E C O N O M I C S B U L L E T I N

Examining goods market integration in the Eurozone: evidence obtained from an analysis of price-setting by UK automobile exporters

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Abstract

This paper investigates whether the pervasive dispersion of automobile prices within the Eurozone (1999-2006) is caused by the existence of market segmentation and divergences in the market structures. The results concerning the Pricing to Market behavior of the United Kingdom exporters indicate that it is heterogeneous across the Eurozone countries, which suggests that the goods markets are not totally integrated.

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1 Introduction

Many European Union (EU) policies are justified by the objective of achieving a single goods market. Since the elimination of checks at internal borders in January 1993, market monitoring of prices in the automobile industry (which constitutes the most representative sector) has revealed information about the achievements in the integration of goods markets between the Member States.[1] The information shows that automobile price differentials across the EU countries continued to decrease until 1999. On this subject, the paper by Goldberg and Verboven (2005) finds evidence in favor of the integration process. Their results, regarding the relative version of the Law of One Price, indicate half-lives of shocks shorter than the ones estimated in an earlier study by the authors (Golberg and Verboven, 2001).

Surprisingly, the most recent reports on the automobile markets seem to indicate that this positive evolution has not continued in recent years. There is a considerable amount of data pointing to the fact that the gap on automobile prices (net of tax) is persistent and pervasive, even within the Eurozone. Although part of this differential in prices could be attributed to transportation costs, it is possible that markets still remain sufficiently segmented for firms to obtain more profits from differences in the market structures. This is supported by the study that Engel and Rogers (2004) conducted over the period from 1999 to spring 2003, where they controlled for an important number of factors that might affect price differences between the local markets.

In this paper we are interested in using an approximation based on FOB export prices to analyze whether the price dispersion that is observed within the Eurozone is also caused by market segmentation and different market structures which induces a price discrimination strategy.[2] More specifically, the paper is based in the *Pricing to Market* behavior (PTM)[3] of United Kingdom automobile exports. We will then study the possible heterogeneity of the FOB price-setting of exporters across Eurozone countries (from January 1999 to December 2006) in response to common exchange rate variations (the euro against the pound).

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[1] This is summarised by the bi-annual reports drawn up by the European Commission.

[2] The FOB prices are net of transportation cost, tariffs and other distribution costs in the local markets.

[3] Since the concept of PTM (Krugman, 1987) is associated with incomplete pass-through, the previous empirical papers that have measured the degree of PTM are more focused on the transmission of international inflation.

2 The econometric approach

In the present approach we make no assumptions about the possible market structures of each export destination country. We specify an econometric system of seemingly unrelated regression equations which could be easily deduced, for example, from Knetter's model (1989). To examine the specific markup adjustments, we focus on the FOB export price differences with regard to a reference destination market (labeled as *1*):[4]

$$p_{it} - p_{1t} = (\lambda_i - \lambda_1) + (\beta_i - \beta_1)e_t + (u_{it} - u_{1t}) \qquad (1)$$

$i = 2,\ldots,n$
$t = 1,\ldots,T$

where the variables are in log terms. The variable (p_{it}- p_{1t}) is the differential in the export prices (in terms of the exporter's currency) and e_t is the common exchange rate (units of exporter's currency per unit of the buyer's currency). The destination fixed effect, (λ_i- λ_1), represents constant differences between each of the markups fixed to destination countries and the reference country. Lastly, (u_{it}- u_{1t}) are the regression disturbance terms.

The interpretation of the parameters, δ_i=(β_i-β_1), is straightforward. This reveals information about differences in the PTM of two export destination countries. Then, a zero value of δ_i indicates the same markup adjustments in the market *i* and *1* (that is, the degree of PTM is not idiosyncratic). Since the degree of PTM is dependent on the convexity of the demand schedule faced by exporters, this case would indicate the same perception of changes in the elasticities in market *i* and market *1*. Alternatively, a non-zero value of δ_i would reveal market segmentation and a different convexity of the demand schedule between the two export destination countries.

3. Data and empirical results

The export prices of automobiles were approximated by monthly 8-digit export unit value indices calculated from data collected from the COMEXT database (published by *Eurostat*).[5] In accordance with this classification, we focus on automobiles with gasoline-powered (spark-ignition) engines with a medium-sized cubic capacity and Diesel-powered automobiles, which are the most important sort of automobiles exported by the United Kingdom to the Eurozone (product codes 87032319 and 87033219, respectively).

[4] Since we are interested in the FOB price differences, the common marginal costs are dropped.

[5] Database follows the *Integrated Tariff of the European Communities* classification.

In the table we show the results of the estimation of δ_ι coefficients using a pooled EGLS (cross-section SUR),[6] where Germany (which is the main destination country of both products) is taken as the reference market. In the case of gasoline-powered automobiles, we found that 7 of the 9 estimated parameters are other than zero at a 5% significance level. In the case of the Diesel-engined automobiles, results indicate that 4 of the 9 estimated parameters are other than zero at a 5% significance level. Therefore, there is enough evidence to show that PTM is critically dependent on the export destination country and, consequently, the market structures across the Eurozone countries differ. That is, in many destination countries, the markup adjustments of the United Kingdom exporters following the exchange rate variations are different from the German case.

The pooled results summarizing the outcome of the values of parameters are in general positive. This indicates that there is a tendency to stabilize prices in local currency terms in response to euro appreciation (or depreciation), which is more intensive than on the German market. The markup adjustments (following a common shock to the exchange rates) are, in general, 70% higher in gasoline-powered automobiles and 40% higher in the Diesel-engined automobiles.[7] Lastly, from the F-values of the Wald test we can reject (at the 1% significance level) the hypothesis that coefficients are equal across the 9 destinations of exports for both types of automobiles described here. This implies that not only do markup adjustments differ with regard to Germany, but that divergences in markup adjustments also take place between the remaining countries of the Eurozone. The market segmentation and heterogeneity in the marked structures is therefore not just an isolated fact.

References

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[6] In this method, the GLS specification is corrected for both cross-section heteroskedasticity and contemporaneous correlation.

[7] Since the response of export prices to exchange rate variations depends on the convexity of the demand schedule, this is consistent with more the convexity of the demand schedule in the German market (see, for example, Gagnon and Knetter, 1995).

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Table: Estimates of the differences in PTM with regard to Germany (1999:01-2006:12)

Destination country(i)	Gasoline-powered automobiles	Diesel-engined automobiles
Austria	0.812** (0.274)	0.040 (0.279)
Belgium-Luxembourg	1.251** (0.223)	1.003** (0.241)
Finland	1.516** (0.235)	1.787** (0.531)
France	0.051 (0.234)	0.282 (0.224)
Ireland	1.100** (0.249)	0.716* (0.315)
Italy	0.957** (0.317)	-0.186 (0.183)
Netherlands	-0.001 (0.252)	0.644* (0.288)
Portugal	1.696** (0.419)	-0.343 (0.318)
Spain	0.488* (0.241)	0.333 (0.235)
Destination pool	0.744** (0.166)	0.349 (0.191)
	F[8,846]=18.979	F[8,846]=9.330

Notes: White cross-section standard errors are between brackets. The estimates that are statistically different from zero at the 1% (5%) significance level are marked with ** (*).