Giorgio ZANARONE[*]

Vertical Restraints in Relational Contracts[†]

September 2007

Job Market paper

Abstract

This paper uses a natural experiment, created by a change in European competition policy, to test two theoretical propositions. First, that vertical restraints support relational contracts, rather than dictating the terms of spot market exchange. Second, that restraints on intrabrand competition are necessary, in explicit or implicit form, to reduce freeriding within the network and give dealers indirect incentives to exert pre-sale effort. The paper shows that, after a 2002 European regulation prohibited to limit intrabrand competition between car dealers, Italian dealership contracts systematically introduced price ceilings and constrains on pre-sale inputs, such as advertising and salespeople. This result is inconsistent with a spot contracting environment, and also with a relational contracting environment in which dealers promise to spend effort and manufacturers monitor their performance, for, in both cases, intrabrand competition would make price ceilings superflous. Instead, the data suggests price ceilings and input constraints are used as last resorts against the dealers' temptation to renege on an implicit "no-compete" agreement.

KEY WORDS: Relational Contracts; Vertical Restraints; Legal Change.

JEL codes: K21; L14; M21

[*] Universitat Pompeu Fabra, Department of Economics and Business, Trias Fargas 25-27, 08005 Barcelona, Spain. E-mail: giorgio.zanarone@upf.edu.

1 Introduction

Several works study contractual restraints as an alternative to vertical integration for coordinating the price and effort decisions of outlet managers in franchising networks. In some of these models, restraints on intrabrand competition, such as exclusive territories and price floors, eliminate inter-dealer freeriding and, combined with other provisions, like quantity floors or non-linear pricing, give dealers *indirect* incentives to efficiently choose price and pre-sale effort (Telser (1960, 1990), Matthewson and Winter (1984)).[1]

In a seminal paper, Klein and Murphy (1988) criticize this approach, arguing that vertical restraints cannot prevent dealers from freeriding and, therefore, manufacturers must enforce their effort *directly*.[2] Klein and Murphy (1988) suggest that, since freeriding is hard to prove in court, manufacturers resort to implicit, relational contracting mechanisms, in which they grant dealers a supra-competitive rent through exclusive territories, price floors, and the like, and terminate the contract (and the rent) if they detect low effort.[3] Klein and Murphy (1988) are right in that the *indirect incentive* models *a*

---

[1] Simplified versions of Matthewson and Winter's (1984) model are discussed, among others, by Tirole (1988) and Rey and Vergé (2005).

[2] In particular, Klein and Murphy (1988) argue that price floors cannot prevent dealers from competing in after-sale services and tie-ins. Therefore, even with price floors, dealers will not appropriate the positive effect of pre-sale effort on demand and will shirk in equilibrium.

[3] See, also, Klein (1980, 1995) and Lafontaine and Raynaud (2002).

la Telser overestimate the possibility to prevent intrabrand competition via contract, which may be limited by technological and, also, legal constraints. However, in arguing that price floors are inadequate for the job, they ignore the analogous role *other* explicit restraints, like exclusive territories, as well as implicit restraints might play. At the same time, they base their *direct enforcement* theory on the troubling assumption that manufacturers can monitor the ongoing effort of widely dispersed dealers. Indeed, according to many authors, the difficulty and costs of such monitoring, and the related need to provide indirect effort incentives, are the main reasons why manufacturers use non-integrated dealers in the first place.[4]

This paper explores a third theory. It argues, in the spirit of the Telser-Matthewson-Winter indirect incentive models, that monitoring intrabrand competition is easier than monitoring dealers' effort. At the same time, it is wary of Klein and Murphy's (1988) caveat that court-enforceable contracts may be unable to prevent competition, and examines the possibility that implicit, relational contracts will help do so. It then shows that the optimal mix of contractual restraints under an implicit dealers' agreement to restrict intra-

---

[4]   Several empirical works support the idea that the importance of local effort favors the use of franchised over vertically integrated outlets. See Lafontaine and Slade (1997) for an excellent survey of this literature.

brand competition differs from the optimal mix under an implicit agreement to spend pre-sale effort, what potentially allows to disentangle the indirect incentive and direct enforcement theories empirically.

