Empirical Regularities on Vertical Restraints*

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Abstract

This paper exploits a unique panel dataset of Spanish manufacturing firms containing information on vertical restraints with retailers and wholesalers. This data reports detailed information on firm distribution systems and the type of vertical restraints that firms impose: Franchise fee, Resale price maintenance, Full-line forcing, Exclusive territories and Exclusive dealing, which is a rather unusual feature. The aim of this paper is twofold. First, the scope of vertical restraints are analyzed through the identification of industry and size heterogeneities for each vertical restraint. Secondly, the determinants of resale price maintence are explored focusing on the effect of the upstream firm effort to increase demand. A simple theoretical example is presented and a probability model is used to analyze the empirical determinants of limiting the resale price. The results confirm that those firms that make greater advertising effort impose resale price more frequently. Besides, larger firms and those firms that impose other restraints such as exclusive territories limit the resale price more frequently.

Keywords: vertical restraints, resale price maintenance, manufacturing sector.

JEL Classification: L22, L12

*I am grateful to Consuelo Pazó and M. José Moral for their suggestions as well as the comments of the participants of the seminars at the Departaments of Economics at Northeastern and Harvard Universities and the audiences of the *XXIII Jornadas de Economía Industrial, XXXI Simposio de Analisis Económico, 35th European Association for Research in Industrial Economics (Toulouse, 2008).* Financial support from the Spanish Ministry of Education (ECO2008-05771) is gratefully acknowledged.

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1. Introduction

Vertical agreements or restraints are defined by antitrust regulation as "agreements of concerted practices entered into between two or more undertakings each of which operates at different levels of the production or distribution chain".[1] In practice, vertical restraints most often arise in retail settings, with the upstream firm or manufacturer typically restricting its downstream retailers choices.

Vertical restraints are grouped into price and non-price restraints. The former refers mainly to *Resale price maintenance*, where a distributor commits to a retail price. This can take the form of a fixed price, either minimum or maximum resale price or even a recommended price.[2] The latter includes: *Exclusive territories,* when a distributor is assigned a geographic territory by the manufacturer and given monopoly rights to sell in that area. *Exclusive dealing*, when a distributor is not allowed to carry the brands of competing manufacturers.[3] *Full-line forcing,* when a distributor is committed to sell all the varieties of the manufacturer's products. This is a particular type of tie-in-sales agreement in which the distributor agrees to buy one or more goods from the manufacturer rather than only the goods it wants to buy.

Vertical structures involve a number of decision variables that affect the joint profits (retail price or selling effort) or the way this profit is shared between the firms (wholesale price). The decentralization of the decision variables to the retailers can create market inefficiencies since they create externalities. The best known problems stemming from a lack of coordination are double marginalization (Spengler, 1950) and infra-provision of

[1] See article 2(1) of Commision Regulation (EC) n^o 2790|1999 of 22 December 1999 on the application of Article 81(3) of the Treaty to categories of vertical agreements and concerted practices (Block exemption Regulation).

[2] Some authors include the *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* usually based on the distributor's sales as price restraints. See Rey and Tirole (1986) and Rey and Vergé (2005) for a more exhaustive classification of vertical restraints.

[3] Exclusive territories is a way of restraining intrabrand competition and exclusive dealing is a way of restraining interbrand competition.

services. Vertical restraints can then be used as a means to coordinate and restore the efficiency of the vertical structure.

Vertical restraints can solve these inefficiencies in a number of ways. Resale price maintenance alleviates the double marginalization problem. Exclusive dealing enables manufacturers to protect their investments against potential retailer opportunism[4]. Exclusive territories reduce free rides among distributors in the provision of services and promote them, they also promote distributor *ex ante* investments in specific facilities or in human capital. Lastly, full line forcing helps manufacturers introduce new or improved products to the market.

On the other hand, vertical restraints can be used by manufacturers to avoid competition. To analyze the anticompetitive effects, we must consider competition not just at the distribution level (intra-brand competition) but also at the manufacturing level (inter-brand competition). Vertical restraints can restrict competition in at least three ways: 1) by diluting competition among producers, (i.e., manufacturers use certain restraints to delegate some decision-making power to their distributors and commit to not competing aggressively with their rivals, [5] 2) by promoting collusion among manufacturers [6] and 3) by acting as foreclosure instruments either by raising rival costs or preventing competitor market entry.

The attitude of competition authorities and courts towards vertical restraints varies significantly over time and from one country to another.[7] Most horizontal agreements among competitors violate antitrust regulation: they are forbidden *per se*, and are considered illegal even without evidence of hurting competition. In the case of vertical agreements the

[4] For example, when a manufacturer launches a general product promotion or makes an investement that reduces a retailer's cost. In the first case, a dealer might encourage costumers to buy another lower-priced brand or one with a higher retail margin. In the second case, reduces retailer's costs of selling competing brands.

