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Xulia González

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Departamento de Economía Aplicada
Universidade de Vigo
As Lagoas Marcosende S/N, 36310 –Vigo
Tfno: +34 986 812500 - Fax: +34 986 812401
<http://webs.uvigo.es/x06/>
E-mail: depx06@uvigo.es

Some empirical regularities on vertical restraints*

Xulia González[†]

University of Vigo

Abstract

Vertical restraints most often arise when an upstream firm wants to restrict the choices of a downstream distributor in order to increase profits. The aim of this paper is to analyze some empirical regularities in the motivations for vertical restraints. Firstly a simple theoretical framework is developed in which an upstream monopoly decides on the intermediate price and an effort level which increase consumer demand, while the distributor decides on the final price. Two externalities arises: the double marginalization and a positive vertical externality due to the effort. The main result of the model indicates that the incentives to vertical coordination are higher when upstream firm make sales effort. Secondly, we test this theoretical prediction with a sample of more than 2000 Spanish manufacturing firms that report detailed information on firms' distribution system and the type of vertical restraints that they impose to their distributors. The main results indicate that the greater the effort put in the upstream firm, the higher the probability of imposing vertical restraints. Furthermore, there is an important heterogeneity by industry and size in the probability to impose vertical restraints.

Keywords: vertical restrictions, vertical integration, manufacturing sector.

JEL Classification: L22, L12

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[†]Universidade de Vigo. Facultad de CC. Económicas. As Lagoas Marcosende s/n 36310 Vigo (Spain).
Fax +34 986812401. Ph.+34 986812516. E-mail: xgzlez@uvigo.es.

INTRODUCTION

Final goods are often produced in several stages, starting from raw materials to intermediate goods to final products. Firms that operate at different but complementary levels in the production/distribution chain are involved in different vertical relationships that range from transactions between completely independent enterprises to the integration of two or more stages of the productive process within a single enterprise. Between these two extremes one can find contractual arrangements, called vertical restraints, which restrict actions of one or both of the upstream and downstream firms.¹

Decisions taken by a downstream/upstream firm usually affect the profits of the vertically related firm, and it is likely that these effects are not taken into account. In these cases, co-ordination between producers and distributors through vertical restraints (or vertical integration) can help firms to increase their profits and under certain circumstances, will be to the benefit of the consumers. From an economic point of view, both vertical integration and vertical restrictions are used to solve problems of vertical coordination between firms. However, all anti-trust laws afford a differentiated treatment. While vertical integration is covered by Merger Regulations, the vertical restraints might be the object of articles on agreements between firms or abuse of a dominant position,² though more recently specific regulations on vertical restraints have appeared in several countries.³

Vertical restraints most often arise in retail settings when an upstream (producer / manufacturer) firm restricts the choices of its downstream distributor (dealer / retailer). According to Rey and Tirole (1986) and Rey and Vergé (2005), vertical restraints are grouped into payment schemes and provisions that limit the parties' rights. The former include the

¹Vertical relationships may exist between an upstream and a downstream firm but in this paper we focus attention on the relation between a manufacturer and its distributors (retailers or wholesalers).

²Section 1 of the Sherman Act in the U.S or Article 81 of the European Communities Treaty in the case of vertical contracts that restrict competition or Section 2 and Art. 82 in the case of abuse of dominant position.

³Vertical Restraints Guidelines published by the U.S Department of Justice in 1985, or the more recent Guidelines of Vertical Restraints published by the European Commission in 2000.

Franchise Fee which consists of a two-part tariff combining a lump sum fee plus a per unit price set at marginal cost, and any kind of *Royalties* based usually on the distributor's sales. The provisions limiting the parties' rights can be price restrictions such as the *Resale Price Maintenance* (RPM), in which the final price is not set by the distributor but imposed by the manufacturer,⁴ and no-price restrictions such as: *Quantity fixing* which specifies the quantity to be bought and resold by the retailer. In some circumstances quantity fixing is equivalent to resale price maintenance.⁵ *Full-line forcing*: a distributor is committed to sell all the varieties of the manufacturer's products. This is a particular type of tie-in-sales which forces the distributor to buy one or more goods from the manufacturer rather than only those the distributor wants to buy. *Exclusive Territories*: the manufacturer commits itself not to allow any other distributor in a geographical area given monopoly rights to sell in that area. Lastly, *Exclusive dealing* presumes that the distributor agrees to buy goods exclusively from the manufacturer.

The attitude of competition authorities and Courts towards vertical restraints varies significantly from one country to another or from one period to another.⁶ Most horizontal agreements among competitors have a clear response in all antitrust regulation: they are forbidden *per se*, that is, they are illegal without proving that they damage competition. In the case of vertical agreements, things are not so clear and the *rule-of-reason* approach is generally applied in most regulations. This means that there is no a priori presumption, and the costs and benefits of a practice must be weighed case by case. This is the basis of the most recent European regulation on vertical restrictions published in the "Guidelines on Vertical Restraints" (2000).⁷ This regulation means that decisions are no longer based

⁴This restriction has several variants, including maximum retail price (price ceiling), minimum price (price floor), non-binding recommended retail price.

⁵If demand is known and depends only on the final price and if the distributor can sell to or buy from other distributors, quantity forcing is equivalent to a price ceiling, and quantity rationing to a price floor.

⁶Comanor-Rey (1996) compares the evolution of the attitudes of the U.S. and UE competition authorities.

