Explaining the endurance of price level differences in the euro area*

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We analyse price level differences in the euro area focusing on the impact of market structure and exploring how consumer behaviour can influence firms' pricing. We consider two elements of market structure: producer market competition structure and the less explored structure of retail market competition. Regarding consumer behaviour we focus primarily on consumer habits. To this effect we utilise an extensive data set on retail prices and quantities for 41 product categories of fast-moving consumer goods across 58 regions in 10 euro area countries. Our results indicate that observed price differences reflect effects from diverse sources. The competition structure of the goods' producers is found to be an important determinant of price differences. However, we also find that retail market structure and consumer habits also matter, explaining a significant and economically meaningful share of observed price differences. This points to possible new and important determinants of price differences across countries that go beyond the traditional goods market structure.

Introduction

The law of one price (LOP) posits that "a good must sell for the same price in all locations". However, deviations from the LOP have been found to be significant and persistent over time.[1] Even within the euro area, which does not have any internal barriers to trade and where exchange rate fluctuations have been eliminated, the empirical evidence suggests that while price dispersion across countries has decreased over time, it still remains significant and may indicate significant impediments to the functioning of the common market.[2]

We investigate the causes of price differences in the euro area going beyond traditional pricing-to-market explanations and exploring further the interaction between firms' pricing and consumer behaviour, with particular emphasis on consumer habits. We examine also the impact of differences across countries in the retail outlets' competition.

We find that producer market competition, retail market concentration, local costs and consumer habits explain a significant part of branded product price differences across countries. In terms of economic importance, it seems that each block of factors has a similar effect in terms of magnitude on price differences with consumer habits, appearing to have a somewhat higher impact. By contrast, macroeconomic factors, such as income levels (GDP per capita) and unemployment are unimportant.

The data

The analysis in this paper is based on a large and highly disaggregated dataset of retail prices and quantities from A.C. Nielsen market research (Nielsen) containing total quantities and sales for various breakdowns. Thus in the empirical investigation we analyse differences in unit prices of branded products using brand-level aggregated unit prices.

Each product category contains information on 4 branded products and private label data. Most often, it refers to two "Pan European" brands and two other brands (local) with a large market share in each country. Even though there are 'missing brands' in each market, the data available (four brands and private labels) have a mean and median coverage of total sales of 75% and 78% respectively. The high coverage on average by just 4 brands and private label products, is a strong indication that most product categories in our dataset can be characterised as oligopolistic markets (as opposed to monopolistic competition which is found in most theoretical models of competition).

The final dataset contains approximately a quarter of a million observations for branded products and about 63 thousand observation for private label products. The data refer to 41 product groups, with 44 unit equivalents in 58 locations. The countries covered are Austria, Belgium, Germany, Spain, France, Greece, Ireland, Italy, Netherlands and Portugal.

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[1] See for example: Isard (1977), Haskel and Wolf (2001), Lach (2002), Anderson and van Wincoop (2004).

[2] See Goldberg and Verboven (2004), Engel and Rogers (2004)), Berlingierim et al (2018), and Reif and Rumler (2014).

Some descriptive statistics

The data show that price dispersion of branded products across countries is significantly larger than within country. Specifically, price dispersion defined as the standard deviation over the mean is 27% across countries which can be contrasted with an average within country dispersion of 2.9% in our sample. On balance Greece and Ireland tend to be among the expensive countries, while Germany and Spain among the cheapest ones.

Even so, differences in prices may reflect differences in quality. That is, average price differences across countries may be due to the inclusion of premium or lower-quality brands. In order to address potential effects stemming from quality differences we also analyse unit value prices of market leaders. Market leaders tend to, by definition, have a broad consumption base and to be characterised by good quality. They offer, in the consumers' eyes a reasonable 'value for money' – within each country.[3]

When comparing the time averaged minimum and maximum unit value prices of market leaders (within each product category) across euro area countries we see that there are very large price differences, indicating strong "pricing-to-market" effects. Specifically, for the 41 product categories, the mean and median price difference is a full 220% and 181%, respectively.

In Figure 1 we present the minimum and maximum unit price of a regional branded market leader within a country (averaged over time) for four different product categories. The data show that for both the lower and upper end of prices there is little overlap between countries. A similar country specific price clustering is also observed when the market leader is the same brand/product across countries.

