Concerning the influence of the degree of competition and demand conditions on the speed of price adjustment, we find that a higher degree of competition is associated with a faster response to a declining demand shock, suggesting that a slow price reaction to a contraction of demand might result in a substantial loss of market share. However, the intensity of competition does not seem to affect the probability of a fast reaction to cost shocks or to an increasing demand shock. In addition, we find that the relevance attached by firms to changes in demand in explaining price changes has a positive impact on the probability of a fast price adjustment. These findings are broadly consistent with the evidence reported in Fabiani et al. (2004), Kwapil et al. (2005) and Loupias and Ricart (2004) for Italy, Austria and France, respectively. The results of these studies unambiguously indicate that price stickiness in response to demand shocks is higher the lower is the degree of market competition. However, the evidence from these studies on the link between market competition and speed of reaction to costs shocks is mixed: negative in Italy, non-significant in Austria and positive for costs increases in France.

The sign and significance of the effects of the rest of the variables on the probability of a fast adjustment are in line with those obtained in the analysis of the determinants of the frequency of price adjustment, with the exception of attractive pricing that does not seem to affect the speed of adjustment. First, we find that those firms using simple rules in the process of reviewing their prices are more likely to display a slow adjustment after shocks, especially in the case of increasing demand shocks. Second, in the case of demand shocks, the smaller are the companies the higher is the probability of a fast adjustment. A very significant effect is found for the variable indicating the intervention of the public sector in the price setting process. Thus, firms whose prices are set by the government are characterised by a lower probability of displaying a fast price reaction. Finally, as regards differences across industries in the probability of a fast adjustment, we find that this probability is consistently highest for firms in the food and energy trade sectors, in reaction to both demand and costs shocks. By contrast, the speed of reaction after demand shocks is likely to be lowest in the production of energy and in bars and restaurants.

8   Conclusions

This paper reports the results of a survey carried out by the Banco de España between May and September 2004 on a sample of 2008 Spanish firms. Its main purpose is to deepen the understanding of the price setting behaviour of Spanish companies and complement the quantitative evidence obtained from micro price data.

The results of the survey indicate that almost 80% of the Spanish companies declare having an autonomous price setting policy. As to the main aspects of their pricing behaviour, some interesting facts are found. First, around two thirds of the companies follow pricing policies with some element of state-dependence while only one third of the companies use a pure time-dependent pricing rule. Second, there are notable differences in the information set used in the process of price revision. Around one third of the companies apply a rule-of-thumb when resetting their prices and the remaining follow some type of optimising behaviour. The share of forward-looking price setters is 27%. This share is higher for largest firms, manufacturing companies and firms operating in very competitive environments. Third, the median firm changes its price once a year. There are substantial differences across industries in the frequency of price changes. This frequency is higher in the trade sector, in particular among traders of energy and food. Fourth, price discrimination is a common practice of Spanish firms. Around two thirds of companies use some form of price discrimination. Uniform pricing is significantly more common in trade and in hotels and restaurants.

Changes in costs are the main factor underlying price increases, whereas changes in market conditions (demand and competitors' prices) are the driving forces behind price reductions. Moreover, prices seem to be more flexible downwards than upwards in response to demand shocks, while the opposite result holds in the face of cost shocks.

The degree of price flexibility, proxied by the frequency of price changes or by the speed of reaction after shocks, is affected by a number of factors: the cost structure, the competitive environment, demand conditions, the use of rules of thumb, firm size, the existence of government set prices and the use of attractive prices. In particular, we find that the higher are labour costs for firms, the lower is the frequency of price changes and the slower is the response to demand shocks. Overall, prices tend to be more flexible the higher is the share of energy inputs over total costs, the more competitive is the environment in which they operate and the more importance they attach to demand conditions. Conversely, prices tend to be more sluggish for smaller companies, for firms setting prices in attractive terms and when the government intervenes in the pricing process.

Finally, among the theories proposed in the economic literature to explain nominal price stickiness, the highest empirical support is obtained for: 1) the existence of implicit contracts or long-term relationships with customers that firms want to preserve by keeping stable their prices as long as possible; 2) the theory of coordination failure according to which firms are reluctant to raise prices if their competitors´ price remains unchanged to avoid loosing customers and 3) the existence of explicit contracts that sets the price until the contract is re-negotiated.

REFERENCES

ÁLVAREZ, L. J., P. BURRIEL and I. HERNANDO (2005). *Price setting behaviour in Spain: evidence from micro PPI data,* Working Paper n.º 0527, Banco de España Working Paper, .

ÁLVAREZ, L. J., and I. HERNANDO (2004). *Price setting behaviour in Spain: stylised facts using consumer price micro data,* Working Paper n.º 0422, Banco de España.

AMIRAULT, D., C. KWAN and G. WILKINSON (2004). "A survey of the price-setting behaviour of Canadian companies", *Bank of Canada Review,* Winter 2004-2005, pp. 29-40.

APEL, M., R. FRIBERG and K. HALLSTEN (2005). "Microfoundations of macroeconomic price adjustment: survey evidence from Swedish firms", *Journal of Money, Credit and Banking,* 37 (2), pp. 313-338.

AUCREMANNE, L., and M. DRUANT (2005). *Price-setting behaviour in Belgium: What can be learned from an ad hoc survey?",* ECB Working Paper n.º 448.

BLINDER, A. S. (1991). "Why are prices sticky? Preliminary results from an interview study", *American Economic Review,* 81 (2), pp. 89-100.

BLINDER, A. S., E. CANETTI, D. E. LEBOW and J. B. RUDD (1998). *Asking about prices: a new approach to understanding price stickiness,* Russell Sage Foundation, New York.

CALVO, G. (1983). "Staggered prices in a utility-maximizing framework", *Journal of Monetary Economics,* 12, pp. 383-398.

CARLTON, D. (1986). "The rigidity of prices", *American Economic Review,* 76, pp. 637-658.

CHRISTIANO, L., M. EICHENBAUM and C. EVANS (2005). "Nominal rigidities and the dynamic effects of a shock to monetary policy", *Journal of Political Economy,* 113 (1), pp. 1-45.

DHYNE, E., L. ALVAREZ, H. LE BIHAN, G. VERONESE, D. DIAS, J. HOFFMAN, N. JONKER, P. LUNNEMANN, F. RUMLER and J. VILMUNEN (2005). *Price setting in the euro area: some stylised facts from individual consumer price data,* ECB Working Paper, forthcoming.

FABIANI, S., M. DRUANT, I. HERNANDO, C. KWAPIL, B. LANDAU, C. LOUPIAS, F. MARTINS, T. MATHAE, R. SABBATINI, H. STAHL and A. STOKMAN (2005). *The pricing behaviour of firms in the euro area: new survey evidence,* mimeo.

FABIANI, S., A. GATTULLI and R. SABBATINI (2004). *The pricing behaviour of Italian firms: new survey evidence on price stickiness,* ECB Working Paper n.º 333.

GALÍ, J., and M. GERTLER (1999). "Inflation dynamics: a structural econometric analysis", *Journal of Monetary Economics,* 44 (2), pp. 195-222.

GEROSKI, P. (1995). "Price dynamics in UK manufacturing: a microeconomic view", *Economica,* 59, pp. 403-419.

GIANNONI, M., and M. WOODFORD (2004). "Optimal Inflation-Targeting Rules", in Ben S. Bernanke and Michael Woodford (eds.), *The Inflation Targeting Debate,* Chicago: University of Chicago Press, pp. 93-162.

HALL, S., M. WALSH and A. YATES (1997). *How do UK companies set prices?,* Working Paper n.º 67, Bank of England.

— (2000). "Are UK companies' prices sticky?", *Oxford Economic Papers,* 52, pp. 425-446.

HOEBERICHTS, M. and A. STOKMAN (2005). *Pricing behaviour of Dutch companies: main results from a survey",* mimeo, De Nederlandsche Bank.

KWAPIL, K., J. BAUMGARTNER and J. SCHARLER (2005). *The price-setting behaviour of Austrian firms: some survey evidence,* ECB Working Paper n.º 464.

LOUPIAS, C., and R. RICART (2004). *Price setting in France: new evidence from survey data,* Banque de France, ECB Working Paper n.º 423.

LÜNNEMANN, P., and T. MATHÄ (2005). *New survey evidence on the pricing behaviour of Luxemburg firms,* mimeo, Banque Centrale du Luxemburg.

MARTIN, C. (1993). "Price adjustment and market structure", *Economics Letters,* 41, pp. 139-143.

MARTINS, F. (2004). *The price setting behaviour of Portuguese firms: evidence from survey data,* ECB Working Paper, forthcoming.

PAPKE, L. E., and J. M. WOOLRIDGE (1996). "Econometric Methods for Fractional Response with an Application to 401(K) Plan Participation Rates", *Journal of Applied Econometrics,* 11 (6), pp. 619-632.

PELTZMAN, S. (2000). "Prices rise faster than they fall", *Journal of Political Economy,* 108 (3), pp. 466-502.

ROTEMBERG, J. (2005). "Customer anger at price increases, changes in the frequency of price adjustement and monetary policy", *Journal of Monetary Economics,* 52 (4), pp. 829-852.