[5] Rey and Stiglitz (1988, 1995) show that exclusive territories eliminate intra-brand competition between retailers and act as a pre-commitment agreement aimed to be less "aggressive" and give incentives to rival manufacturers to set higher prices. See Caillaud and Rey (1995) for a review of this literature.

[6] Julien and Rey (2000) show that the Resale Price Maintenance tool increases the likelihood of collusion by eliminating the retail price variation that make price cuts easier to detect.

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

rule-of-reason approach is generally applied in most regulations, i.e., a priori presumption exits, and courts must weigh the costs and benefits of a practice on a case by case basis. This is the basis of the most recent European Union regulation on vertical restrictions published in the "Guidelines on Vertical Restraints"(2000).[8] Under this regulation decisions are not based primarily on the type of restraint but mainly on the market environment[9].

Although there are numerous theoretical contributions about the motivation for or the effects of vertical restraints, empirical contributions are much scarcer.[10] Consequently, we know little about the scope of these agreements in manufacturing firms. This paper exploits a unique data set of Spanish manufacturing firms which is a representative panel of more than 3000 Spanish manufacturing firms gathered from 1990 to 2001. It contains detailed information on firms' distribution systems (direct selling or distribution nets) and the types of clients/customers: consumers, firms, distributors (wholesalers or retailers) or public agencies. This data set includes information from firms that use distributors (retailers or wholesalers) concerning the use of vertical restraints and the type used among five options: franchise fee, resale price maintenance, full-line forcing, exclusive territories and exclusive dealing, which is a rather unusual feature.

The objective of this paper is to contribute to empirical literature by identifying empirical regularities which manufacturing firms impose. From the analysis of the data set we find that the large firms impose vertical restraints more frequently and, in many cases, firms impose more than one vertical restraint. The combination of exclusive territories and exclusive dealing being the most frequently observed in the data. The restraint used less frequently by manufacturing firms is the franchise fee, almost all being in the textile sector. We found

[8] See 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.

[9] One argument for a general prohibition rather than the case-by-case approach, usually applied to non-price vertical restraints, is that it minimises enforcement and compliance costs.

[10] See 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.

an important heterogeneity in sectors regarding the use of vertical restraints. The industry that uses all five vertical restraints more frequently is the Beverage industry. Resale price maintenance is used more frequently in those sectors in which it has been legal (vehicles, drugs, and books) but has also been observed in others such as the industrial and agricultural equipment, beverage or bicycles industry.

The second part of the paper focuses on the determinants of the most controversial vertical restraint: resale price maintenance. First, a very simple theoretical framework is proposed in a context of intra-brand competition. A vertical chain of two monopolists is considered: a manufacturer and its distributor. We evaluate the profitability for the upstream firm in limiting the resale price when it makes an effort to increase demand. This effort increases the consumers willingness to pay and the distributor takes advantage of it without any cost. The theoretical model shows that the profitability in limiting the resale price is higher when the manufacturer makes an effort to increase demand.

A probability model is used to analyze the empirical determinants of limiting the resale price and the results confirm that those firms that make greater advertising efforts impose the resale price more frequently. Besides, larger firms and those firms that impose other restraints such as exclusive territories limit the resale price with higher probability.

The rest of the paper is organized as follows: Section 2 describes the data and presents some empirical regularities on vertical restraints in the Spanish manufacturing sector. Section 3 presents the theoretical example. Section 4 details the empirical specification and explains the main results and Section 5 presents the conclusions.

2. Empirical regularities on vertical restraints

Data.—

The data set used in this paper contains data at the firm level from the ESEE (Encuesta Sobre Estrategias Empresariales) survey, a firm-level survey of Spanish manufacturing sponsored by the Ministry of Industry. The Survey on Firm Strategies (*Encuesta Sobre Estrategias Empresariales*) is an unbalanced panel data from 1990 to 2000, though the variables

related to vertical restraints are surveyed every four years (1990, 1994 and 1998). At the beginning of the survey period, firms with less than 200 workers were sampled randomly by industry and size strata, and 5% of these firms were included. All firms with more than 200 workers were asked to participate and 60% responded. To preserve representation, samples of newly created firms were added every subsequent year.

The survey also collected detailed information on each firm's clients including whether they were final consumers, firms, retailers, wholesale or public agencies, and the percentage of sales for each client. Additionally, the survey collected information on the main distribution channel used by firms: via direct sale, the firm's distribution network of intermediaries. Moreover, for firms that sell products to intermediaries, the survey asked whether the manufacturer imposed any vertical restraint on the distributors and, if so, the type: franchise fee (FF), resale price limits (RPM), full-line forcing (FLF), exclusive territories (ET) and exclusive dealerships (ED). This information about the firm's relationship with its intermediaries makes the survey especially useful for this analysis.

As Table 1 shows, data on 3,318 firms was collected with a total of 6,420 observations. Almost one third of the firms provided answers to all the questions about vertical restraints for the three periods considered (period I: from 1990 to 1993, period II: from 1994 to 1997 and period III: from 1998 to 2001).[11] Less than 50% of the firms provided just one observation. As the second column in Table 1 indicated, 28% of the sample corresponds to observations from firms with 200 or more workers.