⁷See Commission notice of 13 October, 2000: Guidelines on vertical restraints COM(2000/C291/01) and Regulation No 2790/1999 and the recent modification in Regulation N. 1/2003. Some years earlier, in 1996, the Commission had published a Green Paper on Vertical Restraints, which included an economic analysis of the impact of vertical restraints on competition.

primarily on the type of restraint considered but also account for the market environment,⁸ even though the European competition authority has a more lenient attitude towards non-price restraints.⁹

The economic analysis of vertical restraints has in the past been the subject of debate amongst economists. Debate ranged from regarding them as suspect for competition, to a generalized perception that they were innocuous for competition (the Chicago school).¹⁰ Vertical restraints usually have an unambiguous positive effect when they are properly introduced to solve co-ordination problems. The best known problem of the absence of coordination is the double marginalization (Spengler, 1950). This problem results from the fact that each firm in a vertical chain makes its pricing decision independently and charges a mark up to its respective costs, without taking into consideration the impact of its decision on its partner in the vertical structure. As a result, price is likely to be too high, that is, higher than the price that would maximize the joint profits of producer and distributor(s). A vertical integration or resale price maintenance, for example, could help overcome this situation.

Another typical coordination problem arises when the distribution of goods and services requires the provision of additional services by distributors. These may take the form of after-sales services such as guarantees or maintenance or pre-sales services such as informa-

⁸Prior to enacting this vertical restraints guidelines, the EU attitude was governed by what seemed like a blanket prohibition on vertical agreements that restrict competition under Art. 81 of the Treaty of Rome.

⁹As Rey and Vergé (2004) point out, there is a consensus in jurisprudence against RPM, but the economic analysis of vertical restraints is more ambiguous: it is not so obvious that RPM has a more negative impact on welfare than other vertical restraints that can also limit intrabrand competition; instead, both price and non-price restraints have positive and negative effects on welfare, depending on the context in which they are used. See Mathewson and Winter (1984) for an analysis of the effects of different forms of vertical restraints. Moreover as Motta (2004 pag. 347) pointed out that "vertical restraints are often substitutable with each other. Accordingly, differential treatment of vertical restraints (for instance, allowing some and forbidding others) does not appear to be justified".

¹⁰See Motta (2004), Rey and Vergé (2005) Lafontaine and Slade (2005) or Cooper et al. (2005a, b) for different surveys of the literature of the effects of vertical integration and vertical restrictions on inter- and intra-brand competition.

tion or technical assistance to potential buyers. This raises two different types of efficiency problems. On the one hand, there may be appropriability problems: If a distributor spends on additional services, the demand for the product will increase and both the distributor and manufacturer will benefit from this. In this situation, the distributor's sales effort will be below the optimal level of a vertically coordinated structure. On the other hand, there can be free-rider problems: When several retailers sell the same brand of a given product, all retailers will benefit from the sales efforts of one of them. In such a situation, all retailers will tend to under-invest in such promotion activities.¹¹

Appropriation problems may also appear when a manufacturer spends on promoting sales or makes investments that reduce retailer's cost. In these cases, the manufacturer will also make a lower effort than in a vertically coordinated structure.¹²

To analyze the anticompetitive effect of vertical restraints it is necessary to take into account competition not just at the distribution level (intra-brand competition) but also at the manufacturing level or inter-brand competition. Introducing vertical restraints can be a mean to reducing competition upstream that does not compete directly but indirectly through their retailers. There are at least three different ways in which vertical restraints can restrict competition: Firstly by diluting competition among producers, that is, manufacturers use certain restraints to delegate some decision power to their distributors and credibly commit not to compete aggressively with their rivals.¹³ Secondly, by promoting

¹¹Free-riding can be solved if the producer imposes exclusive territories by the producer. If the distributor is allocated an exclusive territory where he will be the only supplier of a given brand, transportation and transaction costs will minimise the effects of "free-riding". See Motta (2004, chapter 6) for a formal analysis of the effect of vertical restraints in this context.

¹²Besanko and Perry (1993) formalized this idea by considering that a manufacturer can invest in an activity that reduces the cost to the retailer such that it not only benefits sales of its own brand but also other brands. An exclusive dealing that obliges the retailer to sell only one brand, might solve this problem, thereby increasing the manufacturer's incentive to invest in such services.

¹³Rey and Stiglitz (1988, 1995) show that exclusive territories eliminate intrabrand competition between the retailers and act as a pre-commitment to be less "agresive" and give incentives to rival manufacturers to set higher prices. See Caillaud and Rey (1995) for a review of this literature.

manufacturers collusion¹⁴ and thirdly by being instruments of foreclosure, in particular for market access foreclosure, by rising rivals' costs or by preventing the entry of competitors.

Although theoretical contributions analyze the effects of vertical restraints, there is no simple conclusion whether a particular type of vertical restraint is pro- or anti-competitive and a *per se* prohibition would not be sensible due to there being efficiency effects which are likely to dominate in most cases.¹⁵

Although there are numerous contributions to the theoretical literature on vertical restrictions, there are fewer empirical papers that analyze the degree of implementation and the effect of this type of restrictions. Most empirical contributions have been focused on the effects of a particular vertical restraints on a specific sector such as gasoline or beer distribution, but there are no contributions related to the analysis of the importance of this type of restraints in the manufacturing industry.

The objective of this paper is to contribute to the empirical literature on vertical restriction by identifying some empirical regularities of vertical restraints imposed by Spanish manufacturing firms during the 1990's. The data base used in this paper is a representative panel for more than 3000 Spanish manufacturing firms from 1990 to 2001. It reports detailed information on firms' distribution systems (direct selling, own distribution net or retailers/wholesale) and on type of clients: consumers, firms, distributors (wholesalers or retailers) or public administration. Moreover the survey reports information on the type of vertical restraints that firms impose on their distributors in the five categories mentioned above (franchise fee, resale price maintenance, full-line forcing, exclusive territories and exclusive dealing), which is a rather unusual feature.

In this paper, we have developed a simple theoretical framework, by extending Spengler's model (1950), in which the gains of a vertical coordinated structure of a manufac-

¹⁴Julien and Rey (2000) show that Resale Price Maintenance makes collusion more likely by eliminating the retail price variation that make price cuts easier to detect.

