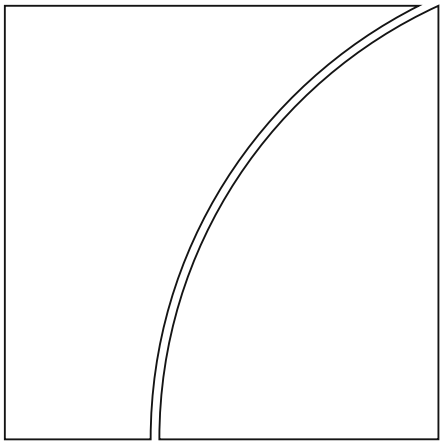


BANK FOR INTERNATIONAL SETTLEMENTS

BIS Working Papers

No 605

Wage and price setting: new evidence from Uruguayan firms

by Fernando Borraz, Gerardo Licandro and Daniela Sola

Monetary and Economic Department

January 2017

A paper produced for the BIS Consultative Council for the Americas 7th Research Conference "Inflation dynamics: the role of labour markets, productivity and globalization", 19-20 May 2016, hosted by the Central Reserve Bank of Peru.

JEL classification: E31, D40, J30, L16

Keywords: price setting, labor market, survey evidence, Uruguay

BIS Working Papers are written by members of the Monetary and Economic Department of the Bank for International Settlements, and from time to time by other economists, and are published by the Bank. The papers are on subjects of topical interest and are technical in character. The views expressed in them are those of their authors and not necessarily the views of the BIS.

This publication is available on the BIS website (www.bis.org).

ISSN 1020-0959 (print)
ISSN 1682-7678 (online)

Wage and Price Setting: New Evidence from Uruguayan Firms*

Fernando Borraz, Gerardo Licandro*** and Daniela Sola******

Abstract

This paper presents new evidence on wage and price setting based on a survey of more than 300 Uruguayan firms in 2013. Most of the firms set prices considering costs and adding a profit margin; therefore, they have some degree of market power. The evidence indicates that price increases appear quite flexible in Uruguay (prices are downward rigid). Most of the firms adjust their prices without following a regular frequency which suggests that price changes in Uruguay are state-dependent, although wage changes are concentrated in January and July. Interestingly, the cost of credit is seen by companies as an irrelevant factor in explaining price increases. We also find that cost reduction is the principal strategy to a negative demand shock. Finally, the adjustment of prices to changes in wages is relatively fast.

Keywords: price setting, labor market, survey evidence, Uruguay

JEL Classification: E31, D40, J30, L16

---

* *The opinions expressed in this document are the sole responsibility of the authors and do not compromise nor represent the position of the Banco Central del Uruguay. We are grateful to Charles Engel, Anna Orlik, Santiago García Couto, Leandro Zipitría, seminar participants at the Seventh BIS CCA Research Conference, Universidad ORT, Banco Central del Uruguay, dECON and the 2013 Annual Meeting of the Central Bank Researchers Network in Mexico City for their very constructive comments and suggestions. All errors are ours.*

** Corresponding author. Banco Central del Uruguay. Diagonal Fabini 777. Montevideo-Uruguay, CP:11100. Email: fborraz@bcu.gub.uy.

*** Banco Central del Uruguay.

**** Universidad de Montevideo.

1. Introduction

In recent years there has been a large increase in the empirical literature on price behavior. Following the work of Calvo (1983), Taylor (1980), Fuerer and Moore (1995), among others, understanding the microstructure of price setting allows us to better understand the way to fight price rigidity and conduct a more efficient monetary and macroeconomic policy. As new and detailed data sets become available, we observe a number of important studies on the microeconomic fundamentals of price setting by firms - mainly retailers - and their impact on inflation. This analysis allows a better understanding of the behavior, dispersion, and volatility of prices.

However, there are few studies that analyze price setting from surveys that directly ask companies regarding price formation, and most of the literature is concentrated in developed countries. In Uruguay in particular, despite recent progress for the retail sector (Borraz and Zipitría (2012)) and in wage formation (Fernández et. al. (2008)), there is no direct evidence on company's price formation strategies. In this study we use a novel data set of a survey of 307 large Uruguayan firms on price setting.

The purpose of this study is to present stylized facts about price setting in Uruguay based on a survey of firms. This new evidence must be viewed as a complement to the new literature on the topic in Latin America. However, the principal objective of this study is to raise a number of unknown questions about price formation for future research. Therefore, the objective is to generate questions as well as answers that would be useful for monetary policy design and to set the future agenda on the microeconomics of price setting. This study can be viewed as a first step to generate a new approach to analyze monetary policy options in a small open economy.

Our findings are as follows: i) prices in Uruguay seem to be more rigid than in previous studies, ii) the frequency of price change is state dependent, iii) the response of prices to wages is fast, iv) firms do not have a clear view on how to respond to unanticipated demand shocks; (more research is needed to understand better the response of firms to unanticipated demand shocks), v) firms seem to pay more attention to wages than their weight on the cost structure would justify, a puzzling behavior that might be related to the way wage negotiations are conducted, vi) there is a high degree of inertia in the manufacturing industry sector .

The rest of the paper proceeds as follows: Section 2 presents a brief review of related literature, section 3 makes a brief description of the data, section 4 presents the basic results of the survey and section 5 concludes.

2. Related Literature

As mentioned above, the price setting literature based on company surveys is scarce and most of it is concentrated on developed countries. Using surveys to analyze price-setting behavior of firms was initiated by Blinder (1991, 1994) in the US. In his pioneer work Blinder interviewed two hundred firms directly regarding their price setting behavior to analyze the validity of theories of sticky prices. He found that prices are sticky with an average duration of three months following a shocks. The only theory that was supported by firms' responses was coordination failure.

In the case of Germany, Stahl (2005) finds that most of the manufacturing firms have market power to set producer prices. Additionally, indexation is minor. Babecký, Dybczak and Galuščák (2008) finds that in the Czech Republic firms' prices are less rigid than wages with a weak pass through of wages to prices. They also find that in response to an unanticipated demand shock, firms reduce temporary employment and non-labor costs.

For fifteen European countries, Druant et. al. (2009) find a close relationship between wages and prices and between wages and the frequency of price changes.

In the case of Canada, Amirault, Kwan and Wilkinson (2006), firms show a wide variation in the frequency with which they adjust prices. Almost 33% of Canadian firms declare price adjustments once a year or less while a similar portion adjust prices more than twelve times per year. Similar studies for Swedish firms (Apel, Firberg and Hallsten (2001)) and Portuguese firms (Martins (2006)) show that firms adjust their prices only once a year. Canadian firms consider wage cost as a very important factor to increase prices.

Greenslade and Miles Parker (2012) analyzed the case of the United Kingdom asking companies directly how their prices behave. As with the studies mentioned before, the median number of price changes was once per year. UK firms were asked how prices were determined for their main product and the explanations that most of the firms considered most important were competitors prices (68% of firms) and mark-up over costs (58% of firms).

Another interesting result was that, in particular, labor costs and raw materials were the most important cause of price rises, whilst lower demand and competitors' prices were the main factors resulting in price reductions.

The study made by Apel, Friberg and Hallsten for Swedish firms also finds that the median firm adjusts the price once a year. Another finding is that state-dependent and time-dependent price setting are equally important. For Portuguese firms (Martins (2006)) it was found that more than 30 % of total price changes are price decreases. Another important finding is that the degree of price stickiness seems to be higher in the service sector than in manufacturing.

In Latin America there are two studies based on firms' responses. The first one is Irregui et. al. (2011) analyze the link between wages and prices in Colombia using a survey of firms. They find that firms adjust their wages principally in the first quarter. They also find a stronger pass through of wages to prices in labor intense sectors or sectors with high labor productivity. The empirical evidence also suggests time-dependent price changes are less common than time-dependent wage adjustments in Colombia.

Based on a survey of 7,002 Brazilian firms, Da Silva, Petrassi and Santos (2016) find that prices are sticky, the cost of reviewing prices, state-dependent price setting and markup pricing.