[Table 1]

Distribution channel.—

As mentioned above, firms reported the type of distribution channel they used. In some

[11] The complete questionnaire, that includes the questions about vertical restraints, is sent every four years (1990, 1994 and 1998). The firms that enter in between these years receive the questionnary the fist year in the sample.

cases they distribute all their goods directly to final consumers (in the case of final goods) or firms (mainly in the case of intermediate goods) or via their own distribution channel. In other cases, they sell products via distributors (retailers or wholesalers). Frequently firms use more than one channel to distribute their products. In these cases, we consider the main distribution channel as the one providing the highest proportion of a firm's sales. Table 2 shows that almost 50% of the observations use direct selling as their main distribution channel and a similar percentage use intermediaries. In the former case, the main clients are other firms, and in a much smaller proportion public agencies or consumers. A small percentage of observations use their own distribution network as the main channel of distribution.

Of the firms that sell primarily to retailers, those with vertical restraints range from 19% of the smaller firms to 42% of the larger firms as illustrated in Table 3.

[Table 3]

Vertical restraints by size.—

Table 4 shows the number of firms that report each type of vertical restraint. Exclusive territories being the restriction most frequent used, and franchise fee the least. Moreover, the use of vertical restraints increase in proportion to company size.

[Table 4]

Another interesting empirical regularity is that firms often impose more than one vertical agreement, as shown in Table 5. Of the firms that impose vertical restraints, around 45% impose only one restraint and 30% impose two simultaneously. This percentage decreases as the number of restraints increases. Firms with fewer than 50 workers use multiple restraints less frequently.

[Table 5]

Table 6 shows which firms most frequently use various restraints based on size . The

figures in the diagonal indicate the number of firms that use only one. The most frequent combination of restraints is exclusive dealing and exclusive territories; 32% of firms with vertical restraints use these two.

[Table 6]

Vertical restraints by industry.—

Table 7 shows that there is a wide range of heterogeneity among sectors in relation to the channel of distribution. Typically for consumer good industries the proportion of firms that sell their products via intermediates is very high (e. g. food and textile industries or furniture). On the other extreme, sales via intermediaries is very limited for those industries that produce intermediate goods (e. g. other transport material).

[Table 7]

Table 8 arranges industries by the use of vertical restraints (the first column). Beverage is the industry that imposes all kind of vertical restraints most frequently; and, surprisingly, textile and clothing, another consumer good industry, is the one that imposes them less frequently.

[Table 8]

The second industry with more vertical agreements is the equipment and machinery industry. This industry includes building, industrial and agricultural machinery, which are intermediate goods. This type of goods requires a number of pre- and post sales services such as information or repair. In this group, typically consumer goods, are also included. In this case, the number of firms with retailers is higher and the most frequent vertical restraint is full line forcing.

The vehicles and accessories industry includes three different activities: vehicles, trucks and components. Most of the vertical restraints are in the vehicle sector, which is also the industry that uses dealers more frequently to distribute their products (although a number of these have their own distribution chain).

The other transport materials industry includes a number of heterogeneous products (boats, bicycles, motorbikes). Vertical restraints are located mainly in the bicycle and motorbike industries.

The most frequent vertical restraint in all industries is exclusive territories; and it ranges between a 10 % usage in industries like textile and clothing and a 36% in the beverage industry.

Resale price maintenance is widely used in four industries: beverage, industrial and agricultural equipment, vehicles and publishing. The last one is due to the specific regulation on book prices in Spain. This regulation has been widely criticized by the Competition authorities in Spain[12].

Vertical restraints and sales effort.—

Sales effort is measured as the advertising expenditures over sales in one year (see Figure 1 for the distribution of this variable). The first column in Table 9 presents the average values of this variable distinguishing between large and small firms. As we can see, advertising effort is greater in large firms. The average effort ranges between 1.4% in smaller firms with no price restraint and 4.1% in large firms with price restraint. The test of equality of means indicates that the difference in effort is significant between firms with and without restraint only in the group of firms with more that 200 workers.

[Table 9]

Table 10 shows a dynamic perspective taking into account the restraint in two consequive years. For big firms, those firms that have price restraint in t and t-1 expend more than twice than those firms without restraint in both periods. The effort is between those two values in the case of firms that impose the restraint any of the two years.

[Table 10]

[12] The Spanish Competition authority has recomended in its 1997 report the liberalization of the book's price. See the report in: http://www.cncompetencia.es/PDFs/OtrosInf/1.pdf

3. A simple example: sales effort and resale price.

The best known case of externalities that affect vertical chains is the double marginalization problem. If both a manufacturer and its retailer have market power, then both charge a positive mark-up, which results in higher prices and lower profits than in a vertically coordinated structure. This inefficiency will be greater when the upstream firm makes an effort to increase demand, by advertising for example. This effort increases the consumers' willingness to pay, making it possible for the downstream firm to increase its price and in turn, increasing mark-up and double marginalization inefficiency. In this case, the upstream firm will have greater incentive to impose a resale price.