The empirical section exploits a natural experiment, created by a 2002 European regulation prohibiting explicit restraints on intrabrand competition, to test the predictive power of the two relational contracting models. For each of 19 Italian dealership networks, it compares franchise contracts before and after this legal change, finding that contracts under the 2002 regulation replaced the mix of exclusive territories and quantity floors dominant in previous ones with a mix of quantity floors, price ceilings and standards on pre-sale inputs. This result is consistent with an implicit dealers' agreement to restrict intrabrand competition, but not with an implicit agreement to exert pre-sale effort. Under the "no-compete" agreement, manufacturers need quantity floors to insure that, when honoring their promise, dealers have incentives to choose price and effort efficiently. At the same time, they need price ceilings and standards on inputs, which are an imperfect, contractible substitute for pre-sale effort, to reduce the monopoly profits dealers enjoy at their location if they renege on the agreement and, gaming the quantity floor, start selling to

their neighbors' customers.[5] Conversely, if dealers implicitly agreed to exert pre-sale effort, intrabrand competition would insure that they choose price efficiently, and manufacturers would only need input standards to reduce their temptation to freeride. For a similar reason, the results are also inconsistent with a world in which implicit agreements are not feasible and the parties must live by the letter of their contract, for, in that case, dealers would compete, making quantity floors uneffective and price ceilings unnecessary, and manufacturers could, at best, use input standards to reduce the amount of freeriding.

The rest of this paper is organized as follows. Section 2 presents the model. Section 3 describes the data. Section 4 discusses the empirical results and how they relate to the model's predictions. Section 5 concludes.

2 The model

Consider a manufacturer, M, who distributes his product at two identical locations[6]. Consumers evaluate M's product by visiting the closest outlet, and

---

[5] This interpretation is supported by a number of interviews I had with managers of dealership networks, who reported that almost no dealer took advantage of the 2002 regulation to sell and advertise out of her territory, and that they do not expect dealers to do so in the future, as "manufacturers have their ways to prevent them".
[6] The model can be immediately extended to allow for an arbitrary large number of identical locations.

then purchase from the one offering the lowest price. Denote by s_j the effort of outlet j's salespeople in persuading consumers to buy the product, and by q_{ij} the amount of product consumers from location j purchase at outlet i, paying price p_{ij}. Without intrabrand competition, $q_{ij} = 0$ and $q_{ii} = q(p_{ii}, s_i)$, where I assume $q_s > 0, q_{ss} < 0, q_p < 0, q_{pp} < 0$ and $q_{sp} = q_{ps} = 0$. Conversely, with intrabrand competition

$$q_{ij} = \begin{cases} q(p_{ij}, s_j) & \text{if } p_{ij} < p_{jj} \\ \frac{1}{2}q(p_{ij}, s_j) & \text{if } p_{ij} = p_{jj} \\ 0 & \text{if } p_{ij} > p_{jj} \end{cases} \tag{1}$$

for every $i, j \in \{1, 2\}$. Supplying s units of pre-sale effort costs $C(s)$, where $C(0) = 0, C_s > 0$ and $C_{ss} > 0$.

2.1 First best: centralized control of price and effort

In an ideal world, M would directly sell to customers, choosing price and pre-sale effort at both locations. In this first best scenario, intrabrand competition would simply determine how revenues are collected across outlets. We can then assume, without loss of generality, that M would fix $p_{12} = p_{21} = 0$ and choose p_{11}, p_{22}, s_1 and s_2 to maximize

$$p_{11}q(p_{11}, s_1) + p_{22}q(p_{22}, s_2) - C(s_1) - C(s_2) \tag{2}$$

Since the two outlets are identical, the solution is given by $s_1 = s_2 = s^{FB}$ and $p_{11} = p_{22} = p^{FB}$, generating output per location $q^{FB} = q(p^{FB}, s^{FB})$

and joint surplus $JS^{FB} = 2\left\{p^{FB}q^{FB} - C\left(s^{FB}\right)\right\}$.

2.2   Decentralized control without vertical restraints

The above scenario seems unrealistic, because M, who is already responsible

for product design and manufacturing, could hardly manage the outlets with-

out incurring prohibitive organizational diseconomies. To capture this idea, I

will assume, from now on, that M must delegate price and effort decisions at

outlets 1 and 2 to managers D_1 and D_2, respectively. I will also assume that,

for every i and j, p_{ij} is public information, whereas q_{ij}, s_i and $C\left(s_i\right)$ are D_i's

private information.[78]

In this section, I focus on a *spot contracting environment*, in which M, D_1

and D_2 meet only once, with no opportunities for further transactions. The

game is as follows. At stage *1*, M offers a take-it-or-leave-it dealership con-

tract, including a wholesale price p_M. At stage *2*, if D_1 and D_2 have ac-

---

[7]   There's no inconsistency in assuming M can observe the dealers' prices but not their
sales. The underlying idea is that, to detect resale prices, M only needs to monitor a random
sample of dealer-customer transactions, whereas, to detect sales, he needs to monitor all of
them.