SHESHINSKI, E., and Y. WEISS (1977): "Inflation and the cost of price adjustment", *Review of Economic Studies,* 44, pp. 287-303.

STAHL, H. (2005). *Price setting in German manufacturing: New evidence from survey data,* mimeo, Deutsche Bundesbank.

TAYLOR, J. (1980). "Aggregate Dynamics and Staggered Contracts", *Journal of Political Economy,* 88, pp. 1-23.

ZBARACKI, M., M. RISTON, D. LEVY, S. DUTTA and M. BERGEN (2004): "Managerial and customer costs of price adjustment: direct evidence from industrial markets", *Review of Economics and Statistics,* 86 (2), pp. 514-533.

APPENDIX A. ADDITIONAL TABLES

Table A1 - The sample

			N° of firms in the sample	Response rate
Economic activity				
Manufacturing			**829**	**73.5**
DA.	15,16	Manufacture of food products, beverages and tobacc	131	**80.0**
DB.	17,18	Manufacture of textiles and textile products	51	**70.3**
DC.	19	Manufacture of leather and leather products	13	**68.4**
DD.	20	Manufacture of wood and wood products	19	**60.0**
DE.	21,22	Manufacture of pulp, paper and paper products; pub	74	**80.6**
DF.	23	Manufacture of coke, refined petroleum products and nucl	4	**63.2**
DG.	24	Manufacture of chemicals, chemical products and ma	66	**73.0**
DH	25	Manufacture of rubber and plastic products	40	**76.8**
DI.	26	Manufacture of other non-metallic mineral products	73	**80.9**
DJ.	27,28	Manufacture of basic metals and fabricated metal p	101	**69.0**
DK.	29	Manufacture of machinery and equipment n.e.c.	61	**69.7**
DL.	30-33	Manufacture of electrical and optical equipment	63	**70.0**
DM.	34,35	Manufacture of transport equipment	89	**72.3**
DN.	36,37	Manufacturing n.e.c.	44	**67.9**
Energy				
EE.	40,41	Electricity, gas and water supply	**59**	**67.4**
Services			**1120**	**66.4**
GG	50	Sale, maintenance and repair of motor vehicles	115	**79.3**
GG	51	Wholesale trade	193	**78.0**
GG	52	Retail trade	207	**64.9**
HH	55	Hotels and restaurants	324	**63.2**
II	601	Rail transport services	8	**88.9**
II	602,603	Land transport and transport via pipeline services	144	**69.8**
II	61	Water transport services	9	**72.7**
II	62	Air transport services	16	**48.6**
II	63	Supporting and auxiliary transport services; travel agency	51	**67.0**
JJ	641	Post services	20	**54.5**
JJ	642	Telecommunication services	33	**43.2**
Size				
		Up to 49	850	**65.6**
		50-199 employees	463	**68.6**
		>200 employees	695	**73.2**
Total			2008	**69.1**

Table A2 - Correspondence between NACE codes and classification used

NACE code	Name
Manufacturing of food products	
151	Production, processing and preserving of meat and meat products
152	Processing and preserving of fish and fish products
153	Processing and preserving of fruit and vegetables
154	Manufacture of vegetable and animal oils and fats
155	Manufacture of dairy products
158	Manufacture of other food products
159	Manufacture of beverages
160	Manufacture of tobacco products
Manufacturing of other consumption goods	
174	Manufacture of made-up textile articles, except apparel
175	Manufacture of other textiles
177	Manufacture of knitted and crocheted articles
181	Manufacture of leather clothes
182	Manufacture of other wearing apparel and accessories
183	Dressing and dyeing of fur; manufacture of articles of fur
191	Tanning and dressing of leather
192	Manufacture of luggage, handbags and the like, saddlery and harness
193	Manufacture of footwear
221	Publishing
222	Printing and service activities related to printing
244	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
245	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
297	Manufacture of domestic appliances n.e.c.
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
334	Manufacture of optical instruments and photographic equipment
335	Manufacture of watches and clocks
341	Manufacture of motor vehicles
354	Manufacture of motorcycles and bicycles
361	Manufacture of furniture
362	Manufacture of jewellery and related articles
363	Manufacture of musical instruments
364	Manufacture of sports goods
365	Manufacture of games and toys
366	Miscellaneous manufacturing n.e.c.
Manufacturing of intermediate goods	
156	Manufacture of grain mill products, starches and starch products
157	Manufacture of prepared animal feeds
171	Preparation and spinning of textile fibres
172	Textile weaving
173	Finishing of textiles
176	Manufacture of knitted and crocheted fabrics
201	Sawmilling and planing of wood; impregnation of wood
202	Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards
203	Manufacture of builders' carpentry and joinery
204	Manufacture of wooden containers
205	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
211	Manufacture of pulp, paper and paperboard
212	Manufacture of articles of paper and paperboard
241	Manufacture of basic chemicals
242	Manufacture of pesticides and other agro-chemical products
243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
246	Manufacture of other chemical products
247	Manufacture of man-made fibres
251	Manufacture of rubber products
252	Manufacture of plastic products
261	Manufacture of glass and glass products
262	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products
263	Manufacture of ceramic tiles and flags
264	Manufacture of bricks, tiles and construction products, in baked clay
265	Manufacture of cement, lime and plaster
266	Manufacture of articles of concrete, plaster and cement
267	Cutting, shaping and finishing of ornamental and building stone
268	Manufacture of other non-metallic mineral products
271	Manufacture of basic iron and steel and of ferro-alloys
272	Manufacture of tubes
273	Other first processing of iron and steel
274	Manufacture of basic precious and non-ferrous metals
286	Manufacture of cutlery, tools and general hardware
287	Manufacture of other fabricated metal products
312	Manufacture of electricity distribution and control apparatus
313	Manufacture of insulated wire and cable
314	Manufacture of accumulators, primary cells and primary batteries
315	Manufacture of lighting equipment and electric lamps
316	Manufacture of electrical equipment n.e.c.
321	Manufacture of electronic valves and tubes and other electronic components

Manufacturing of capital goods

281	Manufacture of structural metal products
282	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers
283	Manufacture of steam generators, except central heating hot water boilers
291	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
292	Manufacture of other general purpose machinery
293	Manufacture of agricultural and forestry machinery
294	Manufacture of machine tools
295	Manufacture of other special purpose machinery
296	Manufacture of weapons and ammunition
300	Manufacture of office machinery and computers
311	Manufacture of electric motors, generators and transformers
322	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
331	Manufacture of medical and surgical equipment and orthopaedic appliances
332	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
342	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
343	Manufacture of parts and accessories for motor vehicles and their engines

Energy

232	Manufacture of refined petroleum products
401	Production and distribution of electricity
402	Manufacture of gas; distribution of gaseous fuels through mains

Food trade

512	Wholesale of agricultural raw materials and live animals
513	Wholesale of food, beverages and tobacco
521	Retail sale in non-specialized stores
522	Retail sale of food, beverages and tobacco in specialized stores

Energy trade

505	Retail sale of automotive fuel

Other trade

501	Sale of motor vehicles
502	Maintenance and repair of motor vehicles
503	Sale of motor vehicle parts and accessories
504	Sale, maintenance and repair of motorcycles and related parts and accessories
511	Wholesale on a fee or contract basis
514	Wholesale of household goods
515	Wholesale of non-agricultural intermediate products, waste and scrap
518	Wholesale of machinery, equipment and supplies
519	Other wholesale
523	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles
524	Other retail sale of new goods in specialized stores
525	Retail sale of second-hand goods in stores
526	Retail sale not in stores
527	Repair of personal and household goods

Hotels and travel agents

551	Hotels
552	Camping sites and other provision of short-stay accommodation
633	Activities of travel agencies and tour operators; tourist assistance activities n.e.c.

Bars and restaurants

553	Restaurants
554	Bars
555	Canteens and catering

Transport

601	Transport via railways
602	Other land transport
603	Transport via pipelines
611	Sea and coastal water transport
612	Inland water transport
621	Scheduled air transport
622	Non-scheduled air transport
623	Space transport
631	Cargo handling and storage
632	Other supporting transport activities
634	Activities of other transport agencies

Communications

641	Post and courier activities
642	Telecommunications

Table A3 - Geographical distribution of sales (Question A2)
Percentage of sales to …

	Spain	Euro area	Rest of the world	N° answers
Total	86.6	9.2	4.2	2008
Economic activity				
Manufacturing of food products	82.9	11.1	6.0	125
Manufacturing of other consumption goods	81.2	13.2	5.6	201
Manufacturing of intermediate goods	77.7	14.7	7.6	298
Manufacturing of capital goods	69.9	21.0	9.0	201
Energy	96.5	2.8	0.7	63
Food trade	89.5	8.3	2.2	143
Energy trade	100.0	0.0	0.0	15
Other trade	96.5	2.4	1.1	357
Hotels and travel agents	83.5	10.7	5.8	183
Bars and restaurants	97.5	1.3	1.2	151
Transport	85.0	11.3	3.7	218
Communications	96.8	1.4	1.8	53
Size (n. employees)				
Up to 50	93.0	4.7	2.4	850
Between 50 and 200	82.6	11.9	5.5	463
More than 200	82.6	12.2	5.2	695