A simple example is developed in the context of intra-brand competition, that is, without taking into account the interaction with other suppliers or distributors. We consider a chain of two monopolies where the upstream firm decides the intermediate price and effort, as well as the final price when the resale price is imposed. We obtain the profits of the manufacturer from limiting the resale price and compare it with the benchmark model of a two-monopoly chain where no effort is made.[13] We find that the gain in vertical coordination is greater when vertical externalities exist in addition to price. This result means that when an upstream firm invests in activities such as adverting or product R&D, it has greater incentive to limit the resale price. Moreover, the lower this gain, the lower the mark up of the downstream firm is.[14]

Consider that there is one upstream firm, U, that manufactures a product and sells it through a retailer, D, who buys the product from U and resells it.[15]

Consumer demand is given by $q = (v + e) - p$, where $v > 0$ is a parameter, q is the

[13] This benchmark case is Spengler's model (1950) which illustrate the double marginalization problem that ocurrs when a downstream monopoly chooses an excesive price without taking into account the negative effect on the upstream firm.

[14] The gain will be zero in the case of perfect competition among the retailers.

[15] In this simple example, we suppose that both the manufacturer and retailer are monopolists, which is an extreme case, but the main conclusions are similar when they have some monopolistic power. Note that this simple model is developed in a context of intra-brand competition, abstracting the interaction with other suppliers.

quantity demanded, p is the price charged to consumers and e is the manufacturer's effort. This effort that aims to increase the consumer's willingness to buy the goods, could be adverting, marketing or product innovations. 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 the firm's efforts is independent of the units sold[16] and we do not consider the inter-brand externality, that is, the manufacturer's services or investments are specific to its brand.[17] The retailer's unit cost is given by price, w, which is paid to the manufacturer.[18]

The upstream firm must decide whether to impose a resale price. If it does not, the manufacturer decides e and the wholesale price w. If it imposes a retail price, the manufacturer decides e and the final price p (as in a vertical integrated monopoly).

$$\max_R \left\{ (1-R) \left(\max_{w,e} \Pi(p,e) \right) + R \left(\max_{p,e} \Pi(p,e) \right) \right\} \tag{1}$$

where R=1; the upstream firm imposes the resale price

Let us analyze the two cases separately.

The manufacturer does not limit the resale price..—

The manufacturer chooses the level of effort, e,and the wholesale price, w, at which to sell to the retailer. The downstream firm chooses the price, p, at which it sells to consumers. The challenge facing 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 manufac-

[16] If 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.

[17] Besanko and Perry (1993) consider the incentives for oligopolistic manufacturers producing differentiated brand,s, to adopt exclusive dealing with the retailers. In this case, manufacturers face an inter-brand externality since brand-enhancing investments made by one manufacturer may benefit other manufacturers selling simillar products.

[18] For simplicity, we assume that the cost of resale is equal to 0.

turer's effort e.

$$p = (v + e + w)/2; \qquad q = (v + e - w)/2.$$

The manufacturer, by anticipating the price decision of the retailer, chooses w and p to maximize its 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 $e^{sep} = \frac{v-c}{4\theta-1}$.

Replacing these solutions in the downstream firm's solution results in the final price and quantity equilibrium:

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

The manufacturer's and retailer's profits are:

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

Manufacturer decides the final price.—

The manufacturer chooses the final price and the intermediate price that guarantee the retailer the same profits than in the previous situation, leaving it indifferent. The upstream firm would choose p and s to maximize the function:[19]

$$\max \pi^{rpm} = (p - c)(v + e - p) - \theta\frac{e^2}{2} - F.$$

Following this, we obtain:

$$p^{rpm} = \frac{\theta(v + c) - c}{2\theta - 1} \; ; \; e^{rpm} = \frac{v - c}{2\theta - 1} \text{ and } \pi_{M+D}^{rpm} = \frac{\theta}{2}\frac{(v - c)^2}{2\theta - 1} - F$$

For this comparison, we notice that the price is lower, and the effort and profit are higher than in the previous case. Moreover, for the lower cost of effort ($\theta = 1$), the effort of the vertically integrated firm is 3 times greater than the effort of the independent manufacturer. This ratio decreases with θ, as: $\frac{e^{vi}}{e^{sep}} = \frac{4\theta-1}{2\theta-1}$ and $\frac{\partial e_{iv}/e}{\partial \theta} < 0$.

[19] The manufacturer chooses the final price maximizing the joint profits, as it was vertically integrated with the distributor.

The upstream firm must decide upon an intermediate price, $w \in [c, p^{vi}]$, in order to share the profits with the distributor. To induce the retailer to accept the resale price, the manufacturer might choose a w that guarantees the distributor the same profits as in the double marginalization case.