3. Data

Our study is based on a survey that was conducted by the National Statistical Office of Uruguay (*Instituto Nacional de Estadística*, INE) in agreement with the Central Bank of Uruguay (*Banco Central del Uruguay*, BCU) in February 2013 on the basis of a sample covering all economic sectors with the exception of the public sector.
The firms were selected using stratified random sampling. The stratification was made according to the number of employees (from 50 to 99; 100 to 199; 200 or more) and the economic sector of the firm. Therefore, only firms with 50 or more employees are in the sample. The survey was sent to 630 firms by traditional mail. A reminder was sent to those firms that had not responded. At the end, 363 valid questionnaires were received (a response rate of 58%). If a firm did not respond, it was not substituted in order to avoid skewing of results. Instead the weights were reestablished.

In order to have more information about the firms we merge this survey with the yearly Economic Activity Survey, EAS (*Encuesta de Actividad Económica*) conducted by INE. The EAS contains information about sales, investments, and labor force and cost structure for Uruguayan firms. The survey is conducted among all private and state-owned firms which operate in Uruguay with 5 or more employees. As a result of the merger of the two samples we end up with a sample of 307 firms. Figure 1 shows the distribution of firms by sector of activity.

4. Empirical Results

This section presents the main results of the analysis of the survey on price setting practices in Uruguayan firms. We present the data without the weights both because of a very uneven non-response rate among sectors and because their use does not change the results.

4.1 Price setting behavior

4.1.1 Market microstructure and price setting.

We asked firms what their strategy was for setting prices. Figure 2a shows that the majority of firms, regardless of sector, set their price with a mark-up over costs, which would indicate the prevalence of imperfect competition. This is a result that is usually found in the literature (Da Siva, Pretrassi and Santos (2016), Irregui et. al. (2011) and Stahl (2005)). Also, the only economic sector that does not set their price with a profit margin is the transport sector, which has their prices regulated by the Government (Figure 2b). The price setting based on cost and a mark-up is highest in the trade and other business sectors. As expected, manufacturing is the sector with the highest exposure to international competition.

In Figure 2c we analyze price setting within manufacturing. Cost and mark up price setting is predominant in heavy industry. This sector also has the lowest exposure to international competition. This result reflects the high participation of heavily protected industries. Other manufacturing sub sectors tend to find the international price more important as a reference for price setting, probably as a result of lower redundant protection. If we consider domestic and international competition, the sub sectors that show a higher exposure to it are food and wood, both basic export commodities in the case of Uruguay (60% and 67% of firms respond to competition). Since the main export of goods from Uruguay are those produced by the food sector, the lower response to competition the sector

shows compared to wood, which is puzzling in principle and deserves further research, might be related to market segmentation in some strategically important food components.[1] Overall, the high percentage of firms that follow non competitive practices might be related to the trade protection structure.

4.1.2. Frequency of price adjustment

Analyzing the frequency of price changes, Figure 3 indicates that 40% of firms do not have a regular frequency and in 30% the adjustments are semiannual. This result, based on a survey of producer and consumer firms, suggests that prices are more rigid than in the findings of Borraz and Zipitría (2012). They find that the median duration of prices in food, beverages and personal products in the retail sector is approximately two and a half months. The large proportion of firms claiming not to have a regular frequency of price adjustment might indicate that price adjustment opportunities arise in a random way, as in Calvo (1983). This result comes in stark contrast to the relatively large importance given to wages in the price formation process, particularly when wages, since Uruguay returned to centralized wage negotiations, are adjusted mostly twice a year in January and July. It would be important to compare the wage adjustment in the sectors and the claimed frequency of price setting. As mention before, Swedish (Mikael Apel et. al. - 2001), Spanish (Luis J. Álvarez et. al. - 2004), United Kingdom (Miles Parker et. al 2012) and Portuguese (Fernando Martins -2006) firms adjust their prices only once a year which shows a difference in the frequency with which Uruguayan firms adjust their prices.

Our results suggest more frequent price adjustment than in Blinder's survey (1994) in the US. However, at the time of the survey, inflation was 8.9% annually in Uruguay, but at the time of Blinder's paper was 3% annually in the US. Because the pressure to change prices is lower in a low inflation environment, the difference in the inflation levels between US and Uruguay can explain the discrepancy in the results.

Table 1 analyzes the correlation between the frequency of price change and employment (in thousands) and sector of activity. The dependent variable is a discrete one with values from 1 (weekly prices changes) to 7 (no regular pattern). Surprisingly, the results show a negative correlation between price rigidity and employment. However, this correlation becomes

[1] The Uruguayan government has special regimes for some food commodities that have an important share of the consumption basket of the population.

positive at the employment level of four thousand. Additionally, once we control for employment, we do not find a significant correlation between the frequency of price changes and the sector of activity. This evidence seems to suggest that the frequency of price change in Uruguay is state dependent. This is consistent with Borraz and Zipitría (2012) who find that the empirical evidence seems to point to state-dependent models as the main explanation for the inflation phenomenon in Uruguay

Firms stated conduct in terms of seasonality of price adjustment is barely consistent with the marked seasonality of inflation observed in the data. In this sample most firms do not declare to have a clear pattern of seasonal price adjustment.

Only 29% of firms (see Figure 4), mostly transport and real estate sectors, declare that they change their price in a particularly month. The other firms do not concentrate their price changes at a specific time of the year. The percentage of firms that do not change prices in a particular month ranges from 50% for transport and communications and others business to 97% for the trade sector. For the manufacturing industry the response is 82%. Not surprisingly, the most important months for price adjustment are January and July, which coincide with the dates of adjustments of most of the sectors in the Wages Councils (Figure 5).

4.2 Factors Affecting Pricing

Figure 6 indicates that wages and raw material prices are the most relevant factors for firms increasing their prices. In all the different economic sectors salary was ranked as a very important factor to determine a change in the main product price. The study of Canadian firms also ranks wage costs as a very important factor in determining a change in price, whereas the study of Swedish firms ranks it as less important. The economic sectors that consider the price of raw materials more relevant are manufacturing industry and the trade sector.

Since raw materials include a large proportion of commodities, it is also puzzling that the exchange rate plays a lesser role than wages. Ex ante, in a small open economy like Uruguay in which most raw materials are tradables, it would be reasonable to think that firms would find equally important changes in the value of raw materials and the dollar. Other factor that would support a large role for the dollar lies in a past of high inflation in which indexation, particularly to the dollar was a regular practice. The lack of importance of the dollar in price formation

could then be the result of lower indexation due to inflation stabilization and a floating exchange rate. This stylized fact is consistent with the fall in persistence in inflation documented in Ganón (2012) among others.

Another interesting finding obtained from the survey is that finance costs do not affect prices in any economic sector. This might reflect the fact that Uruguayan firms show relatively low levels of banking credit (see BCU (2013)). Other factors that do not have an important influence in the price of any economic sector are the price of competitors, the price of the dollar and demand. Considering that firms set their price with a mark-up we believe it is reasonable that they do not take into account the price of their competitors.

Inflation is a factor that is considered very important for transport and real estate firms at the time of changing prices. On the other hand, manufacturing industry and the trade sector do not consider it significant.

A striking fact is the high importance given by employers to wages to determine price increases. The high importance of wages in price formation contrasts with the relatively low participation of wages in the cost structure. As can be seen in Table 2 the weight of wages on total cost averages less than 20 % while raw materials are close to 60%. One can think that this is a strategic behavior by firms because of the existence of Wage Councils that mandate wage negotiations between the employers, employees and the government. Therefore, it is possible that firms overweight the importance of wages to increase prices. In order to check this, we compare the firm's response with the true structure of costs from INE for the manufacturing sector. If that is the case, this large importance of wages would be an indication of the role of aggregate demand in price formation. As wages are adjusted at the same time, firms know that the dates of wage increases (January and July) are points in which aggregate demand would jump in response to the increase in household income. The contingency analysis indicates that the correlation between the perceived importance of wages and the share of wages in total cost is positive and significant but it is far away from perfect.[2]

Additionally, because price setting is costly and price are changed frequently when inflation is 8.9% (inflation in Uruguay when the survey was taken), it probably makes sense to adjust prices based on less than full information. Therefore, wage may play an important role because they

[2] Results available upon request.

may provide information about costs, demand inflation and the state of the economy.

