ISSN 0347-8769

Seminar Paper No. 591

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April 1995

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March 31, 1995

Abstract

The European car market is segmented by regulatory measures that support price discrimination by manufacturers and make consumer arbitrage difficult and costly. In a sample covering 43 models making up 80 % of car sales in 11 countries in 1989-1992, we find that the average standard deviation of pre-tax prices across markets is 14 %. The difference between the maximum and minimum price is typically about 50 % of the average price. The price discrimination seems to be driven largely by taxes, tariffs and import quotas. For example, a quota raises the pre-tax price of the average Japanese car by 12 % and of the average competing European car by 7 %.

New JEL classification number: F13, F15

Keywords: price discrimination, market segmentation, voluntary export restraint

1. Introduction

The market for cars in Western Europe is effectively segmented into national markets. This is evident by the fact that pre-tax prices differ substantially across markets while arbitrage is minimal. Market segmentation is supported by government regulations; notably by a block exemption granted to the automobile industry that allows manufacturers to maintain a system of exclusive and selective distributors in contravention of

Institute for International Economic Studies, Stockholm University, and World Trade Organization, Geneva, respectively. The analysis, views and conclusions in this paper are strictly those of the authors and should not be attributed to IIES or WTO. We are grateful to seminar participants at ERWIT, Humboldt University, Institute for International Economic Studies, Stockholm School of Economics, and Tel-Aviv University for comments. Nils Gottfries has been especially helpful. Flam thanks WTO for its hospitality, and the Swedish Humanities and Social Science Research Council, Axel and Margaret Ax:son Johnson's Foundation and Carl Mannerfelt's Fund for financial support.

EU competition law. Other barriers that serve to effectively segment national markets for cars are the requirement of national registration and - at least before the creation of the single market in 1993 - differences in national product standards.

Market segmentation, whether supported by regulation or pure transactions costs, allows manufacturers to tailor prices to the conditions in each market without inducing offsetting consumer arbitrage. This possibility has been widely exploited, judging from studies made by the Brussels based Bureau Européen des Unions de Consommateurs (BEUC, 1989, 1992) and by the Commission of the EU (1992). There exists much evidence that manufacturers set prices that violate the conditions under which the block exemption is granted, namely that the difference in the pre-tax price of the same model between any pair of countries does not exceed 12 per cent in the long run and 18 per cent during periods shorter than one year. Despite the fact that violations seem to be the rule rather than the exception, the Commission is now recommending that the block exemption be extended for another 10 years when it expires on June 30, 1995.

The car manufacturers take the position that the observed price differences are caused by differences in taxes and by exchange rate fluctuations. "Total price harmonization will remain a fantasy as long as there is no truly uniform market with harmonized taxes combined with a single currency or prolonged period of guaranteed currency stability," according to the executive secretary of the European Automobile Manufacturers Association (Financial Times, October 4, 1994).

The causes, extent and pattern of price discrimination in the European car market has been the subject of several academic studies. The study by Mertens and Ginsburgh (1985) is primarily concerned with establishing the degree of price discrimination. They ascribe the observed price discrimination to differences in demand elasticities (one expects higher markups in markets with low elasticities and vice versa) and differences in competitive conditions. However, no formal test is offered to support these hypotheses.

Kirman and Schueller (1990, 1992) argue that the domestic firm or firms normally play the role of price leaders in their home markets, and demonstrate that prices will be higher in a given market if the domestic firm or firms are high cost producers. They present empirical evidence that is consistent with this finding.

In a recent study, Verboven (1995) estimates a structural model of the European car market along the lines of Berry, Levinsohn and Pakes (1993) and obtains estimates of own- and cross-price elasticities and relative markups. He finds price discrimination caused by differences in demand elasticities and the presence of import quotas, but cannot identify effects of differences in costs or the nature of competition.

The present study has much the same aim as the earlier studies: to measure existing price differences and to increase our understanding of their causes.

Our various estimates of price differences are based on a large and comprehensive set of data. We have collected retail prices for 43 models in 11 countries and for four years, 1989-1992. The 43 models account for about 80 per cent of car sales in Western

Europe and about 90 per cent of all sales in the four size classes. These models are divided into four size classes that conform to industry definitions, with 11 models defined as small, 12 as small-medium, 11 as medium-large and 9 as large. The prices apply to identical or nearly identical specifications of each model. The importance of specification is illustrated by the example of Ford Escort, of which more than 70 models are sold in the United Kingdom alone, depending on the combination of engine, gearbox, number of doors, style (hatch-back or station wagon), front or four-wheel-drive, and trim level.

Our main findings are the following: First, we demonstrate the substantial incidence of taxes, which earlier studies have neglected. Second, we provide estimates of the extent to which import quotas on Japanese models raise their prices as well as the prices of competing European models. Third, we find that small to medium size models command a premium price in the home market, while large models are sold at a discount. The average home-market effect across size segments is found to be insignificant, which contrasts with the positive overall effect found by Mertens and Ginsburgh (1985). Fourth, it appears that the price variation that is not explained by differences in trade policies and taxes is largely due to market-wide effects that have a more or less uniform impact on the various models. This conclusion is supported by the fact that the ranking from the cheapest to the dearest model is practically identical across markets, while the overall price levels differ substantially. In other words, whatever the reason for high prices in a particular market, it affects all models to more or less the same extent. The difference in price levels could be caused by cost factors, such as high wages in local distribution, or by market behaviour in combinaton with cost factors. For example, Kirman and Schueller (1990, 1992) have suggested that if there is a price leader in the various national markets, we should expect a positive correlation between the price leaders' costs and the price levels. Fifth, genuine differences in preferences seems to exist across national markets. This conclusion follows from the observation that market shares for individual models vary substantially across markets, while relative prices are more or less the same.

It should be pointed out that welfare aspects are not considered. In particular, one should not conclude that less price dispersion (price discrimination) in the European car market would increase total welfare. Dewatripont, Ginsburgh and Labbé (1989) have demonstrated the possibility that both European and Japanese welfare may in fact decrease.

2. Market segmentation

We assume in this study that national markets are perfectly segmented, i.e. that no arbitrage takes place to take advantage of price differences across countries. Comprehensive and reliable statistics on arbitrage, or so-called parallell imports, are hard to come by. The Bureau Européen des Unions de Consommateurs (1989, 1992) reports that parallell imports amounted to 1-3 per cent of total sales in France, Germany, Italy,

Portugal and Spain around 1990, and less than one per cent in Belgium, Denmark, Greece, Ireland, Netherlands and United Kingdom. Thus, our assumption seems to approximate reality.

A combination of regulation and manufacturer practises have - at least until recently - served to effectively segment national markets within the EU: the exemption from competition law allowing manufacturers to control distribution through exclusive and selective dealerships, national product standards, the requirement to register the car in the country in which it is used, and article 115 under the EEC treaty, which enabled member states to take protective measures against indirect exports from other member states.

The exemption allowing and placing conditions on exclusive and selective dealerships ends on June 30, 1995, but the Commission has recently proposed that it be prolonged for another ten years. Under selective distribution a manufacturer selects dealers and prohibits them from selling new cars to other than end-users or other approved sellers. Exclusive distribution means that a manufacturer agrees to supply new cars exclusively to one dealer in a designated territory. In principle, consumers have been free to buy cars in one EU member state for use in another, and manufacturers have been obliged to supply cars to their dealers in one member state with technical specifications that allow registration in another member state. In practise, a number of manufacturer and dealer practises have made imports difficult, uncertain and costly for consumers. For example, dealers have been punished by manufacturers when selling cars for parallell imports by encountering excessive delivery times and reduced deliveries, and consumers have been denied warranty services by domestic dealers (BEUC, 1992).