Comparing profits.—

We compare the total profits of both cases: *without* vertical restraint, when the manufacturer only decides the intermediate price and, in the effort and the second case, *with* vertical restrain.

It is easy to show that when the upstream firm decides the resale price the sum of profits of the two separate firms is greater than the sum of profits of the two separately, in the absence of any fix cost to impose the restraint.[20] $\pi_{M+D}^{rpm} > \pi_M^{sep} + \pi_D^{sep}$.

If the upstream firm chooses an intermediate price that guarantees the profits, π_D^{sep}, to the distributor, the upstream firm still earns greater profits than in the double marginalization case as, $\pi_M^{rpm} = \pi_{M+D}^{rpm} - \pi_D^{sep} > \pi_M^{sep}$.

When F>0 this inequality does not always hold; the decision of whether or not to impose the resale price depend on what it cost to do so. The incentives to impose the resale price would be equal to the profit increase due to the restraint, that is:

$$R^* = \pi_M^{rpm} - \pi_M^{sep} = \left[\left(\frac{\theta}{2} \frac{(v-c)^2}{2\theta - 1} - \left(\frac{\theta(v-c)}{4\theta - 1} \right) - F \right) \right] - \frac{\theta(v-c)^2}{2(4\theta - 1)} \tag{2}$$

and we observe that a firm will impose the resale price whenever this difference in profits is positive.

This means that the manufacturer will find it profitable to fix the resale price when the fixed cost to do that is less than: $F \leq \frac{2\theta^3(v-c)^2}{(2\theta-1)(4\theta-1)^2}$.This fraction is decreasing in θ, and increasing in $(v-c)$. That is, as the effort becomes more costly, the optimal effort and the incentives to impose the restriction becomes lower. Moreover, as the fix cost is greater the incentive to impose the restrain will be lower.

This outcome leads us to an interesting empirical prediction: limiting the resale price is

[20] And this unequality holds for all values of v, c and θ

more likely when distributors have market power[21] and double marginalization occurs, but this likelihood will be higher when other types of vertical externalities, besides price, occur. In particular, those firms that make an effort to increase demand will have a higher incentive to limit the resale price. In the next section, we test if there is any correlation between the demand effort (advertising), the market power of the distributors and the limitation of resale price.

6. EMPIRICAL MODEL AND RESULTS

The decision to impose a vertical restraint is typically a discrete decision based on profitability as in equation (2).

$$\begin{aligned} R^*_{it} &= z_{it}\beta_1 + \gamma e_{it} + u_{it} \\ R &= 1[R^*_{it} > 0] \end{aligned}$$

The observed dependent variable takes the value one if the manufacturer limited the resale price to its distributors (retailers or wholesalers) and zero otherwise. The explanatory variables include the demand effort, e, and the monopoly power of the retailers and the cost to limit the price, all included in the vector z.

To conduct the empirical exercise, we select the subsample of firms that declare to have sold some of their products via intermediaries, from the database of Spanish manufacturing firms. The data set contains a total of 1,893 observations and two periods, 1994 and 1998.[22]

To measure the firm's effort we use the advertising effort measured, as the advertising expenditures over sales. In our sample we have information about the amount that the firms

[21] This result can be extended to the case of a downstream Cournot oligopoly. In this case, it is easy to show that the profit increase due to vertical integration decreases as the number of distributors increases.

[22] We selected the observations of firms that provided answers for all variables. A total of 106 observations were discarded because they did not report infomation on some of the variables used in the estimation. Also, we discarded observations of the first period in order to built the lags. Finally, we eliminated the other transport materials industry because none of its firms declare to limit the resale price.

had expended in advertising, which is a direct measure of demand effort.[23] In accordance with the theoretical framework, e is considered as an endogenous variable. Given the likely simultaneity of both decisions, it is sensible to assume that the demand effort and the error are correlated.

We are not able to directly measure the market power of the distributors as the survey does not provide information about them. We use the information about other restraints that in any way give some kind of market power such as exclusive territories and exclusive dealership. Under exclusive territories, retailers are protected from intra-brand competition in a given area. In this case we expect a clear positive effect on the probability of limiting the resale price. With exclusive dealing, retailers are protected from inter-brand competition as they are not allowed to sell competing brands. We include three dummies, two of them take the value one if the firm declares to impose exclusive dealing or exclusive territories (and only one restraint) and the third in the case that firms impose both simultaneously.

To measure the fix cost to impose the restraint, we will use several indicators. The first one is the size of the manufacturing firms. We assume that greater firms are more able to enforce vertical agreements. We include a dummy variable for those firms with over 200 workers.

The second is relative to the industry. The use of this restraint by the rest of the fims in which the firm operates is an indicator of the general acceptance of this restraint. In these cases, the cost of limiting the resale price will be lower because the more generalized this practice is, easier it will be to impose the resale price on their distributors. We include a variable that measures the percentage of the firms in the same industry that had declared in the survey to limit the resale price. Moreover, we include industry dummies to take into account specific industry regulation on vertical restraints.