Figure 1: Min and max unit price (incl. VAT) of regional market leaders for selected products
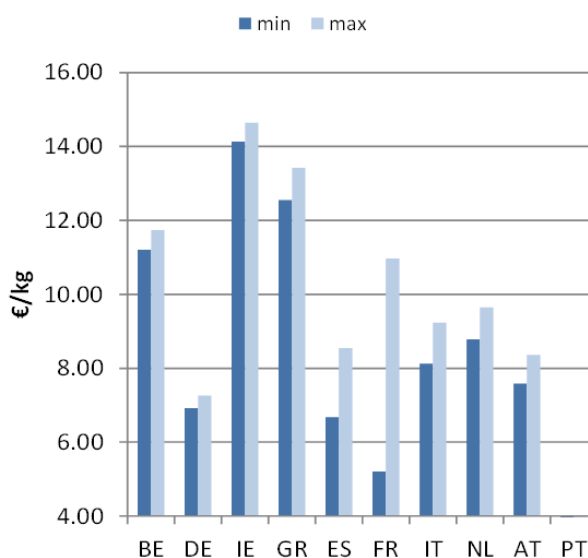

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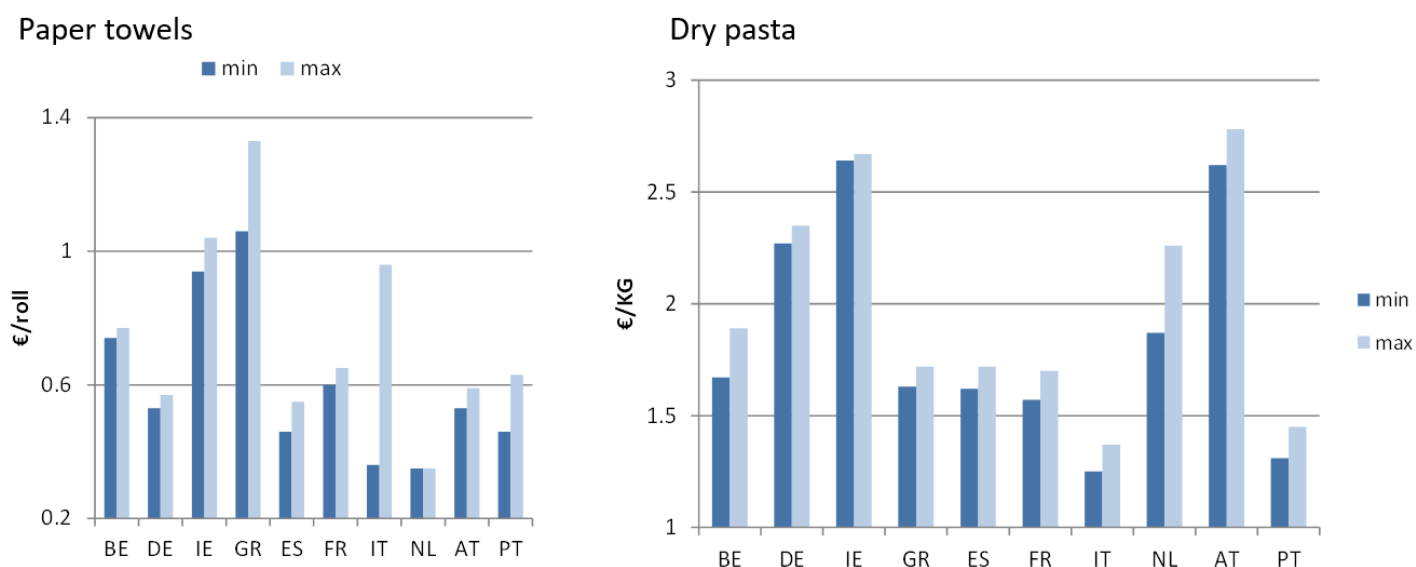
[3] Indeed for many product categories, the market leaders tend to be the same producers offering the same base products – for example Barilla in the product category of dry pasta. In this respect, quality differences are minimized. On average, market leaders are about 4 per cent more expensive than the non-leading brands.