4.3 Forward and Backward Looking Behavior

One very important question regarding price formation is the relative role of backward and forward looking factors. Most short term macro models are based on the existence of a Phillips curve that takes into account both past and expected fundamentals. To shed some light into how the usual logic of monetary models fits the behavior of Uruguayan firms we compare the importance they give to the same fundamentals in past and expected terms. Surprisingly enough, firms assign the same importance to past and future values of fundamentals as can be seen in Figure 7. This result is of paramount importance for the prospects of inflation targeting, since they suggest that if the Central Bank generates credibility in the conduct of monetary policy, the cost of stabilizing inflation expectation would go down significantly.

To analyze the time orientation of firms regarding different fundamental values in the margin, we construct a very simple statistic of Time Orientation

$$to_{z,i,j} = z^{f}_{i,j} - z^{p}_{i,j} \quad (1)$$

Where z indicates the fundamental value to be valued (wages, credit, etc.), the superscript indicates time orientation (f-future, p-past), i, indicates firm, and j sector.

- Temporal Orientation of firms in factor z:

- $to_{z,i,j} > 0 \rightarrow$ the firm is forward looking in factor z.
- $to_{z,i,j} < 0 \rightarrow$ the firm is backward looking in factor z.
- $to_{z,i,j} = 0 \rightarrow$ the firm is neutral in factor z.

Looking at Figure 8a we can see that while firms are largely neutral in the aggregate, they do not always give the same importance in every fundamental, showing in the margin a slight backward looking orientation.

When we open the time orientation statistic by fundamental, we observe that the most important fundamentals in price setting, namely raw materials and wages, are the ones that favor marginally past behavior the most (Figures 8a). When we look at which sectors are forward or backward looking in the margin (Figure 8b), we observe even when we consider firms as units, the neutrality result holds true in the aggregate. Figures 9a and 9b reports the following version of the time orientation indicator

$$to_{i,j} = \sum_{z=1}^{7} to_{z,i,j} \quad (2)$$

We compute this statistic for every firm, and the figure shows the composition of firms in terms of the sign of their time orientation. Notice that in order to classify a firm as forward or backward looking we only need for the firm to give a different valuation of importance in the case of one fundamental. Since we have already documented the neutrality of firms in the aggregate, this is only a marginal indication of time orientation. With this in mind, we see that most firms are neutral in the margin as well, with the lowest and highest levels of neutrality reported in the Trade & repairs and Other business sectors, respectively. In all sectors there are more backward looking firms than forward looking ones, with the highest incidence of backward looking orientation in the Transport, storage and communication sector with 33%, and the lowest in the Other business sector with 18%. The highest presence of forward looking firms occurs in Trade and Repairs, and the lowest in the Other business sectors.

Since manufacturing is the sector in which we have more data, we can see the time orientation of the sector in terms of each fundamental. Figure 9b shows that the marginal time orientation of manufacturing firms is backward looking as well.

4.4 Prices and Wages

We study the speed of price adjustment after an increase in salaries in Figure 10. Firms were asked to report the average time between the increase of salaries and the corresponding price reaction. Almost 60% of the firms declared adjustment of their prices very quickly (less than one month to three months). Approximately 22% of firms declared no increase in prices and absorbed the costs of the salaries. This result casts doubt regarding some of the responses. These types of answer turn on an alert signal for

the analysis of surveys of firms. The design of the surveys should capture these contradictions in the answers.

The fact that we previously find that firms do not have a regular schedule to setting their prices is not contradictory with this fast pass trough of wages to prices. Maybe is a matter of how the firms' managers interpreted the survey. The firms do not have a calendar date for changing prices, but, they can anticipate that the prices will need to be changed after wage negotiations. Therefore, prices are not really reset that often, but firms do respond quickly because they can anticipate wage changes.

4.5 Firms reaction to an unexpected demand shock

The majority of firms, when faced with a decrease in demand, tend to reduce their costs (Figure 11). Another reaction is to disseminate the mark-up they generate, although when they have a decrease in demand they do not decrease their prices or their production. Alike Blinder (1994), we find that firms response is not symmetric to demand or supply shocks or to negative or positive shocks.

Table 3 presents the contingency analysis of the correlation between the different strategies of firms to a demand shock. Suspiciously there is a highly significant positive correlation between two opposite strategies like price increases and prices reductions. This can be explained by the fact that both strategies are not relevant at all for the firms under a negative demand shock. This result suggests a certain amount of price rigidity.

We find that the optimal response of the firm to a negative demand shock is not just one but a mix of strategies such as reduction of costs and margins and to some extent production.

5. Conclusions

This study provides new insights into price setting in a small economy like Uruguay based on a survey of firms. The results indicate that prices are more rigid than previously thought and indicate a relative low degree of competition in the markets.

Firms stated conduct in terms of seasonality of price adjustment is barely consistent with the marked seasonality of inflation observed in the data. In this sample most firms do not declare to have a clear pattern of seasonal price adjustment.

Another puzzle we find in the data is the large importance they give to wages in price adjustment, which stands in stark contrast with the relatively low participation of wages in costs. This could be an indication that firms anticipate aggregate demand pressures through the behavior of wages. Also, wages may play a larger role because they may provide information about the state of the economy.

There is also a blunt contrast between the high importance given to raw materials and the dollar in price formation. This could then be the result of lower indexation due to inflation stabilization and a floating exchange rate. This stylized fact is consistent with the fall in persistence in inflation documented in Ganón (2012) among others.

Another encouraging find for monetary policy management is that firms seem to give the same importance to the past and expected behavior of fundamentals in price formation. The higher the role of expected factors, the more active the expectations channel of monetary policy is.

Finally, the firms' main response to a negative demand shock seems to be to lower costs (raise productivity).

6. References

Apel, M. , Firberg, R. and Hallsten, K. (2005) "Microfoundations of Macroeconomic Price Adjustment: Survey Evidence from Swedish Firms" Journal of Money, Credit and Banking, Vol. 37:2 pp. 313-338

Amirault, D., Kwan, C. and Wilkinson, G. (2006). "Survey of Price-Setting Behaviour of Canadian Companies," Bank of Canada WP 035.

Babecký, J., Dybczak, K., Galuščák, K., (2008). "Survey on Wage and Price Formation of Czech Firms," Czech National Bank, Working Paper Series,12, December.

Borraz, F., and Zipitría, L. (2012). "Retail Price Setting in Uruguay," Economia, 12(2), 77-109.

Blinder, A. (1991). "Why are Prices Sticky? Preliminary Results from an Interview study," American Economic Review, 81(2), 89-100.

Blinder, A. (1994). "On Sticky Prices: Academic Theories Meet the Real World" in Monetary Policy, Edited by Gregory Mankiw, The University of Chicago Press, 117-154.

Calvo, G. A. (1983). "Staggered Prices in a Utility-Maximizing Framework," *Journal* of Monetary Economics 12 (3): 383–98.

Da Silva, A., Petrassi, B. and Santos, R. (2016). "Price-Setting Behavior in Brazil: Survey Evidence," Banco Central de Brasil, Working Paper 422.

Druant, M., Fabiani, S., Kezdi, G., Lamo, A., Martins, F., Sabbatini, R., (2009). "How are Firms' Wages and Prices Linked: Survey Evidence in Europe," Working Paper 174, National Bank of Belgium.

Fernández, A., Lanilotta, B., Mazzuchi, G. and Perera, J.M. (2008). "La Negociación Colectiva en Uruguay" Análisis y Alternativas," Centro de Investigaciones Económicas and Programa de Modernización de las Relaciones Laborales, Universidad Católica del Uruguay.

Ganon, Elena. (2012). "Persistencia de la inflación en Uruguay" Banco Central del Uruguay, Working Paper 13.

Greenslade, J. and Parker, M. (2012). "New Insights Into Price-Setting Behaviour In The UK: Introduction And Survey Results"

Irregui, A.M, Melo, L. and Ramiréz, M. (2011). "Wage Adjustment Practices and the Link between Price and Wages: Survey Evidence from Colombian Firms," Borradores de Economía Nr. 660, Banco de la República, Colombia.

Fuhrer, J. and Moore, G. (1995). "Inflation Persistence," The Quarterly Journal of Economics 110 (1): 127-159.

Marques, C.R., Martins, F., Portugal, P., (2010). "Price and Wage Formation in Portugal," European Central Bank, Working Paper Series 1225.

Martins, F. (2005). "The Price Setting Behaviour of Portuguese Firms Evidence from Survey Data, " European Central Bank, Working Paper Series 562.

Stahl, H. (2005). "Price Setting in German Manufacturing: New Evidence from New Survey Data," Discussion Paper Series 1: Economic Studies No 43. Deutsche Bundesbank.

Silverman, B. W. (1986*).* Density Estimation for Statistics and Data Analysis. Chapman & Hall.

Taylor, J. B. (1980). "Staggered Wage and Price Setting in Macroeconomics." Journal of Political Economy 88 (1): 1–23.

Figures

Figure 1. Sample Distribution by Sector (in %)

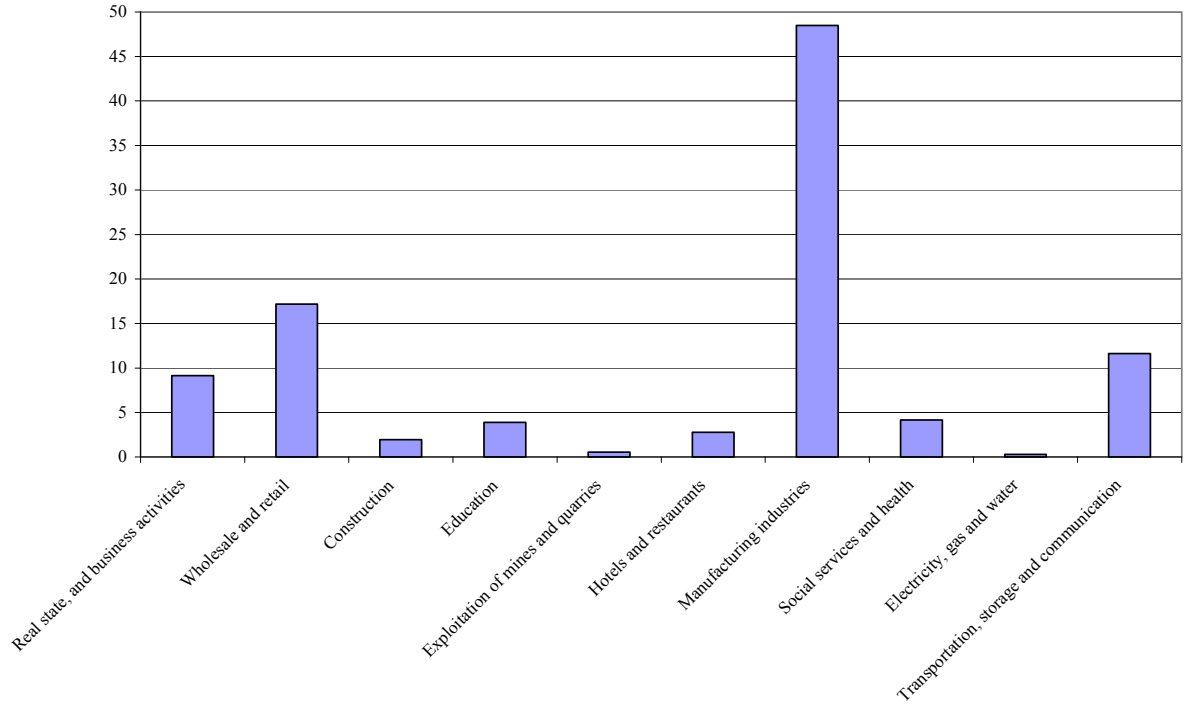


Figure 2a. Pricing of the Firm's Main Product (in %)

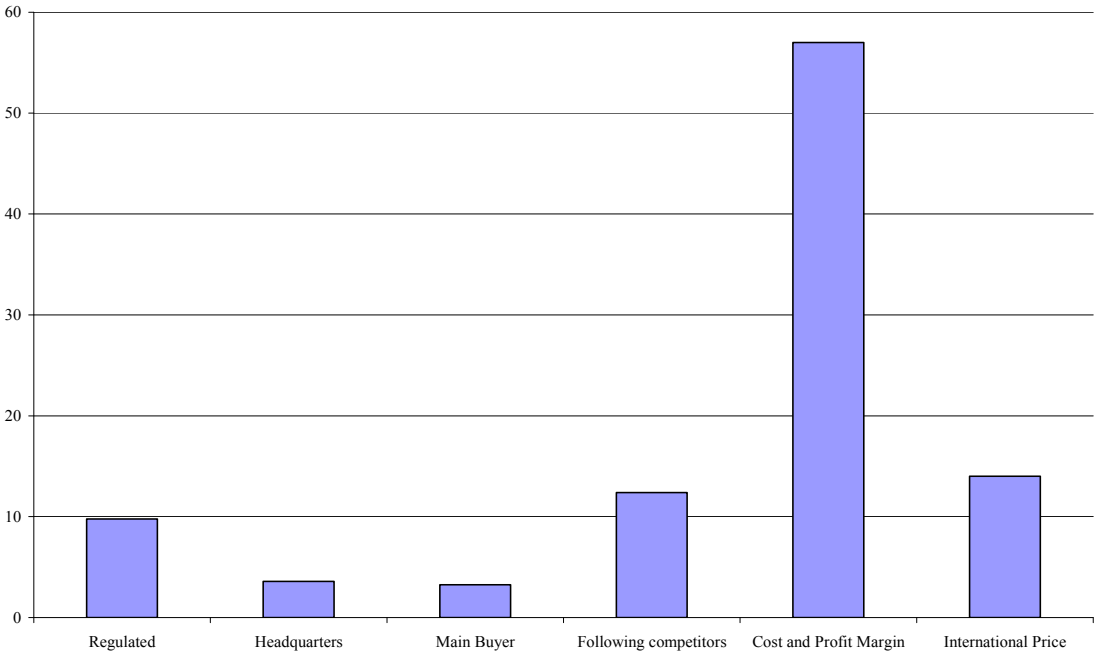


Figure 2b. Pricing of Firm's Main Product by Sector (in %)

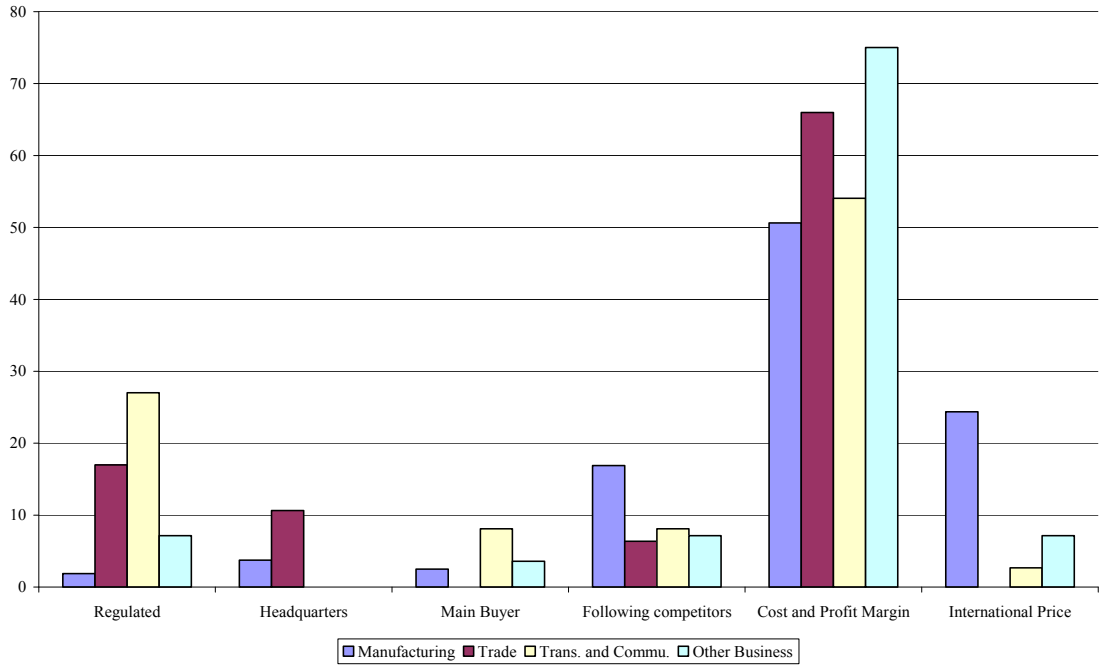


Figure 2c. Price Setting in the Manufacturing Industry by Subsector (in %)