Finally, we include a variable that measures the number of distributors that the firm has. This variable takes the vaue one if the firm declares having more than 50 distributors and serving a national or international market.

As a control variable we included the kind of intermediary the main client of the firm is,

[23] We include this variable in logs.

we included a dummy that takes the value one if most of the production is sold via retailers and zero if it is sold via wholesalers.

Results.—

We estimate this model as a linear probability model by two stages least squares[24]. Table 11 shows the estimated coefficients of the explanatory variables. The first column considers the firms advertising effort as an exogenous variable and the second and third columns consider that the effort is endogenous. To instrument the effort we use the value of lagged advertising effort and a dummy variable if the firm had introduced a product innovation in the previous period.

Advertising effort has a positive and significative effect on the chances that a firm will limit the resale price. As we can see in columns 2 and 3, an increase of 1% in advertising, the probability of limiting the resale price increases in almost 3 percentual points. This is a high impact because the proportion of firms in our sample that impose this restraint is around a 6%. When we consider the variable as endogenous the coefficient increase in almost one percentual point.

[Table 11]

The effect of other restraints is clear. When a retailer has local monopolies (as they have Exclusive territories) the probability of the manufacturer limiting the resale price increase in more than nine percentual points. However, the effect of exclusive dealership does not play a role if it is imposed alone. But when it is combined with exclusive territories the effect is significant.

The size of the firms is also an important determinant. Firms with more than 200 workers have a higher probability of limiting the resale price. Moreovers, the probability of limiting the prices is greater when the main client of the firm is a retailer than when it is a wholesaler.

[24] Following Wooldridge (2001) pag 472, The 2SLS procedure provide a good estimate of the average effect in a latent variable model where one of the explanatory variables is correlated with the error term. Moreover, to its advantage the estimated coefficients are directly interpretable.

The number of distributors and the size of the market have negative impact. If the number of retailers is greater than 50, imposing vertical agreement becomes more difficult.

Last of all, the industry in which the firm operates plays a small but significative role. The probability of imposing the resale price is greater when more firms in the same industry do the same, as we can see in column 2. However, this effect is less important when we include industry dummies.

7. Summary and conclusions

Coordination 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.

Although there are numerous theoretical contributions that deal with the motivation or the effects of vertical restraints, the empirical contributions are much scarcer. So, we know little about the scope of these agreements in manufacturing firms. In this paper, we exploit a very data set of manufacturing firms that contains information about the vertical restraints they impose. Those firms that have distributors (retailers or wholesalers) report if they have vertical restraints, and, if so, identify the type choosing among 5 possibilities: Franchise fee, Resale price maintenance, Full line forcing, Exclusive dealing and Exclusive territories.

The empirical regularities obtained from the data base show that big firms impose vertical restraints more frequently and in a number of cases firms impose more than one vertical restraint. The combination of Exclusive territories and Exclusive dealing is the most frequently observed in the data. The restraint used by manufacturing firms less frequently is Franchise fee. There is an important heterogeneity, by sectors, in the use of vertical restraints. The industry that uses all the vertical restraints analyzed more frequently is the Beverage sector. Resale price maintenance is used more frequently in those sectors in which it is legal (vehicles, drugs, and books) but also in others where products require a number of pre- and post-sales services such as Industrial and agricultural equipment. Moreover, the

data show that those firms that limit the resale price make a greater effort in advertising.

This paper extends the classical model of Spengler (1950) of two vertically related monopolists by considering that upstream firm makes an effort to increase demand. This effort increases the consumers' willingness to pay and retailers will be able to incrase their markups without incurring in the cost of the effort. This situation gives way to a higher double marginalization inefficiency as well as higher the incentives to limit the resale price. Empirical analysis using a linear probability model confirms this hypothesis: those firms that make an effort to increase demand via advertising have a higher probability of imposing price restraints on their retailers. Moreover, this probability is also higher when manufacturing firms impose other vertical restreints such as eclusive territories, besides price, that give local monopoly power to their distributors. The size of the firm and the industry in which they operate also play a significative role in the probability to observe this vertical agreement.

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Table 1. Sample description

Periods in the sample	n^o firms	Observations
T=1	1247	1247
T=2	963	1926
T=3	1176	3528
Total	3386	6701

Table 2. Main distribution channel

	N. Obs.	Retailer/ wholesale	Direct selling	Own Network
$\leq$ 20 workers	1995 (100%)	42,7%	52,4%	4,9%
20-50	1579 (100%)	42,4%	51,9%	5,8%
50-100	516 (100%)	38,0%	53,5%	8,5%
100-200	575 (100%)	45,6%	47,5%	7,0%
200-500	1356 (100%)	46,4%	45,1%	8,6%
>500 workers	680 (100%)	47,4%	42,8%	9,9%