Table A4 - Geographical scope of the main market (Question A5)

	Local	Regional	National	International	N° answers
Total	26.2	22.2	41.3	10.3	2008
Economic activity					
Manufacturing of food products	17.6	19.5	52.0	10.9	125
Manufacturing of other consumption goods	12.3	15.6	61.6	10.5	201
Manufacturing of intermediate goods	14.5	22.2	45.3	18.0	298
Manufacturing of capital goods	11.6	17.8	42.8	27.8	201
Energy	33.4	25.9	40.7	0.0	63
Food trade	33.4	42.4	11.7	12.5	143
Energy trade	79.6	0.0	20.4	0.0	15
Other trade	34.1	23.5	41.3	1.2	357
Hotels and travel agents	28.1	19.6	39.5	12.8	183
Bars and restaurants	62.8	25.0	10.7	1.5	151
Transport	22.6	18.9	45.7	12.8	218
Communications	14.0	18.9	67.1	0.0	53
Size (n. employees)					
Up to 50	41.5	26.1	28.3	4.2	850
Between 50 and 200	21.1	21.0	43.4	14.5	463
More than 200	14.6	19.2	52.2	14.0	695

Table A5 - Degree of perceived competition
Importance of changes in competitors' price to explain price changes (Question C2_8)

	Very low	Low	High	Very high	N° answers
Total	26.7	18.8	23.9	30.7	1884
Economic activity					
Manufacturing of food products	22.5	21.7	28.9	26.9	125
Manufacturing of other consumption goods	30.1	21.5	16.4	32.0	201
Manufacturing of intermediate goods	19.0	19.7	29.1	32.2	298
Manufacturing of capital goods	22.1	22.2	23.5	32.2	201
Energy	59.7	9.5	25.4	5.5	63
Food trade	20.0	14.8	23.0	42.3	143
Energy trade	38.4	23.1	7.7	30.8	15
Other trade	29.5	16.3	27.0	27.2	357
Hotels and travel agents	16.9	16.8	29.3	37.0	183
Bars and restaurants	34.5	21.5	20.6	23.5	151
Transport	35.5	18.7	22.5	23.3	218
Communications	4.9	25.8	7.4	61.9	53
Size (n. employees)					
Up to 50	31.0	22.6	24.0	22.4	492
Between 50 and 200	25.4	18.8	22.6	33.3	296
More than 200	23.3	15.3	24.4	37.0	255

Table A6 - Type of customer

	Main customer (question A8)			Type of relationship (question A9)	
	Other companies	Consumers	Public sector	Occasional	Regular
Total	58.2	38.9	3.0	14.5	85.5
Economic activity					
Manufacturing of food products	91.3	8.7	0.0	1.4	98.6
Manufacturing of other consumption goods	88.8	9.7	1.6	1.5	98.6
Manufacturing of intermediate goods	84.8	13.9	1.3	1.7	98.4
Manufacturing of capital goods	84.7	12.2	3.1	9.0	91.0
Energy	32.5	56.3	11.2	0.8	99.2
Food trade	42.3	57.7	0.0	5.8	94.3
Energy trade	6.5	93.5	0.0	39.8	60.2
Other trade	37.4	61.1	1.6	27.2	72.8
Hotels and travel agents	60.8	39.2	0.0	37.8	62.2
Bars and restaurants	8.3	84.3	7.4	39.2	60.8
Transport	62.4	33.1	4.5	11.7	88.3
Communications	40.5	52.4	7.2	1.4	98.6
Size (n. employees)					
Up to 50	56.7	41.7	1.7	16.5	83.5
Between 50 and 200	67.5	30.6	1.9	15.3	84.7
More than 200	55.2	40.2	4.6	12.2	87.8

Table A7 - Who sets the price? (Question B1)

	Own firm	Parent company	Main customers	Public sector	Other
Total	78.5	5.2	2.4	5.4	8.5
Economic activity					
Manufacturing of food products	91.5	3.2	1.6	0.0	3.7
Manufacturing of other consumption goods	81.8	3.7	3.0	9.5	2.1
Manufacturing of intermediate goods	92.3	2.6	2.4	0.0	2.7
Manufacturing of capital goods	79.4	8.0	3.7	0.0	8.9
Energy	26.2	0.8	0.0	33.5	39.6
Food trade	85.7	7.7	3.5	0.0	3.1
Energy trade	40.8	20.4	0.0	0.0	38.8
Other trade	74.1	10.2	1.4	2.9	11.3
Hotels and travel agents	90.1	2.3	3.0	0.0	4.6
Bars and restaurants	88.2	0.7	1.5	3.4	6.2
Transport	62.2	3.3	4.5	17.4	12.8
Communications	87.2	11.4	0.0	0.0	1.5
Size (n. employees)					
Up to 50	83.3	5.3	3.7	2.0	5.8
Between 50 and 200	80.3	3.7	2.1	4.2	9.7
More than 200	73.4	5.8	1.4	9.1	10.4
Perceived competition					
Very low	62.5	7.0	2.5	13.9	14.1
Low	87.7	3.8	1.0	1.8	5.7
High	85.2	4.5	2.2	1.6	6.4
Very high	84.3	5.5	3.4	0.9	6.1

Table A8 - Time-dependent versus state-dependent pricing rules (Question B4)
When do you review the price of your main product?

	At specific time intervals	Mainly at specific time intervals, but also in reaction to specific events	In reaction to specific events
Total	33.4	28.1	38.5
Economic activity			
Manufacturing of food products	24.8	31.9	43.3
Manufacturing of other consumption goods	42.3	28.6	29.1
Manufacturing of intermediate goods	18.2	22.7	59.2
Manufacturing of capital goods	22.6	28.7	48.6
Energy	45.7	16.7	37.6
Food trade	26.0	23.1	50.9
Energy trade	41.6	31.5	27.0
Other trade	34.8	24.5	40.7
Hotels and travel agents	52.1	38.1	9.8
Bars and restaurants	35.0	31.9	33.1
Transport	40.3	35.0	24.7
Communications	26.4	28.6	45.0
Size (n. employees)			
Up to 50	30.5	24.0	45.6
Between 50 and 200	34.5	28.9	36.6
More than 200	35.6	31.5	32.9
Perceived competition			
Very low	41.7	18.2	40.0
Low	32.3	29.1	38.6
High	28.6	33.0	38.4
Very high	30.6	31.2	38.2

Table A9 - Information set used in the revision of prices (Question B6)
How do you recalculate the price of your main product?

	Applying a rule of thumb	Using a wide range of indicators related to the current operating environment	Using a wide range of indicators related to the current and expected operating environment
Total	32.6	39.5	27.9
Economic activity			
Manufacturing of food products	25.2	43.0	31.8
Manufacturing of other consumption goods	34.9	35.5	29.6
Manufacturing of intermediate goods	25.3	43.5	31.2
Manufacturing of capital goods	32.8	42.8	24.4
Energy	27.9	44.6	27.6
Food trade	29.6	57.4	13.0
Energy trade	0.0	83.8	16.2
Other trade	35.1	45.0	20.0
Hotels and travel agents	27.6	29.1	43.3
Bars and restaurants	46.6	40.0	13.4
Transport	47.0	29.2	23.8
Communications	17.2	18.4	64.5
Size (n. employees)			
Up to 50	42.6	43.3	14.1
Between 50 and 200	30.7	39.8	29.5
More than 200	24.3	36.0	39.7
Perceived competition			
Very low	46.7	34.9	18.4
Low	38.9	41.3	19.8
High	27.9	37.8	34.3
Very high	20.5	42.9	36.6

Table A10 - Frequency of price reviews (Question B5)
If you review the price of your product at specific intervals, how often do you do so?

	Four or more times per year	Two or three times per year	Once a year	Less than once a year
Total	14.0	15.6	63.1	7.4
Economic activity				
Manufacturing of food products	23.1	11.4	63.6	2.0
Manufacturing of other consumption goods	6.6	17.6	67.6	8.1
Manufacturing of intermediate goods	14.0	4.4	74.6	7.0
Manufacturing of capital goods	8.7	5.9	76.5	8.8
Energy	0.0	0.0	73.6	26.4
Food trade	65.3	9.6	25.1	0.0
Energy trade	100.0	0.0	0.0	0.0
Other trade	14.6	23.2	56.3	5.9
Hotels and travel agents	16.4	24.4	57.7	1.5
Bars and restaurants	0.0	14.8	74.9	10.4
Transport	1.0	13.6	80.6	4.8
Communications	18.3	45.3	20.3	16.1
Size (n. employees)				
Up to 50	8.2	9.6	74.0	8.2
Between 50 and 200	17.0	14.7	62.8	5.5
More than 200	17.8	21.4	53.3	7.4
Perceived competition				
Very low	5.7	6.5	80.6	7.3
Low	9.8	14.3	69.2	6.7
High	13.6	15.6	61.0	9.8
Very high	25.4	25.1	45.3	4.3

Table A11 - Frequency of price changes (Question B7)
How often do you usually change the price of your product?