[8]   Even though, for simplicity, I refer to them as "dealers", given the model's informa-
tion structure, D_1 and D_2 could equally be M's employees. In a different model, mak-
ing M owner of the outlets (vertical integration) could improve his control over price and
effort, by giving him access to local information (Holmstrom and Milgrom (1991), Lutz
(1995), Maness, 1996) or more pervasive decision and enforcement powers (Masten (1988),
Williamson 1985, 1991). I do not further pursue this issue here, except to note that the bene-
fits of vertical integration must be often outweighed by its costs, or else we would not observe
the widespread use of independent dealers and franchisees in a variety of industries.

cepted M's offer at stage *1*, they simulaneously choose, respectively, s_1 and s_2 and proceed to stage *3*; conversely, if D_1 and D_2 have rejected M's offer at stage *1*, the game ends and each party receives her reservation payoff, which I normalize to *0*. At stage *3*, D_1 and D_2 simultaneously choose, respectively, p_{11}, p_{12} and p_{21}, p_{22}. At stage *4*, M receives $p_M (q_{11} + q_{12} + q_{21} + q_{22})$ and D_i receives $(p_{ii} - p_M) q_{ii} + (p_{ij} - p_M) q_{ij} - C (s_i)$.

Suppose the stage *1* contract solely consists of the wholesale price p_M. At stage *3*, D_i will solve

$$\underset{p_{ii}, p_{ij}}{Max} (p_{ii} - p_M) q_{ii} + (p_{ij} - p_M) q_{ij} \tag{3}$$

where q_{ii} and q_{ij} are given by the demand function in (1). Since the dealers are identical and compete *a la* Bertrand, the equilibrium prices at stage *3* will be $p_{11} = p_{12} = p_{21} = p_{22} = p_M$. Anticipating this, at stage *2*, D_i chooses s_i to solve

$$\max_{s_i} \frac{1}{2} (p_M - p_M) q (s_i, \cdot) - C (s_i) \tag{4}$$

This problem has a corner solution at $s_1 = s_2 = 0 < s^{FB}$. At stage *1*, then, M chooses p_M to maximize $p_M q (p_M, 0)$, resulting in wholesale price p_M^{CO} and joint surplus $JS^{CO} = 2 p_M^{CO} q (p_M^{CO}, 0) < JS^{FB}$.

2.3 Decentralized control with restraints on intrabrand

competition

Even if centralized control is too costly, M can condition the dealers' price and effort decisions by contracting, at stage *1*, appropriate restrictions on the publicly observed variables. These can be aimed to prevent intrabrand competition (exclusive territories, price floors, quantity ceilings), increase sales and reduce resale prices (quantity floors, price ceilings), or constrain certain pre-sale inputs, such as advertising (service standards). For simplicity, I assume exclusive territories, price floors and quantity ceilings are perfect substitutes and completely eliminate competition between D_1 and D_2, guaranteeing that $q_{12} = q_{21} = 0.$[9] Given that M cannot observe the dealers' sales, quantity floors and ceilings are enforced by forcing dealers to purchase a minimum or maximum amount of product from M. Finally, standards guarantee the equivalent of $\underline{s} < s^{FB}$ units of pre-sale effort by requiring dealers to implement a verifiable program of fixed cost $C(\underline{s})$, such as furnishing the outlet according to a specific design or hiring salespeople with certain qualifications. I assume $\underline{s} < s^{FB}$ to capture the idea that standards are an *imperfect* substitute for the dealers' ongoing effort, which is prohibitively costly to monitor.[10] Given these

---

[9] In reality, certain restratints on intrabrand competition may be more effective than others, depending on the circumstances.

[10] The dealers' fixed costs of meeting the standard need not equal the variable costs they

assumptions and definitions, the optimal mix of vertical restraints is given by the following

Proposition 1 *A spot contract achieves the first best if, and only if it imposes a restraint on intrabrand competition and either a quantity floor or a wholesale price equal to M's marginal cost.*

Proof In appendix.

This result is well-known. Absent intrabrand competition, freeriding disappears, but the dealers do not fully appropriate the value of a marginal sales unit, leading to high prices and low effort. This vertical externality can be eliminated by either "selling the business" to the dealers via a wholesale price equal to M's marginal cost, or by imposing a quantity floor equal to the first best output.