Table 3. Firms intermediaries and Vertical Restraints by size

	N. Obs.	With intermediaries	With retailers	With V.R.
$\leq$ 20 workers	1995	1158 (58%)	849 (43%)	159 (19%)
20-50 workers	1579	950 (60%)	663 (42%)	163 (25%)
50-100 workers	516	304 (59%)	196 (38%)	83 (42%)
100-200 workers	575	368(64%)	221 (38%)	83 (38%)
200-500 workers	1356	892(66%)	568 (42%)	247 (43%)
$>$ 500 workers	680	471 (69%)	296 (44%)	123 (42%)
Total	6701	4149 (62,2%)	2973 (42%)	1269 (30,6%)

Table 4: Vertical restraints by size (firms with retailers)

	FF	RPM	Full Line Forc.	Excl Terr.	Excl. Deal.
$\leq$ 20 workers	9(1%)	56(7%)	49(6%)	93(11%)	53(6%)
20-50 workers	9(1%)	47(7%)	51(8%)	108(16%)	72(11%)
50-100 workers	5(3%)	17(19%)	38(19%)	59(30%)	44(22%)
100-200 workers	8(5%)	29(13%)	34(15%)	50(23%)	32(14%)
200-500 workers	15(3%)	91(16%)	108(19%)	173(30%)	115(20%)
$>$ 500 workers	22(7%)	47(16%)	47(16%)	71(24%)	54(18%)
Total	68(2%)	287(10%)	327(12%)	554(20%)	370(13%)370

Table 5. Multiplicity of vertical restaints (firms with retailers).
(Number of agreements by size)

	1 restraint	2 restraints	3 restraints	4 restraints	5. restraints
$\leq$ 20 workers	93(58%)	39(25%)	19(12%)	8(5%)	0(0%)
20-50 workers	76(47%)	58(36%)	22(13%)	6(4%)	1(1%)
50-100 workers	34(41%)	25(30%)	17(21%)	7(8%)	0(0%)
100-200 workers	37(45%)	24(29%)	20(24%)	2(2%)	0(0%)
200-500 workers	93(38%)	77(31%)	53(21%)	24(10%)	0(0%)
$>$ 500 workers	55(45%)	32(26%)	26(21%)	6(5%)	4(3%)
Total					

Table 6. Multiplicity of vertical restraints

	FF	RPM	Full Line Forc.	Excl Terr.	Excl. Deal.
FF	22(2)	36(3)	22(2)	32(3)	28(2)
RPM		112(9)	142(11)	222(17)	143(11)
FLF			112(9)	325(26)	267(21)
ET				226(18)	406(32)
ED					104(8)

Table 7. Firms intermediaries by industry

Industry	N. Obs	W. interm.	W.retailers
1. Meat related products	192	181 (94%)	164 (85%)
2. Food and tobacco	654	553 (85%)	442 (68%)
3. Beverage	133	126 (95%)	103 (77%)
4. Textile and clothing	753	502 (67%)	391 (52%)
5. Leather, fur. and footwear	240	193 (80%)	139 (58%)
6. Timber	184	108 (59%)	55 (30%)
7. Paper	187	76 (41%)	29 (16%)
8. Printing and publishing	345	160 (46%)	119 (34%)
9. Chemicals	448	347 (78%)	233 (52%)
10. Plastic and rubber products	343	175 (51%)	92 (27%)
11. Nonmetal mineral products	449	326 (73%)	187 (42%)
12. Basic metal products	194	129 (67%)	51 (27%)
13. Manufactured metal products	623	238 (38%)	148 (24%)
14. Industrial & agricultural equipment	465	203 (44%)	112 (24%)
15. Office mach., data proc., and similar	114	81 (71%)	43 (38%)
16. Electric material and accesories	418	212 (51%)	108 (26%)
17. Vehicles and accesories	303	115 (38%)	49 (16%)
18. Other transpotation materials	146	30 (21%)	15 (10%)
19. Furniture	351	258 (74%)	204 (58%)
20. Miscellaneous	159	136 (86%)	109 (69%)
	-		

Table 8. Vertical Restraints by industry

Industry	VR	FF	RPM	FLF	ET
3. Beverage	58%	5%	25%	32%	36%
14. Industrial & agricultural equipment	49%	2%	22%	21%	35%
17. Vehicles and accesories	49%	0%	24%	18%	27%
18. Other transpotation materials	40%	0%	0%	27%	27%
2. Food and tobacco	38%	5%	15%	14%	22%
16. Electric material and accesories	35%	0%	10%	19%	23%
19. Furniture	34%	1%	7%	11%	25%
13. Manufactured metal products	32%	1%	4%	11%	24%
8. Printing and publishing	31%	1%	23%	10%	13%
1. Meat related products	30%	5%	10%	12%	20%
11. Nonmetal mineral products	29%	1%	6%	9%	19%
9. Chemicals	29%	3%	11%	12%	17%
7. Paper	28%	0%	10%	17%	21%
20. Miscellaneous	27%	2%	6%	11%	17%
10. Plastic and rubber products	24%	2%	11%	13%	18%
12. Basic metal products	24%	2%	2%	8%	20%
15. Office mach., data proc., and similar	23%	0%	9%	12%	14%
5. Leather, fur. and footwear	20%	1%	4%	6%	16%
6. Timber	18%	0%	5%	9%	15%
4. Textile and clothing	16%	4%	3%	3%	10%

Table 9. Advertising effort and Price Restraint

	With PR	Without PR	Mean Test
$\leq$200	1.7	1.4	-1.0
>200	4.1	2.9	-2.8
Total	2.2	3.4	-3.7

Table 10. Advertising effort and Price Restraint.