¹⁵In fact, Lafontain and Slade (2005) conclude from this survey of the empirical evidence that when vertical restraints benefits consumers, they also tend to be congruent with manufacturers' profits, at least with respect to the voluntary adoption of vertical restraints, in contrast with those vertical restraints legally imposed.

turer/distributor are higher when the manufacturer makes efforts to increase demand. This sales effort generates a vertical externality towards distributors that the producer could recover by a vertical merger or vertical restraints. Secondly, we have analyzed the scope of vertical restraints in Spanish manufacturing firms, through identifying industry and size heterogeneity. Finally we have tested whether a demand increasing effort of manufacturing firms (e.g. advertisement effort or product innovation), has a positive impact on vertical restraints. The main results identify an important industry and size heterogeneity and confirm the main theoretical prediction: firms that make undertake effort have a higher probability of imposing vertical restrictions on their distributors.

The rest of the paper is organized as follows: Section 2 presents the theoretical framework. Section 3 describes the data and presents some empirical regularities. Section 4 details the empirical specification and explains the main results and Section 5 presents the conclusions.

THEORETICAL FRAMEWORK: EFFORT AND VERTICAL RELATIONS

The best known case of externalities that affect a vertical chain is the double marginalization problem. If both a manufacturer and its retailer have market power, both charge a positive mark-up, which result in higher prices and lower profits than a vertically coordinated structure. Moreover if a manufacturer makes an effort to increase the consumers' willingness to pay and therefore their demand, both the distributor and manufacturer will benefit from this, but manufacturer cannot fully appropriate the profits of this effort.

In order to illustrate the effect of vertical restrictions when an upstream firm makes an effort to promote sales, we developed a simple example, by extending the model of Spengler (1950), in which upstream firm decides on price and effort, which is costly to provide.

Consider that there is one upstream firm U that manufactures a product and sells it via a retailer D , who buys the product from U and resells it.¹⁶

¹⁶In this simple example we suppose than both manufacturer and retailer are monopolists, which is an extreme case, but the main conclusions are similar when they have some monopolistic power. Note that we do not take into account the effects of vertical restrictions on inter-brand competition, this means that we do not take into account the anticompetitive effects of vertical restrictions (see Motta, 2004 for a selected

Consumer demand is given by $q = (v + e) - p$, where $v > 0$ is a parameter, q is quantity demanded and p is the final price charged to consumers and e is the effort made by the manufacturer. This effort that increases the consumer's willingness to pay could be advertisement, marketing or product R&D activities. The manufacturer has a constant marginal production cost, c , and a quadratic effort cost, given by $C(c, e) = cq + \theta e^2/2$, where θ is the slope of the marginal investment cost function (this functional form follows Besanko and Perry, 1993). In this case the cost of effort is independent of the units sold¹⁷ and we do not consider the inter-brand externality, that is, the services or investment by a manufacturer are specific to its brand.¹⁸ The retailer's unit cost is given by the price w that has to be paid to the manufacturer.¹⁹

Let us analyze the following two cases. In the first case, the manufacturer and retailer are independent firms, while in the second case, they vertically coordinate their decisions through a vertical integrated structure.

Manufacturer and retailer independent firms

The manufacturer chooses the level of effort, e , and the wholesale price w at which it sells to the retailer. The downstream firm chooses the price p at which it sells to consumers. The problem of the retailer is to choose p so that

$$\max \pi_D = (p - w)(v + e - p).$$

from which we obtain the price and quantity as a function of the price w and the manufacturer effort e .

$$p = (v + e + w)/2$$

survey of papers on this topic).

¹⁷If we consider other types of effort such as pre-sale or post-sale assistance it would probably be necessary to include variable costs of service provision, as each unit sold requires a higher cost of effort.

¹⁸Besanko and Perry (1993) consider the incentives for oligopolistic manufacturers producing differentiated brand, to adopt exclusive dealing with the retailers. In this case, manufacturers face interbrand externality since brand-enhancing investments made by one manufacturer may benefit the brands of other manufacturers.

¹⁹For simplicity we assume that the cost of resale is equal to zero.

$$q = (v + e - w)/2.$$

The manufacturer, by anticipating the decision of the retailer, chooses w and p to maximize its own profit

$$\max \pi_M = (w - c) \frac{v + e - w}{2} - \theta \frac{e^2}{2}.$$

From the first-order conditions, and after rearranging, one finds the solution to be: $w = \frac{v+e+c}{2}$ and $e = \frac{v-c}{4\theta-1}$.

Replacing these solutions in the downstream solution one finds that the final price and quantity in equilibrium are:

$$p = \frac{3\theta v + c(\theta - 1)}{4\theta - 1}; \quad q = \frac{\theta(v - c)}{4\theta - 1}$$

Profits of the manufacturer and retailer are:

$$\pi_M = \frac{\theta(v - c)^2}{2(4\theta - 1)}; \quad \pi_D = \left(\frac{\theta(v - c)}{4\theta - 1} \right)^2$$

Manufacturer and retailer vertically integrated

If the manufacturer and retailer are vertically integrated in a single company²⁰, the firm would choose p and s to maximize the following function:

$$\max \pi_{VI} = (p - c)(v + e - p) - \theta \frac{e^2}{2}.$$

It is easy to obtain that

$$p_{iv} = \frac{\theta(v + c) - c}{2\theta - 1}; \quad e_{iv} = \frac{v - c}{2\theta - 1} \quad \text{and} \quad \pi_{VI} = \frac{\theta(v - c)^2}{2(2\theta - 1)}$$

From comparison we can notice that the price is lower, the effort is higher and profit is higher than in a vertically separated situation. Moreover, for the lower cost of effort ($\theta = 1$), the level of effort of the vertically integrated firm is 3 times higher than the level of effort of an independent manufacturer. And this ratio decreases with θ , that is, $\frac{e_{iv}}{e} = \frac{4\theta-1}{2\theta-1}$ and $\frac{\partial e_{iv}/e}{\partial \theta} < 0$.