The three countries in our sample that were not members of the EU in 1989-92, Austria, Sweden and Switzerland, have also allowed exclusive and selective dealerships.[1]

Differences in national standards and pure protectionism created considerable bar-

[1]One of the authors has first-hand experience of the difficulties and costs of overcoming the local monopoly created by the system of selective and exclusive dealerships. He has tried to import a new SAAB 900 to Switzerland from Sweden. First, the local SAAB dealer in Geneva refused to service the car; he would not provide the standard 10 000 kilometer service since the car was not bought from, only delivered through him. The dealer further refused to fix the breaking system following a safety recall mandated and paid for by SAAB. He also refused to carry out homologation of the car, including certifying that the car satisfied Swiss standards, and even to give any information on the necessary technical modifications and administrative procedures involved. The problem was exarcerbated by the fact that the particular engine was not type approved in Switzerland, although the car had been ordered for the Swiss market and delivered in Geneva. This was a mistake on the part of the Swedish retailer, which was reluctantly admitted but only after steps of legal action had been taken. It still remains to be seen, however, whether the local SAAB dealer in Geneva will undertake the costly modification to Swiss standards - under the pressure from SAAB in Sweden - that are estimated to cost SFR 4 250, or almost 20 per cent of the pre-tax price. The total cost of this highly frustrating exercise in consumer arbitrage, including the costs of a three month standstill, is likely to exceed 25 per cent of the pre-tax purchase price. Since a similar SAAB 900 costs about 60 per cent more in Switzerland than in Sweden before tax, the exercise still promises to be profitable in pecuniary terms. Even so, never again!

riers to arbitrage during the period under study and continue to do so. For example, prior to purchase of a car abroad consumers in Greece, Spain, Ireland, Italy and United Kingdom must obtain special documents and/or satisfy special requirements; consumers in France, Italy and Spain must obtain authorization to import Japanese cars; and a great number of documents have to be filled in in the country of purchase and in the home country for tax, registration and insurance purposes. Prior to 1993, consumers had to make certain that the imported car would qualify for type approval, on which information sometimes was hard to obtain.[2] Differences in national product standards could make costly modifications necessary, or prohibit imports. (For more examples, see BEUC, 1992). A uniform set of technical requirements was finally agreed upon in the EU and took effect in 1993. A car model that meets these requirements and has received type approval in one country can now, in principle but apparently often not in practise, be sold in all EU countries plus Norway without the need to fulfill any additional national requirement.

The national registration requirement and article 115 made it possible for some EU member states, namely France, Italy, Portugal, Spain and United Kingdom, to limit imports of Japanese cars from other member states prior to 1993. It is sometimes claimed (e.g. by de Melo and Messerlin, 1988), but officially denied, that Germany has operated a quota system since 1981. Also, Sweden in 1988 voiced concerns with the Japanese government over the rapid expansion of sales of Japanese cars in Sweden. The Japanese undertook to monitor developments so as not to contribute to any market disruption. (Swedish Board of Commerce memo of August 22, 1988.)

Under the system of national quantitative import restrictions, Italy, Spain, and Portugal limited direct imports to a few thousand units per year, giving Japanese cars market shares of 1-2 per cent, while the voluntary export restraint agreements of France and United Kingdom with Japan gave Japanese cars market shares of 3 and 11 per cent. The different national restrictions were replaced by a common export restraint agreement between the Commission and the Japanese government that took effect in 1993. Despite the agreement and the creation of the single market it is likely

[2]The information barriers regarding the formal procedures to import a car privately may be formidable, as illustrated by the following passages from the report by BEUC (1992) on parallell imports. In Italy, consumer organizations report that "... several difficulties have been encountered ... to obtain detailed information about the number, the kind and the cost of documents which are required for importing and registering a car in Italy. The majority of automobile agencies did not carry out such practises and in any case the replies provided here were often contradictory. Specialized magazines, dealers and distributors provided no information at all. Only the "Motorizzazione civile" in Milan was able to provide a general framework describing, at least partly, the complex and inaccurate bureaucratic procedure linked to the registration of a car brought from abroad. Therefore, the part regarding the costs and, notably, the time remains vague. The customs office in Milan underlined that the time for registering a car is undefinable ... " . Moreover, parallell imports of Japanese cars to Italy requires authorization from the Ministry of Foreign Affairs. "But it seems that the delays are not predictable in advance ... ". Another interesting case is Greece. "If the car does not conform to local type approval, it appears that the consumer has to bribe his way. Cost: depends on the value of the car. Delay: 10 days to 6 months."

that France, Italy, Portugal, Spain, and United Kingdom will continue to restrict direct and indirect Japanese imports. In a communication (94/C 379/10) on the future of the bloc exemption, the Commission states that it is "... examining what changes could be made to Regulation 123/85 ... taking account of ... the contribution of the selective and exclusive distribution system to the efficient management of the arrangement between Japan and the EU on trade in automobiles; the efficient management of this arrangement must not be weakened in any way." See also Mason (1994) and Mattoo and Mavroidis (1994).

3. Price dispersion

Effective segmentation of national markets has led to substantial price differences across national markets both for prices of individual models and for average prices.

We have collected retail prices for 43 car models sold in 11 countries for the period 1989-1992. The models are identical or nearly identical across markets with respect to body style, engine size, number of doors, and trim level. They are listed in table 3. The models were selected on the basis of sales and country coverage. The eleven countries are Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland and United Kingdom.

The collected prices were retail prices including taxes listed on January 1 in 1989 to 1992. Local prices were converted to DEM using the average exchange rates for January each year. The exchange rates between the European currencies were quite stable during this period. Lags in the adjustment to exchange rate changes should not bias the regression results. We have calculated net prices (but with no account for discounts) given the sometimes quite complex taxation of cars in the various countries. [3] The potential number of observations in our panel data set is $43x11x4 = 1892$. The actual number is 1788 since some models are not sold in some countries for at least part of the period.

Figure 1 summarizes pre-tax price differences per model across countries. The average price across markets for each model on the horizontal axis is plotted against the maximum price difference (the difference between the highest and the lowest price found for each model in a particular year) and against the standard deviation of the cross-country differences.

(*FIGURE* 1)

Several facts are notable: 1) Maximum price differences are very large. The average maximum price difference is nearly 50 per cent of the average price (and of course

[3]List prices were supplied by the Motor Industry Research Unit, a U.K. car industry consultant that assisted in the preparation of a Commission report (1992) on price differences. Information on taxation of motor vechicles was taken from *Motor Vechicle Taxation in Europe,* published annually by European Automobile Manufacturers Association. Data on fuel consumption, needed for Austrian tax calculation, and curb weight, needed for Swedish tax and Swiss tariff calculations, were taken from *Bilfakta,* published three times annually by Bilfakta Autograph AB, Helsingborg, Sweden.

higher relative to the minimum price). This is noteworthy since the bloc exemption from the EU competition law is given on the condition that pre-tax prices not differ more than 12 per cent in the long run between any pair of countries and not more than 18 per cent in during periods shorter than one year. The lowest price is always to be found in Denmark, which taxes cars at an average rate of more than 200 per cent (250 per cent on the margin) and the highest price most often in the United Kingdom, which taxes cars at a rate of 22 per cent (25 per cent in 1989 and 1990).

2) The average price difference measured by the standard deviation is 14 per cent of the price or DEM 3 417 for the average car in 1992. See also table 1. This is probably much more than the pure transactions costs for a consumer of purchasing a car across the border. However, judging from the limited consumer arbitrage that actually takes place between European countries, the profit does not usually compensate for the bother and uncertainty involved.

3) The percentage standard deviation and the maximum price difference are decreasing with respect to the average price, but not sufficiently to prevent the absolute differences from increasing. The standard deviation is about DEM 2 000 for small cars and DEM 2 500 for large cars, while the average maximum difference is about DEM 7 000 for small cars and DEM 11 000 for large cars. Transactions cost of cross-border purchases are at the same time probably more or less constant with respect to the size of the car. Consumers therefore stand to gain more from arbitraging a large than a small car.

4) There is no discernible trend over time, see table 1. This is not surprising in view of the fact that tax rates changed little during the period and no significant steps were taken to eliminate the factors that make market segmentation possible.

(*TABLE* 1)

5) A comparison of country price indices (average prices relative to the lowest average price, i.e. the average price in Denmark) reveals that differences are stable over time and size class, which indicates that cross-country price differences for individual models are explained mainly by country-specific factors. Table 2 shows unweighted country price indices and country rankings for the four different size classes and for all cars in the sample. (The all cars index would take on lower values in countries with relatively large sales of smaller cars if it were weighted and vice versa in countries with relatively large sales of large cars.)