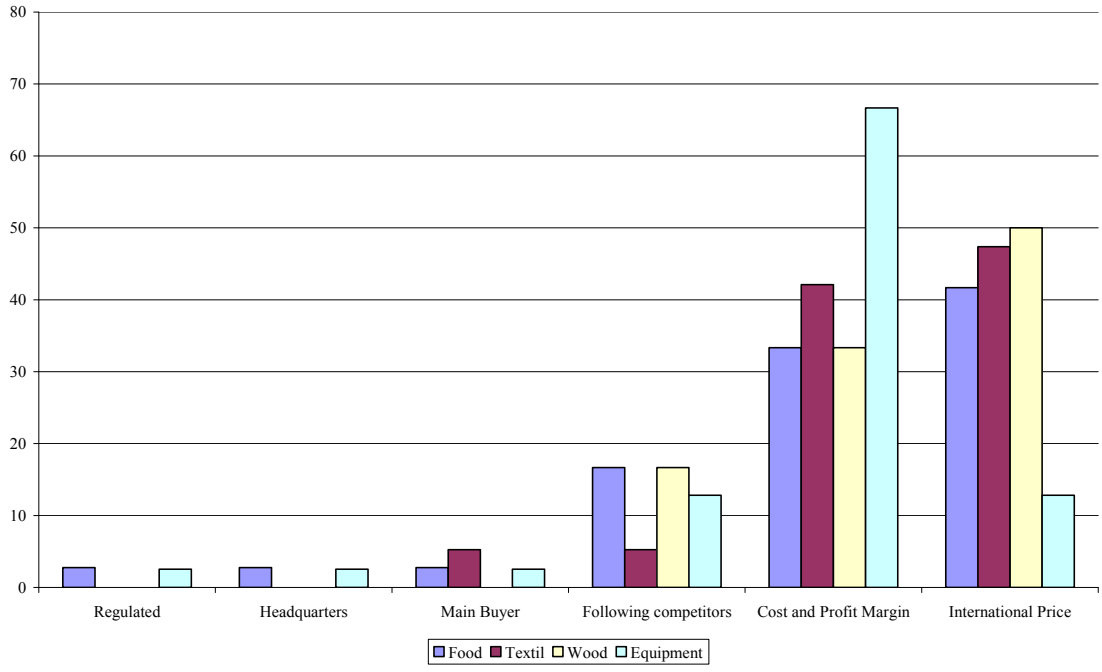


Figure 3. Frequency of Price Adjustmetn (in %)

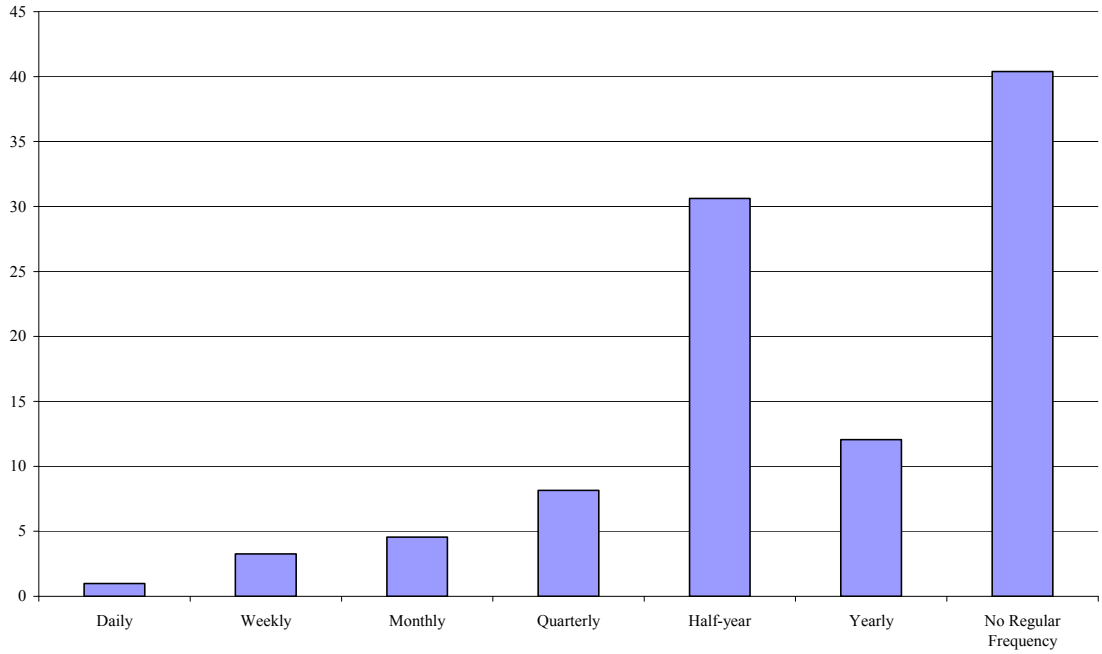


Figure 4. Are Price Changes Concentrated in a Particular Month?

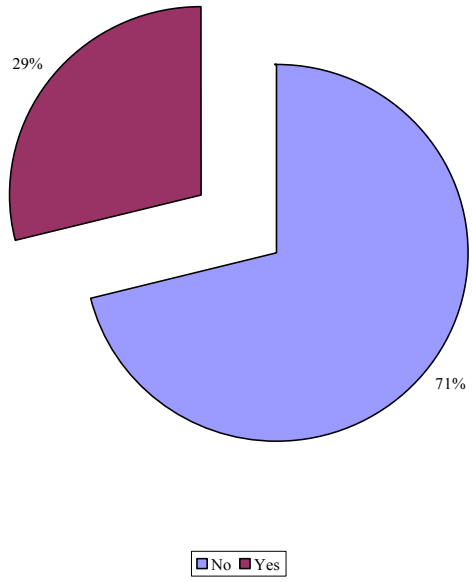


Figure 5. Price Changes by Month (in %)

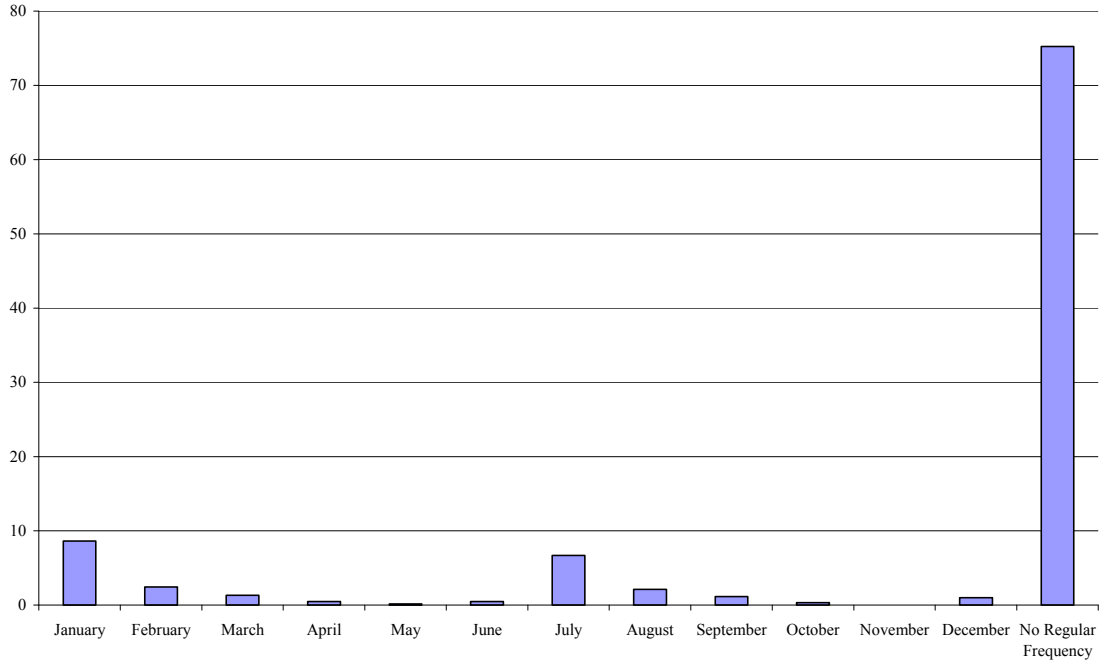


Figure 6. Factors Determining Price Increases (Median Response)
1=Not Relevant, 5=Very Relevant