²⁰This situation is equivalent to a manufacturer that sells its products directly to the final consumers.

Comparing profits

By comparing the total profit of both market structures we observe that vertically integrated firms have higher profits than the sum of the profits of the two separate firms for any value of the parameters $\pi_{VI} > \pi_M + \pi_R$, that is,

$$\frac{\theta (v - c)^2}{2 (2\theta - 1)} > \frac{\theta(6\theta - 1)}{2} \left(\frac{v - c}{4\theta - 1} \right)^2.$$

This result implies that when retailers have monopoly power and when there is price and effort vertical externality, the upstream firm will prefer to internalize price and effort externality via a more vertically integrated structure.²¹

Moreover, the profits of a vertically integrated chain of monopolies without any kind of effort is given by: $\frac{(v-c)^2}{4}$, and the sum of the profits of the retailer and the manufacturer are given by: $\frac{3(v-c)^2}{16}$. In this case, the profit gain due to the vertical integration is given by the difference between the two profits.

We are interested now in obtaining the extra profits from integration in the presence of vertical externalities. The gain from integration when an upstream firm makes an effort is given by:

$$\Delta\pi_{VI} = \frac{\theta (v - c)^2}{2 (2\theta - 1)} - \frac{\theta(6\theta - 1)}{2} \left(\frac{v - c}{4\theta - 1} \right)^2$$

while the profit gains in the absence of effort is.

$$\Delta\pi'_{VI} = \frac{(v - c)^2}{4} - \frac{3(v - c)^2}{16}$$

It is easy to check that profits increase due to vertical integration is higher in the presence of vertical externalities than the profit increase in the absence of this externality, that is $\Delta\pi_{VI} - \Delta\pi'_{VI} > 0$ and simplifying we obtain:

$$\frac{\theta}{2\theta - 1} - \frac{\theta(6\theta - 1)}{(4\theta - 1)^2} > \frac{1}{8}$$

²¹Note that the effort externality disappears if manufacturers distribute their goods through perfectly competitive retail outlets and the level of effort would be the same under separate or vertical integration

and this is valid for all values of v , c and θ .

This conclusion gives us an interesting empirical prediction: vertical coordinated actions are more likely to exist in the presence of other types of vertical externalities besides price.²²

DATA AND DESCRIPTIVE STATISTICS

The data used to carry out this research comes from a survey financed by the Spanish Ministry of Industry, the Survey on Firm Strategies (*Encuesta Sobre Estrategias Empresariales*). The data set consists of an unbalanced panel of Spanish manufacturing firms observed annually during the period 1990-2001, though the variables related to vertical restrictions are surveyed every four years. At the beginning of the survey, firms with less than 200 workers were sampled randomly by industry and size strata, and 5% of these were included. Firms with more than 200 workers were all requested to participate, and the positive answers represented around a self-selected 60% of firms within this size. To preserve representation, samples of newly created firms were added every subsequent year. A complete questionnaire was sent to firms at four year intervals (1990, 1994 and 1998) adding several questions on vertical relations, so we will use the three periods to conduct the empirical analysis.²³

This data also contains detailed information on the type of client: final consumers, firms, retailers, wholesale or public administration, and the percentage of sales to each. Additionally, the survey reports information on the main distribution channel used by firms: direct sale, own distribution network or via intermediaries. Moreover, in the case of firms that sell their products to intermediaries, the survey indicates whether the manufacturer imposes any type of vertical restriction on the distributors, and includes information of the type: resale price maintenance, exclusive territories, exclusive dealing or full line forcing. This

²²Moreover it is easy to show that the profit increase due to vertical integration is lower as the number of distributors increase under Cournot competition.

²³Note that when a firm enters in the middle of each four years, a complete questionnaire is sent out and this means that we have information on vertical relations for that year of entry. For the majority of the observations the answers correspond to the years 1990, 1994 and 1998.

precise information about the relation with clients makes this survey especially adequate to conduct this analysis.

Data description

As can be seen in Table 1, we have a total of 3318 firms observed over different periods with a total of 6420 observations. Almost one third of the firms have provided answers for the three periods considered (period I: from 1990 to 1993, period II: from 1994 to 1997 and period III: from 1998 to 2001). Less than half the firms provided just one observation. As the second column indicates, 28% of the sample corresponds to observations of firms with 200 or more workers. The last two columns of Table 2 indicate the percentage of firms that sell some of their products via intermediaries. On average, 60% of the firms indicated contact with at least one intermediary²⁴. The other 40% sold all their production directly to clients (firms, consumers or public administration) using different means as we will see later.

[Table 1]

In what follows we present some descriptive statistics in order to evaluate the importance of intermediaries as a channel of product distribution of the Spanish manufacturing firms and evaluate the presence of vertical restraints. The channels that firms use to distribute their products and the type of clients are first described. The frequency of vertical restraints and the type of vertical restraints that firms impose to their retailers is then analyzed.

As mentioned above, firms report the distribution channel. In some cases they distribute all the production directly to final consumers (in the case of final goods) or firms (mainly in the case of intermediate goods) or via an own distribution channel. In other cases, they sell products via distributors (retailers or wholesalers). It is also frequent that firms use more than one mechanism to distribute their products.

²⁴It is necessary to take into account that we are analyzing the manufacturing sector in which firms produce consumer and intermediate goods. Vertical restrictions are more typical in those firms that produce final or consumer goods and intermediaries are the nexus with the clients. the presence of intermediaries is less frequent, in the case of producers of intermediate goods .

[Table 2]

Table 2 shows that 19% of firms sell all their products via intermediaries, 32% sell all their all products directly and a small number of firms exclusively use their own distribution network. The fourth row of this table show us that almost half the firms use more than one distribution channel.