(*TABLE* 2)

4. The model: Bertrand price competition in segmented national markets

The main aim of our study is to explain the large differences in prices observed across countries. As the first step, we choose a model of oligopoly that we think incorporates

the important characteristics of the car market and derive the equilibrium pricing equations and their comparative statics properties. As the second step, we regress prices on a set of explanatory variables where the pricing equations will guide us in the choice of variables and the comparative statics will provide us with expected signs on the parameter estimates.

Our model choice is the standard model of oligopoly with Bertrand competition and differentiated products. National markets are assumed to be perfectly segmented and manufacturers are assumed to maximize profit for each model separately and without consideration of cross-market interactions. Demand and cost functions are assumed to be linear so as to yield explicit and relatively simple solutions.

4.1. Markets without import quotas

We first consider markets where no models are subject to quantitative import restrictions. Demand for model i in a particular market (market subscripts will be supressed) is given by

$$x_i = \alpha_i - \beta p_i + \gamma \sum_{j \neq i}^{n} \frac{p_j}{n-1}, \; i = 1, 2, ..., n, \tag{4.1}$$

with obvious notation.

The operating profit generated from model i is maximized according to

$$Max\pi_i = \left[\frac{p_i - s_i}{(1+v)(1+t_i)} - c_i \right] x_i, \; i = 1, 2, ..., n,$$

where

c_i =constant marginal cost of supply (production and distribution),

v = uniform ad valorem tax (value-added plus eventual car tax),

t_i =model specific ad valorem tax (import tariff), and

s_i = specific tax (uniform lump-sum component in two-part tax systems or model-specific tax based on weight).

Existing taxes on cars differ substantially in structure and level between the countries under consideration. All tax systems can, however, be represented in terms of uniform and firm (or category) specific ad valorem taxes and a specific tax as written here. The tax systems in Denmark, Netherlands, Sweden and Switzerland necessitate the inclusion of s_i . This tax component is a uniform lump-sum amount in Denmark and the Netherlands, where it is part of a two-tier car tax, it is model specific in Sweden, where it is based on weight, while it represents a specific import tariff depending on weight applicable to non-EU/EFTA imports in the case of Switzerland.

Our assumption about the composition of the marginal cost implies that the manufacturer controls both production and distribution and maximizes profit on both activities jointly by choosing the optimal pre-tax price. The first order conditions for profit maximization are

$$p_i = \frac{1}{2\beta}\left[\alpha_i + \beta c_i(1+v)(1+t_i) + \beta s_i + \gamma \sum_{j\neq i}^{n} \frac{p_j}{n-1}\right], i = 1, 2, ..., n,$$

We solve for equilibrium prices by adding $\frac{\gamma}{2\beta(n-1)} p_i$ on both sides, summing over all first order conditions, solving for $\sum_j^n p_j$, and substituting the solutions into the first order conditions to arrive at

$$q_i^{UU} = \left(\frac{1}{2\beta-\gamma}\right)\left\{\begin{array}{l} \frac{1}{(1+v)(1+t_i)}\left[\Omega\alpha_i + (1-\Omega)\sum_{j\neq i}^{n}\frac{\alpha_j}{n-1}\right] \\ +\beta\left[\Omega c_i + (1-\Omega)\sum_{j\neq i}^{n}\frac{c_j\frac{(1+t_j)}{(1+t_i)}}{n-1}\right] \\ +\frac{\beta}{(1+v)(1+t_i)}\left[\Omega s_i + (1-\Omega)\sum_{j\neq i}^{n}\frac{s_j}{n-1}\right] \end{array}\right\} + \\ -\frac{s_i}{(1+v)(1+t_i)} \qquad (4.2)$$

where q_i^{UU} is the equilibrium net price for unrestricted firm i in an unrestricted market and is defined as

$$q_i^{UU} \equiv \frac{p_i - s_i}{(1+v)(1+t_i)}.$$

The weight Ω is defined as

$$\Omega \equiv 1 - \frac{\gamma}{2\beta + \frac{\gamma}{n-1}}.$$

A sufficient condition for $1 > \Omega > 0$ is that $\beta > \gamma/2$, i.e. that the own-price effect on demand is sufficiently larger than the cross-price effect. Given that $\beta > \gamma$, which seems reasonable, it follows that $\Omega > 1 - \Omega$, i.e. the own effect of a change in preferences (α), costs (c) and specific taxes (s) always are stronger than the effects of a change in the average of the competitors' preferences, costs and specific taxes.

The net price in (4.2) is a positive function of 1) a weighted sum of the own demand intercept and the average for the competitors, 2) a weighted sum of the own marginal cost and the average for the competitors adjusted for an eventual difference in the own tariff rate and the average for the competitors, 3) a weighted sum of the own specific tax and the average for the competitors, and a negative function of 4) the own specific tax, and 5) ad valorem tax rates.

4.2. Markets with import quotas

We consider next a market in which a subset n^R of all n models are subject to import quotas and the rest are unrestricted; $n^U + n^R = n$. Market indices are suppressed except for pre-tax prices.

The prices of the restricted models adjust so that demand is equal to the level of supply determined by the quota:

$$x_i^R = \alpha_i - \beta p_i + \gamma \sum_{j \neq i}^{n} \frac{p_j}{n-1}, i = 1, 2, ..., n^R, \tag{4.3}$$

where x_i^R is restricted supply of firm i set by the quota.

Demand for unrestricted models is given by (4.1). The resulting equlibrium price for the unrestricted firm is

$$q_i^{UR} = \left(\frac{1}{2\beta-\gamma}\right)(1+\zeta)\left\{\begin{array}{c} \left(\frac{1}{(1+v)(1+t_i)}\right)\left[\begin{array}{c}\Theta_i^U \alpha_i \\ +\Theta^{U-i}\sum_{j\neq i}^{n^U}\frac{\alpha_j}{n^U-1} + \Theta^R \sum_{r=1}^{n^R}\frac{\alpha_r}{n^R}\end{array}\right] \\ +\beta\left[\Theta_i^U c_i + \Theta^{U-i}\sum_{j\neq i}^{n^U}\frac{c_j\frac{(1+t_j)}{(1+t_i)}}{n^U-1}\right] \\ +\frac{\beta}{(1+v)(1+t_i)}\left[\Theta_i^U s_i + \Theta^{U-i}\sum_{j\neq i}^{n^U}\frac{s_j}{n^U-1}\right] \\ -\left(\frac{1}{(1+v)(1+t_i)}\right)\Theta^R\sum_{r=1}^{n^R}\frac{x_r^R}{n^R} \end{array}\right\} \\ -\frac{s_i}{(1+v)(1+t_i)} \tag{4.4}$$

where

$$\Theta_i^U \equiv \Omega - (1-\Omega)\left(\frac{n^R}{n-1}\right)\frac{\beta}{\left(\beta+\frac{\gamma}{n-1}\right)},$$

$$\Theta^{U-i} \equiv \left(\frac{n^U-1}{n-1}\right)(1-\Omega),$$

$$\Theta^R \equiv \left(\frac{n^R}{n-1}\right)(1-\Omega)\left(1+\frac{\beta}{\left(\beta+\frac{\gamma}{n-1}\right)}\right),$$

and

$$\zeta \equiv \left(\frac{n^R}{n-1}\right)\frac{\beta\gamma}{\left(2\beta+\frac{\gamma}{n-1}\right)(\beta-\gamma)+\left(\frac{n^U}{n-1}\right)\beta\gamma},$$

while the equilibrium price for the restricted firm is

$$q_i^{RR} = \left(\frac{1}{2\beta-\gamma}\right)(1+\zeta+\eta)\left\{\begin{array}{c} \left(\frac{1}{(1+v)(1+t_i)}\right)\left[\begin{array}{c}\Phi_i^R\alpha_i \\ +\Phi^{R-i}\sum_{j\neq i}^{n^R}\frac{\alpha_j}{n^R-1}+\Phi^U\sum_{j=1}^{n^U}\frac{\alpha_j}{n^U}\end{array}\right] \\ +\beta\Phi^U\sum_{j=1}^{n^U}\frac{c_j\frac{(1+t_j)}{(1+t_i)}}{n^U} \\ +\frac{\beta}{(1+v)(1+t_i)}\left(\Phi^U\sum_{j=1}^{n^U}\frac{s_j}{n^U}\right) \\ -\left(\frac{1}{(1+v)(1+t_i)}\right)\left(\Phi_i^R x_i^R+\Phi^{R-i}\sum_{j\neq i}^{n^R}\frac{x_j^R}{n^R}\right) \end{array}\right\} - \frac{s_i}{(1+v)(1+t_i)} \tag{4.5}$$

