PRICE (IN) FLEXIBILITY IN PORTUGAL: EVIDENCE FROM MICRO PRICE DATA–PART II(1)*

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1. INTRODUCTION

In the first part of this article we have focused on the behaviour of consumer prices in Portugal during the period January 1997 to January 2001. In the second part, and with the same motivation as before — having a better understanding of price setting patterns in Portugal —, we will look at producer prices in a similar way. For this analysis we use a micro price dataset built by the Instituto Nacional de Estatística (INE) to compute the Industrial Production Price Index (IPPI). In addition to the analysis of producer prices, we compare consumer and producer price setting features. To do so, and because the consumer and producer baskets of products do not have the same composition, we have had to transform the original datasets in order to make them as comparable as possible. As far as we are aware, it is the first time that a comparison with such a broad coverage is made.

The rest of the text is organized as follows. Section 2 presents the main stylised facts about producer price setting practices. Section 3 compares the behaviour of consumer and producer prices. Section 4 presents the conclusions and, finally, a description of the datasets is made in the Annex.

2. SUMMARY OF FINDINGS ON PRODUCER PRICES

This section explores the IPPI micro price dataset previously mentioned to identify the main stylised features of producer price setting in the Portuguese economy over the sample period. Contrarily to what was made in the analysis of consumer prices, we do not compare the results for Portugal with the U.S. or with the Euro area. The reason for this is that there are no equivalent studies for these two economies(2).

Fact 1—In the manufacturing industry, almost 1 in every 4 prices is changed, on average, in a given month.

The first column of Table 1 shows the frequencies of price changes for the total of the sample as well as for the specific sectors analysed. The average frequency of price changes in the manufacturing industry, over the sample period, is 0.23. This figure is remarkably close to the corresponding result for consumer prices. However, as it will be-

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(1) We thank Nuno Alves, Carlos Robalo Marques, João Santos Silva, Maximiano Pinheiro, José Ferreira Machado, participants at various meetings of the Inflation Persistence Network of the Eurosystem. We are also grateful to Daniel Santos, Cristina Cabral, Cristina Fernandes and Humberto Pereira, from the Instituto Nacional de Estatística, for many helpful discussions concerning the methodological aspects of the datasets. The usual disclaimer applies.

(2) It is important mentioning that all empirical results presented in this section use weights. Such weights are expected to reflect the importance in terms of Gross Added Value of each industry.
come clear in section 3, this is more a statistical coincidence than an evidence of similar price setting practices at the producer and consumer levels. Another interesting result is the one displayed in the fifth column of Table 1, i.e., the median average duration of a price. Despite the relatively high average frequency of price changes, the median average price duration is 12 months which is a figure much higher than the one suggested by the frequency of price changes.

**Fact 2**—*There is a considerable degree of heterogeneity in producer price setting behaviour by product. On one extreme case — the energy sector — a price change is expected in each and every month; on the other extreme, intermediate goods only change prices once every nine months.*

As in the case of prices at the consumer level, a notable heterogeneity of producer price behaviour practices emerges from the data. The energy sector constitutes a very extreme situation, as price changes occur in almost 70 per cent of the occasions. This is likely to reflect the extremely high volatility in the international prices for crude oil, suggesting a very flexible price setting pattern responding to changes in the marginal costs of production. However, the administered nature of the prices for energy during the sample period, at the consumer level, prevented this volatility in producer prices to be transmitted to consumer prices. The high frequency of price changes observed in the energy sector affects significantly the frequency of price changes in the manufacturing industry as a whole, as it accounts for around one sixth of the total. Indeed, the average frequency of price changes registered in the manufacturing industry excluding energy is reduced to just over 14 per cent, while the median average price duration increases to 14 months. Relatively to the consumer goods and intermediate goods sectors, we see that prices for consumption goods change more frequently than those for intermediate goods, as indicated by the frequency of price changes (0.17 and 0.12, respectively) and median average price duration (of about just over 1 and 1.5 years, respectively). Two different explanations may account for these differences. On the one hand, consumption goods are in a more advanced production stage and, in this way, more likely to accumulate shocks that affect the production cost. In addition, the argument of ‘customer anger’ put forward by Rotemberg (2004) justifies a smaller frequency of price changes in intermediate goods — where more information between parties exists — than in final goods.