	$\leq$200 workers		>200 workers	
	R_t=1	R_t=0	R_t=1	R_t=0
R_{t-1}=1	4.4	3.9	2.3	1.5
R_{t-1}=0	3.1	2.0	1.3	1.1

Table 11: Determinats of limiting the resale price.
Dependent variable: R= 1 if firm limits intermediaries price.

	(1)		(2)		(3)	
Variables	Coef.	(T-ratio)	Coef.	(T-ratio)	Coef.	(T-ra
Constant	0.93	(0.5)	0.85	(0.6)	2.21	(
Effort (advertising)	1.88	(3.3)	-		-	
$e_i = z_i\gamma + v_i$	-		2.63	(3.3)	2.89	(
Only Exclusive territories$_{t-1}$	9.77	(3.3)	9.73	(3.3)	9.61	(
Only Exclusive dealership$_{t-1}$	-0.27	(-0.1)	-0.47	(-0.1)	-0.50	(-
Both restraints	5.34	(1.8)	5.19	(1.8)	5.21	(
Large firm ($\geq$200 workers)	4.47	(3.1)	4.55	(3.3)	4.07	(
% of firms with RPM(same industry)	0.70	(2.0)	0.77	(4.4)	0.61	(
Retailer main client	3.41	(2.3)	2.99	(2.1)	3.15	(
$>$ 50 distributors and wide market	-2.53	(-1.8)	-3.21	(-2.2)	-3.13	(-
Industry dummies	incl.		-		incl	
N^o observations	1893		1893		1893	
R^2	6%		5%		6%	
Rivers-Wong Test of exogeneity					-1.8 (-1.96	
Estimation method	LS		2SLS		2SLS	

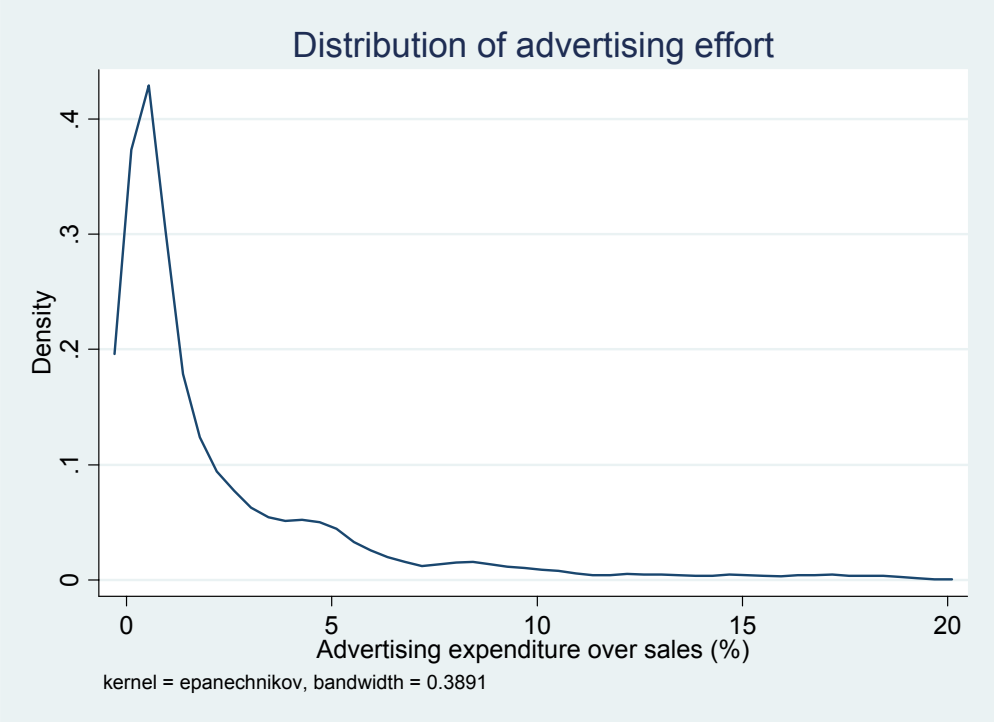
Distribution of advertising effort
Density
0
.1
.2
.3
.4
0
5
10
15
20
Advertising expenditure over sales (%)
kernel = epanechnikov, bandwidth = 0.3891

Figure 1: