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Price Setting in Retailing: the Case of Uruguay

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Abstract

We use a rich and unique dataset of 20 million daily prices in groceries and supermarkets across the country to analyze stylized facts of the behaviour of consumer prices. Our findings are as follows: i) The median duration of prices is little over 2 months. Therefore, retail prices in Uruguay are less sticky than in the US but stickier than in the UK. ii) We do not find evidence of a seasonal pattern in the likelihood of price adjustments. iii) The frequency of price adjustment varies positively with expected inflation for the food and personal care product categories. However, in the alcohol and soft drink categories we find that firms increase the percentage points of the adjustment and not its frequency. iv) The probability of price change in the first day of the month is seven times higher than in any another day. v) The probability of a price change is not constant over time.

Keywords: Retail; micro data; prices; price volatility; sticky prices.

Resumen

Utilizamos una base de datos con 20 millones de precios diarios de supermercados y almacenes en el país para establecer hechos estilizados sobre formación de los precios al consumo en Uruguay. El análisis permite determinar los siguientes hechos : i) La mediana de la duración de los precios es levemente superior a 2 meses. Por lo tanto, los precios minoristas en Uruguay son menos rígidos que en Estados Unidos pero más rígidos que en Inglaterra. ii) No encontramos un patrón de estacionalidad en el ajuste de precios. iii) La frecuencia de precios varía positivamente con la inflación esperada para alimentos y artículos de tocador. Sin embargo, para la categoría de bebidas concluimos que las empresas aumentan el porcentaje del ajuste de precios y no su frecuencia. iv) La probabilidad de modificar un precio en el primer día del mes es siete veces mayor que en cualquier otro día. v) La probabilidad de cambio de precios no es constante en el tiempo.

Palabras claves: rigideces de precios, datos micro, comercios minoristas

JEL: E31, D40, L16, L81.

1.- Introduction

In recent years there has been an increase in the empirical literature of price behaviour. As new and detailed datasets become available we observe an important number of studies on the microeconomic fundamentals of price setting of firms -mainly retailers- and its impact on inflation. This analysis allowed a better understanding of the behaviour, dispersion and volatility of prices.

Although there are different theoretical models that explain these issues in the macroeconomic literature -such as menu cost models, sticky price or sticky information models, or time or state dependent pricing strategies-, the stylized facts pointed out in the literature avoid a unique formalization. Klenow and Malin (2010) provide an up to date and concise overview of the empirical evidence, and confront the data with different theoretical models. They stress ten facts of the microeconomic behaviour of prices. The main ones are that prices do change at last once a year; that the main instrument for downward price adjustment is price discount; that most markets have a stickier reference price; that goods prices differ in their frequency of adjustment and their changes are asynchronous between them; that there exist microeconomic forces that explain the behaviour of prices that differ from aggregate inflation and, finally, prices adjust mainly when wages change.

Gopinath and Rigobon (2008) study the stickiness of traded goods using micro data on US import and export prices at-the-dock for the period 1994-2005. They find long price duration of traded goods -10.6 months for imports, and 12.8 months for exports-; large heterogeneity in price stickiness across goods at the disaggregated level; a declining probability of price adjustment over time for imports and a rather low exchange rate pass-through into US import prices.

Nakamura (2008) studies price dynamics at the retail and wholesale level. Her retail dataset consists of weekly observations for 100 products and 7,000 groceries across US. She decomposes the variance of prices into price variation common to all items within a product category and price variation idiosyncratic to a particular product. For each category she further decomposes price variation into: i- variation that is common across all stores; ii- variation that is common only to stores within the same retail chain; and iii- variation that is completely idiosyncratic. She finds that chains explain 64% of price variation, product about 16%, stores just 2%, and that 16% of total price variation is totally

idiosyncratic to a particular store and product. She concludes that pricing strategies at retail level are difficult to reconcile with variations in demand or costs, and they might be the consequence of retailers or manufacturers dynamic pricing strategies.

Nakamura and Steinsson (2008) use the Consumer Price Index (CPI) and the Producer Price Index (PPI) from the Bureau of Labor Statistics (BLS) in the US for the period 1988-2005 to study price stickiness. Their results show a duration of regular prices of between 8 and 11 month, after excluding price sales; that temporary sales are an important source of price flexibility -mainly downward price flexibility-; that excluding sales roughly one third of price changes are price decreases; that price increases covariates strongly with inflation, but price decreases not; and that price changes are highly seasonal -mainly in the first quarter-. Finally, they find that the hazard function of price changes, which estimates the probability of a price change after t periods without changing, is slightly downward slopping, which implies that the probability that a price change decreases the longer the time span from last change.

Ellis (2009) studies the behaviour of prices in the UK using weekly prices for 280 products in 240 supermarkets from February 2005 to February 2008. He finds low price rigidities in the UK retailing industry. Prices change frequently (the mean duration is about two weeks) even after discarding promotions and sales. He relates this finding to the frequency of the data: using weekly data translates into more price changes rather than monthly. When analysing the sign of the price change in price reversals -that is, price changes that later reverted to the original price-, he finds that there is a prevalence of price decreases, which is consistent with sales. Also the range of price changes is very wide: there are some products that display large changes in prices, and a large number that have small changes. Lastly, he finds that all products have declining hazard functions as Nakamura and Steinsson (2008).

Studies for Latin America are scarce due to the lack of availability of scan data, and have concentrated on micro CPI data. Because of the access to scan data the literature has focused in the USA and the Euro area. Barros et al (2009) Medina et al (2007) analyze price formation in Brazil and Chile respectively. They show that the frequency of adjustment is different than the one obtained using macro data. They estimate median duration of 4 and 3 months for Brazil and Chile respectively. Because their data is monthly they can not capture prices change within a month. Also, the CPI data has to deal with

higher measurement error than scan data.

Chaumont *et al* (2010) study price setting behaviour in Chile using weekly data. They find significant heterogeneity in price behaviour by supermarkets. In contrast with Nakamura (2008), they find that nearly 35% of price changes are idiosyncratic to product or chain shocks, and 65% of prices changes are common shocks that affect all products in a category and all stores in the country at the same time.

This paper is the first one that analyzes the pricing behaviour of retailers in Uruguay. Additionally, to the best of our knowledge this is the first paper to use daily price data. The objective of this study is to describe stylized facts of price formation in Uruguay, and compare them with those of the existing literature. The paper is organized as follows. The next section presents a detailed description of the database. Next we present the main findings of the analysis, and offer a brief comparison with the available evidence. Section 4 shows the main conclusions.

2.- Data

We analyze a micro dataset with a daily frequency compiled by The General Directorate of Commerce (DGC, by its Spanish acronym) which includes more than 300 grocery stores all over the country and 149 products (see Annex I for a map with the cities covered in the dataset). The products brands were chosen to be the most representatives of the product being described, and they were chosen to be the most selling brands of each category. The products in the sample represent at least 12.6% of the goods and services in the CPI basket (see Annex II).

The DGC is the authority in charge of the enforcement of the Consumer Protection Law at the Ministry of Economy and Finance. In 2006 a new tax law was passed by the legislative which changed the tax base and rates of the value added tax (VAT). The basic rate was reduced from 23% to 22% and its minimum rate (staple foods, hotel rooms (high season), certain health related services and electricity for public consumption) from 14% to 10%. In addition exemptions were eliminated (e.g. health, passengers transport, sales of new homes). A tax on intermediate consumption of goods at a 3% rate (COFIS) was eliminated. The tax reform also reduced the asymmetries between sectors of activity regarding the employer contribution to social security and introduced a personal income tax.