**Fact 3**—*Strong seasonal patterns are observed for industrial prices, as price changes are concentrated in January.*

Chart 1 displays the frequency of price changes for industrial goods by type of industry. Almost every January registers a peak in the frequency of price changes. This seasonal feature is more apparent in price increases than in price decreases, and in consumer goods than in intermediate goods.
Fact 4—Price increases are more likely than price decreases, as one could expect in a context of positive inflation. However, on average, price increases only account for around 60 per cent of total price changes.

In Table 1 it is shown the frequency of price increases and price decreases. In a context of a moderate, but positive, rate of inflation, price increases are more frequent than price decreases. However, only 60 per cent of the price changes correspond to price increases. These proportions hold for consumption, intermediate and, this time, for energy as well. In this way, producer price setting practices over the sample period were characterized by relatively frequent price decreases.

Fact 5—The mean magnitude of price increases is very similar to the magnitude of price decreases; in this way, the observed positive inflation reflects the fact that price increases are more frequent than price decreases, as described in the previous fact.

Table 2 shows some descriptive statistics of the empirical distribution of the magnitude of price increases and price decreases. The first interesting result is that price changes are usually sizeable. For instance, in the manufacturing industry (excluding energy) both the median price increase and the median price decrease amounted, in absolute terms, to 3.8 per cent; the third quartile of the distribution of price increases was 6.8 per cent (7.5 per cent in the case of consumption goods and 6.3 per cent in the case of intermediate goods); the first quartile of negative price changes was -8.5 per cent (-8.7 per cent in the case of consumption goods and -8.2 per cent in the case of intermediate goods).

A second interesting feature of the results is that the magnitude of price increases is broadly similar to the magnitude of price decreases. In this way, the positive inflation observed in producer prices is more a result of the larger frequency of price increases, vis-à-vis the one of price decreases, than a result of larger price increases than price decreases.
3. THE COMMON SAMPLE: COMPARING CONSUMER AND PRODUCER PRICE SETTING PRACTICES

In this section we present the results of the comparison between the consumer and the producer price setting practices:

Fact 1—Consumer prices change more frequently than producer prices. 

Chart 2 plots the frequency of consumer and producer price changes for each of the comparable categories of items. The diagonal line is the geometric space where equal frequencies would be positioned. Most of the observations are concentrated below the diagonal line, indicating that prices at the retailer level do change more frequently than prices at the producer level. It is also important to point out that points above the diagonal tend to correspond to food industries (like meat products) or to goods for which consumer prices were regulated over the sample period (energy)(3).

Fact 2—Consumer price increases (decreases) are more frequent than producer price increases (decreases).

Chart 3 presents the frequency of price increases (decreases) at the retailer and producer level. Panel A displays positive price changes and panel B presents negative price changes. The same pattern is observed for both: price changes are always more frequent at the retailing level, independently of the sign.

Fact 3—More sizeable price changes are found for the CPI than for the IPPI, regardless of the sign of the change.

Chart 4 plots the median rates of price change for positive and negative changes in panel A and B, respectively. Changes at the retail level are generally larger, independently of the direction of the change. Again, different definitions of price are not responsible for this result. Thus, we are left with either the “end of the road” argument or some differences in the elasticity of demand at the production and consumers levels.

(3) Nine out of the ten points above the diagonal correspond to food industries. The remaining point above the line is energy.