where

$$\Phi_i^R \equiv \Omega + (1-\Omega)\left(\frac{n^R}{n-1}\right)\frac{\beta}{\beta+\frac{\gamma}{n-1}},$$

$$\Phi^{R-i} \equiv (1-\Omega)\left(\frac{n^R-1}{n-1}\right)\left(1+\frac{\beta}{\beta+\frac{\gamma}{n-1}}\right),$$

$$\Phi^U \equiv (1-\Omega)\left(\frac{n^U}{n-1}\right),$$

and

$$\eta \equiv \frac{\beta(2\beta-\gamma)}{\left(2\beta+\frac{\gamma}{n-1}\right)(\beta-\gamma)+\left(\frac{n^U}{n-1}\right)\beta\gamma}.$$

From expression (4.5) it can be seen that the net price of unrestricted firms is 1) a negative function of a weighted sum of the own intercept and separate averages of the intercepts for other unrestricted firms and the restricted firms, 2) a positive function of a weighted sum of own marginal cost and the average marginal cost of *unrestricted* competitors' (the restricted firms' marginal cost does not enter given that the import quota binds), 3) a positive function of a weighted sum of the own specific tax and the average of other *unrestricted* firms' specific taxes, 4) a negative function of the average size of the import quota, and a negative function of the 5) specific tax and 6) ad valorem tax rates. The positive effect of a specific tax rate increase is an indirect effect and is smaller than the negative direct effect, shown by the last term in (4.5).

From expression (4.6) it can be seen that the net price of restricted firms is a similar function of preferences, restricted import quantities, costs, and tax rates. Note the absence of restricted firms' cost in both the restricted and unrestricted firms' pricing equations.

4.3. Comparative statics results

The comparative statics results are summarized below where q_i^{UU}, q_i^{UR}, and q_i^{RR} denote unrestricted firms i's net price in an unrestricted market, unrestricted firm i's net price in a restricted market, and restricted firm i's price in a restricted market respectively:

	v	t_i	$t_j \left(\neq t_i, t_j^R\right)$	c_i	$c_j \left(\neq c_j^R\right)$	s_i	$s_j \left(\neq s_j^R\right)$	x_i^R	x_j^R
q_i^{UU}	$-$	$-$	$+$	$+$	$+$	$-$	$+$		
q_i^{UR}	$-$	$-$	$+$	$+$	$+$	$-$	$+$		$-$
q_i^{RR}	$-$	$-$	$+$		$+$	$-$	$+$	$-$	$-$

The effect of own tax increases (in v, t_i, s_i) is negative, while the effect of tax increases for rival non-restricted firms is positive. Note that in the case of a change in the firm-specific ad valorem tax for other firms only changes in tax rates that are different than the own tax rate is relevant. This can be seen in the expressions for net prices in (4.2), (4.5), and (4.6) and the ratio $\frac{(1+t_j)}{(1+t_i)}$ which collapses to unity when $t_i = t_j$.

Increases in own and unrestricted rivals' costs have a positive effect on the price, with one exception. Restricted firms' marginal cost is irrelevant for market prices as their behaviour is restricted by quotas and not costs.

A restricted firm lowers its net price both when its own and its restricted rivals' supplies are allowed to increase. Unrestricted firms are likewise forced to lower their prices when restricted imports are increased.

We were unable to establish a ranking - even a presumption about a ranking - for the same partial effect between different types of firms and markets. For example, we tried to establish whether we should expect the own effect of a tax increase to be higher for unrestricted firms in restricted than in unrestricted markets.

5. The econometric model and results

In this section, we will estimate basically linear approximations of the pricing equations of the theoretical model.

5.1. The basic model

The basic model has the following form:

$$q_i^{lk} = \alpha_i + \beta_0 D^H + \beta_1 v + \beta_2 v^2 + \beta_3 t_i + \beta_4 \bar{t}_j + \beta_5 s_i + \beta_6 kW + \beta_7 CPI_z + \beta_8 D^{UR} + \beta_9 D^{RR}, i = 1, 2, ..., n; z = 1, 2, ..., m,$$

where

$$D^H = \begin{cases} 1 \; if \; domestic \; model \\ 0 \; otherwise \end{cases}$$
$$D^{UR} = \begin{cases} 1 \; if \; l = U, k = R \\ 0 \; otherwise \end{cases} \qquad (5.1)$$
$$D^{RR} = \begin{cases} 1 \; if l = R, \; k = R \\ 0 \; otherwise \end{cases}$$

and CPI_z is the consumer price index for country z.

The basic model differs from the theoretical in the following ways:

1) The market-independent (or common) impact of costs and preferences is picked up by a model-specific intercept (fixed effect).

2)The variable kW controls for cost differences that are due to slight differences in engine power across markets. (Some models are not sold with identical engines in all countries.)

3) We also include a dummy variable to capture the presence of a uniform bias for or against domestic models. A domestic model is so defined if it is produced domestically or by a firm that has significant domestic production. Specifically, all Ford and GM models are defined as domestic in Germany and United Kingdom, Volvo 700/900 as domestic in Belgium - where it is also produced - and Sweden, Volvo 300/400 in Netherlands - where it is produced - and Sweden. In spite of the fact that Volkswagen owns SEAT, we presume that Volkswagen models are not considered as domestic by Spanish consumers, and that SEAT Ibiza is not considered as domestic by German consumers. GM Corsa is defined as domestic in Spain - where it is produced - and in Germany and the United Kingdom, but no other GM models are defined as domestic in Spain. Alternative classifications in border-line cases did not yield qualitative changes of the results.

4) A quadratic term for the uniform ad valorem tax rate has been added. The reason is that Denmark is an outlier; it has a rate of 250 or 241 per cent whereas the other countries typically have rates in the 15 to 30 per cent range. Without the quadratic term the value of β_1 is much lower (as is $\bar{R}^2$). This implies that price is not a linear function of the tax rate but has a positive second derivative - as does the theoretical model.

5) The term capturing rival firms' average specific tax is not included. The reason is that the own and rivals' specific taxes in most cases are identical, making for a near perfect correlation between the two. When both the own and the adjusted average of rivals' specific tax were included in the regressions we found that the signs were unstable. Furthermore, the value of $\bar{R}^2$ was hardly affected by the inclusion of one or both variables. The near perfect collinearity between the two variables (0.998) makes it impossible to interpret the value and sign of any one of the coefficients of the variables also in the case when the other variable is left out; the single variable left in

seems to measure the average influence of the two variables.

6) Country consumer price indices were included to control for inflation.

7) Dummies for the existence of quantitative import restrictions were included instead of the restricted quantities or market shares.

The estimated coefficients and intercept terms are presented in table 3:

Table 3. Regression results for the basic model

	All cars	Small	Small -medium	Medium -large	Large
Average price 1989, DEM	21 128	12 362	17 295	23 437	33 647
Coefficients					
Engine power, per kW	122*** (9)	75*** (9)	109*** (14)	140*** (14)	170*** (27)
Ad valorem tax, per pct. point	−82*** (5)	−59*** (7)	−91*** (8)	−94*** (10)	−70*** (15)
Ad valorem squared, per pct. point	20*** (2)	18*** (2)	23*** (3)	23*** (4)	13** (5)
Own tariff, per pct. point	−224*** (26)	−146*** (23)	−149*** (37)	−303*** (48)	62 (46)
Rivals' tariff, per pct. point	215*** (28)	120*** (33)	90** (40)	259*** (54)	
Specific tax, per DEM 1000	−170** (79)	338*** (107)	−265** (120)	−191 (137)	−389* (204)
CPI, per index point	215*** (8)	118*** (9)	187*** (11)	237*** (15)	358*** (23)
Intercepts					
Home market	−178 (170)	498*** (190)	707*** (240)	106 (339)	−1490*** (452)
Own quota	2721*** (352)	1077** (445)	2826*** (416)	3500*** (518)	
Rivals' quota	1660*** (130)	263* (153)	1111*** (198)	1950*** (248)	2541*** (339)
R^2 adjusted	0.63	0.71	0.74	0.73	0.65
N	1788	442	503	467	376

Notes:
OLS with fixed effects.
Standard errors within parenthesis.
* Significant at 90 per cent level.
** Significant at 95 per cent level.
*** Significant at 99 per cent level.