Tinned tuna
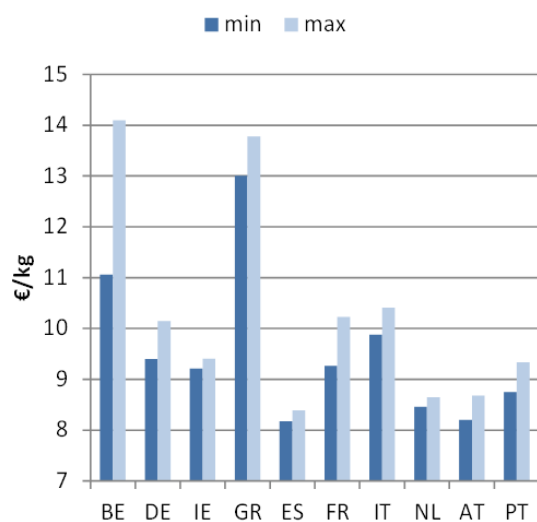
Ground Coffee

Note: Based on time average unit prices of market leaders of branded products, EMU 10 sample, 58 regions.
Sources: Nielsen and authors' calculations.

Estimation results

The rich dataset allows us to investigate the significance of various drivers of price differences of branded products across euro area countries in a regression setting. All our variables are expressed as relatives to the location with the median price of the market leader for each product. Thus our dependent variable are the observed unit prices of branded products relative to the unit prices of branded products in the median price location. Our explanatory variables are divided into five blocks:

1. Producer market competition, which includes: (a) the relative quantity share of the market leader in different locations – capturing the relative 'monopoly power', (b) the relative quantity shares of other brands – capturing the increasing competition and (c) the relative quantity shares of private label.

2. The retail market competition using relative concentration measures, defined as the Herfindahl-Hirschman Index, both (a) downstream – towards the consumer, as well as (b) upstream – towards the producer. The former captures the 'monopoly power' of retailers that allows them higher margins while the latter captures the 'monopsony power' towards the producers, allowing retailers to acquire goods at lower prices.

3. Two measures of relative consumer habits are also included. Namely, (a) the consumption intensity of each good - calculated as the number of units sold per person per month in a location and where a higher consumption intensity is associated with lower prices as consumers will spend more time researching the market if they consider the product to be important and (b) the average pack size which captures a consumer trait indicating some type of 'consumer cost indifference or inattention' as smaller pack sizes are consistently more expensive per unit sold.

4. Relative local cost differences such as wages of low skilled workers (including social contributions) and rents which affect the total cost of retailers.

5. Relative regional macroeconomic variables which may be important for determining price levels, such as GDP per capita, the unemployment rate and population density.

Finally, we also include VAT differences and dummy variables capturing sales in our estimations.

Our results indicate that observed price differences reflect effects from diverse sources. The competition structure of the goods' producers and retailers, consumer habits and local costs each contribute a significant and economically meaningful share to the observed price differences. The estimated coefficients of our explanatory variables show substantial differences in terms of elasticities. Even so, the feasible economic impact, which one can descry from the in sample differences of our variables, suggests a similar importance of the different 'blocks' of variables, with some added importance of consumer habits. By contrast, macroeconomic factors, like regional GDP per capita and unemployment differences are not found to be important in explaining cross-country price differences within the euro area.

Our results are robust to a variety of estimations specifications which involve assumptions about quality differences among the various brands. They are also robust to region and product exclusion as well as alternative estimation methods (OLS, IV, clustered errors). Finally, they are also robust with respect to the choice of reference location.

Policy implications

Our results show that observed price differences reflect effects from diverse sources. In a similar vein, the policy implications are also diverse if the goal is to reduce observed price differences in the euro area.

Namely, reducing product market regulation and increasing competition among producers is important, but is also only one step in the process. Of equal importance is the structure of the retail market. With regard to the prices consumers face it would seem that there are gains to be had if retailers a) are located in close proximity to each other – say two hypermarkets side by side which b) co-operate in terms of buying from producers. In this respect, regulations that restrict the entry of retailers of certain size in various local markets allow for higher consumer prices. Local costs, measured as annual wages of low skilled workers – a predominant group within the retail market also affect observed price differences. Finally, differences in consumer habits seem to have a larger impact on observed price differences. While some differences may be location specific inclined preferences, it nevertheless points to the importance of educating and informing consumers that their habits affect the prices they face. ∎

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