	Four or more times per year	Two or three times per year	Once a year	Less than once a year
Total	13.9	15.1	56.8	14.3
Economic activity				
Manufacturing of food products	19.1	14.0	60.6	6.3
Manufacturing of other consumption goods	2.2	18.8	65.0	14.0
Manufacturing of intermediate goods	12.1	9.1	57.4	21.4
Manufacturing of capital goods	8.4	8.1	64.2	19.3
Energy	20.2	0.0	43.4	36.4
Food trade	53.3	20.1	23.6	3.0
Energy trade	100.0	0.0	0.0	0.0
Other trade	16.5	20.2	51.8	11.5
Hotels and travel agents	17.8	23.0	56.2	3.1
Bars and restaurants	0.0	9.4	76.1	14.5
Transport	2.7	10.5	73.3	13.5
Communications	8.5	36.0	38.9	16.7
Size (n. employees)				
Up to 50	8.0	9.0	64.0	19.0
Between 50 and 200	15.3	16.2	53.7	14.9
More than 200	18.5	20.0	51.7	9.7
Perceived competition				
Very low	6.7	6.6	67.9	18.8
Low	11.4	14.4	61.8	12.4
High	16.2	15.8	52.7	15.3
Very high	21.0	22.3	46.5	10.2

Table A12 - Price discrimination (Question B3)
The price of your main product is:

	The same for all the customers	Differentiated according to the quantity	Decided case by case	Differentiated according to other reasons
Total	32.3	25.1	31.2	11.5
Economic activity				
Manufacturing of food products	24.0	33.1	36.5	6.4
Manufacturing of other consumption goods	37.0	26.5	29.4	7.1
Manufacturing of intermediate goods	10.8	35.9	44.3	9.1
Manufacturing of capital goods	14.1	24.3	54.0	7.6
Energy	18.9	18.1	35.1	27.9
Food trade	58.5	17.7	15.2	8.6
Energy trade	39.8	16.5	0.0	43.7
Other trade	46.7	21.4	19.0	12.9
Hotels and travel agents	19.8	36.3	20.9	23.0
Bars and restaurants	78.8	5.5	11.6	4.1
Transport	15.0	25.0	53.4	6.7
Communications	49.1	24.5	12.4	14.1
Size (n. employees)				
Up to 50	38.7	26.8	27.5	7.0
Between 50 and 200	21.1	33.1	35.0	10.8
More than 200	31.7	19.8	32.7	15.8
Perceived competition				
Very low	42.0	23.2	27.4	7.4
Low	31.5	27.5	28.6	12.5
High	26.1	24.8	35.5	13.6
Very high	27.7	25.8	33.4	13.2

Table A13. Importance of factors in differentiated price-setting across markets (Question A4)
Average scores (*)

	Price of competitors on the market	Cyclical fluctuations in demand on the market	Structural market conditions	Exchange rate of the currency used for payment	Tax system on the market
Total	3.2	2.9	2.5	2.2	1.8
Economic activity					
Manufacturing of food products	3.2	2.9	2.6	2.2	1.7
Manufacturing of other consumption goods	2.8	2.8	2.4	2.5	1.8
Manufacturing of intermediate goods	3.5	3.1	2.4	2.4	1.6
Manufacturing of capital goods	3.4	2.9	2.3	2.4	1.7
Energy	3.1	2.6	3.5	2.6	2.4
Food trade	3.4	3.4	2.6	2.4	1.9
Energy trade	--	--	--	--	--
Other trade	2.8	2.7	2.2	2.1	2.3
Hotels and travel agents	3.2	3.3	2.3	2.2	1.5
Bars and restaurants	3.8	3.3	3.0	2.5	2.5
Transport	3.2	2.9	2.5	1.8	1.5
Communications	3.2	3.0	2.8	2.0	1.7
Size (n. employees)					
Up to 50	3.0	2.7	2.2	1.9	1.8
Between 50 and 200	3.3	3.1	2.5	2.3	1.7
More than 200	3.2	3.0	2.7	2.4	1.9
Perceived competition					
Very low	2.4	2.3	2.3	2.2	1.9
Low	3.2	2.8	2.4	1.9	1.6
High	3.3	3.2	2.8	2.4	2.0
Very high	3.6	3.2	2.5	2.3	1.8

(*) Respondents are asked to indicate the importance of each factor, the alternative scores being: (1) unimportant, (2) of minor importance, (3) important, (4) very important.

Table A14 - Driving factors of price increases (Question C1). Mean scores (1) by sector.
Which factors may cause you to raise the price of your company's main product/service?

	Total	Food	Consumer non food	Intermediate goods	Capital goods	Energy	Food trade	Energy trade	Other trade	Hotels and travel agents	Bars and restaurants	Transport	Communica-tions
1. A change in labour costs	2.72	2.63	3.07	2.71	2.89	2.45	2.47	1.55	2.51	2.82	3.03	3.02	2.17
2. A change in financial costs	1.77	1.83	1.69	1.71	1.83	2.02	1.66	1.55	1.76	1.70	1.71	1.88	1.77
3. A change in the cost of raw materials	3.12	3.56	3.42	3.50	3.37	2.92	3.36	3.39	3.22	2.71	3.67	2.11	2.35
4. A change in energy and fuel prices	2.20	2.17	1.97	2.38	1.88	3.00	1.81	2.65	1.83	2.13	1.91	3.39	1.47
5. A change in other production costs	2.10	2.19	2.39	2.23	2.18	1.91	2.12	1.94	2.03	1.95	2.00	2.06	2.05
6. A change in productivity	1.91	2.04	2.13	2.08	2.14	1.62	1.85	1.27	1.66	1.95	1.88	1.94	1.67
7. A change in demand	2.36	2.27	2.32	2.43	2.19	2.18	2.43	1.67	2.26	2.88	2.04	2.37	2.64
8. A change in competitors' prices	2.54	2.67	2.54	2.57	2.45	1.72	2.98	3.50	2.51	2.71	2.29	2.55	2.80
9. An improvement in design, quality or the product range	2.09	1.90	2.50	2.15	2.25	1.68	1.96	1.50	2.08	2.23	2.13	1.65	2.39
10. The intention of gaining market share	--	--	--	--	--	--	--	--	--	--	--	--	--

(1) Respondents are asked to indicate the importance of each factor, the alternative scores being: (1) unimportant, (2) of minor importance, (3) important, (4) very important.

Table A15 - Driving factors of price increases (Question C1). Mean scores (1) by sector.
Which factors may cause you to lower the price of your company's main product/service?

	Total	Food	Consumer non food	Intermediate goods	Capital goods	Energy	Food trade	Energy trade	Other trade	Hotels and travel agents	Bars and restaurants	Transport	Communica-tions
1. A change in labour costs	1.96	1.93	2.21	1.84	2.24	1.57	1.97	1.40	1.76	1.97	2.08	2.18	1.93
2. A change in financial costs	1.55	1.55	1.48	1.48	1.69	1.88	1.49	1.40	1.50	1.46	1.55	1.51	1.77
3. A change in the cost of raw materials	2.54	2.93	2.77	2.78	2.80	2.38	2.82	2.91	2.70	2.05	2.83	1.67	2.39
4. A change in energy and fuel prices	1.83	1.80	1.73	1.91	1.67	2.52	1.74	2.18	1.54	1.67	1.57	2.55	1.53
5. A change in other production costs	1.83	1.84	2.04	1.84	1.88	1.63	1.95	1.80	1.75	1.66	1.70	1.72	2.31
6. A change in productivity	1.85	1.95	2.01	1.99	2.21	1.55	1.87	1.29	1.56	1.79	1.65	1.91	1.98
7. A change in demand	2.43	2.32	2.41	2.52	2.21	1.78	2.53	1.67	2.29	3.01	2.13	2.37	3.07
8. A change in competitors' prices	2.66	2.59	2.67	2.76	2.66	1.90	2.91	3.00	2.61	2.88	2.38	2.55	3.21
9. An improvement in design, quality or the product range	--	--	--	--	--	--	--	--	--	--	--	--	--
10. The intention of gaining market share	2.20	2.03	2.15	2.12	2.24	1.99	2.44	1.56	2.30	2.27	2.14	1.98	2.62

(1) Respondents are asked to indicate the importance of each factor, the alternative scores being: (1) unimportant, (2) of minor importance, (3) important, (4) very important.

Table A16 - Price reactions after shocks (Question C2)

	Increase in demand		Increase in production costs		Decline in demand		Decline in production costs	
	Fraction of firms reacting within three months	Mean response (*)	Fraction of firms reacting within three months	Mean response (*)	Fraction of firms reacting within three months	Mean response (*)	Fraction of firms reacting within three months	Mean response (*)
Total	24.3%	4.1	28.1%	3.6	32.3%	3.7	23.2%	4.0
Economic activity								
Manufacturing of food products	36.9%	3.5	34.1%	3.4	42.0%	3.2	26.0%	3.7
Manufacturing of other consumption goods	11.3%	4.4	19.4%	3.8	18.1%	4.1	14.7%	4.2
Manufacturing of intermediate goods	24.0%	4.1	29.0%	3.5	32.6%	3.7	23.1%	4.0
Manufacturing of capital goods	16.8%	4.3	27.9%	3.6	20.5%	4.0	21.4%	4.0
Energy	9.5%	5.2	18.7%	4.0	9.5%	5.1	18.7%	4.2
Food trade	56.9%	2.8	55.7%	2.9	67.1%	2.4	48.0%	3.1
Energy trade	66.9%	2.8	83.5%	1.9	66.9%	2.8	66.9%	2.8
Other trade	26.7%	4.1	33.9%	3.4	34.2%	3.6	28.2%	3.8
Hotels and travel agents	32.9%	3.5	17.8%	3.8	49.7%	2.8	19.1%	4.0
Bars and restaurants	6.5%	4.7	21.0%	3.8	11.3%	4.3	15.0%	4.3
Transport	15.6%	4.4	17.9%	4.0	24.6%	4.1	11.2%	4.4
Communications	35.6%	3.6	36.6%	3.4	48.3%	3.0	35.7%	3.4

(*) Respondents are asked to indicate how long it takes to their company to change the price in response to a specific shock, the alternative responses being: (1) less than 1 month, (2) 1-3 months, (3) 3-6 months, (4) 6months-1year, (5) more than 1 year, (6) prices are not changed.

Table A17 - Theories of price stickiness (Question D1). Mean scores (1) by sector.
Reasons for deferring a price increase

	Total	Food	Consumer non food	Intermediate goods	Capital goods	Energy	Food trade	Energy trade	Other trade	Hotels and travel agents	Bars and restaurants	Transport	Communica-tions
Implicit contracts	2.56	2.65	2.63	2.71	2.61	1.45	2.74	3.12	2.55	2.65	2.45	2.57	2.86
Coordination failure	2.42	2.54	2.48	2.64	2.37	1.54	2.89	3.77	2.38	2.41	2.09	2.49	2.39
Explicit contracts	2.25	2.22	2.05	2.38	2.49	1.56	1.89	1.46	1.89	2.87	1.89	2.61	2.80
Temporary shocks	1.82	1.90	1.88	1.90	1.75	1.52	2.00	1.85	1.78	1.82	1.66	1.87	1.95
Pricing points	1.49	1.32	1.43	1.26	1.29	1.00	1.85	1.35	1.68	1.63	1.84	1.38	1.56
Menu costs	1.43	1.30	1.51	1.26	1.32	1.28	1.54	1.12	1.59	1.56	1.78	1.20	1.30
Change non-price factors	1.34	1.30	1.40	1.37	1.50	1.09	1.29	1.23	1.34	1.26	1.22	1.43	1.53
Information costs	1.33	1.22	1.35	1.27	1.34	1.18	1.46	1.35	1.38	1.37	1.46	1.25	1.29
Quality signal	--	--	--	--	--	--	--	--	--	--	--	--	--

(1) Respondents are asked to indicate the importance of each theory, the alternative scores being: (1) unimportant, (2) of minor importance, (3) important, (4) very important.

Table A18 - Theories of price stickiness (Question D1). Mean scores (1) by sector.
Reasons for deferring a price reduction

	Total	Food	Consumer non food	Intermediate goods	Capital goods	Energy	Food trade	Energy trade	Other trade	Hotels and travel agents	Bars and restaurants	Transport	Communica-tions
Coordination failure	2.21	2.26	2.35	2.33	2.15	1.35	2.52	3.29	2.20	2.15	1.87	2.21	2.71
Explicit contracts	2.09	1.87	1.90	2.10	2.29	1.65	1.84	1.76	1.82	2.42	1.83	2.37	2.91
Temporary shocks	1.82	1.89	1.85	1.86	1.86	1.45	1.93	1.84	1.74	1.75	1.80	1.80	2.24
Quality signal	1.82	1.86	1.86	1.61	1.81	1.12	1.84	1.58	1.86	2.09	2.29	1.64	2.02
Pricing points	1.42	1.29	1.36	1.22	1.28	1.00	1.85	1.33	1.50	1.50	1.71	1.33	1.57
Menu costs	1.39	1.28	1.47	1.22	1.33	1.35	1.54	1.11	1.48	1.48	1.72	1.22	1.35
Change non-price factors	1.34	1.33	1.34	1.34	1.54	1.12	1.40	1.22	1.29	1.22	1.17	1.40	1.72
Information costs	1.30	1.23	1.31	1.23	1.32	1.23	1.55	1.33	1.33	1.30	1.40	1.21	1.27
Implicit contracts	--	--	--	--	--	--	--	--	--	--	--	--	--

(1) Respondents are asked to indicate the importance of each theory, the alternative scores being: (1) unimportant, (2) of minor importance, (3) important, (4) very important.

Table A19. Data definitions for variables used in the section on deteminants of price stickiness

Variable	Source	Comment
Labour	Industrial, Trade and Services surveys	Labor costs as a percentage of labour and intermediate inputs costs. NACE 3 digit level
Energy	Input output tables	Energy costs as a percentage of labour and intermediate input costs. NACE 2 digit level
Competiveness	Survey	Dummy variable equal to one for firms declaring that competitors' prices are very important to explain price decreases (question C.1.8.2)
Demand conditions	Survey	Sum of questions C.1.7.1 and C.1.7.2. Importance attached by firms to demand conditions in explaining price changes.
Rule of thumb	Survey	Dummy variable equal to one for firms that apply a rule of thumb when reviewing their prices (question B.6.A)
Small sized firm	Survey	Employment of firms with less than 50 employees (question 0.D'
Regulated price	Survey	Dummy variable equal to one for firms declaring that is price is set by the government (question B.1.D)
Attractive price	Survey	Dummy variable equal to one for firms declaring that attractive pricing is important or very important to explain delays in price adjustment (question D.1.4)

APPENDIX B: QUESTIONNAIRE

Banco de España

rs

dir

mun   prov

cp   nace   est   fuente

nif   **ident**

INFORMATION PROTECTED BY STATISTICAL SECRET

SURVEY ON PRICING BY COMPANIES

A

CHANGES IN THE ADDRESS OF THE COMPANY (indicate only those items that differ with respect to those in the survey label)

1. |...| |__ __ __ __ __ __ __|
   Name   I.D. Card No

2. |...|
   Company address

3. |...|
   Other identification data

4. |__ __ __ __ | |.......................................| |.......................| |.............................|
   Zip Code   Municipality   Province   Web page

B

PERSON IN CHARGE OF ANSWERING THE QUESTIONNAIRE.

1. |..| 3. |__ __ __ __ __ __ __| 4. |__ __ __ __ __ __ __|
   First name and surname   Tel   Fax

2. |..| 5. |..|
   Position   E-mail

C	D

C — INDICATE THE MAIN ACTIVITY IN WHICH YOUR COMPANY ENGAGES

|...
....| |_____|

D — TOTAL NUMBER OF EMPLOYEES (AVERAGE FOR THE YEAR 2003)

|__ __ __ __ __|
Average number of employees

INSTRUCTIONS

This survey has been designed to learn about the key features of the pricing process at Spanish companies. Throughout the survey, the term *price* refers to the actual sale price of the **product/service**, even if it should differ from the list price.

Many of the questions in this survey refer to your main product/service. The main product/service may correspond to a group of products/services provided that these are relatively homogenous in terms of your company's pricing policy.

Should your company set prices differently according to the customer involved, please refer to the price applied to the most usual type of customer.

Should you have any doubts or require further clarification, or if you wish to send the completed survey by fax, the following channels are open:

Tel: **902.888.906**

Fax: **902.889.509**

e-mail: **precios@cuestionet.com**

To complete the survey on-line, go to the following website: **www.cuestionet.com/bde/precios**

and use the following: **User:**   **pe4966**

Password: precios

Once at the website, the data identifying your company must be introduced: Clave_Web and Seg_Web. These feature on the survey label.

A. MARKET STRUCTURE

1

WHAT IS YOUR COMPANY'S **MAIN PRODUCT/SERVICE**? WHAT PERCENTAGE OF TURNOVER DO SALES OF THIS PRODUCT/SERVICE ACCOUNT FOR?

....

....

....

....

Percentage: | __ __ __ | %

2

WHAT PERCENTAGE OF SALES OF YOUR **MAIN PRODUCT/SERVICE** IS GENERATED IN THE FOLLOWING AREAS?

		Don't have	Have	Percentage	
1.	Spain	☐ 6	☐ 1	| __ __ __ | %	— 5
2.	Euro area * (excluding Spain) .	☐ 7	☐ 2	| __ __ __ | %	
3.	Other countries	☐ 8	☐ 3	| __ __ __ | %	3

TOTAL | 1 0 0 | %

* The euro area Member States are: Belgium, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland.