Consider first the price adjustment for differences in engine power. All estimates are highly significant. One kW costs an estimated DEM 122 for the average car, and DEM 75, 109, 140 and 170 for small, small-medium, medium-large and large cars respectively, or 0.5-0.6 per cent of the average price for all size classes.

The uniform ad valorem tax lowers the price as predicted by the model. All estimates are highly significant. Note that the total effect of the ad valorem tax is obtained by adding the estimated coefficient for the linear term and the coefficient for the quadratic term multiplied by two and by the relevant tax rate. For example, if the tax effect is evaluated at the Swedish VAT rate of 25 per cent one should add the coefficient for the linear term and half of the coefficient for the quadratic term. A one percentage point increase in the Swedish VAT would lower the pre-tax price of the average car by DEM 72 or by 0.3 per cent.

The estimated own effects of a tariff are highly significant except for large cars and are negative as predicted. A 1 percentage point increase in the own tariff rate - leaving tariffs on other models constant - lowers the price of the average car by an estimated DEM 224 or by 1 per cent. The estimate for large cars should be disregarded since there is no variation in tariff rates across models for large cars. The only country where a tariff was imposed on large cars was Spain, which was allowed to gradually phase out its tariffs on cars from EC countries after it became a member in 1985. Tariffs were imposed on Japanese cars in all countries, but not on large Japanese cars since no such models were imported.

The cross effects of tariffs are positive and highly significant. There is no estimate for large cars for the reason just stated. To obtain the quantitative cross effect it is necessary to adjust the estimated coefficients by taking account in some way for the market shares of models that were subjected to tariffs. If the adjustment is done simply by multiplying the estimates by the market shares, the effect of an increase of the EU tariff on Japanese imports – with about 11 per cent of the EC market - by one percentage point is an increase of DEM 19 or 0.09 per cent of the average car price.

There is near perfect correlation (0.99) between own and rivals'specific taxes. We included the own specific tax rate in the regressions, but the estimates should be disregarded due to severe multicollinearity.

There exists a highly significant and positive home market bias for small and small-medium cars, where domestic producers can raise the price by about DEM 500 and 700 respectively or about 4 pent on the average price, and a highly significant and negative home market bias for large cars, making producers charge about DEM 1 500 or 4 per cent less in their home markets. We explain the difference in the following way. Domestic models have an advantage in the domestic market because their larger market shares give consumers lower costs of obtaining information and service. However, there is a counteracting factor for large cars. They cater to price-insensitive, high-income buyers in export markets with particular preferences. This is not true - at least not to the same extent - for smaller cars in export markets. The position of large cars in export markets is exploited by producers. Large cars are in fact often mass market cars in domestic markets, as for example Volvo and Saab in Sweden, and Mercedes and BMW in Germany.

The existence of quantitative import restrictions in some markets is estimated to raise prices substantially for restricted as well as non-restricted models. Producers of

restricted models were able to raise prices by DEM 1 077 on small, DEM 2 826 on small-medium and DEM 3500 on medium-large cars, or by 8, 15 and 14 per cent of the average price respectively. This means that the Japanese producers had an incentive to shift their supply towards larger cars, as they have been found to do in the United States as a result of voluntary export restraints (Feenstra, 1984).

European producers were also able to raise their prices as a result of the restrictions on Japanese imports but not as much as the restricted Japanese producers. Note that European producers of large cars - which had practically no competition from large Japanese models - were able to raise prices by an estimated DEM 2 541 or 7 per cent because smaller Japanese models were in limited supply.

As a check on the robustness of the estimates we ran the regressions for each year separately. We found that almost all estimates remained highly significant, had roughly the same values, and that the value of $\bar{R}^2$ remained constant or decreased by a few percentage points.

As another check on the results, we also ran regressions without Denmark since Danish taxes are extreme. The results are not much affected: $\bar{R}^2$'s are somewhat lower and the estimates are still highly significant with expected signs.

5.2. The augmented model

We have also estimated an augmented model. The augmented model contains two additional explanatory variables, the real interest rate and price of gasoline, that are not indicated by the theoretical model but influences user cost and therefore potentially car prices. Higher taxes on gasoline make driving a car more costly, and lead to lower demand for cars and lower prices. Higher real interest rates increases the cost of owning a car, leading to lower demand and lower prices. A more complete theoretical model of the car market would of course take account of gasoline prices, real interest rates, and other components of user cost. We have therefore estimated an augmented version of the model that include gasoline prices - effectively gasoline taxes - and real interest rates. The estimates are presented in table 4.

Table 4. Regression results for the augmented model

	All cars	Small	Small -medium	Medium -large	Large
Average price 1989, DEM	21 128	12 362	17 295	23 437	33 647
Coefficients					
Engine power, per kW	116*** (8)	67*** (8)	91*** (13)	135*** (14)	171*** (27)
Ad valorem tax, per pct. point	−50*** (6)	−30*** (7)	−45*** (8)	−58*** (11)	−49*** (17)
Ad valorem squared, per pct. point	11*** (2)	10*** (2)	10*** (3)	13*** (4)	7 (6)
Own tariff, per pct. point	−231*** (26)	−132*** (22)	−148*** (34)	−295*** (47)	−8 (55)
Rivals' tariff, per pct. point	170*** (28)	64** (31)	23 (37)	189*** (54)	
Specific tax, per DEM 1000	30 (80)	483*** (100)	73 (115)	46 (139)	−217 (212)
CPI, per index point	235*** (8)	133*** (8)	216*** (11)	261*** (15)	376*** (24)
Gasoline, per DEM 0.01	−25*** (3)	−16*** (3)	−34*** (4)	−29*** (6)	−24*** (9)
Real interest rate, per pct. point	−120*** (31)	−200*** (31)	−172*** (40)	−114** (55)	33 (92)
Intercepts					
Home market	−164 (166)	627*** (174)	615*** (218)	15 (331)	−1436*** (454)
Own quota	2901*** (343)	1279*** (405)	2914*** (379)	3813*** (502)	
Rivals' quota	2079*** (133)	541*** (142)	1620*** (186)	2374*** (250)	2917*** (371)
R^2 adjusted	0.65	0.76	0.79	0.75	0.65
N	1788	442	503	467	376

Notes:
OLS with fixed effects.
Standard errors within parenthesis.
* Significant at 90 per cent level.
** Significant at 95 per cent level.
*** Significant at 99 per cent level.

There are practically no qualitative differences between the previous and the new estimates. Signs are unchanged and estimates are in two cases more significant. The explanatory power of the model has increased by a few percentage points.

The magnitudes of the estimates have changed as a result of the inclusion of new variables. The reasons for some of the differences are quite evident. There is considerable covariance between the ad valorem tax and gasoline prices both contain the value added tax rate. The previous estimates for the ad valorem terms seems to have picked up the effects of the value added tax through gasoline prices; the new estimates are considerably lower.

An increase in gasoline prices of DEM 0.01 is estimated to lower the average price of a car by DEM 25. This correponds to an average cross-price elasticity between gasoline and cars of 0.17. In other words, a one per cent increase in the price of gasoline is associated with a 0.17 per cent decrease in the average price of cars.

A 1 percentage point increase in the real interest rate lowers the sales price by an estimated DEM 120 or 0.53 per cent. Note that the effect is negative and highly significant for all size classes except large cars, where it is insignificant.

6. Remaining questions

We have shown that market segmentation and differences in government policies have led to substantial differences in pre-tax prices for cars in Europe. As much as two thirds of the existing price differences can be attributed to government policies (taxes, interest rates, tariffs and import quotas) and measurable demand and cost differences (home-market bias in demand and differences in engine size). We will conclude by speculating about the nature of the missing elements in the story.

A closer look at the data indicates that the unexplained price variation is largely due to market-wide factors that affect models uniformly. This conclusion is supported by the fact that the ranking from the cheapest to the dearest model is practically identical across markets, while the overall price levels differ substantially. The correlation between pre-tax prices across markets for the 28 models that were sold in all eleven markets are presented in table 5. The value of the correlation coefficient between pairs of countries ranges from 0.93 to 0.99, with an average of 0.97. This extraordinary high correlation suggests that all prices move up or down in tandem. Whatever the cause is for a high price level in a particular market, it affects all models uniformly.

(*TABLE* 5)

A number of possible causes can be found on the supply side of the market. First, genuine cost differences exist across markets. For example, the high price level in Switzerland is probably a reflection of its high wage level and consequent high cost of retailing. Second, differences in national regulation may cause differences in costs. An example is left-hand driving in the United Kingdom. Adapting models for left-hand

driving should make for an extra cost and therefore contribute to the high price level found in the United Kingdom. Third, market conduct and structure may differ across markets and cause differences in overall prices. For example, Kirman and Schueller (1990, 1992) argue that firms often are price leaders in their domestic markets, and demonstrate that one should expect a positive correlation between price leaders' costs and price levels in markets with domestic producers. Another example is provided by Switzerland, which has an extremely cartelized economy with more than one thousand cartels in industry, retailing and professions (GATT, 1991). It is likely that cartelized retailing adds to the price of cars in Switzerland, in addition to high wages.

What about causes on the demand side? There are strong indications of differences in demand across national markets: market shares and market concentration differ much, see table 6 and 7. One should expect a positive correlation between mark-ups and market shares, and, if costs of supply are more or less equal across markets, also between prices and market shares. (The story is complicated by the fact that prices and market shares are jointly determined.) Consequently, the relative price structure should differ between countries. As can be seen from table 5, this is however not the case. Thus, model specific demand differences across countries seem to play almost no role in explaining the price variation across countries. Market-wide differences could play a role. Evidence to this effect is given by Verboven (1995), who finds that part of the price variation depends on differences in market-wide demand elasticities.

(*TABLE* 6)

(*TABLE* 7)

7. Concluding comments

We have argued that the market for cars in Western Europe is effectively segmented into national markets by government regulations, notably the block exemption from EU competition law granted to the car industry that allows manufacturers to maintain a system of exclusive and selective distributors. Arbitrage by consumers between national markets is made difficult by various manufacturer and distributor practises, and also by administrative practises used by government agencies. Manufacturers exploit the existing market segmentation by setting prices tailored to the conditions in each market.

The price structure observed in Western Europe is consistent with the predictions of a simple oligopoly model with no interaction across national markets. For example, ad valorem taxes are only partially shifted onto consumers; our estimates indicate that manufacturers absorb about a third of the local taxes. Another finding that fits well with theory is that quantitative import restrictions (voluntary export restraints) raise prices of import restricted as well as of unrestricted cars; our estimates indicate that

Japanese models are priced some 10 to 15 per cent higher in restricted markets than what otherwise would be the case, while competing European models are priced 5 to 10 per cent higher.

The price differences net of tax typically exceed 50 per cent between the least and most expensive markets, Denmark and United Kingdom respectively. Such huge price differences are not easily reconciled with the concept of a European single market. Prices cannot differ by more than natural transactions costs in a truly integrated market without inducing consumer arbitrage. The example of the United States indicate price differences of a few percentage points at the most. The European car market has a long way to go before the present single markets become one single market for cars.

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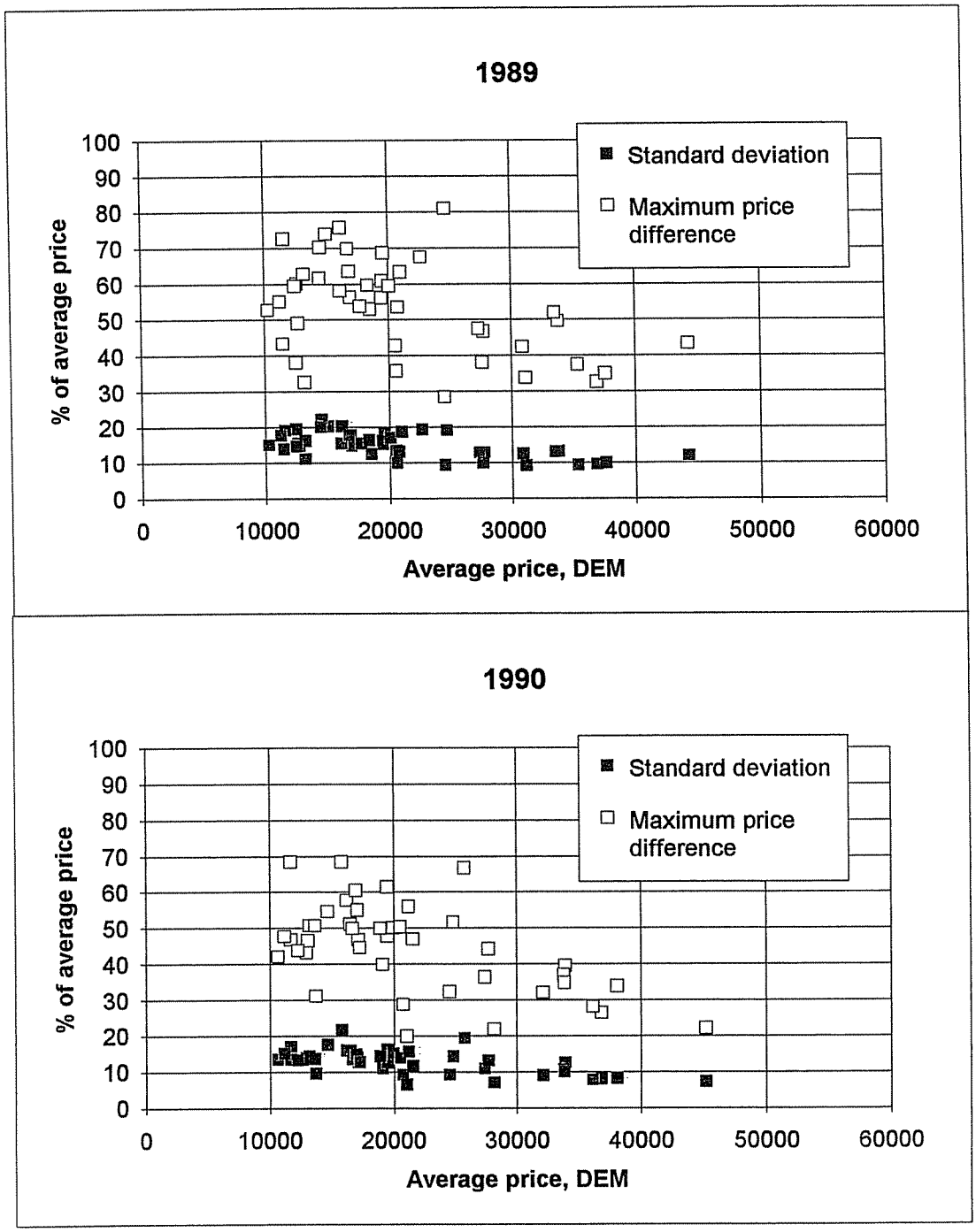
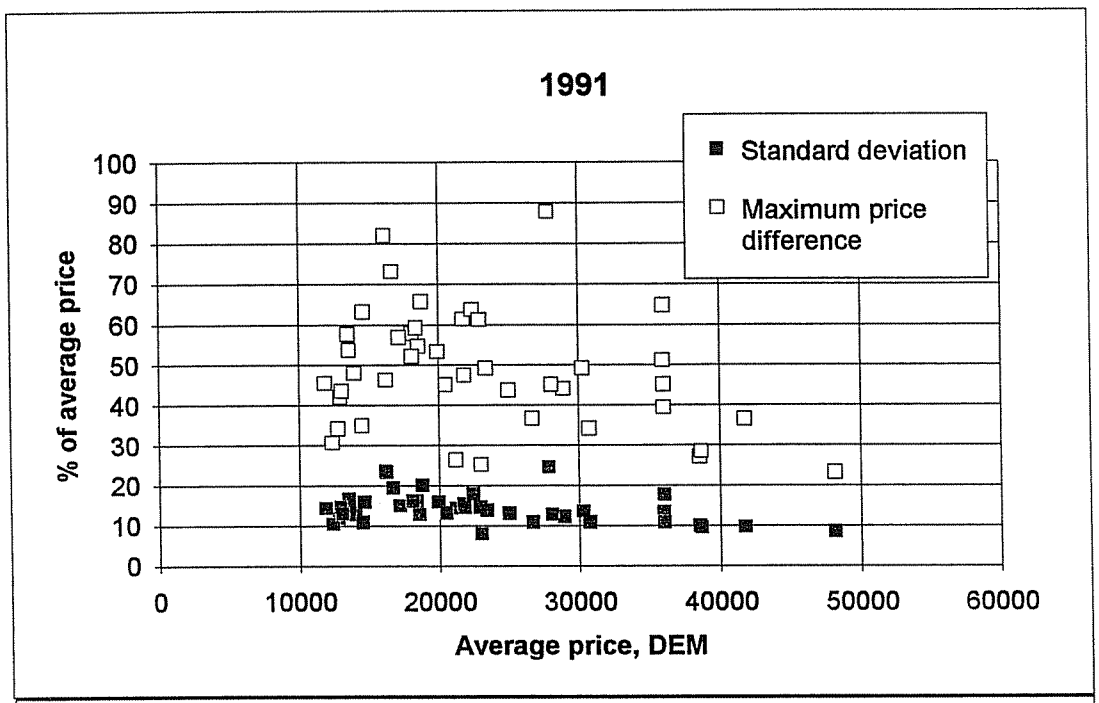
Figure 1. Cross-country price variation




1991
Standard deviation
Maximum price difference
% of average price
100
90
80
70
60
50
40
30
20
10
0
0
10000
20000
30000
40000
50000
60000
Average price, DEM

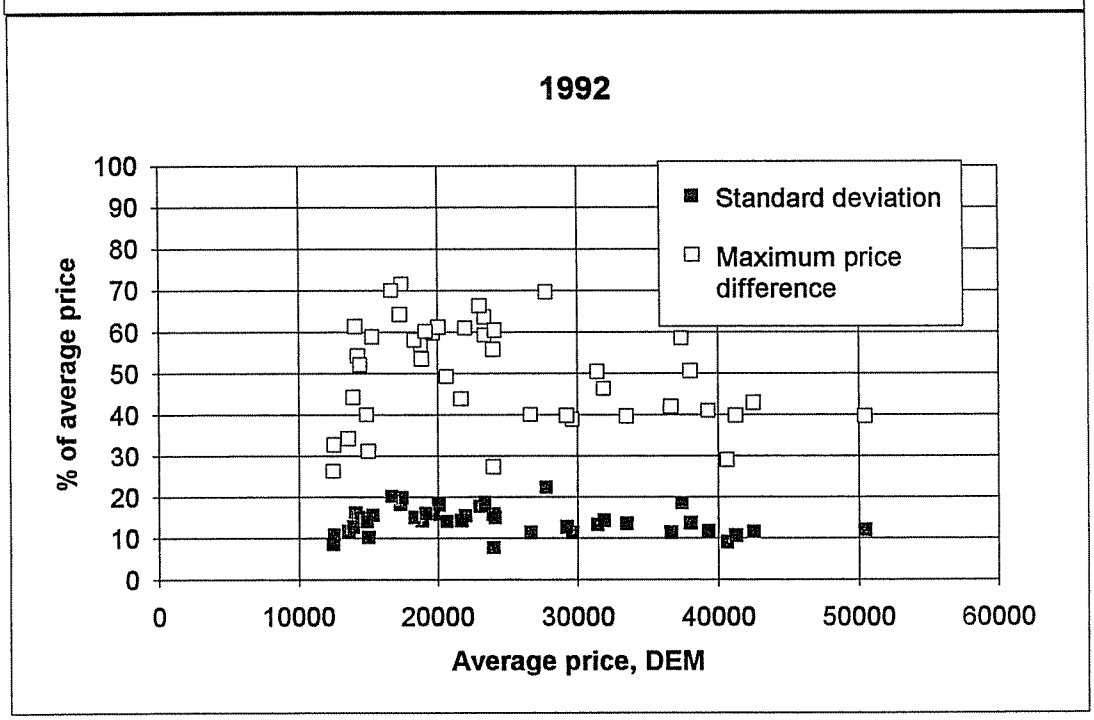

1992
Standard deviation
Maximum price difference
% of average price
100
90
80
70
60
50
40
30
20
10
0
0
10000
20000
30000
40000
50000
60000
Average price, DEM

Table 1. Average price dispersion 1989-1992

	1989	1990	1991	1992
Average for all models				
Price, DEM	20979	21459	23188	24405
Standard deviation, %	14	12	14	14
Maximum price difference, %	51	42	49	49

Table 2. Country price indices and rankings

	Price index				Ranking			
	1989	1990	1991	1992	1989	1990	1991	1992
	Small							
Belgium	122	127	126	124	3	3	3	3
Germany	140	149	146	143	7	7	7	7
Spain	125	138	144	140	4	5	6	6
France	125	133	129	125	5	4	4	4
Italy	136	141	141	138	6	6	5	5
Netherlands	121	125	121	116	2	2	2	2
United Kingdom	164	151	169	161	9	8	11	10
Austria	152	155	146	144	8	9	8	8
Denmark	100	100	100	100	1	1	1	1
Switzerland	175	167	167	152	11	10	10	9
Sweden	170	172	165	164	10	11	9	11
	Small-medium							
Belgium	140	137	140	137	3	3	3	3
Germany	157	151	151	146	6	6	5	5
Spain	156	150	173	167	5	5	9	10
France	151	152	148	141	4	7	4	4
Italy	165	161	160	156	8	8	8	8
Netherlands	135	132	127	122	2	2	2	2
United Kingdom	195	169	186	179	11	10	11	11
Austria	158	150	152	148	7	4	6	6
Denmark	100	100	100	100	1	1	1	1
Switzerland	186	173	180	158	10	11	10	9
Sweden	177	167	158	154	9	9	7	7
	Medium-large							
Belgium	121	122	125	127	3	3	3	3
Germany	131	132	133	135	5	4	5	5
Spain	135	140	153	156	7	7	9	10
France	130	133	129	133	4	6	4	4
Italy	144	146	144	147	8	10	8	7
Netherlands	118	116	118	117	2	2	2	2
United Kingdom	160	143	159	163	11	9	11	11
Austria	134	133	136	137	6	5	6	6
Denmark	100	100	100	100	1	1	1	1
Switzerland	154	149	156	149	9	11	10	8
Sweden	158	141	141	150	10	8	7	9
	Large							
Belgium	111	111	117	120	3	3	3	3
Germany	113	114	119	123	4	4	4	4
Spain	128	125	144	148	9	10	11	11
France	118	125	125	125	5	9	5	5
Italy	127	127	131	134	8	11	9	8
Netherlands	110	109	111	112	2	2	2	2
United Kingdom	138	121	139	143	11	7	10	10
Austria	126	124	130	133	7	8	7	7
Denmark	100	100	100	100	1	1	1	1
Switzerland	125	120	131	132	6	6	8	6
Sweden	129	115	126	136	10	5	6	9
	All cars							
Belgium	120	121	124	125	3	3	3	3
Germany	129	130	132	133	5	4	5	5
Spain	134	135	152	152	6	7	10	10
France	128	133	131	130	4	5	4	4
Italy	139	140	141	142	8	10	8	7
Netherlands	118	117	117	116	2	2	2	2
United Kingdom	157	139	157	158	11	9	11	11
Austria	137	135	137	139	7	6	6	6
Denmark	100	100	100	100	1	1	1	1
Switzerland	150	143	151	144	9	11	9	8
Sweden	150	139	141	147	10	8	7	9