2.4 Decentralized control without restraints on intrabrand competition

If explicit restraints cannot prevent intrabrand competition, the optimal spot contract is given by the following

Proposition 2 *When explicit restraints cannot prevent intrabrand competition, a spot contract will not achieve the first best. The second best contract imposes a standard on pre-sale inputs.*

---

would incur if they supplied $\underline{s}$ units of pre-sale effort. However, assuming so does not affect the results and simplifies the exposition in the rest of the model.

Proof   It follows immediately from the facts that *i)* because of proposition 1, absence of intrabrand competition is necessary for the first best, and *ii)* the equilibrium level of pre-sale effort is $0 < s^{FB}$ with no vertical restraints, and $\underline{s} > 0$ with a service standard.

Suppose, now, that M, D_1 and D_2 infinitely repeat their transaction, rather than meeting only once as assumed so far. Then, the first best can be achieved if D_1 and D_2 implicitly agree not to compete. In this *relational contract*, the optimal mix of vertical restraints is given by the following

Proposition 3   *If patient enough, M, D_1 and D_2 can achieve the first best through an implicit agreement, in which D_1 and D_2 do not compete, and M pays them a bonus in exchange. The optimal contract imposes a quantity floor to assure that, if dealers honor the implicit agreement, they have an incentive to choose efficient price and pre-sale effort. Also, it imposes an input standard, a price ceiling, and a wholesale price above M's marginal cost, in order to minimize the dealers' temptation to renege on the implicit agreement.*

Proof   In appendix.

The intuition behind proposition 3 is that, absent explicit restraints on intrabrand competition, M tries to prevent freeriding through an implicit "no-compete" agreement. If both dealers honor it, a quantity floor equal to q^{FB} will insure that they choose the first best price and effort, as in proposition 1. However, if D_j honors the agreement, D_i will have a temptation to freeride, using the quantity floor to appropriate revenues at location j and, at the same

10

time, enjoying monopoly profits at location i. This temptation can be minimized with a price ceiling equal to p^{FB} and an input standard, which reduce the profits D_i enjoys at location i by gaming the quantity floor and freeriding.

Table 1 summarizes the predictions from propositions 1 through 3.

<TABLE 1 HERE>

2.5 Enforcement of effort through manufacturer's monitoring

In contrast with the previous analysis, assume that, unlike courts, M can observe s_1 and s_2, as in Klein and Murphy (1988). Without explicit restraints on intrabrand competition, mix of vertical restraints is given by the following

Proposition 4 *If patient enough, M, D_1 and D_2 can achieve the first best through an implicit agreement, in which the dealers supply s^{FB}, and M pays them a bonus in exchange. The optimal contract imposes an input standard to minimize the dealers' temptation to renege on this implicit agreement.*

Proof In appendix.

Propositions 3 and 4 have two interesting implications. Proposition 4 predicts different contract terms depending on whether manufacturers can or cannot observe the dealers' pre-sale effort. This allows to test the alternative hypotheses that effort incentives are provided *indirectly*, as suggested by Telser (1960) and Matthewson and Winter (1984), or directly, as proposed by Klein

11

and Murphy (1988). On the other hand, proposition 3 predicts different contract terms under one-shot and repeated transactions, allowing to test Klein's long-standing conjecture that franchise contracts are not a "handbook" for spot market exchange but, rather, an instrument to facilitate relational contracts.[11]

3 Evidence from automobile franchising

In 1995, the European Commission passed a regulation of car distribution making price floors and quantity ceilings illegal, on the grounds that these provisions, by restricting intrabrand competition, obstructed the free circulation of cars throughout the EU. This still left some scope for manufacturers to limit intrabrand competition by assigning dealers to exclusive territories. In 2002, the Commission passed a stricter regulation, which also prohibited the so called "location clauses", that is, contractual provisions preventing dealers from selling, advertising and opening new outlets out of their territory. To reinforce this measure, the 2002 regulation also prohibited territorial sales targets, that is, provisions requiring dealers to sell a minimum amount of cars within a specific territory.[12] Having reduced the menu of explicit restraints on

---

[11] See Klein (1980, 1995). The argument is also discussed by Lafontaine and Raynaud (2002).
[12] Under the 2002 regulation, manufacturers can still require dealers to achieve a sales tar-

intrabrand competition, the 2002 regulation provides a natural experiment to test the model's predictions.