3

IF YOUR COMPANY SELLS SOME PORTION OF ITS PRODUCTS/SERVICES OUTSIDE SPAIN, IT MAY SET DIFFERENT PRICES ACCORDING TO THE MARKET CONCERNED. IF SO, INDICATE WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR MAIN PRODUCT/SERVICE:

A. The price in euro is the same for all countries/markets . . . . ☐ 1 — 5

B. The price in euro on the domestic market (Spain) differs from that set for the other euro area countries . . . . ☐ 2

C. The price in euro is the same in all euro area countries, but differs from the price in other countries . . . . ☐ 3 — 4

E. The price in euro is different for each country/market . . . . ☐ 4

4

IF THE PRICE SET IN THE VARIOUS MARKETS/COUNTRIES DIFFERS, I.E. IF YOU HAVE TICKED THE SECOND, THIRD OR FOURTH BOXES, INDICATE HOW IMPORTANT THE FOLLOWING FACTORS ARE IN SETTING DIFFERENT PRICES FOR DIFFERENT MARKETS/COUNTRIES:

		Unimportant	Of minor importance	Important	Very important
1.	Exchange rate movement of the currency used for payment	☐ 11	☐ 12	☐ 13	☐ 14
2.	Tax system (e.g. VAT rate)	☐ 21	☐ 22	☐ 23	☐ 24
3.	Demand	☐ 31	☐ 32	☐ 33	☐ 34
4.	Competitors' prices	☐ 41	☐ 42	☐ 43	☐ 44
5.	Other market characteristics (e.g. consumer preferences, income levels)	☐ 51	☐ 52	☐ 53	☐ 54

5

WHAT IS YOUR **MAIN MARKET**? INDICATE THE COUNTRY AREA ACCOUNTING FOR THE HIGHEST PERCENTAGE OF SALES OF YOUR **MAIN PRODUCT/SERVICE**:

A. Local . . . . ☐ 61

B. Regional . . . . ☐ 62

C. National . . . . ☐ 63

D. International . . . . ☐ 64

6

REGARDING SALES OF YOUR **MAIN PRODUCT/SERVICE** IN YOUR **MAIN MARKET**, WHAT IS YOUR MARKET SHARE (YOUR COMPANY'S SALES AS A PROPORTION OF TOTAL SALES OF THAT PRODUCT/SERVICE IN THAT MARKET)?

A. Not significant . . . . ☐ 71

B. Less than 5% . . . . ☐ 72

C. 5 - 25% . . . . ☐ 73

D. 25 - 50% . . . . ☐ 74

E. Over 50% . . . . ☐ 75

7

HOW MANY COMPETITORS ARE THERE IN YOUR **MAIN MARKET** FOR YOUR **MAIN PRODUCT/SERVICE**?

A. None . . . . ☐ 81

B. Fewer than 5 . . . . . ☐ 82

C. 5 - 20 . . . . ☐ 83

D. More than 20 . . . . . ☐ 84

8

WHAT IS THE PERCENTAGE OF SALES TO:

		Don't have	Have	Percentage
1.	Group companies:			
1.1	Wholesalers	☐ 6	☐ 1	| __ __ __ | %
1.2	Retailers	☐ 7	☐ 2	| __ __ __ | %
1.3	Other	☐ 8	☐ 3	| __ __ __ | %
2.	Companies outside the group:			
2.1	Wholesalers	☐ 9	☐ 4	| __ __ __ | %
2.2	Retailers	☐ 6	☐ 1	| __ __ __ | %
2.3	Other	☐ 7	☐ 2	| __ __ __ | %
3.	General government agencies	☐ 8	☐ 3	| __ __ __ | %
4.	Consumers	☐ 9	☐ 4	| __ __ __ | %

TOTAL | 1 0 0 | %

9

REGARDING SALES OF YOUR **MAIN PRODUCT/SERVICE** ON YOUR **MAIN MARKET**, ARE MOST OF YOUR CUSTOMERS OCCASIONAL OR REGULAR? REGULAR CUSTOMERS ARE UNDERSTOOD TO BE THOSE WITH WHOM THERE IS A STABLE COMMERCIAL RELATIONSHIP.

A. Occasional

☐ 6

B. Regular

☐ 1

10

INDICATE WHETHER YOUR COMPANY:

	No	Yes
1. Undertakes regular promotional activities	☐ 7	☐ 2
2. Pursues a habitual customer-discount policy	☐ 8	☐ 3

B. PRICING AT YOUR COMPANY

① THE PRICE OF YOUR **MAIN PRODUCT/SERVICE** IS SET BY:

A. Your own company . . . . ☐ 11 ──②

B. The parent company, without involvement of the company itself . . . . ☐ 12

C. The main customers, without involvement of the company itself . . . . . . ☐ 13 ──④

D. Certain general government sectors, without involvement of the company itself . . . . ☐ 14

E. Other (please specify) . . . . ☐ 15

| . . . . |

② TO WHAT EXTENT ARE THE FOLLOWING PRICING METHODS APPLIED IN YOUR COMPANY?

	Unimportant	Of minor importance	Important	Very important
1. Pricing is on the basis of costs	☐ 21	☐ 22	☐ 23	☐ 24
2. Pricing depends on the prices of our main competitors	☐ 31	☐ 32	☐ 33	☐ 34

③ THE PRICE OF YOUR **MAIN PRODUCT/SERVICE**:

A. Is the same for all your customers . . . . ☐ 41

B. Differs depending on the amount sold . . . . ☐ 42

C. Is decided on a case-by-case basis . . . . ☐ 43

D. Differs depending on other criteria (please specify) . . . . ☐ 44

| . . . . |

④ HOW OFTEN DO YOU RECALCULATE (THIS DOES NOT NECESSARILY MEAN CHANGE) THE PRICE OF YOUR **MAIN PRODUCT/SERVICE**?

A. Periodically (at specific time intervals) . . . . ☐ 51 ──⑤

B. Mainly at specific time intervals, but also in response to specific events (e.g. a considerable change in costs) . . . . ☐ 52

C. Essentially in response to specific events (e.g. a considerable change in costs) . . . . ☐ 53 ──⑥

D. Other (please specify) . . . . ☐ 54

| . . . . |

⑤ IF YOUR COMPANY RECALCULATES ITS PRICES AT SPECIFIC INTERVALS, HOW OFTEN DOES THIS OCCUR?

A. More than once a year . . . . ☐ 61

A.1 If so, how many times a year? |__ __|

B. Once a year . . . . ☐ 62

B.1 If so, in which month? . . . . . . |__ __|

C. Less than once a year . . . . ☐ 63

C.1 If so, once in how many years? |__ __|

⑥ HOW DID YOU RECALCULATE THE PRICE OF YOUR **MAIN PRODUCT/SERVICE** ON THE LAST OCCASION?

A. Applying a rule of thumb (e.g. a fixed amount/percentage change, a CPI indexation rule ☐ 71

B. Using a wide range of indicators (demand, costs, competitors' prices) relevant for profit maximisation

B.1 These indicators relate to the company's current operating environment . . . . ☐ 72

B.2 These indicators relate both to the current and expected future environment . . . . ☐ 73

⑦ HOW OFTEN DO YOU CHANGE THE PRICE OF YOUR **MAIN PRODUCT/SERVICE**?

A. More than once a year . . . . ☐ 81

A.1 If so, how many times a year? |__ __|

B. Once a year . . . . ☐ 82

B.1 If so, in which month? . . . . . . |__ __|

C. Less than once a year ☐ 83

C.1 If so, once in how many years? |__ __|

⑧ OVER 2003 AS A WHOLE, WAS THERE ANY CHANGE (IN PERCENTAGE TERMS) IN THE PRICE OF YOUR **MAIN PRODUCT/SERVICE**?

A. No   B. Yes

☐ 7 ──⑨   ☐ 2

|__ __| %

If any, by how much?

⑨ DO YOU RECALL A SIGNIFICANT RECENT CHANGE IN THE INDIRECT TAXATION (VAT/EXCISE DUTIES) ON YOUR **MAIN PRODUCT/SERVICE**? IF YES, TO WHAT EXTENT WAS IT PASSED ON?

A. No   B. Yes

☐ 8 ──C1   ☐ 3

A. In full . . . . ☐ 11

B. Partly . . . . ☐ 12

C. It was not passed on . . . . ☐ 13

C. DETERMINANTS OF PRICE CHANGES

1

INDICATE THE SIGNIFICANCE OF THE FACTORS THAT MAY CAUSE YOU TO RAISE/LOWER THE PRICE OF YOUR COMPANY'S **MAIN PRODUCT/SERVICE**? GIVE A VALUE OF **1** (UNIMPORTANT) TO **4** (VERY IMPORTANT) FOR THE FOLLOWING FACTORS:

	Factors causing a:	
	Price increase	Price reduction
1. A change in labour costs	|___|	|___|
2. A change in financial costs	|___|	|___|
3. A change in the cost of raw materials	|___|	|___|
4. A change in energy and fuel prices	|___|	|___|
5. A change in other production costs	|___|	|___|
6. A change in productivity	|___|	|___|
7. A change in demand	|___|	|___|
8. A change in competitors' prices	|___|	|___|
9. An improvement in design, quality or the product range	|___|	
10. The intention of gaining market share		|___|
11. Other factors (please specify)	|___|	|___|

\| . . . . \|

2

INDICATE HOW LONG IT TAKES YOUR COMPANY TO MAKE PRICE CHANGES AS A RESULT OF CHANGES IN PRODUCTION COSTS AND/OR CHANGES IN DEMAND

	Less than 1 month	1 - 3 months	3 - 6 months	6 months - 1 year	Over 1 year	Prices are not changed
1. Significant increase in demand	☐ 41	☐ 42	☐ 43	☐ 44	☐ 45	☐ 46
2. Significant increase in production costs	☐ 51	☐ 52	☐ 53	☐ 54	☐ 55	☐ 56
3. Significant decline in demand	☐ 61	☐ 62	☐ 63	☐ 64	☐ 65	☐ 66
4. Significant decline in production costs	☐ 71	☐ 72	☐ 73	☐ 74	☐ 75	☐ 76