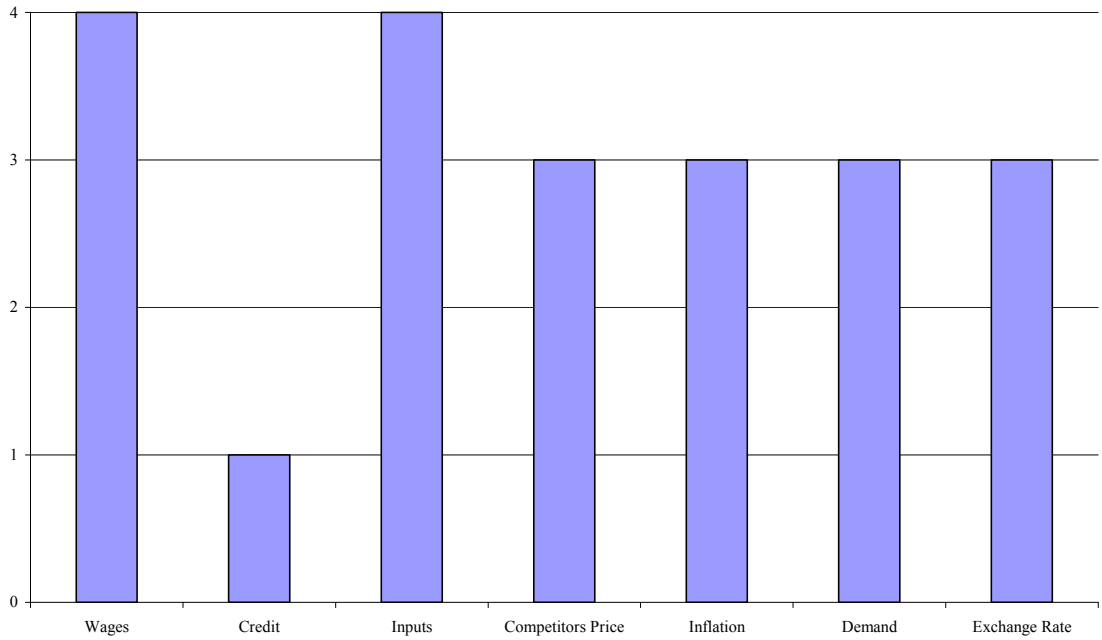
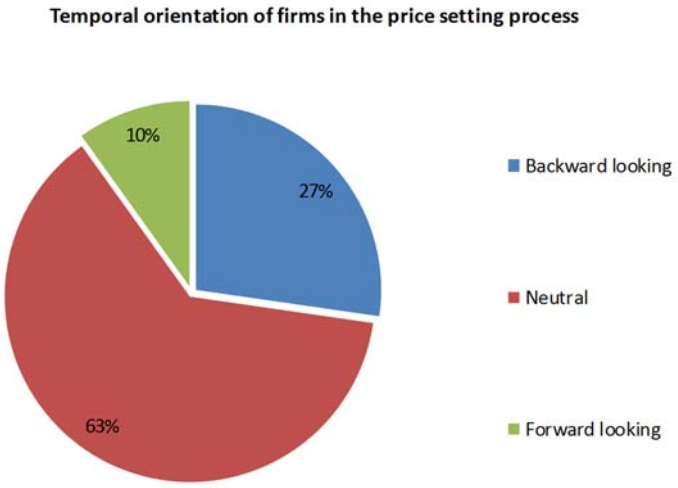
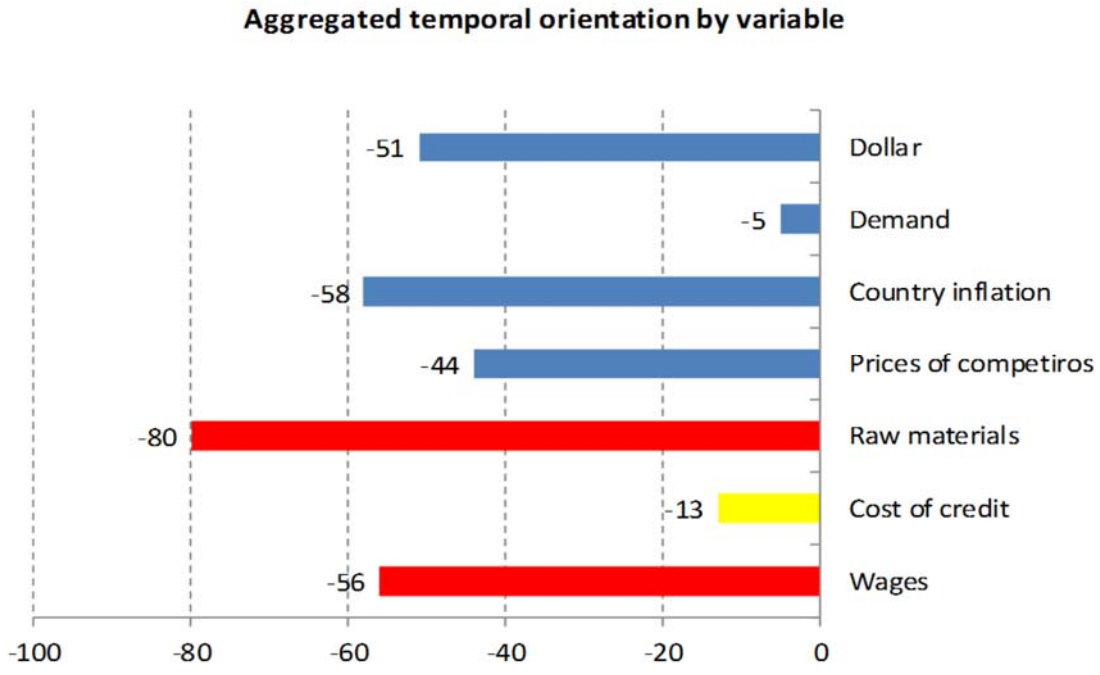


Figure 7.



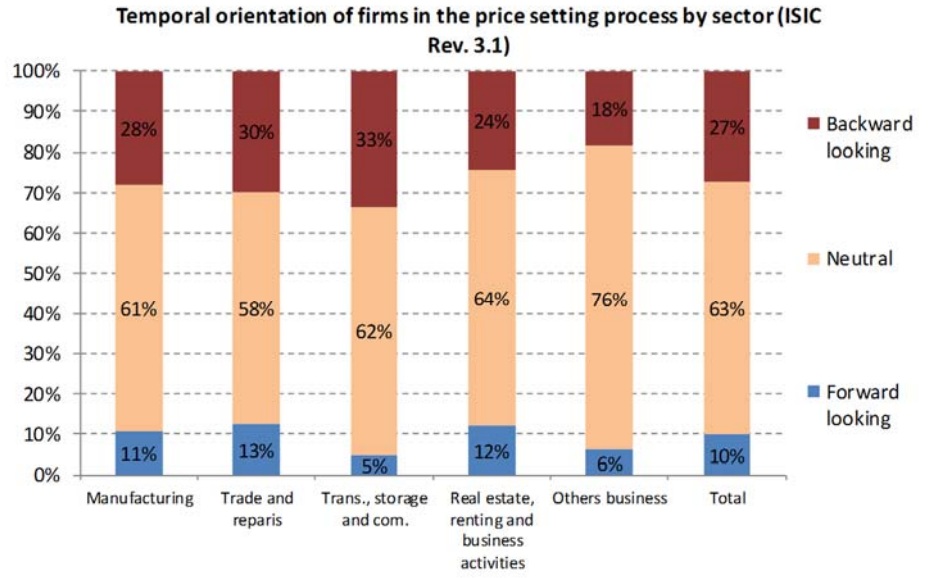
Source: Price setting survey (INE).