As the Ministry of Economy and Finance was concerned about incomplete pass-

through from tax reduction to consumer prices, it publishes an open public dataset of prices in different groceries and supermarkets in order to monitor its pass-through to consumers. In this regard, the DGC issued Resolution Number 061/006 which mandates groceries or supermarkets to report the daily prices for a list of products if they fulfil the following two conditions: i- they sell over 70% of the products listed in the Annex II of such Resolution, and ii- they have more than four grocery stores under the same name, or have more than three cashiers in a store. The information sent by each supermarket is an affidavit, which means that it is subject to penalties in case of misreport.

The DGC made the information public through a web page that published the average monthly prices of each product for each store in the defined basket (see <http://www.dgc-mef.gub.uy/publico/>). This information is available within the first ten days of the next month. It should be noted that there are no further uses for the information; eg. no price control, nor further policies were instrumented to control supermarkets with this price information. The idea was to give consumers more information about prices so they can do their shopping at the cheapest store.

The products to be reported to the DGC were defined after a survey to the main supermarket chains inquiring about their annual sells for each item and brand. After discarding supermarkets own brands, the three most selling brands were chosen to be reported in each item. Most items were homogenized in order to be comparable, and each supermarket reports always the same item. As an example, bottled sparkling water of the SALUS brand is reported in its 2.25 liter's presentation by all stores.

Each item is defined by its universal product code (UPC) with the exception of meat, eggs, ham, some types of cheese and bread. In some cases, as meat and some types of cheese, general definitions were set, but items could not been homogenized. In the case of bread, most groceries buy frozen bread and bake it, they do not produce them at the store. Grocery shops differ in the kind of bread they sell, so in some cases the reported bread does not coincide with the definition, or grocery shops prorate the price submitted to the DGC; i.e. if the groceries sold bread in 450 grams each, and the requested bread is 225 grams, they submit half the price of it.

Each month, the DGC issue a brief report with details of the price evolution. This report counts the number of products that increase or decrease their prices. The prices used for these calculations are the simple average market prices for each product.

The database starts in March 2007 and the new tax base was put into place in July 2007. A few months later, new products were added to the database, after a push of inflation in basic consumer products in 2008. The government made “voluntary sectoral price agreements” with producers in the salad oil, rice and meat markets.

Within two days after a month ends, each supermarket uploads their price information to the DGC. After that, it begins a process of so-called price consistency check of the information. This process starts by calculating the average price for each item in the basket. Each price bigger or lower than 40% average price is selected. Then the supermarket is contacted in order to check if the price submitted is right. If there is no answer from the supermarket, or if the supermarket confirms the price submitted, the price is posted online as it was reported. If the supermarket corrects the price, which is an exception, the price is corrected in the database and posted online.

Our database has daily prices from April 2007 to August 2009 on 149 items. From the database, we eliminated those items that were not used (marked as 'XXX' and '0'). The complete list of products can be found in Annex II. We also eliminate March 2007 observations, because they were preliminary and had not been posted online. Finally, we eliminate those products -and supermarkets- for which we do not have observations for more than half of the period.

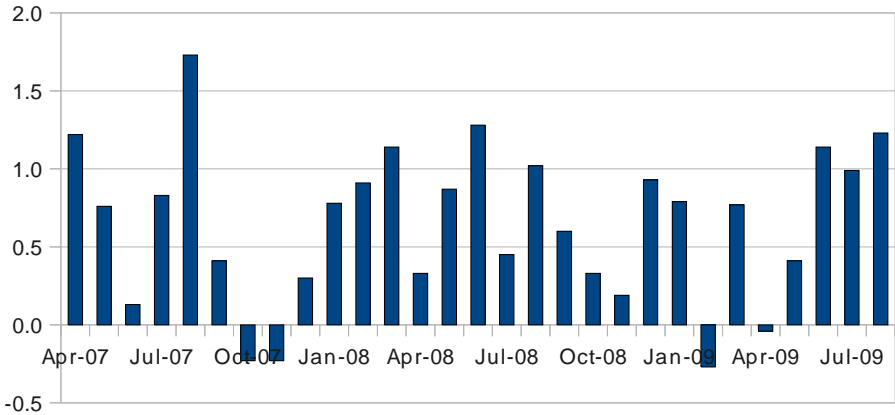
We end up with data for 125 products in 330 grocery stores from 45 cities in the 19 Uruguayan departments (see Annex I). These cities represent 80% of the total population in Uruguay. The capital city -Montevideo- with 45% of the population concentrates 60% of the supermarkets in the sample.

Table 1 summarizes the total number of price observations (20 millions) according to four categories: food, soft drinks, alcohol, and personal care and cleaning items (named personal). Food is the main category, followed by products of personal cleaning, and lastly beverages.

Category	Number of Observations	Percentage of Total
Food	13,099,463	65.0
Soft Drinks	1,190,988	5.9
Alcohol	972,609	4.8
Personal	4,892,116	24.3
Total	20,155,176	100

Finally, as our results could be driven by differences in the overall inflation in the sample, we plot the monthly variation of prices. This period was characterized by inflation pushes, and the government was worried that inflation reach a high level in the medium term.

Figure 1.- Monthly Inflation Rate (%)



3.- Results

This section shows the main results of the analysis, divided into five facts. The first one reviews the frequency of price adjustment, and compares its results with the existing literature. The second one, linked to the first one, study the existence of seasonality in the pricing adjustment of supermarkets. The third one study the nexus between price changes and expected inflation. The fourth one study price changes by day of the month, which is new in the literature. The fifth one compute the hazard rates of price changes.

3.1 Frequency of Price Adjustments

As is standard in the literature, we first study the rigidity of prices by computing the median probability of daily price changes, the median duration of prices in months, and contrast the results separating between price increases and price decreases. It should be noted that we study the whole sample, not differentiating between sales or not. From a theoretical point of view if there is a price decrease because of a sale this fact is showing evidence of price flexibility and we do not want to eliminate such observation.

The median daily price change for the whole sample is a non trivial 1.5%. This implies a medium price change every 65 days or every 2.15 months on average, which is considerably lower than the estimate of Nakamura and Steinsson (2008) and Nakamura (2008), but higher than the results of Ellis (2009) of two weeks. This result is slightly smaller than the median duration of 3 and 4 months find by Barros et al (2009) and Medina et al (2007) for Brazil and Chile respectively.

We offer two explanations for this behaviour. First, this is a period of relatively high inflation, so one could expect that prices change fast: the median monthly inflation in the period in Uruguay was 0.77%. Second, as our database has daily prices, we can calculate more accurately prices changes than in previous researches, that use weekly or monthly data. In this case, we can detect earlier price changes and our measure of price rigidity would be more sensitive to them. This would result in less price stickiness for our database.

Nearly one third (36.8%) of those price changes are price decreases, in line with Nakamura and Steinsson (2008), 40%, but lower than Ellis (2009), 50%. Table 2 presents the median probability of price changes, the percentage that are decreases and the median monthly duration by product category.

Category	Median probability	Percentage	Monthly duration
Food	1,54	38,8	2,12
Soft Drinks	0,87	45,0	3,77
Alcohol	0,96	27,8	3,41
Personal	1,90	37,9	1,72

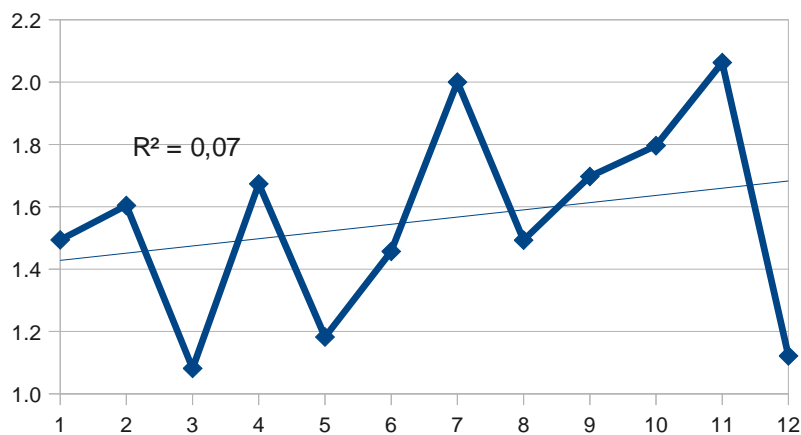
Our results show that Personal cleaning are the products that change price more frequently, and Soft drinks are the opposite. In the Annex III we present a detailed analysis of this result for each product in the sample. There is a high variability of results across products. For example, we found products that change prices quite quickly, such as Cheese “Disnapt” and “Cerros del Este” which prices change 5 and 2.5 times a month respectively, and others that change prices more slowly such as Eggs whose prices last up to 5 months.