D. FACTORS HAMPERING PRICE ADJUSTMENTS

1

INDICATE WHICH FACTORS MAY LEAD TO A DELAY IN THE ADJUSTMENT OF THE PRICE OF YOUR **MAIN PRODUCT/SERVICE**? GIVE A VALUE OF **1** (UNIMPORTANT) TO **4** (VERY IMPORTANT) FOR EACH OF THE FOLLOWING FACTORS:

	Reasons for deferring an **increase** in the price	Reasons for deferring a **reduction** in the price
1 Competitors might not adjust their price	|___|	|___|
2. In the near future, it might be necessary to readjust the price in the opposite direction	|___|	|___|
3. The existence of some type of contract that sets the price	|___|	|___|
4. The price is set in commercially attractive terms (e.g. 10 euro or 4.99 euro) and is only changed when it is advisable to move to a new attractive threshold	|___|	|___|
5. The existence of costs arising from changing prices (new catalogues, menu costs, changing price tags)	|___|	|___|
6. The costs of collecting and processing the information associated with the decision to change prices	|___|	|___|
7. The possibility of using some alternative measure to a change in price (change in delivery periods)	|___|	|___|
8. The possibility of losing customers (even if competitors also raise their prices)	|___|	|___|
9. The possibility that customers will interpret a reduction in price as a reduction in quality	|___|	
10. Other (please specify)		|___|
	|___|	|___|

\| . . . . \|

Appendix C. Robustness of results

This Appendix C presents a robustness analysis of results on the determinants of the frequency of price changes and the determinants of the speed of adjustment, which were reported in section 7 of the paper. In section C.1.1 we present a methodological review. Specifically, we briefly review two popular count data models, namely the Poisson and negative binomial regression models and then two relative frequency models: the widely used log odds ratio model and the quasi maximum likelihood Papke and Wooldridge procedure (1996). We further report our estimates in section C.1.2 and section C.2.

C.1 Frequency of price change

C.1.1 METHODOLOGICAL REVIEW

The *Poisson regression* model is the benchmark model of count data. It assumes that the probability that a variable, such as the absolute frequency of price change (*afreq*) equals h conditional on a set of explanatory variables (x) is given by

$$\Pr(afreq = h \mid x) = \frac{\exp[-\exp(x\beta)][\exp(x\beta)^h]}{h!}$$

where h! denotes factorial. Although the model implies that probabilities are entirely determined by the mean and in particular that the variance is equal to the mean it has a very nice robustness property: whether or not the Poisson distribution holds, it still provides consistent and asymptotically normal estimators of β .

A popular alternative to the Poisson regression is the *negative binomial regression* model, which has the ability to capture extra-Poisson variation by means of an extra parameter α

$$\Pr(afreq = h \mid x) = \frac{\lambda^h}{h!} \frac{\alpha^\alpha}{(\alpha + \lambda)^{\alpha+h}} \frac{\Gamma(\alpha + h)}{\Gamma(\alpha)}$$

where $\Gamma(x)$ is the gamma function. Indeed, the distribution converges to the Poisson for constant λ and $\alpha \to \infty$. Small values of α drag the mode of the binomial negative distribution towards zero and increase its variance, compared to the Poisson.

As an alternative to modelling the absolute frequency we can also model the relative frequency (*freq*) defined as the number of changes per day. Given that proportions are by nature bounded between 0 and 1 and linear predictors can take any real value, linear models are inappropriate. The most common solution is to model the *log-odds ratio* $\log\left(\frac{freq}{1 - freq}\right)$ as a linear function of explanatory variables and estimate an equation such as:

$$\log\left(\frac{freq}{1-freq}\right) = \alpha + \sum \beta_i x_i + \varepsilon$$

Another possibility is the quasi-maximum likelihood (QML) approach of *Papke and Woolridge* (1996). These authors suggest the direct estimation of a non linear model. Specifically, their method involves expressing the observed frequency as a bounded non-linear function of the explanatory variables and maximizing a Bernoulli likelihood function. The corresponding estimator is consistent and asymptotically normal. We have the followed the QML approach using a logistic cumulative distribution function and assuming freq to follow a Bernoulli distribution, i.e estimating

$$freq = \frac{e^{\alpha + \sum \beta_i x_i}}{1 + e^{\alpha + \sum \beta_i x_i}} \qquad freq \sim \text{Bernoulli}$$

C.1.2 RESULTS

Table C1 reports the estimates of the four estimators presented above[33]. As can be seen, all variables are significant regardless of the estimation method used. Even the attractive price variable, which was not significant in the log linear model, is significantly negative in all specifications.

C.2 Determinants of the speed of adjustment

In this section, the dependent variable in the probit model takes a value of 1 if the firm declares that it changes its price in reaction to a shock within 6 months, instead of within 3 months as in the main text. As can be seen in tables C2 and C3, most results are robust. The main discrepancies are the following. In the case of a fall in demand, the labour and size of the firm variables cease to be significant. In the case of cost increases rule of thumb, size and attractive prices are now significant and in the case of cost decreases energy, competition, size of firm and attractive prices are now significant.

---

33. Some firms do not change their prices every year. To estimate count data model we consider that the number of changes is zero. There are also a few firms in the sample with a daily frequency of change equal to 1. To apply the log odds ratio method we have replace their relative frequency with the second highest in the sample (0.98).

Table C1. Determinants of the frequency of price changes. Alternative models (1)

	Poisson	Negative Binomial	Log odds ratio	Papke-Wooldridge
Labour	-1.11***	-1.07***	-0.64***	-1.13*
Energy	0.03***	0.07***	0.04***	0.04**
Competition	0.41***	0.28***	0.14**	0.45**
Demand conditions	0.19***	0.16***	0.09***	0.21***
Rule of thumb	-0.55***	-0.37***	-0.16***	-0.60***
Small sized firm	-0.02***	-0.02***	-0.01***	-0.02***
Regulated price	-2.66***	-0.73***	-0.54***	-3.06***
Attractive price	-0.16***	-0.11***	-0.04***	-0.18***
Food	0.49***	0.43***	0.16	0.50**
Consumer non food	-0.89***	-0.75***	-0.28***	-0.85***
Intermediate	-0.49***	-0.52***	-0.38***	-0.53*
Capital goods	-0.15***	-0.15	-0.19**	-0.14
Energy	1.58***	-0.97**	-0.44*	1.54**
Food trade	1.84***	1.94***	1.52***	1.93***
Energy trade	2.62***	2.73***	3.15***	2.79***
Hotels and travel agents	0.56***	0.39**	0.23*	0.52
Bars and restaurants	-0.75***	-0.68***	-0.25***	-0.68***
Transport	-0.85***	-0.98***	-0.41***	-0.87***
Communications	-0.84***	-0.52**	-0.22	-0.84***
Constant	1.09***	0.93***	-5.62***	-4.90***
Number of observations	1869	1869	1869	1869
Log likelihood	-1.30E+04	-4098	-2853.18	-105.13
AIC	26985.04	8238.01	5746.36	250.26
BIC	27095.7	8354.2	5857.02	360.92

*/**/*** denote coefficient significant at the 10%/5%/1% level.
(1) See Appendix B for a description of the alternative models.

Table C2 - Determinants of the speed of adjustment after demand shocks. Probit estimates (1)

	Increase in demand				Fall in demand			
	Coefficient	p value	Marginal effect (2)	p value	Coefficient	p value	Marginal effect (2)	p value
Labour	-0.91	0.01	-0.29	0.01	-0.43	0.17	-0.16	0.17
Energy	0.02	0.03	0.01	0.03	0.04	0.00	0.02	0.00
Competition	0.03	0.67	0.01	0.67	0.20	0.01	0.08	0.01
Demand conditions	0.18	0.00	0.06	0.00	0.19	0.00	0.07	0.00
Rule of thumb	-0.23	0.00	-0.07	0.00	-0.25	0.00	-0.09	0.00
Small sized firm	-0.01	0.02	0.00	0.02	0.00	0.11	0.00	0.11
Regulated price	-0.79	0.00	-0.19	0.00	-1.13	0.00	-0.31	0.00
Attractive price	0.02	0.33	0.01	0.33	0.05	0.02	0.02	0.02
Food	0.43	0.00	0.15	0.01	0.27	0.06	0.11	0.06
Consumer non food	-0.02	0.90	-0.01	0.90	-0.29	0.04	-0.10	0.03
Intermediate	0.03	0.84	0.01	0.84	0.00	0.99	0.00	0.99
Capital goods	0.00	0.99	0.00	0.99	-0.09	0.51	-0.03	0.51
Energy	-1.16	0.00	-0.23	0.00	-2.46	0.00	-0.39	0.00
Food trade	0.79	0.00	0.29	0.00	0.66	0.00	0.26	0.00
Energy trade	0.73	0.04	0.27	0.05	0.39	0.28	0.15	0.28
Hotels and travel agents	0.49	0.02	0.17	0.03	0.49	0.01	0.19	0.01
Bars and restaurants	-0.31	0.10	-0.09	0.07	-0.33	0.05	-0.12	0.03
Transport	0.05	0.78	0.01	0.78	-0.35	0.03	-0.12	0.02
Communications	0.21	0.37	0.07	0.39	0.09	0.68	0.03	0.69
Constant	-1.29	0.00			-1.19	0.00		
Number of observations		1861				1862		
Log likelihood		-941.61				-1017.27		
AIC		1923.23				2074.54		
BIC		2033.81				2185.13		