Figure 8a.



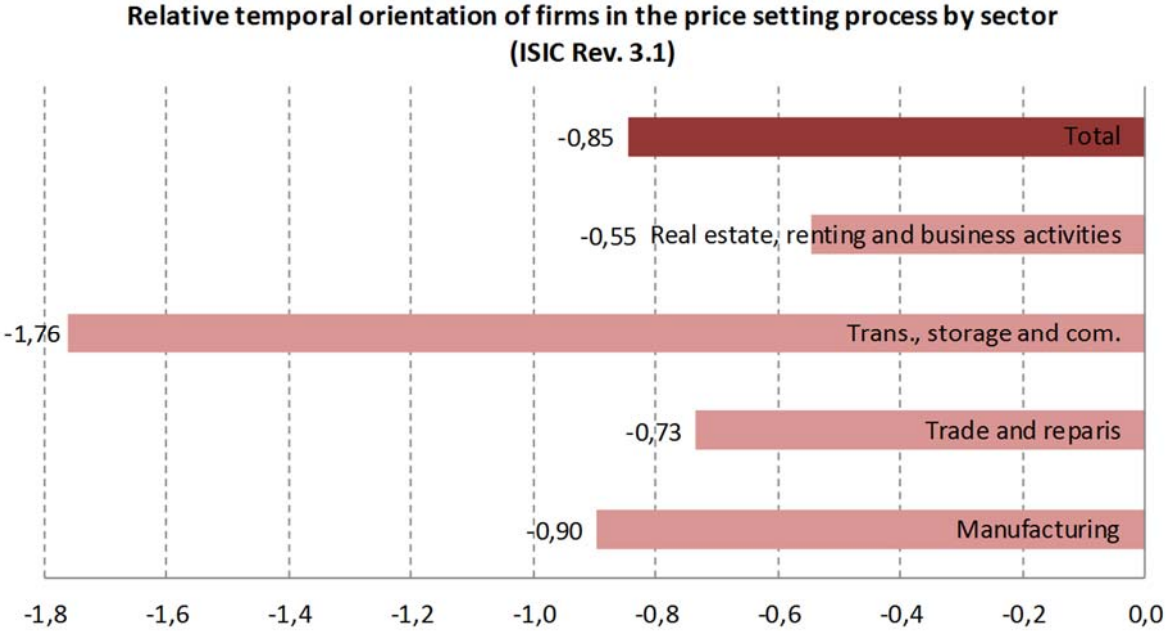
Source: Price setting survey (INE) .

Figure 8b.



Source: Price setting survey (INE).

Figure 9a.



Source: Price setting survey (INE).

Figure 9b.

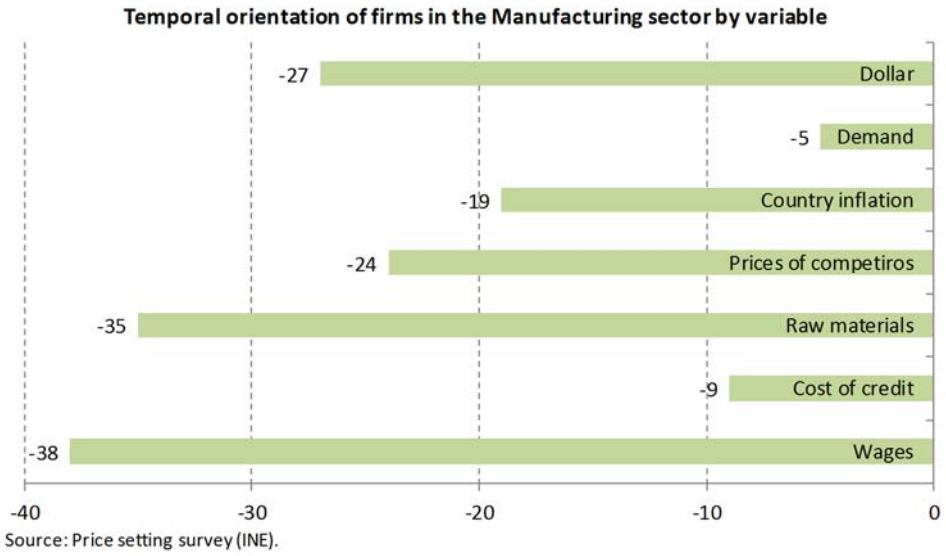


Figure 10. Months to Adjust Prices when Wages Change
(In %)

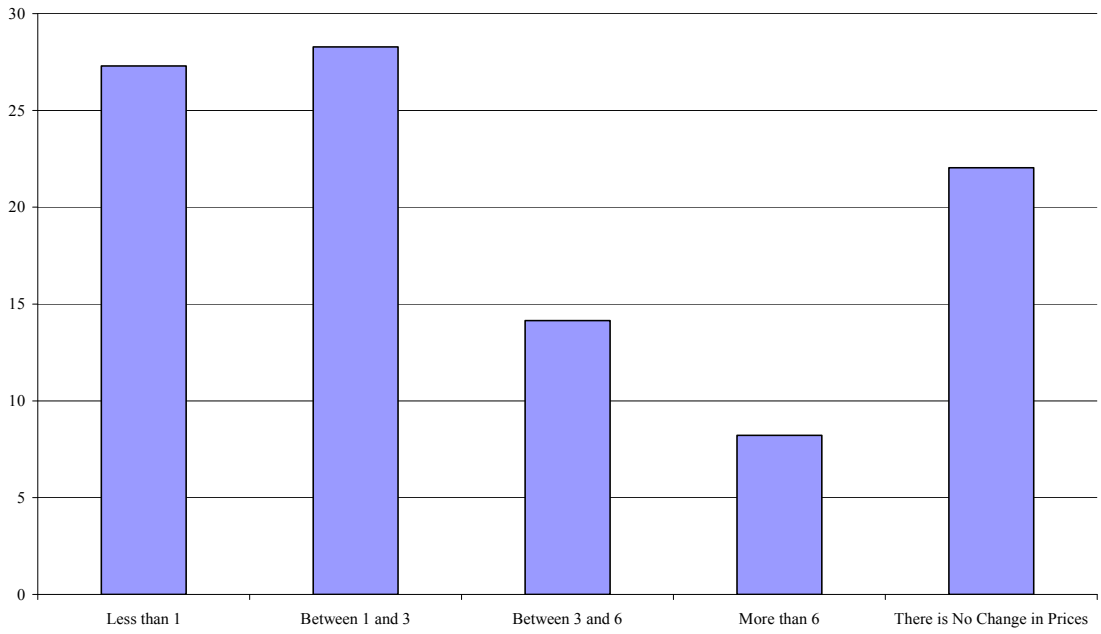
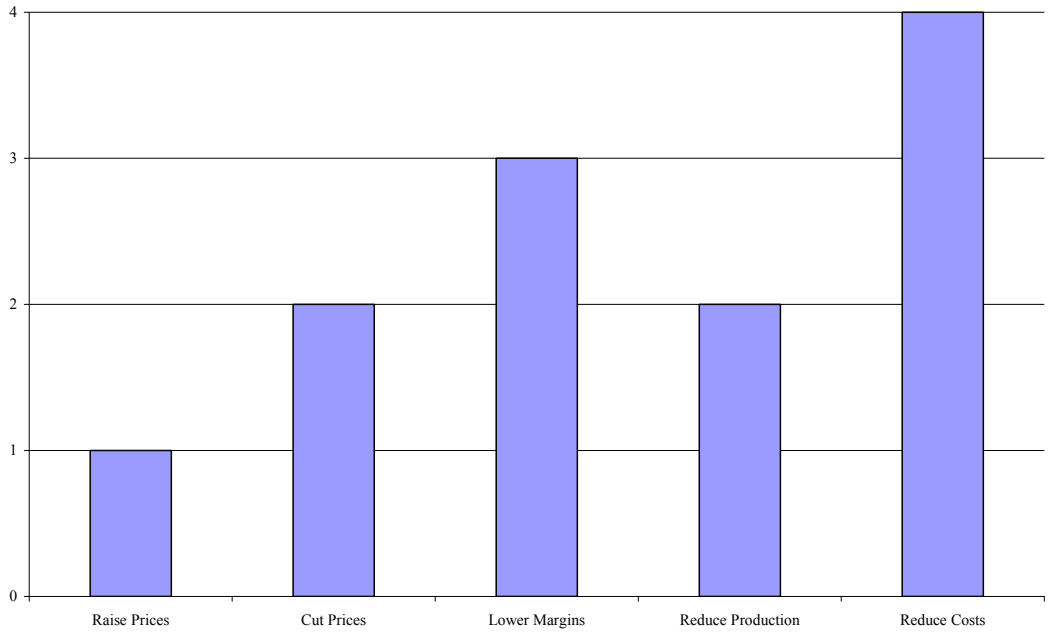