<table>
<thead>
<tr>
<th>Table 2</th>
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<td>MAGNITUDES OF PRICE CHANGES (MONTHLY FIGURES)</td>
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<table>
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<tr>
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<th>Magnitude of positive price changes</th>
<th>Magnitude of negative price changes</th>
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<td></td>
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<tr>
<td>Total</td>
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<td>Total excluding energy</td>
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<td>By type of good</td>
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<td>Consumer goods</td>
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<td>Energy</td>
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4. CONCLUDING REMARKS

In this part of the article we have identified the main stylised features of producer price setting behaviour in Portugal over the period 1995-2001. Additionally, we have established a comparison of consumer and producer price setting patterns. The main conclusions of this empirical research are the following:

a) The monthly frequency of price changes is slightly below 0.25 meaning that, on average, almost 1 in every 4 prices is changed in a month.
b) This remarkably high frequency of price changes is, however, strongly influenced by the behaviour of energy.
c) The median average price duration for producer prices is around 12 months.
d) Consumption goods experience more frequent price changes than intermediate goods and energy goods experience more frequent price changes than consumption goods.
e) There is strong seasonality in price setting.
f) Price increases are more frequent than price decreases, as they account for around 60 per cent of total changes, but of similar magnitudes.
g) In general, price changes are sizeable, at least having in mind the levels of inflation observed in the Portuguese economy over the sample period.
h) For comparable goods, consumer prices change more often than producer prices.
i) For comparable goods, when consumer prices change they change for bigger amounts than producer prices.

This study for Portugal and the corresponding studies for other countries are mostly descriptive and therefore do not allow rejecting or maintaining any of the many existing price setting theories. Nevertheless, and given the richness of the used datasets, the knowledge on this subject has increased tremendously and nowadays, Portugal, as well as the other Euro Area member countries, is one of the places in world for which there is more information about price setting practices.

REFERENCES


DATA ANNEX

A.1 IPPI DATASET

The IPPI dataset reports prices in industry for the following sectors: Mining and Quarrying, Manufacturing, Electricity, Gas, and Water Supply. This study, however, focus only on the Manufacturing industry, thus eliminating the information available for the other sectors. Data runs from January 1995 to August 2002 on a monthly basis. Each observation corresponds to the price of an item in a firm at a given moment in time. Items are classified using the Prodcom Nomenclature at the 12-digits level and are further characterised at a more disaggregated level, including brand. However, due to statistical secrecy we are only able to label the products at the 12-digits classification. Again, this is a longitudinal dataset, with the same firms and items being followed over time. The sample was designed having 1995 as the year of reference and covering firms that produce in part or totally for the domestic market. Up to January 2001, this survey covers 2,406 firms and 538 items (1).

The price collected by INE is defined as the list price of industrial production traded within the domestic market. More specifically, it corresponds to the gross figures presented in the table of prices for items produced by the firm. Any discounts or subsidies are not deducted and taxes are not added. The relevant price is that in force at the 15th of each month (2).

Missings may occur either because the item is discontinued, the firm closes temporarily or permanently, or it just does not reply in a given month. When this situation occurs, missing observation, INE uses the last reported price as an estimate of the missing one. This criterion is applied for up to 4 consecutive months, after which the item is dropped and replaced by a similar one. The occurrence of a missing is not signalled in the dataset. Thus, observable missings in the middle of a record are virtually inexistent. However, they are responsible for incomplete records, these being the ones not observed up to the end of the sampled period. In fact, only about 82 percent of the records ever started during the 1995-2000 period are still in the dataset in January 2001.

A.2 COMPARABILITY BETWEEN IPPI AND CPI

For comparison purposes, we have constructed subsets of the CPI and IPPI datasets with similar composition. These are the common samples. Matching was performed at the most detailed labelling information available for both CPI and IPPI. The comparison between consumer and producer price practices, through the use of the micro-datasets underlying the CPI and the IPPI, raises some comparability issues given the different methodological characteristics of these two indexes. We have identified five different sources of attrition: i) sample constitution, ii) VAT, iii) missing values, iv) sales and promotions and v) forced item substitution. Dias, Dias and Neves (2004) discuss the impact of these five sources of attrition on the comparison of results and, for each one of these, they propose a solution. As this discussion is somewhat lengthy and technical we have preferred to not include it in here and instead remise the interested reader to the original paper.

(1) INE (1997) describes the main features concerning sample definition, selection and size.

(2) Prices are collected by mail and, if necessary, a fax/telephone/postal insistence takes place at the 26th of the reference month.