Figure 1

To show a more precise map of the percentage of sales distributed via intermediaries, Figure 1 provides the histogram for percentage sales that firms made via intermediaries (retailers or wholesales). The total number of observations is 3967 and as can be seen, about one third of the observations reported selling less than 50% of their sales via intermediaries, while more than 40% sold more than 90% of their products via retailers or wholesalers.²⁵

[Table 3]

For those firms using more than one distribution system, the one providing the highest proportion of their sales was considered as their main distribution system. Table 3 shows that almost half the observations use direct selling as the main distribution system and a similar percentage use intermediaries. A small percentage of observations use their own distribution network as the main channel of distribution. Larger firms make lesser direct sales than smaller firms.

[Table 4]

Firms also reported the number of intermediaries to which they sold their products according to the following four intervals: 1) No intermediaries; 2) between one and five; 3) between 6 and 50 and 4) more than 50 intermediaries. Table 4 shows that about one third of manufacturing firms have no intermediaries, this percentage is slightly higher in the group

²⁵The number of observations correspond with those firms that declared to have sold some products via intermediaries. The remaining 2453 observations, sold their products directly to clients.

of smaller firms. The number of distributor firms, varies from fewer than 5 in 14% of the manufacturers to more than 50 intermediaries in 29% of the observations. Large firms tend to contract with a greater number of distributors, in fact, 42% of firms with more than 200 workers have more than 50 intermediaries.

The sample of manufacturing companies includes firms that produce both intermediate and final goods. Their choice of distribution channel will depend in great measure on the type of good or client. The ESEE provides information on the type of client and the proportion of the total sales directed to each type. Table 3 shows that the main client is a retailer or a wholesale for 44% of the observations. Table 5 outlines the main client for the remainder observations.²⁶

[Table 5]

Table 5 indicates that half of the companies sell most of their products directly to other firms, and this percentage is slightly higher in small firms. These are typically firms that produce intermediate goods. Secondly, a small number of firms sells their products directly to final consumers and this is more frequent in the group of small firms. Lastly, public administration is the main client of a very reduced number of firms, mainly large firms.

[Table 6]

Firms which sold some of their products via intermediaries were asked whether they imposed any vertical restraints, and reported about 5 types of vertical restrictions. Table 7 shows us that 38% of firms imposed some type of vertical restriction, and this percentage is significantly higher in the group of large firms. This percentage is quite similar in the three periods considered. Moreover those firms with wholesaler as main client imposed vertical restraints more frequently.

[Table 7]

Lastly, we analyzed the type of vertical restrictions imposed by manufacturing firms on their intermediaries. As can be seen in Table 7, *exclusive territories* are the most frequent

²⁶We consider the main client to be the one with the highest proportion of sales.

restriction used by Spanish manufacturing firms and the *franchise fee* is the least frequent. This conclusion is the same for the subsamples of big and small firms.

[Table 8]

Although firms that impose one type of restraint are the most abundant, there do exist firms that impose more than one. Table 8 shows that 40% of firms impose more than one type of restriction. And there is a small number of them that impose all restrictions simultaneously.

The following subsection analyzes firms that impose vertical restraints by industry and size.

Industry and size heterogeneities

Most empirical works that have analyzed the effects of vertical restraints have been focused on a particular sector such as, Beer, Gasoline or Distribution of automobiles.²⁷ Although these are sectors that often apply vertical restrictions, many firms from other sectors also use vertical restraints in relations with their distributors.

In order to evaluate the importance of these restraints over the different industries of the Spanish manufacturing sector, we selected those firms that reported selling a proportion of their goods. via distributors (a total of 3967 observations). A probability model (probit) which included industry, size and year dummy variables was used:

$$P(y > 0|I, S, T, Ent, Exit) = \beta + \sum_{i=1}^{19} \beta_i^I I_i + \sum_{i=2}^6 \beta_i^S S_i + \sum_{i=2}^3 \beta_i^T T_i + \beta^E Ent + \beta^X Exit + u$$

where y is a 0/1 variable that takes a value of 1 when firm i reports some type of vertical restraint in its relations with the distributors, and I_i refers to 20 industry dummies, S_i to 6 size dummies and T_i to time period dummies.²⁸ The estimated coefficients show whether there is a positive or negative correlation between each characteristic and the probability of imposing some type of vertical restraint.

[Table 9]

²⁷See Lafontaine and Slade (2005) and Cooper et. al (2005b) for a survey of empirical works.

²⁸In order to avoid multicollinearity one dummy from each group was not included in the estimation.

Table 9 reports the estimated coefficients and the marginal effects of the probability model. Since all the explicative variables are dummies, the marginal effect is obtained as the difference between the estimated probability when the dummy takes the value one and zero. The general pattern that emerges from these figures is that there is a significant heterogeneity among sectors and size -as the Log-likelihood test shows- but not over time.

The first set of results indicate that the proportion of manufacturing firms that impose vertical restraints changes significantly across industries. Food, Beverage, Industrial and office equipment, Vehicles manufacturer and Furniture are the sectors in which vertical restraints are most frequent. However, Textile and clothing and Paper sectors are those in which vertical restraints are imposed least frequently. Upon analyzing the five types of vertical restraints separately we find that the patterns of industry heterogeneity depend on the type of restriction.²⁹ Only the Beverage sector presented a positive and significant coefficient over the five restraints considered. On the other hand, Furniture showed a positive and significant coefficient only in the Exclusive territories restraint. The Textile and clothing sector, showed a negative coefficient in the general regression, the coefficient became positive when the Franchise Fee was analyzed. On the other hand, the Printing and publishing industry is included in the group of sectors with a higher probability of imposing a Resale price maintenance restriction. The Vehicles sector presents a higher probability of imposing Exclusive territories and Resale price.

Firm size also plays an important role in the probability of imposing vertical restraints on distributors. This probability increases significantly with the size of the firms. The probability of larger firms to engage in vertical restraints is 33 points higher than the smallest ones (the excluded category). The bigger the size of the upstream firm the greater is the firms' negotiation power with the distributors and the ability to impose restraints. We replicated the estimation of this model for each of the five types of vertical restraints separately and the results confirm this general pattern in all cases.

Periods are not significant, although there is a small reduction of the probability in the

²⁹The five restraints are: Franchise fee, Resale price maintenance, Full line forcing, Exclusive territories and Exclusive dealing.

last period and this conclusion is the same for the five types of vertical restraints analyzed.

EMPIRICAL RESULTS

This section presents the empirical exercise to test the main predictions of our theoretical framework. That is, those firms that put in a greater effort to increase demand have a higher incentive to vertically coordinate their actions, and therefore a higher probability of engaging in vertical restraints. To conduct the empirical exercise we selected those firms that sold part of their production via intermediaries and excluded those that sold the majority of their products directly or via their own distribution network. The data set used contains a total of 3835 observations.³⁰

The following linear probability model was estimated:

$$y_{it}^* = \gamma e_{it} + Z_{it}\delta + v_i + u_{it}, \quad y_{it} = 1[y_{it}^* > 0]$$

Where $\Pr(y_{it} = 1|e_{it}, Z_{it}, c_i) = \Phi(\bullet)$, and Φ are assumed to be the standard normal cumulative distribution function, y is a dummy variable which takes the value one if firms declared the imposition of vertical restraints on their distributors and e represents the firm's demand increasing effort. To measure this effort we have two possibilities: first, the advertisement effort, which is a direct measure of this effort. A dummy variable is included to take the value one in case the firm undertakes advertising activities in addition to a continuous variable (defined as the proportion of advertisement expenditure over sales, in logs) to take into account the effort made. The second possibility is to consider product R&D expenditure. Although firms reported the amount of expenditure on R&D, we were not able to distinguish between product and process R&D. However, the survey reports information on product innovation introduced by firms. A product innovation is assumed to occur when a firm answers positively to the question of whether it has obtained product innovation as a completely new product or as an important modification of the present product (new design, new functions of the products or new materials). A dummy variable which takes the

³⁰We selected the observations of firms that provided answers for all variables. A total of 106 observations were discarded because they did not report information on some of the variables used in the estimation.

value one when the firm declares the undertaking of R&D activities and the introduction of product innovation, is considered as an indicator of demand effort. In accordance with the theoretical framework the expected sign of these variables is positive.

Vector Z includes several variables other than industry, size, period and entry/exit dummies. Firstly the number of distributors as an indicator of retail competition. Secondly the age of the firm to control its experience in the market. This variable is constructed according to the number of years it has been active in the marketplace³¹. Thirdly we include a dummy that takes the value one if the firm is foreign, that is, if a firm declares more than 50% of its capital as foreign. Fourthly we include a dummy that takes the value one if the firm reports exports of more than 50% of its sales. These two variables will take into account the different patterns in vertical restrictions in other countries. As mentioned before the legal attitude toward vertical restraints can be heterogeneous by countries. This fact could affect the use of vertical restraints of foreign firms located in Spain and could also affect the use of vertical restraints of Spanish firms that sell most of their products in other countries, which in some cases sell them via foreign distributors. Lastly, v_i is an unobserved effect that we assume to be uncorrelated with observed variables.³²

[Table 10]

Table 10 reports the estimated coefficients of γ and δ . The first two columns correspond to a pooled probit in which the variable measuring the increasing demand effort is advertisement effort. The first column does not include sector, size and period effects, which are included in the remainder of the specifications. The third column not only includes advertisement effort but also a product innovation dummy, and the last column corresponds with the random effects model.

³¹We established a maximum category of 40 years or more, see Huergo and Jaumandreu, 2004 for an explanation on the construction of this variable with this survey.

³²We assumed that v_i is uncorrelated with observed variables and has normal $(0, \sigma_v^2)$ distribution. Given that a number of firms are only observed in one period it is natural to choose a random-effect model. Using a fixed-effect would have implied exclusion of firms with only one observation and firms which do not change in the status of the dependent variable.

The first interesting result is that advertising effort plays an important role as a determinant of vertical restraints. On the one hand, firms with a positive publicity drive present a significantly higher probability of imposing vertical restraints on their retailers or wholesalers. Moreover, higher advertisement effort also gives higher incentives to impose vertical restraints. By comparing the results of specifications (1) and (2), the magnitude of the effect is observed to decrease when industry composition and firm size are included in the specification, but the effects remain significant. On the other hand, the introduction of product innovation, -as we can see in column (3)- increases the incentives to impose vertical restraints. These results are robust to the introduction of random effects in the specification, as we can see in column (4).

Another interesting result is the negative effect of the number of retailers on the probability of vertical restraints. Two reasons can explain this finding. Firstly, a higher number of retailers could indicate a higher level of competition and this could reduce the benefits of vertical restraints. On the other hand, an increasing number of distributors could increase the contracting cost and this dissuades firms from imposing vertical restraints.

Firms' age has a negative effect on probability, meaning that experience does not seem to play a role in vertical restraints. Foreign / Spanish firms have no differing patterns on vertical restraints once size and industry dummies are included in the specification. But, those firms which sell most of their production in foreign markets impose vertical restraints more frequently.

As mentioned in the previous section, the questionnaire asked the firms that declared a positive answer in vertical agreements with retailers or wholesalers, to specify amongst the five types of vertical restraints. We are now interested in the effect of demand increasing effort in the probability of imposing each of them.

[Table 11]

Table 11 presents the coefficients of the advertisement and product innovation variables, although each one of them contains all variables of specification 3. As can be seen, *franchise fee* is the only vertical restraint that is not at all affected by the demand increase effort made

by firms. Franchising is a very specific type of commercialization. That is more frequent in the textile sector and implies agreement not only of price but also of other variables such as type of establishment, location, etc.

On the other hand, *resale price maintenance* is a vertical restraint that is significantly affected by sales effort, mainly advertising. The results are quite similar in the case of *full line forcing*. *Exclusive dealing* and *exclusive territories* are imposed more frequently by those firms with positive advertising or R&D effort, but the effect of the intensity of advertisement effort is not significant. Note that this type of vertical restraint tries to solve, in some cases, downstream externalities provoked by retailers' effort (information, post-sales service) and this may be more important in those products that suffer important changes or improvements.

SUMMARY AND CONCLUSIONS

Co-ordination between producers and distributors via vertical restraints can help firms to increase their profits and, under certain circumstances, such efficiency gains could be passed on to consumers.

The *rule of reason* approach followed by antitrust regulation is consistent with the different conclusions from theoretical literature that focus on the different effects of vertical restraints. On the one hand, vertical restraints can be used to restore the efficiency of the vertical interaction (solving double marginalization or fee-riding problems). But, on the other hand, vertical restraints can eliminate or reduce inter-brand competition. In general, there is no simple conclusion as to whether a particular type of vertical restraint is pro- or anti-competitive and a *per se* prohibition would not be sensible due to there being efficiency effects which are likely to dominate in most cases.

Vertical restraints normally have an unambiguous positive effect when they are properly introduced to solve co-ordination problems. This paper extends the classical model of Spengler (1950) by considering that producers can make an effort to increase demand (advertisement or product R&D activities) and by concluding that vertical coordination is

more profitable when the producer makes this type of effort. Empirical analysis confirms this hypothesis: those firms that engaged in product R&D activities or advertisement expenditure presented a higher probability of imposing vertical restraints on their retailers or wholesalers.

Moreover, as the number of retailers increased the probability of imposing vertical restraints decreased, and we did not detect a differing pattern between foreign and Spanish firms. However, firms which sold most of their production in foreign markets were found to impose vertical restraints more frequently.

These results are similar in four of the five types of vertical restraints analyzed. The Franchise fee presents a different pattern.

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Table 1: Sample description

	Firms	Observations			With distributors	
		≥ 200	< 200	Total	N. obs.	%
<u>Three observations</u>						
I + II + III	1050	1002	2148	3150	1971	62.6
<u>Two observations</u>						
I + II	391	226	558	784	498	63.5
II + III	555	218	892	1110	660	59.4
I + III	54	56	52	108	74	68.5
<u>One observation</u>						
Period I	735	132	603	735	446	61.0
Period II	138	37	101	138	82	59.4
Period III	395	163	232	395	236	59.7
Total	3318	1834	4586	6420	3967	61.8

Table 2: Firm's distribution system.

	Total observations	Large firms	Small firms
Retailer/wholesale ¹	1226 (19%)	282 (15%)	944 (21%)
Direct sale ²	2082 (32%)	476 (26%)	1606 (29%)
Own network ³	169 (3%)	62 (3%)	107 (2%)
Mixed system	2943 (46%)	1014 (55%)	1929 (42%)
Total	6420 (100%)	1834 (100%)	4586 (100%)

¹observations of firms that declared selling all their products via intermediaries.

²observations of firms that declared selling all their products directly.

³observation of firms that declared selling all their products via an own distribution network.

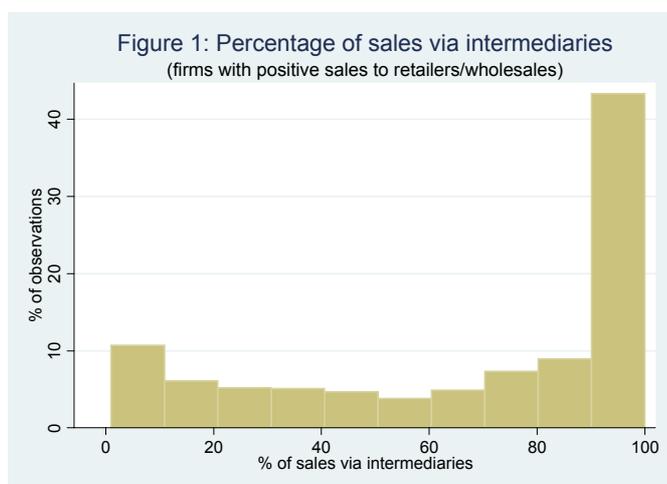


Table 3: Firms' main distribution system.

	Total observations	Large firms	Small firms
Retailer/wholesale	2854 (44%)	872(47%)	1982 (43%)
Direct selling	3135(49%)	802(44%)	2333 (51%)
Own network	431(7%)	160 (9%)	271 (6%)
Total	6420 (100%)	1834 (100%)	4586(100%)

Table 4. Number of intermediaries

N°of intermediaries	Total observations	Large firms	Small firms
0	2453 (38%)	603 (33%)	1850 (40%)
1-5	897 (14%)	179 (10%)	718 (16%)
6-50	1292 (20%)	287 (15%)	1005 (22%)
more than 50	1778 (28%)	765 (42%)	1013 (22%)
	6420 (100%)	1834 (100%)	4586 (100%)

Table 5: Main client of the firms without intermediaries.

	Total	Large firms	Small firms
Consumers	8.3 %	2.7 %	10.4 %
Firms	88.2 %	90.6 %	87.3 %
Public administration	3.5 %	6.7 %	2.3 %
Total	3566 (100%)	962 (100%)	2604 (100%)

¹The main client of the firms is the one with the highest proportion of sales

Table 6: Vertical Restraints (VR) by size, period and client.
(percentage of firms)

	Without VR	With VR	Total
Large firms	47.0%	53.0%	1231 (100%)
Small firms	68.6%	31.4%	2736 (100%)
Period I	61.9%	37.1%	1405 (100%)
Period II	61.5%	38.5%	1318 (100%)
Period III	62.3%	37.8%	1244 (100%)
Retailer main client	65.8%	34.2%	1469 (100%)
Wholesale main client	59.6%	40.3%	2498(100%)
Total observations	62.0%	38.0%	3967 (100%)

Table 7: Type of vertical restriction

	Total	Big firms	Small firms
Franchise fee	5.2%	7.0%	3.7%
Resale price maintenance	24.8%	28.5%	22.0%
Full line forcing	31.8%	35.4%	29.1%
Exclusive territories	50.1%	52.4%	48.4%
Exclusive dealing	35.4%	37.8%	33.7%
Other type	22.1%	19.4%	22.4%
Total observations with vertical restraints	1511	653	858

Table 8: Number of vertical restrictions

N°of VR	% of obs.
1	57.2%
2	22.8%
3	14.8%
4	4.8%
5	0.5%
N°observations	1511

Table 9. Size, industry, period heterogeneities.