3.2 Seasonality of Price Changes

A second issue we study is the existence of a seasonal adjustment pattern of prices. Nakamura and Steinsson (2008) find that price changes in the US are highly seasonal, and concentrated in the first quarter and then declining. This seasonality of Nakamura and Steinsson (2008) is consistent with their price rigidity calculation of about 8 month. By contrast, Ellis (2009) found no monthly seasonality in its study, a result in line with its finding of just 2 weeks of price rigidity. As we found a price duration slightly higher than two month, we should expect to find no seasonality in the data.

Studying monthly data we observe an increasing tendency of *price changes* from January to December, although the relationship is not significant (see Figure 2.a).

Figure 2.a- Probability of Price Change by Month (in %)



However, this pattern nearly disappears when looking at data on a quarterly basis. The percentage of daily price change in the first quarter is 1.35%, 1.44% in the second quarter, 1.78% in the third quarter, and 1.49% in the fourth quarter. The highest price change seems to be concentrated in the third quarter. Next we look at the seasonal behaviour of prices by categories (see Table 3).

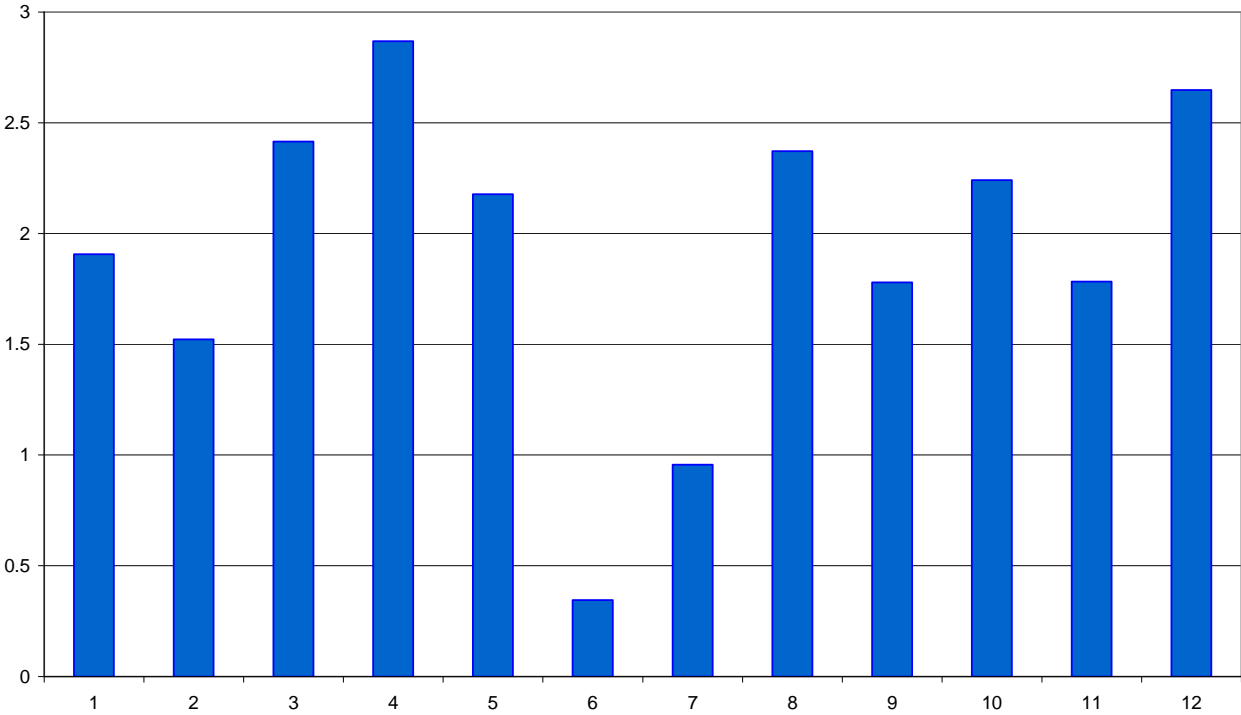
Table 3
Seasonal Price Change by Category
(in percentage)

Quarter / Category	Food	Soft Drinks	Alcohol	Personal
1	1.48	0.82	0.68	1.37
2	1.35	0.78	0.84	1.97
3	1.78	1.27	1.2	2.01
4	1.61	0.86	1	2.15

All categories but personal have the highest number of price changes in the third quarter, although there is no clear tendency in the data. We cannot conclude that there is seasonality in the speed of price adjustments.

Next we study if there is seasonality in the *level* of the price adjustments. Figure 2.b shows the price growth rate conditional on price change by month. Again, we do not observe a clear pattern of seasonality. It should be said that in Uruguay workers receive half an extra monthly paid in June and December. Also, in the last month are the New Year festivities and supermarkets sales generally boost.¹ Having said that, we do not find demand driven price changes in the data.

Figure 2.b Prices Growth Rate giving Price Change by Month



3.3 Individual Price Changes and Inflation

Next we study if price changes and inflation moves together. Ellis (2009) suggests a positive relationship between the frequency of price changes in its sample and the inflation perception surveyed by Bank of England. Table 4 shows the results of OLS regression of

¹ In Uruguay supermarkets sales usually soar the day before it remain closed. The 1st and 6th of January, the 1st of May, and the 25th of December are usually the days supermarkets do not open.

median price duration and price changes against expected inflation, yearly devaluation and an indicator variable for the tax reform. The expected inflation variable is the median forecast from a survey of experts performed by the Central Bank of Uruguay. The regression shows a surprising positive correlation between expected inflation and price duration. One would suggest that if prices tend to be stickier, then the inflation expectations should not be of inflation acceleration. It is interesting to point out that we do not observe correlation between inflation and the percent variation in individual prices.

Table 4. Individual Price Changes and Inflation: OLS Regression				
April 2007 to August 2009				
Variables	Dependent Variable			
	Median Price Duration Months	All	Increases	Decreases
Expected Yearly Inflation	1.126 (0.442)**	0.0323 (0.533)	-0.191 (0.334)	-0.510 (0.350)
Yearly Devaluation	-0.0257 (0.0171)	-0.000551 (0.0207)	0.00889 (0.0129)	0.0171 (0.0136)
Indicator Variable Tax Reform	-1.188 (0.689)*	0.369 (0.832)	0.112 (0.521)	0.916 (0.546)
Constant	-3.733 (2.718)	1.210 (3.283)	9.028 (2.056)***	-4.778 (2.155)**
Observations	29	29	29	29
R-squared	0.212	0.013	0.020	0.120

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For a better understanding of the relationship between individual daily prices and inflation we estimate the previous equation by product category. Table 5 shows the results of the coefficient on expected inflation. Results indicate that only for the food and personal product categories there is a positive association between frequency of price changes and expected inflation. Interestingly, for the alcohol and soft drink categories the correlation between frequency of price change and expected inflation is zero. This means that expectation about future inflation do not influence the price strategies of firms in those markets. We do found an association between expected inflation and the average increase rate of prices for these categories. As Table 2 shows, these categories are the ones with the most price duration, so when the adjustment comes one should expect higher ones compared to other categories.

**Table 5. Individual Price Changes and Inflation: OLS Regression by Product Category
April 2007 to August 2009**

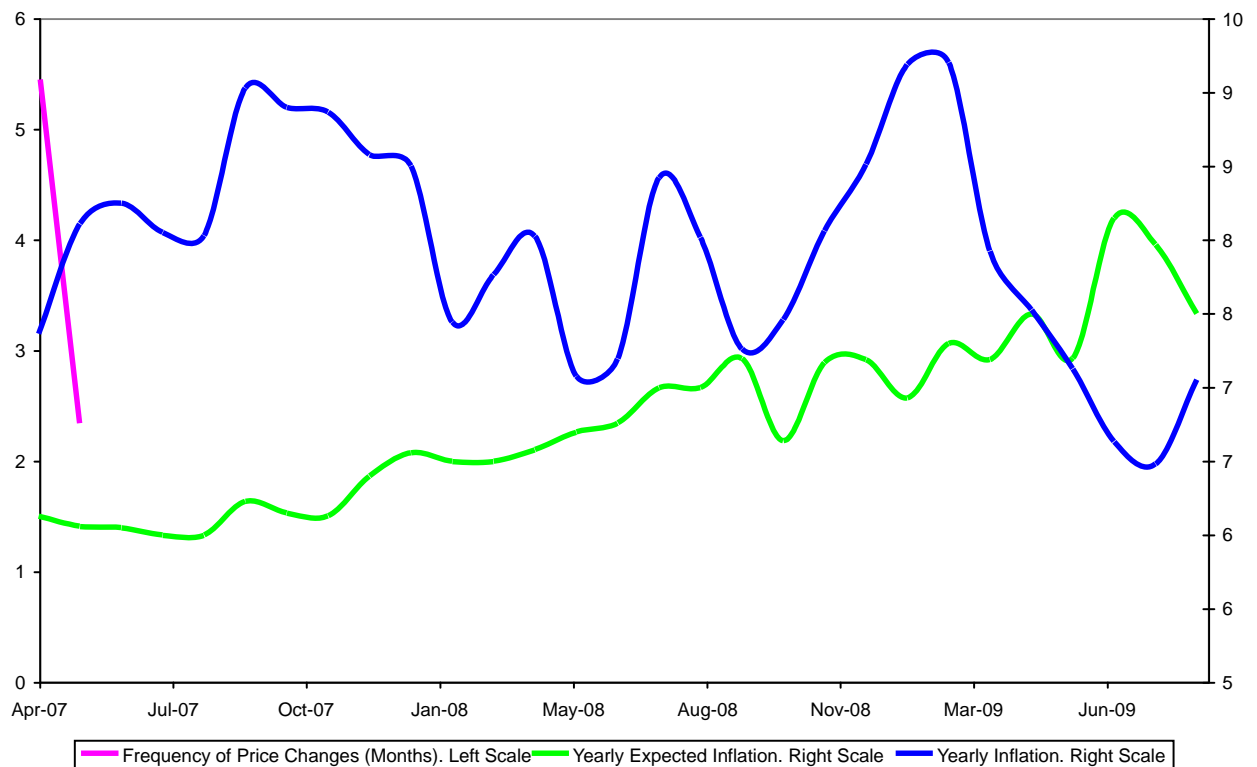
Category	Dependent Variable			
	Median Price Duration Months	Price Change in Percentage		
		All	Increases	Decreases
Coefficient - Standard Error on Yearly Expected Inflation				
Food	1.153 (0.486)**	-0.136 (0.616)	-0.353 (0.375)	-0.402 (0.399)
Soft Drinks	1.029 (10.31)	-0.133 (0.827)	2.173 (0.539)***	-0.360 (0.873)
Alcohol	0.978 (4.156)	1.175 (0.862)	1.435 (0.799)*	-0.985 (0.754)
Personal	0.892 (0.310)***	0.846 (0.676)	-0.146 (0.478)	-0.429 (0.478)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

To provide more evidence in this topic Figure 3 plots the frequency of adjustments (left scale) and the inflation and expected inflation (left scale).

Figure 3. Frequency of Price Adjustment, Inflation and Expected Inflation



3.4 Prices Changes by Day of the Month

Given the fact that we have daily data we can analyze the pricing decision of firms by day of the month. Figure 4a shows the probability of a price change by day of the month. Interestingly, the probability of price change in the first day of the month is seven times higher than in any other day.

Figure 4a: Probability of Price Change by Day

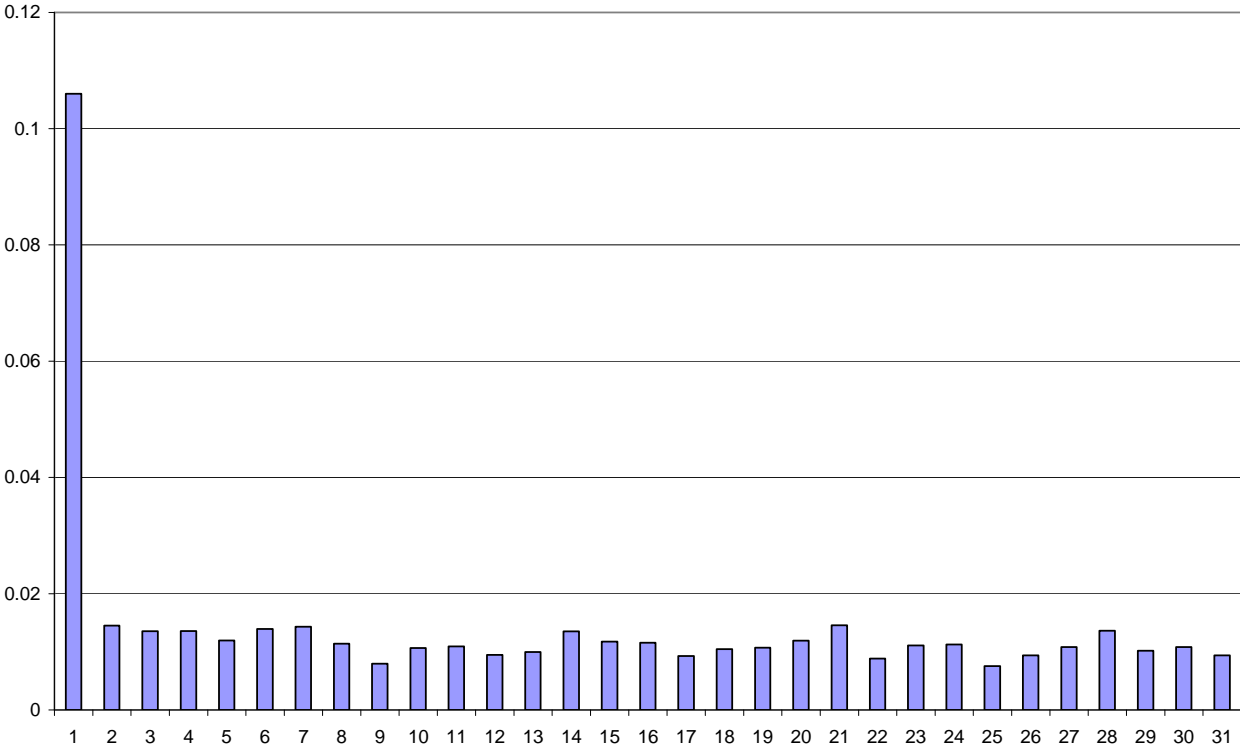


Figure 4.b plots the daily probability of a price change from the second day to the last one. We can observe some peaks in the days 7th, 14th, 21st and the 28th.

**Figure 4b: Probability of Price Change by Day
Day 2nd to 31th**

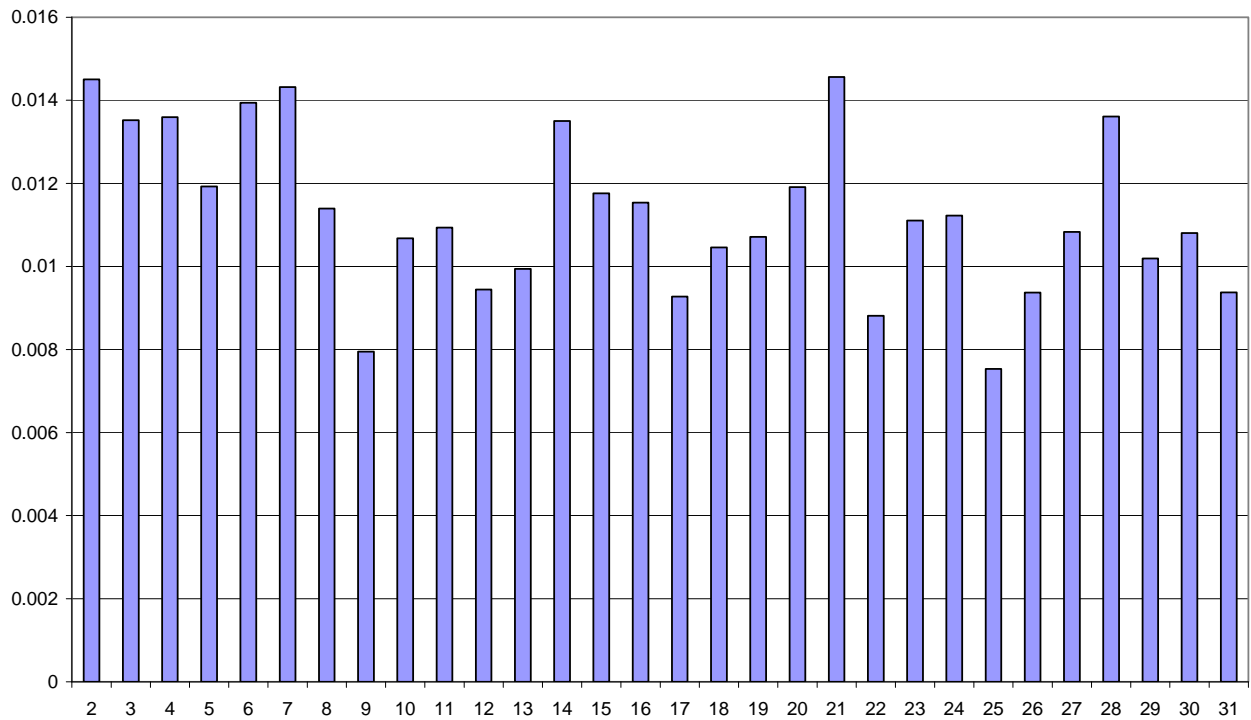


Figure 5 shows that price increases and decreases are concentrated on the first day of the Month. Also, Figure 6 shows that the fact that price changes are concentrated the first day of the month is a general result invariable to product categories. This is one of the most remarkable finding of our paper, as to the best of our knowledge no other study analyzes the distribution of price changes by day of the month. One supermarket manager told us that this behaviour is related to producers, which tend to adjust their prices the first day of the month. In this case, the observed behaviour could be a response to cost increases by supermarkets. Interestingly however is that this patter is the same for price increases and price decreases. As price decreases are associated with sales, this implies that supermarkets tend to follow a pattern of price change that concentrate most of them in one day, which may indicate the existence of menu cost associated with pricing behaviour or some other rigidity that prevent the supermarkets to change prices.

Figure 5. Probability of Price Increases and Decreases by Day of the Month

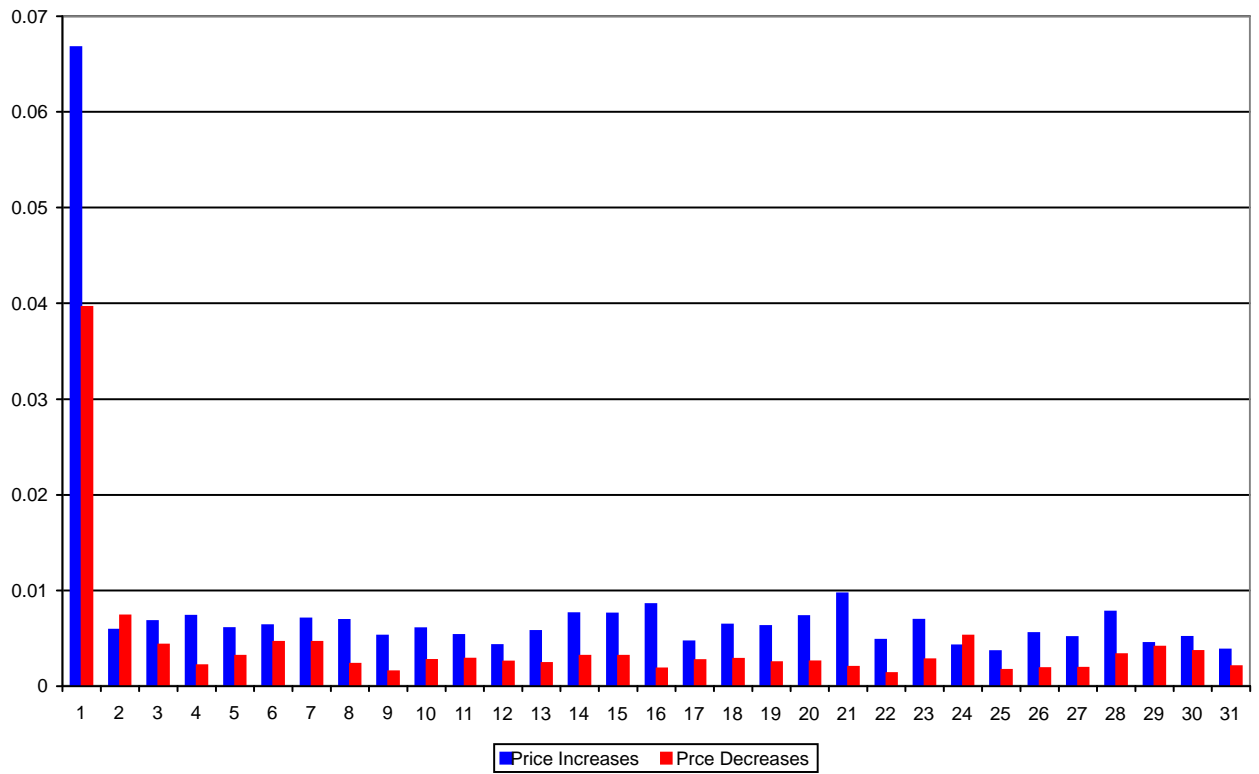
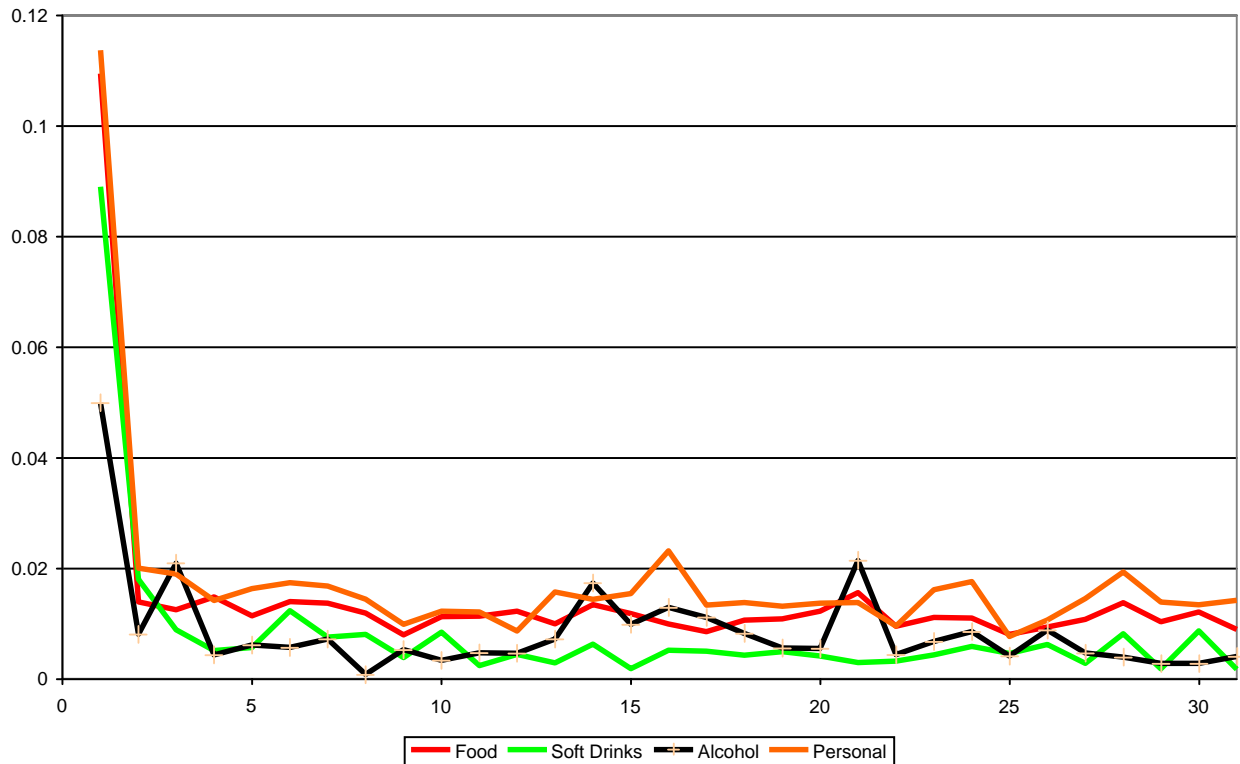
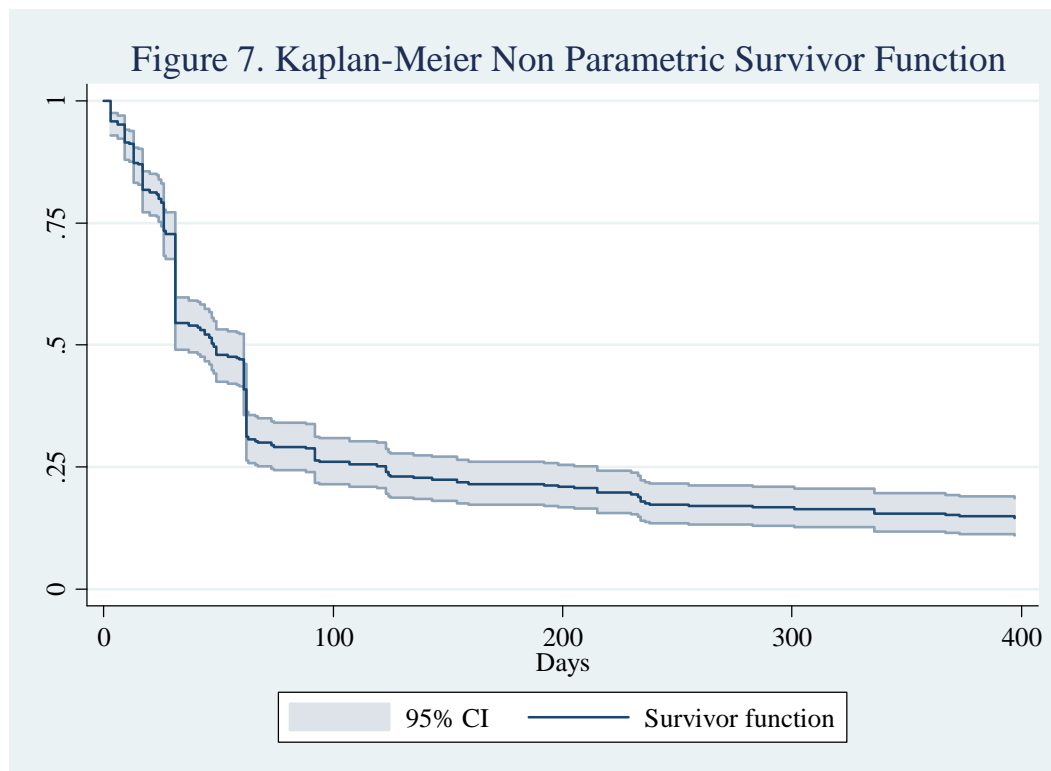


Figure 6. Daily Probability of Price Change by Product Category



3.5 Hazard Rate Estimates

Lastly, we estimate the hazard rate in order to study if the probability of price change is time dependent. The hazard rate at moment t is calculated as the quotient of the number of prices that change in t , given that they do not change until that moment, over the number of prices that have not change until moment t . As the most price duration is half year (see Annex III) we calculate the hazard function up to one year. The Figure 7 shows the price survivor function. We observe a non constant over time hazard rate. This result is consistent with Nakamura (2008) and Ellis (2009). This fact invalidates de modelling of a constant probability of price change, and implies that supermarkets do not follow a time dependent strategy for price setting. In turn, this result is in line with section 3.2, when we do no find seasonality in price changes.



4.- Conclusions

We present evidence on price formation at the retail level in Uruguay. We use a rich and unique dataset of 20 million daily prices in grocery stores and supermarkets across the country to analyze the behaviour of consumer prices in Uruguay. We find that retail prices in Uruguay are less sticky than in the US but stickier than in the UK. Also, the prices are less sticky than in Brazil and Chile. The median duration of prices in Uruguay is little over 2 months.

We do not find evidence of a seasonal pattern in the adjustment of prices. The frequency of price adjustment varies positively with expected inflation for the food and personal care product categories. However, in the alcohol and soft drink categories we find that firms increase the percentage points of the adjustment and not its frequency. Also, the probability of price changes in the first day of the month is seven times higher than in other day of the month. Finally, the probability of price adjustments is not constant over time.

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ANNEX I

The next figure plot the cities for which we have information of. All “departamentos”, which are Uruguay's regions, are included in the study.



ANNEX II: List of products

Product	Brand	Specification	Share in CPI (%)	Category
Bovine "Bottom"	Boneless - No Brand	1 Kg	0.43	Food
Bovine "Bottom"	With Bone - No Brand - Cow	1 Kg	0.43	Food
Bovine "Bottom"	With Bone - No Brand	1 Kg	0.43	Food
Bovine "Bottom"	Boneless - No Brand - Cow	1 Kg	0.43	Food
Bovine "Needle" Meat	Boneless - No Brand	1 Kg	0.86	Food
Bovine "Needle" Meat	With Bone - No Brand - Cow	1 Kg	0.86	Food
Bovine "Needle" Meat	With Bone - No Brand	1 Kg	0.86	Food
Bovine "Needle" Meat	Boneless - No Brand - Cow	1 Kg	0.86	Food
Bovine "Paleta"	With Bone - No Brand - Cow	1 Kg	n/i	Food
Bovine "Paleta"	With Bone - No Brand	1 Kg	n/i	Food
Bovine "Rueda"	With Bone - No Brand	1 Kg	n/i	Food
Bovine "Rueda"	With Bone - No Brand - Cow	1 Kg	n/i	Food
Bovine Minced Meat	Up to 20% fat	1 Kg	0.29	Food
Bovine Minced Meat	Up to 5% fat	1 Kg	0.29	Food
Bread	No Brand	1 unit aprox. 0.215 Kg	1.21	Food
Butter	Calcar	0.2 Kg	0.15	Food
Butter	Conaprole sin sal	0.2 Kg	0.15	Food
Butter	Lactería	0.2 Kg	0.15	Food
Cacao	Vascolet	0.5 Kg	0.04	Food
Cacao	Copacabana	0.5 Kg	0.04	Food
Cheap Ham "Leonesa"	La Constancia	1 Kg	0.21	Food
Cheap Ham "Leonesa"	Centenario	1 Kg	0.21	Food
Cheap Ham "Leonesa"	Schneck	1 Kg	0.21	Food
Cheese	Cerros del Este	1 Kg	0.23	Food
Cheese	Dispnat	1 Kg	0.23	Food
Coffee	Chaná	0.2 Kg	0.1	Food
Coffee	Águila	0.2 Kg	0.1	Food
Colorado Eggs	Prodhin	1/2 Dozen	0.34	Food
Colorado Eggs	El Jefe	1/2 Dozen	0.34	Food
Colorado Eggs	El Ecologito	1/2 Dozen	0.34	Food
Dulce de leche	Manjar	1 Kg	0.14	Food
Dulce de leche	Los Nietitos	1 Kg	0.14	Food
Dulce de leche	Conaprole	1 Kg	0.14	Food
Flour	Puritas	1 Kg	0.16	Food
Flour	Cololó	1 Kg	0.16	Food
Flour	Cañuelas	1 Kg	0.16	Food
Grated Cheese	El Trébol	0.08 Kg	0.15	Food
Grated Cheese	Conaprole	0.08 Kg	0.15	Food
Grated Cheese	Milky	0.08 Kg	0.15	Food
Grit Noodles	Las Acacias	0.5 Kg	n/i	Food
Grit Noodles	Adria	0.5 Kg	n/i	Food
Ham	Arizona	1 Kg	0.35	Food
Ham	Otonello	1 Kg	0.35	Food
Ham	Picorell etiqueta verde	1 Kg	0.35	Food
Margarine	Danica dorada	0.2 Kg	0.02	Food

Product	Brand	Specification	Share in CPI (%)	Category
Margarine	Primor	0.25 Kg	0.02	Food
Margarine	Doriana nueva	0.25 Kg	0.02	Food
Mayonnaise	Fanacoa	0.5 Kg	0.09	Food
Mayonnaise	Uruguay	0.5 Kg	0.09	Food
Mayonnaise	Hellmans	0.5 Kg	0.09	Food
Noodles	Las Acacias	0.5 Kg	0.3	Food
Noodles	Cololó	0.5 Kg	0.3	Food
Noodles	Adria	0.5 Kg	0.3	Food
Peach Jam	Limay	0.5 Kg	0.17	Food
Peach Jam	Dulciora	0.5 Kg	0.17	Food
Peach Jam	Los Nietitos	0.5 Kg	0.17	Food
Peas	Trofeo	0.35 Kg	0.05	Food
Peas	El Hogar	0.35 Kg	0.05	Food
Peas	Arcor	0.35 Kg	0.05	Food
Poultry	Avesur	0.2 Kg	0.64	Food
Poultry	Melilla	1 Kg	0.64	Food
Poultry	Tenent	1 Kg	0.64	Food
Rice	Aruba tipo Patna	1 Kg	0.2	Food
Rice	Blue Patna	1 Kg	0.2	Food
Rice	Vidarroz	1 Kg	0.2	Food
Rice	Pony	1 Kg	0.2	Food
Rice	Green Chef	1 Kg	0.2	Food
Salad Cookies	El Trigal	0.15 Kg	0.17	Food
Salad Cookies	Maestro Cubano	0.15 Kg	0.17	Food
Salad Cookies	Famosa	0.14 Kg	0.17	Food
Salad Oil	Uruguay	0.9 Litre	0.25	Food
Salad Oil	Óptimo	0.9 Litre	0.25	Food
Salt	Torre vieja	0.5 Kg	0.05	Food
Salt	Urusal	0.5 Kg	0.05	Food
Salt	Sek	0.5 Kg	0.05	Food
Sausage	Cattivelli	0.34 Kg - 8 Units	0.26	Food
Sausage	Otonello	0.33 Kg - 8 Units	0.26	Food
Sausage	Schneck	0.33 Kg - 8 Units	0.26	Food
Soybean Oil	Condasa	0.9 Litre	n/i	Food
Sugar	Bella Unión	1 Kg	0.25	Food
Sugar	Azucarlito	1 Kg	0.25	Food
Tea	Lipton	Box 19 Units	0.09	Food
Tea	La Virginia	Box 19 Units	0.09	Food
Tea	Hornimans	Box 19 Units	0.09	Food
Tomato Pulp	De Ley	1 L	0.08	Food
Tomato Pulp	Conaprole	1 L	0.08	Food
Tomato Pulp	Qualitas	1 L	0.08	Food
Yerba mate	Del Cebador	1 Kg	0.34	Food
Yerba mate	Sara	1 Kg	0.34	Food
Yerba mate	Canarias	1 Kg	0.34	Food
Yogurt	Parmalat (skim)	0.5 L	0.06	Food
Yogurt	Conaprole	0.5 L	0.06	Food
Cola	Nix	1.5 L	1.94	Soft Drink
Cola	Pepsi	1.5 L	1.94	Soft Drink

Product	Brand	Specification	Share in CPI (%)	Category
Cola	Coca Cola	1.5 L	1.94	Soft Drink
Sparkling Water	Nativa	2 L	0.7	Soft Drink
Sparkling Water	Matutina	2 L	0.7	Soft Drink
Sparkling Water	Salus	2.25 L	0.70	Soft Drink
Beer	Patricia	1 L	0.3	Alcohol
Beer	Pilsen	1 L	0.3	Alcohol
Wine	Tango	1 L	0.34	Alcohol
Wine	Rosés	1 L	0.34	Alcohol
Wine	Santa Teresa Clásico	1 L	0.34	Alcohol
Bleach	Sello Rojo	1 L	0.08	Personal
Bleach	Solución Cristal	1 L	0.08	Personal
Bleach	Agua Jane	1 L	0.08	Personal
Detergent	Deterjane	1.25 L	0.2	Personal
Detergent	Hurra Nevex	1.25 L	0.2	Personal
Laundry Soap	Skip	0.8 Kg	n/i	Personal
Laundry Soap	Drive	0.8 Kg	n/i	Personal
Laundry Soap	Nevex	0.8 Kg	n/i	Personal
Laundry Soap in Bar	Nevex	0.2 Kg - 1 Unit	0.45	Personal
Laundry Soap in Bar	Bull Dog	0.3 Kg - 1 Unit	0.45	Personal
Shampoo	Suave	0.35 L	n/i	Personal
Shampoo	Fructis	0.35 L	n/i	Personal
Shampoo	Sedal	0.35 L	n/i	Personal
Soap	Suave	0.125 Kg	0.16	Personal
Soap	Palmolive	0.125 Kg	0.16	Personal
Soap	Astral	0.125 Kg	0.16	Personal
Toilet Paper	Personal	4 Units - 25 M each	0.24	Personal
Toilet Paper	Sin Fin	4 Units - 25 M each	0.24	Personal
Toilet Paper	Higienol Export	4 Units - 25 M each	0.24	Personal
Toothpaste	Kolynos	0.09 Kg	0.49	Personal
Toothpaste	Closeup Triple	0.09 Kg	0.49	Personal
Toothpaste	Colgate Total	0.09 Kg	0.49	Personal

Note: n/i means not included in the CPI.

ANNEX III: Detailed price change and duration of prices by product.