Figure 11. Firms Reaction to an Unexpected Sales Fall
1=Not Relevant, 5=Very Relevant



Tables

Table 1. Multinomial Logit Model **Frequency of Price Change. Marginal Effects**	
Exploratory Variables	Coeff. / S.E.
Employment	-0.0012**
	(0.0005)
$Employment^2$	0.0003*
	(0.0002)
Manufacturing	0.0318
	(0.0442)
Trade	0.0246
	(0.0363)
Other Business	-0.0001
	(0.0001)
Education	-0.0000
	(0.0001)
Minning	-0.0001
	(0.0001)
Health	0.0006
	(0.0006)
Observations	307
Robust Standard Errors in Parentheses ** p<0.05, * p<0.1	

Table 2. Cost Structure by CIIU Classification (in %)					
Sector	CIIU	Raw	Excedent	Wages	Others
Beef	1511	82.3	1.7	5.9	10.1
Dairy	1520	60.3	4.3	17.1	18.3
Tanneries	1911	72.4	1.8	7.5	18.2
Ricemills	1534	67.9	2.2	7.3	22.7
Textiles	1711-13	66.6	2.9	16.2	14.3
Rubber and Plastic	2519-20	62.4	3.6	17.6	16.4
Fish	1512	60.2	3.0	21.3	15.6
Malt	1553	55.8	2.8	18.8	22.6
Basic Metal	2700	42.6	6.4	19.3	31.7
Automotive	3400	66.3	2.3	16.0	15.4
Wood	2010-2021	55.8	3.7	31.7	8.8
Basic Chemical	2411-12	70.8	2.0	14.1	13.1
Pesticides	2421	67.0	2.0	13.4	17.6
Pharmaceutical	2423	54.9	0.5	26.1	18.5
Cleaning	2424	55.3	0.5	15.8	28.4
Paints and other Plastics	2422	68.7	0.6	12.4	18.3
Clothing	1810	61.2	3.0	13.7	22.1
Tobacco	1600	44.7	0.9	21.3	33.1
Medical Instruments	3300	41.8	1.8	19.0	37.5
Other Textiles	1720-30	57.4	3.5	19.7	19.4
Glass	2610	42.6	7.9	27.8	21.8
Fruits and Vegetables	1513	43.4	4.0	14.1	38.5
Electrical Appliances	3100	50.8	1.5	39.4	8.3
Furniture	3610	59.7	2.8	18.7	18.8

Source: 2010 Annual Economic Activity Survey, INE.

Table 3: Firms Reaction to Unexpected Sale Shock					
Pearson chi2(25) : Contingency tables					
	Raise Prices	Cut Prices	Lower Margins	Reduce Production	Reduce Costs
Raise Prices	1.50E+03	382,943	337,789	360,909	319,444
Cut Prices	382,943	1.50E+03	468,933	380,467	340,909
Lower Margins	337,789	468,933	1.50E+03	348,577	333,218
Reduce Production	360,909	380,467	348,577	1.50E+03	337,997
Reduce Costs	319,444	340,909	333,218	337,997	1.50E+03
Pr = 0.000					

Survey Questionnaire

1) How do you set the price of the main product?

a. The price is regulated

b. The price is set in the central office abroad

c. The Price is set by the main buyer

d. The Price is set following competitors

e. The price is set according to costs and a profit margin

f. The price is set following the international price

2) Under normal conditions: ¿How often does your company change the price of the main product'

a. Daily

b. Weekly

c. Monthly

d. Quarterly

e. Every six months

f. Yearly

g. There is no regular frequency

3) Under normal conditions: Are price changes concentrated in a particular month?

a. No

b. Si. Write month/s

4) What is the relevance of the following factors to explain price increases? Grade from 1 (not relevant) to 5 (very relevant)

a. Wage increases

b. Cost of credit increases

c. Input price increases

d. Competitors' price increase

e. Inflation increases

f. Demand increases

h. US dollar exchange rate increases

5) What is the relevance of the following factors to explain price increases? Grade from 1 (not relevant) to 5 (very relevant)

a. Expected wage increases

b. Expected cost of credit increases

c. Expected input price increases

d. Expected competitors' price increase

e. Expected inflation increases

f. Expected demand increases

h. Expected US dollar exchange rate increases

6) How long does it take to adjust prices after a wage change?

a. Less than a month

b. Between one and three months

c. Between three and six months

d. More than six months

e. The firm does not raise prices and absorbs the increase in wages

7) What is your firm response to an unexpected drop in sales? Grade from 1 (not relevant) to 5 (very relevant)

1. Increase prices

2. Reduce prices

2. Reduce margin

3. Reduce production

4. Reduce costs

Previous volumes in this series

No	Title	Author
604 January 2017	Endogenous wage indexation and aggregate shocks	Julio A. Carrillo, Gert Peersman and Joris Wauters
603 January 2017	Multiplex interbank networks and systemic importance – An application to European data	Iñaki Aldasoro, Iván Alves
602 January 2017	The globalisation of inflation: the growing importance of global value chains	Raphael Auer, Claudio Borio and Andrew Filardo
601 January 2017	Asymmetric information and the securitization of SME loans	Ugo Albertazzi, Margherita Bottero, Leonardo Gambacorta and Steven Ongena
600 December 2016	The currency dimension of the bank lending channel in international monetary transmission	Előd Takáts and Judit Temesvary
599 December 2016	Banking Industry Dynamics and Size-Dependent Capital Regulation	Tirupam Goel
598 December 2016	Did the founding of the Federal Reserve affect the vulnerability of the interbank system to contagion risk?	Mark Carlson and David C Wheelock
597 December 2016	Bank Networks: Contagion, Systemic Risk and Prudential Policy	Iñaki Aldasoro, Domenico Delli Gatti, Ester Faia
596 December 2016	Macroeconomics of bank capital and liquidity regulations	Frédéric Boissay and Fabrice Collard
595 December 2016	Bank lending and loan quality: the case of India	Pallavi Chavan and Leonardo Gambacorta
594 December 2016	A quantitative case for leaning against the wind	Andrew Filardo and Phurichai Rungcharoenkitkul
593 December 2016	The countercyclical capital buffer and the composition of bank lending	Raphael Auer and Steven Ongena
592 November 2016	The dollar, bank leverage and the deviation from covered interest parity	Stefan Avdjiev, Wenxin Du, Catherine Koch and Hyun Song Shin
591 November 2016	Adding it all up: the macroeconomic impact of Basel III and outstanding reform issues	Ingo Fender and Ulf Lewrick
590 October 2016	The failure of covered interest parity: FX hedging demand and costly balance sheets	Vladyslav Sushko, Claudio Borio, Robert McCauley and Patrick McGuire
589 October 2016	International prudential policy spillovers: a global perspective	Stefan Avdjiev, Cathérine Koch, Patrick McGuire and Goetz von Peter

All volumes are available on our website www.bis.org.