Dependent variable: 1 if firm imposed a vertical restraints. Probit regresion.

	Coef.	t-ratio ¹	Marg. efect ²
constant	-0.79	-6.5	
1. Meat related products	0.15	1.0	0.06
2. Food and tobacco	0.48	3.8	0.19
3. Beverage	0.83	5.0	0.32
4. Textile and clothing	-0.41	-3.1	-0.14
5. Leather, fur. and footwear	-0.03	-0.2	-0.01
6. Timber	-0.16	-0.9	-0.06
7. Paper	-0.47	-2.3	-0.16
8. Printing and publishing	-0.03	-0.2	-0.01
9. Chemicals	0.07	0.5	0.03
10. Plastic and rubber products	-0.12	-0.8	-0.04
11. Nonmetal mineral products	-0.10	-0.7	-0.04
12. Basic metal products	-0.29	-1.7	-0.10
13. Manufactured metal products	-0.07	-0.5	-0.03
14. Industrial & agricultural equipment	0.44	3.0	0.17
15. Office mach., data proc., and similar	0.33	1.8	0.13
16. Electric material and accesories	0.16	1.1	0.06
17. Vehicles and accesories	0.29	1.7	0.11
18. Other transpotation materials	0.22	0.5	0.08
19. Furniture	0.33	2.4	0.13
20. Miscellaneous	-	-	-
LR test	213.3		
less than 20 workers	-	-	-
20-50	0.22	3.6	0.08
50-100	0.55	6.4	0.22
100-200	0.69	8.6	0.27
200-500	0.75	11.8	0.29
more than 500 workers	0.86	10.7	0.33
LR Test	221.8		
1990-1993	-	-	-
1994-1997	0.03	0.5	-0.01
1998-2001	-0.08	-1.5	-0.03
LR Test	2.2		
Entry	0.04	0.7	0.02
Exit	0.05	-0.6	0.02
N. observations	3967		
Log likelihood	-2391.4	-	-

¹Robust t-ratio²Marginal effect is calculated for a discrete change of each dummy variable from 0 to 1.

Table 10: Effect of increasing demand effort on the vertical restraints.

Dependent variable: 1 if firm imposed vertical restraints

Variables	(1) coef. ¹	(2) coef. ¹	(3) coef. ¹	marg. ef	(4) coef. ¹
Constant	-0.39 (-3.6)	-0.62 (-3.5)	-0.68 (-3.9)	-0.12	-0.81 (-2.7)
Advertising dummy: $e_A > 0$	0.51 (9.5)	0.39 (6.8)	0.37 (6.3)	0.03	0.44 (5.5)
Adv. effort ² : $\log(e_A)$	0.13 (7.2)	0.09 (4.5)	0.08 (3.9)	0.03	0.11 3.7
R&D dummy: $e_{R\&D} > 0$	- -	- -	0.36 (5.7)	0.13	0.39 4.7
Retail competition	-0.05 (-1.6)	-0.08 (-2.5)	-0.08 (-2.5)	-0.03	-0.12 2.7
Firms age	0.01 (0.7)	-0.06 (-2.5)	-0.06 (-2.6)	-0.02	-0.08 -2.2
Foreign firm dummy	0.33 (5.8)	0.12 (1.9)	0.14 (2.1)	0.05	0.21 2.2
Exporter firm dummy	0.31 (4.5)	0.22 (3.0)	0.21 (2.8)	0.07	0.23 2.1
Industry dummies (19)	not. incl.	incl.		incl.	incl.
Size dummies (5)	not. incl.	incl.		incl.	incl.
Period dummies (2)	not. incl.	incl.		incl.	incl.
Entry/exit dummies (2)	not. incl.	incl.		incl.	incl.
n° observations	3831	3831	3831		3831
n° firms					1607
Log-likelihood	-1606.3	-2112.5	-2095.5		-1451.3
F-test		412.4	447.3		224.6
Estimation method	Probit	Probit	Probit		Panel

¹Robust T-ratio in parenthesis.²Advertising effort $e_A = \log((\text{advertisement expenditure}/\text{sales}) * 100)$

Table 11: Effect of increasing demand effort on different types of vertical restraints

	$e_A > 0$		$\log(e_A)$		$e_{R\&D} > 0$	
	coef.	marg. ef..		marg. ef	coef	ef. marg.
Franchise fee	-0.05 (-0.4)	0.00	0.06 (1.4)	0.00	0.08 (0.6)	0.00
Resale price maintenance	0.33 (4.1)	0.04	0.09 (3.6)	0.01	0.16 (2.0)	0.02
Full line forcing	0.21 (2.9)	0.03	0.07 (3.0)	0.01	0.16 (2.1)	0.03
Exclusive territories	0.40 (5.9)	0.09	0.03 (1.3)	0.01	0.35 (5.3)	0.10
Exclusive dealing	0.18 (2.6)	0.03	0.00 (0.1)	0.00	0.32 (4.5)	0.07
Variables included in Z			incl.			
N° observations			3831			

¹Coefficients of the effort variables of the probit regression (especificacion 3) and robust t-ratio in parenthesis

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