(1) The dependent variable in the probit model takes a value of 1 if the firm declares that it changes its price in reaction to a shock within 6 months.
(2) Marginal effects computed at sample averages

Table C3 - Determinants of the speed of adjustment after costs shocks. Probit estimates (1)

	Increase in costs				Fall in costs			
	Coefficient	p value	Marginal effect (2)	p value	Coefficient	p value	Marginal effect (2)	p value
Labour	-1.06	0.00	-0.38	0.00	-1.08	0.00	-0.36	0.00
Energy	0.01	0.28	0.00	0.28	0.02	0.09	0.01	0.09
Competition	-0.09	0.25	-0.03	0.24	-0.15	0.05	-0.05	0.05
Demand conditions	0.07	0.00	0.03	0.00	0.10	0.00	0.03	0.00
Rule of thumb	-0.14	0.04	-0.05	0.04	-0.06	0.35	-0.02	0.35
Small sized firm	-0.01	0.06	0.00	0.06	-0.01	0.06	0.00	0.06
Regulated price	-1.11	0.00	-0.28	0.00	-1.13	0.00	-0.25	0.00
Attractive price	0.07	0.00	0.03	0.00	0.09	0.00	0.03	0.00
Food	0.10	0.45	0.04	0.46	0.20	0.16	0.07	0.18
Consumer non food	-0.03	0.83	-0.01	0.83	-0.07	0.65	-0.02	0.65
Intermediate	0.07	0.55	0.03	0.56	0.05	0.71	0.02	0.71
Capital goods	0.21	0.11	0.08	0.12	0.24	0.09	0.08	0.10
Energy	-0.38	0.35	-0.12	0.29	-0.41	0.33	-0.12	0.25
Food trade	0.40	0.01	0.15	0.01	0.52	0.00	0.19	0.00
Energy trade	0.26	0.48	0.10	0.49	0.51	0.15	0.19	0.17
Hotels and travel agents	0.01	0.95	0.00	0.95	0.28	0.16	0.10	0.18
Bars and restaurants	-0.09	0.58	-0.03	0.57	-0.07	0.68	-0.02	0.67
Transport	-0.10	0.53	-0.03	0.52	-0.14	0.38	-0.04	0.37
Communications	0.15	0.50	0.05	0.51	0.22	0.33	0.08	0.35
Constant	-0.57	0.00			-0.95	0.00		
Number of observations	1862				1862			
Log likelihood	-1113.31				-1036.22			
AIC	2266.61				2112.45			
BIC	2377.2				2223.03			

(1) The dependent variable in the probit model takes a value of 1 if the firm declares that it changes its price in reaction to a shock within 6 months.
(2) Marginal effects computed at sample averages

BANCO DE ESPAÑA PUBLICATIONS

WORKING PAPERS[1]

0501 ÓSCAR J. ARCE: The fiscal theory of the price level: a narrow theory for non-fiat money.

0502 ROBERT-PAUL BERBEN, ALBERTO LOCARNO, JULIAN MORGAN AND JAVIER VALLÉS: Cross-country differences in monetary policy transmission.

0503 ÁNGEL ESTRADA AND J. DAVID LÓPEZ-SALIDO: Sectoral mark-up dynamics in Spain.

0504 FRANCISCO ALONSO, ROBERTO BLANCO AND GONZALO RUBIO: Testing the forecasting performance of Ibex 35 option-implied risk-neutral densities.

0505 ALICIA GARCÍA-HERRERO AND ÁLVARO ORTIZ: The role of global risk aversion in explaining Latin American sovereign spreads.

0506 ALFREDO MARTÍN, JESÚS SAURINA AND VICENTE SALAS: Interest rate dispersion in deposit and loan markets.

0507 MÁXIMO CAMACHO AND GABRIEL PÉREZ-QUIRÓS: Jump-and-rest effect of U.S. business cycles.

0508 LUIS J. ÁLVAREZ, PABLO BURRIEL AND IGNACIO HERNANDO: Do decreasing hazard functions for price changes make any sense?

0509 ÁNGEL DE LA FUENTE AND JUAN F. JIMENO: The private and fiscal returns to schooling and the effect of public policies on private incentives to invest in education: a general framework and some results for the EU.

0510 JUAN J. DOLADO, MARCEL JANSEN AND JUAN F. JIMENO: Dual employment protection legislation: a framework for analysis.

0511 ANA DEL RÍO AND GARRY YOUNG: The determinants of unsecured borrowing: evidence from the British household panel survey.

0512 ANA DEL RÍO AND GARRY YOUNG: The impact of unsecured debt on financial distress among British households.

0513 ADELA LUQUE: Skill mix and technology in Spain: evidence from firm-level data.

0514 J. DAVID LÓPEZ-SALIDO, FERNANDO RESTOY AND JAVIER VALLÉS: Inflation differentials in EMU: The Spanish case.

0515 ISAAC ALFON, ISABEL ARGIMÓN AND PATRICIA BASCUÑANA-AMBRÓS: How individual capital requirements affect capital ratios in UK banks and building societies.

0516 JOSÉ MANUEL CAMPA AND IGNACIO HERNANDO: M&As performance in the European financial industry.

0517 ALICIA GARCÍA-HERRERO AND DANIEL SANTABÁRBARA: Does China have an impact on foreign direct investment to Latin America?

0518 MAXIMO CAMACHO, GABRIEL PEREZ-QUIROS AND LORENA SAIZ: Do European business cycles look like one?

0519 DANIEL PÉREZ, VICENTE SALAS-FUMÁS AND JESÚS SAURINA: Banking integration in Europe.

0520 JORDI GALÍ, MARK GERTLER AND J. DAVID LÓPEZ-SALIDO: Robustness of the estimates of the hybrid New Keynesian Phillips curve.

0521 JAVIER ANDRÉS, J. DAVID LÓPEZ-SALIDO AND EDWARD NELSON: Sticky-price models and the natural rate hypothesis.

0522 OLYMPIA BOVER: Wealth effects on consumption: microeconometric estimates from the Spanish survey of household finances.

0523 ENRIQUE ALBEROLA, LUIS MOLINA AND DANIEL NAVIA: Say you fix, enjoy and relax: the deleterious effect of peg announcements on fiscal discipline.

0524 AGUSTÍN MARAVALL: An application of the TRAMO SEATS automatic procedure; direct versus indirect adjustment.

0525 ALICIA GARCÍA-HERRERO AND MARÍA SOLEDAD MARTÍNEZ-PERÍA: The mix of international banks' foreign claims: determinants and implications for financial stability.

0526 J. IGNACIO GARCÍA-PÉREZ AND JUAN F. JIMENO: Public sector wage gaps in Spanish regions.

0527 LUIS J. ÁLVAREZ, PABLO BURRIEL AND IGNACIO HERNANDO: Price setting behaviour in Spain: evidence from micro PPI data.

---

1. Previously published Working Papers are listed in the Banco de España publications calalogue.

0528 EMMANUEL DHYNE, LUIS J. ÁLVAREZ, HERVÉ LE BIHAN, GIOVANNI VERONESE, DANIEL DIAS, JOHANNES HOFFMANN, NICOLE JONKER, PATRICK LÜNNEMANN, FABIO RUMLER AND JOUKO VILMUNEN: Price setting in the euro area: some stylized facts from individual consumer price data.

0529 TERESA SASTRE AND JOSÉ LUIS FERNÁNDEZ-SÁNCHEZ: Un modelo empírico de las decisiones de gasto de las familias españolas.

0530 ALFREDO MARTÍN-OLIVER, VICENTE SALAS-FUMÁS AND JESÚS SAURINA: A test of the law of one price in retail banking.

0531 GABRIEL JIMÉNEZ AND JESÚS SAURINA: Credit cycles, credit risk, and prudential regulation.

0532 BEATRIZ DE-BLAS-PÉREZ: Exchange rate dynamics in economies with portfolio rigidities.

0533 ÓSCAR J. ARCE: Reflections on fiscalist divergent price-paths.

0534 M.ª DE LOS LLANOS MATEA AND MIGUEL PÉREZ: Diferencias en la evolución de los precios de los alimentos frescos por tipo de establecimiento.

0535 JOSÉ MANUEL MARQUÉS, FERNANDO NIETO AND ANA DEL RÍO: Una aproximación a los determinantes de la financiación de las sociedades no financieras en España.

0536 S. FABIANI, M. DRUANT, I. HERNANDO, C. KWAPIL, B. LANDAU, C. LOUPIAS, F. MARTINS, T. MATHÄ, R. SABBATINI, H. STAHL AND A. STOKMAN: The pricing behaviour of firms in the euro area: new survey evidence.

0537 LUIS J. ÁLVAREZ AND I. HERNANDO: The price setting behaviour of Spanish firms: evidence from survey data.