Product	Brand	Median probability Median probability	Percentage Percentag	Monthly duration
Salad Oil (Oil)	Optimo	4,0	41,5	0,8
Salad Oil (Oil)	Uruguay	3,7	39,4	0,9
Water	Salus	1,4	32,6	2,3
Water	Matutina	1,3	43,8	2,5
Rice	Green Chef	3,0	41,5	1,1
Rice	Blue Patna	2,7	39,8	1,2
Rice	Aruba tipo Patna	1,9	40,3	1,7
Peas	Arcor	1,3	44,3	2,6
Peas	El Hogar	1,2	26,6	2,8
Peas	Trofeo	1,6	40,5	2,0
Sugar	Azucarlito	2,0	43,1	1,7
Sugar	Bella Union	1,8	42,3	1,8
Coffee	Aguila	1,2	31,3	2,8
Coffee	Chana	0,9	41,7	3,5
Beer	Pilsen	1,1	25,1	3,1
Beer	Patricia	1,0	22,3	3,4
Shampoo	Sedal	1,9	48,9	1,7
Cacao	Copacabana	1,3	35,7	2,6
Detergent	Hurra Nevex	2,6	42,5	1,2
Detergent	Deterjane	2,4	43,3	1,4
Dulce de leche	Conaprole	1,3	40,1	2,6
Noodles	Adria	1,9	39,6	1,7
Noodles	Las Acacias	1,8	39,6	1,8
Cookies	Famosa	1,3	34,0	2,5
Cookies	Maestro Cubano	1,4	38,7	2,3
Cookies	El Trigal	1,2	32,7	2,6
Cola	Coca Cola	0,8	41,3	4,0
Cola	Pepsi	0,9	43,8	3,5
Flour	Cañuelas	3,0	42,1	1,1
Flour	Cololo	2,6	39,8	1,2
Flour	Puritas	1,6	36,4	2,0
Bleach	Agua Jane	2,0	39,7	1,7
Bleach	Solucion Cristal	1,7	37,5	2,0
Bleach	Sello Rojo	1,5	37,6	2,2
Soap	Astral	2,1	41,4	1,6
Soap	Palmolive	2,5	49,4	1,3
Soap	Suave	1,3	37,3	2,6
Laundry Soap	Nevex	2,4	42,0	1,3
Laundry Soap	Drive	1,5	37,3	2,2
Laundry Soap	Skip	2,0	46,7	1,6
Laundry Soap1	Bull Dog	1,9	37,4	1,7
Laundry Soap1	Nevex	1,9	38,8	1,8
Butter	Lacteria	0,8	43,6	4,2
Butter	Conaprole sin sal	1,5	36,7	2,1
Margarine	Doriana nueva	1,5	40,7	2,2
Margarine	Primor	1,9	40,2	1,8
Margarine	Danica dorada	1,2	42,5	2,7

Product	Brand	Median probability Median probability	Percentage Percentag	Monthly duration
Mayonnaise	Hellmans	2,3	40,4	1,4
Mayonnaise	Fanacoa	1,2	40,7	2,7
Peach Jam	Los Nietitos	1,1	37,9	3,0
Toilet paper	Higienol Export	1,7	32,1	1,9
Toilet paper	Sin Fin	2,2	40,5	1,5
Toilet paper	Personal	1,6	32,4	2,1
Toothpaste	Colgate Total	2,6	39,9	1,3
Toothpaste	Kolynos	1,4	35,1	2,4
Tomato Pulp	Qualitas	1,2	37,3	2,6
Tomato Pulp	Conaprole	2,0	41,7	1,6
Tomato Pulp	De Ley	1,5	31,5	2,2
Tea	Hornimans	1,2	50,2	2,8
Yerba	Canarias	1,6	36,4	2,0
Yerba	Sara	1,7	40,3	1,9
Yogurt	Conaprole (Entero Frutado)	1,3	34,1	2,6
Yogurt	Parmalat (Descremado Frutado)	1,2	35,1	2,6
Shampoo	Suave	1,3	47,1	2,6
Bread		1,3	29,1	2,5
Tea	La Virginia	1,3	51,1	2,6
Tea	Lipton	1,1	39,1	3,0
Shampoo	Fructis	2,7	45,5	1,2
Cacao	Vascolet	1,8	42,4	1,8
Dulce de leche	Manjar	1,2	38,1	2,7
Mayonnaise	Uruguay	2,4	42,8	1,4
Peach Jam	Dulciora	1,0	40,4	3,3
Peach Jam	Limay	0,9	27,5	3,6
Grated cheese	Conaprole	0,8	29,1	3,9
Salt	Sek	1,2	39,6	2,8
Yerba	Del Cebador	1,4	35,4	2,3
Dulce de leche	Los Nietitos	1,4	41,3	2,3
Grit Noodles	Adria	1,8	36,0	1,8
Grit Noodles	Las Acacias	1,9	44,2	1,7
Soybean Oil	Condesa	3,3	61,9	1,0
Rice	Pony	1,3	41,3	2,5
Rice	Vidarroz	1,8	51,2	1,8
Noodles	Colols	1,8	37,2	1,8
Water	Nativa	0,8	31,1	4,3
Cola	Nix	0,8	46,5	4,0
Cheese	Cerros del Este	8,2	45,0	0,4
Salt	Urusal	1,4	37,1	2,3
Wine	Santa Teresa Clasico	1,5	34,5	2,2
Wine	Tango	1,0	42,2	3,4
Bovine "Needle" Meat	With Bone - No Brand	2,7	41,9	1,2
Bovine "Needle" Meat	With Bone - No Brand - Cow	1,9	29,9	1,8
Bovine Minced Meat	Up to 20% fat	2,4	40,8	1,3
Bovine Minced Meat	Up to 5% fat	2,1	39,6	1,5
Sausage	Cattivelli	1,0	47,8	3,3
Sausage	Otonello	1,1	50,5	3,0
Sausage	Schneck	1,5	42,1	2,1

Product	Brand	Median probability	Percentage	Monthly duration
Eggs 6	El Ecologito	0,6	33,5	5,8
Eggs 6	El Jefe	0,7	34,0	4,4
Eggs 6	Prodhin	1,1	33,6	2,9
Ham	Arizona	1,2	40,4	2,8
Ham	Otonello	2,2	44,3	1,5
Ham	Picorell etiqueta verde	1,9	48,2	1,7
Cheap Ham "Leonesa"	La Constancia	3,9	45,3	0,8
Cheap Ham "Leonesa"	Schneck	1,4	42,1	2,4
Butter	Calcar	1,8	43,8	1,8
Bovine "Bottom"	With Bone - No Brand	1,6	40,5	2,0
Bovine "Bottom"	Boneless - No Brand	3,2	47,9	1,0
Bovine "Paleta"	With Bone - No Brand	2,9	42,3	1,1
Toothpaste	Closeup Triple	1,2	38,1	2,7
Poultry	Avesur	3,6	45,5	0,9
Poultry	Tenent	4,0	45,6	0,8
Cheese	Dispnat	14,4	48,3	0,2
Grated cheese	El Tribol	1,1	35,4	2,9
Grated cheese	Milky	0,9	31,1	3,8
Bovine "Rueda"	With Bone - No Brand	1,3	46,3	2,4
Wine	Roses	0,8	20,0	4,2
Cheap Ham "Leonesa"	Centenario	0,7	29,3	4,5
Bovine "Bottom"	Boneless - No Brand - Cow	2,4	46,3	1,4
Bovine "Rueda"	With Bone - No Brand - Cow	0,9	40,3	3,8
Bovine "Paleta"	With Bone - No Brand - Cow	1,8	33,8	1,8
Bovine "Needle" Meat	With Bone - No Brand - Cow	2,1	36,1	1,6
Bovine "Bottom"	With Bone - No Brand - Cow	0,9	46,3	3,8
Salt	Torre vieja	0,8	29,8	4,1
Bovine "Needle" Meat	With Bone - No Brand	1,9	37,0	1,7
Poultry	Melilla	1,8	43,1	1,9