Table 5. Correlation between pre-tax prices across countries, 1990

	Belgium	Germany	Spain	France	Italy	Netherl.	UK	Austria	Denmark	Switzerl.	Sweden
Belgium	1										
Germany	0,97	1									
Spain	0,97	0,97	1								
France	0,97	0,98	0,97	1							
Italy	0,97	0,98	0,96	0,96	1						
Netherl.	0,97	0,99	0,98	0,99	0,96	1					
UK	0,97	0,97	0,98	0,98	0,96	0,97	1				
Austria	0,96	0,98	0,96	0,98	0,97	0,98	0,97	1			
Denmark	0,98	0,97	0,96	0,97	0,95	0,98	0,94	0,97	1		
Switzerland	0,97	0,97	0,98	0,97	0,96	0,96	0,97	0,96	0,96	1	
Sweden	0,96	0,93	0,94	0,96	0,93	0,94	0,95	0,93	0,93	0,93	1

Table 7. Market shares in 1990

		Belgium	Germany	Spain	France	Italy	Netherland	UK	Austria	Denmark	Switzerland	Sweden
Small cars												
PSA-Citroen	AX	9,9	3,4	13,0	13,7	5,0	7,0	4,5	5,7	9,5	3,4	2,3
Fiat	Uno 45	6,3	11,0	6,8	6,4	39,4	8,4	4,8	11,3	20,8	12,8	4,7
Fiat-Lancia	Y10	0,3	1,5	0,8	0,8	12,9	0,6	0,1	0,6	0,0	2,6	0,2
Ford	Fiesta	12,1	22,5	17,1	8,7	14,1	8,0	30,6	12,6	11,1	7,3	18,5
GM	Corsa/Nova	12,9	14,7	12,8	6,9	2,9	10,8	11,1	10,5	7,4	12,1	10,5
PSA-Peugeot	205	14,7	9,6	11,6	24,6	8,3	16,7	10,1	10,1	11,8	13,8	11,9
Renualt	5	12,3	5,6	15,0	28,1	8,9	4,9	4,2	6,2	1,9	6,5	10,8
Rover Group	Metro	0,7	0,1	0,4	1,6	0,4	1,1	16,4	0,0	0,5	0,0	0,0
VW-Seat	Ibiza	5,5	4,3	16,8	3,8	3,7	4,4	1,4	3,2	0,9	6,9	0,0
Suzuki	Swift	2,7	2,5	0,4	0,0	0,1	8,7	0,5	7,4	4,7	3,3	9,9
VW-Volkswagen	Polo	8,7	14,7	5,1	4,2	4,1	5,7	5,1	6,2	13,7	7,0	8,4
Other		13,8	10,3	0,2	1,1	0,4	23,6	11,3	26,2	17,8	24,3	22,8
Sales, units		**110 079**	**442 124**	**379 982**	**932 505**	**934 938**	**94 059**	**495 229**	**47 083**	**10 788**	**54 742**	**22 266**
Small to medium cars												
Fiat-Alfa Romeo	33	1,6	0,3	2,5	1,7	12,3	1,9	0,2	0,9	0,6	3,5	0,6
Fiat	Tipo	3,2	3,4	5,8	5,9	34,2	3,0	1,6	4,9	4,2	4,9	1,3
Ford	Escort/Orion	8,7	8,4	17,3	9,2	5,0	9,6	23,5	9,3	10,2	5,6	10,2
GM	Astra/Kadett	14,1	23,2	18,6	4,5	9,4	19,1	29,2	14,0	14,9	14,9	11,7
Nissan	Sunny	6,0	2,1	0,7	1,4	0,0	7,0	3,4	4,2	5,0	4,5	5,0
PSA-Peugeot	309	4,2	1,4	7,8	18,8	1,6	4,0	3,8	2,6	6,5	2,6	2,3
Renualt	19	11,5	5,4	20,4	28,0	9,5	6,6	2,8	5,6	3,2	3,2	4,9
Rover Group	200	0,8	0,1	1,6	1,7	1,7	0,6	13,7	0,1	0,0	0,2	0,0
Toyota	Corolla	8,0	4,7	0,8	1,1	0,2	6,1	2,0	7,9	16,7	12,3	12,7
VW-Volkswagen	Golf	21,3	36,6	15,4	18,5	18,6	13,4	6,6	26,0	9,9	22,1	16,6
Volvo	300	2,2	0,6	0,3	0,8	1,7	7,0	2,7	1,1	2,9	1,6	11,8
Other		18,3	13,8	8,7	8,5	5,9	21,7	10,5	23,4	25,9	24,5	22,8
Sales, units		**168 871**	**978 088**	**344 510**	**516 049**	**553 879**	**190 926**	**821 211**	**118 487**	**36 301**	**96 921**	**65 524**
Medium to large cars												
VW-Audi	80/90	10,5	14,5	2,1	4,9	11,9	7,7	3,8	10,4	2,1	4,3	5,0
BMW	318	4,3	10,6	4,9	2,8	3,4	3,6	6,1	5,0	1,6	7,3	2,8
PSA-Citroen	BX	9,9	1,7	13,3	16,4	4,9	11,2	7,6	5,4	11,5	4,0	3,1
Ford	Sierra	9,0	8,8	7,2	4,9	5,2	11,4	31,5	9,1	10,4	10,9	15,8
GM	Cavalier/Vectra	11,0	17,7	8,2	3,8	4,5	12,2	0,0	18,9	13,9	16,9	11,2
Honda	Accord	1,3	1,9	0,1	0,5	0,1	2,0	2,1	2,3	4,7	1,8	4,5
Mazda	626	4,1	4,6	0,2	1,3	0,1	7,6	2,0	10,3	16,0	5,3	9,4
Mercedes-Benz	190	3,4	10,6	3,3	2,7	4,2	3,4	2,5	4,7	0,3	3,9	3,2
PSA-Peugeot	405	11,4	2,3	17,5	24,3	5,3	10,0	9,8	4,8	8,8	7,6	5,1
Renualt	21	7,3	1,6	20,9	28,0	3,6	4,1	4,0	3,3	0,0	4,7	0,0
VW-Volkswagen	Passat	9,2	17,8	3,9	3,6	13,5	5,6	2,8	10,7	2,5	9,5	6,6
Other		18,6	7,9	18,3	6,8	43,2	21,1	27,9	15,0	28,1	23,6	33,3
Sales, units		**119 360**	**810 397**	**167 298**	**543 509**	**345 704**	**134 341**	**407 986**	**77 736**	**26 739**	**79 562**	**53 708**
Large cars												
VW-Audi	100	10,3	9,8	21,6	1,8	0,3	2,0	2,1	8,4	5,1	7,3	9,2
BMW	520	10,6	19,5	11,2	6,4	9,7	9,6	10,3	20,9	9,7	9,2	3,2
Fiat	Croma	2,8	1,0	3,7	2,9	13,9	2,1	0,5	2,3	1,2	3,6	0,3
Fiat-Lancia	Thema	1,2	0,9	2,4	1,4	21,2	2,1	0,4	2,1	0,9	3,9	0,0
Ford	Scorpio	6,1	7,1	6,1	1,9	1,7	12,8	23,9	4,8	8,1	6,3	4,6
GM	Carlton/Omega	12,3	17,7	9,9	1,9	3,0	19,1	17,6	11,4	8,3	21,0	4,0
Mercedes-Benz	230	15,7	34,7	15,4	6,6	16,9	12,5	9,0	25,0	16,2	11,3	5,2
Renualt	25	10,2	0,8	3,1	25,7	1,2	7,8	3,8	1,4	0,0	4,1	0,0
Volvo	740	8,1	2,2	5,1	3,2	6,6	11,7	18,2	7,2	17,2	8,0	51,3
Other		22,7	6,2	21,4	48,1	25,4	20,2	14,1	16,5	33,2	25,4	22,4
Sales, units		**46 007**	**422 811**	**38 454**	**185 823**	**150 981**	**42 546**	**140 823**	**21 383**	**5 078**	**41 518**	**77 112**

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