To exploit this experiment, I study how Italian dealership contracts have adapted to the 2002 regulation.[13] For each of 19 car manufacturers, I examine two contracts, the first in force between 1995 and 2002 and disciplined by the expired 1995 European regulation, and the second in force since 2002 and disciplined by the current 2002 regulation. This results in a sample of 38 contracts.[14] To complement the information provided by the contracts, I have conducted in-depth interviews with several top managers of the manufacturers' Italian networks, as well as with a lawyer, who has represented numerous manufacturers and dealers in court and has assisted them in preparing dealership contracts.[15] Overall, manufacturers in this survey realized, in 2004, 85%

---

get. However, they are obliged to take the whole European Union (currently formed by 27 countries), rather than the dealers' territories, as the reference market to verify fulfillment of the target.

[13] The EU competition law requires a unique contract between a car manufacturer and all his dealers in a given member country (the so called "no-discrimination" rule). This implies that, for instance, the same vertical restraints, incentives and rules for contract termination apply to all Ford dealers in Italy.

[14] The contracts in this study represent the following manufacturers: Ford, Opel (i.e., General Motors), Toyota, Mitsubishi, Mazda, Mercedes, BMW, Volkswagen, Audi, Peugeot, Citroen, Renault, Volvo, Jaguar, Land Rover, Seat, Fiat, Alfa Romeo and Lancia. Although some manufacturers are owned by the same group, thet typically use different dealership contracts. For instance, the Jaguar and Land Rover contracts are different from the Ford contract, and the Alfa Romeo contract is different from the Fiat contract.

[15] The managers who participated to the survey are responsible for the Italian networks of Volvo, Jaguar, Nissan, Honda, Peugeot, Citroen, Renault, Porsche, Volkswagen, Audi, Skoda, Seat, Fiat, Alfa and Lancia.

of new car sales in Italy (83% in the whole European Union), making my sample of contracts largely representative of the industry.[16] Some managers even suggested that, due to the existence of a common regulator, manufacturers use the same dealership contract all over the European Union, merely translating it in each country's official language. Since I could not confirm this information for all 19 manufacturers, I will conservatively refer to Italy when analysing the data. However, it is useful to keep in mind that the results in this paper hold the promise to extend to the entire European automobile industry.

Table 2 lists the vertical restraints in my contracts. These include exclusive territory provisions, which forbid dealers to open outlets, sell and advertise out of their territory; quantity floors and price ceilings, which require them, respectively, to purchase a minimum number of cars and to price them below a maximum threshold; and several constraints on the dealers' inputs, such as a minimum advertising budget and minimum required number of salespeople.

<TABLE 2 HERE>

_____

[16] The source of this data is the GMAP European Car Distribution Handbook, 2005 edition.

4 Hypotheses and results

The model predicts that, if price floors and quantity ceilings are illegal, manufacturers should create exclusive territories to isolate dealers from intra-brand competition, reducing their incentive to freeride on pre-sale effort. To prevent double marginalization (on price and effort), manufacturers should also impose quantity floors. Consistent with that, *all contracts* under the 1995 regulation contained an exclusive territory provision and imposed a quantity floor (see table 2). If exclusive territories are also illegal and, therefore, virtually no explicit restraints on intrabrand competition are available, the model suggests two alternative hypotheses, depending on whether *i)* manufacturers can monitor pre-sale effort and *ii)* the parties have enough reputational capital to restrict intra-brand competition implicitly. If manufacturers can monitor effort, or if they cannot restrict intrabrand competition implicitly, contracts under the 2002 regulation should impose input standards to reduce the dealers' freeriding/temptation to freeride (**H1**). If manufacturers cannot monitor effort but can restrict intrabrand competition implicitly, contracts under the 2002 regulation should impose quantity floors and, to reduce the dealers' temptation to compete, *price ceilings* and input standards (**H2**). Note that, while both hypotheses predict greater use of input standards under the 2002

regulation, standards are used to prevent a *horizontal externality* under H1, and a *vertical externality* under H2.

Evidence consistent with H2 would simultaneously support two theoretical propositions: first, that contracts under the 2002 regulation are *relational* (i.e., support implicit agreements enforced by the parties' concern for future business), rather than *spot* (i.e., dictate the actual terms of trade between the parties). Second, that these contracts prevent dealers' freeriding through indirect incentives (restraints on intrabrand competition), rather than direct enforcement (manufacturer's monitoring of effort).

4.1 Relational "no-compete" agreements

Table 2 indicates that, consistent with hypothesis H2, both price ceilings and standards on pre-sale inputs appear more frequently in contracts under the 2002 regulation. First, the proportion of these contracts imposing a price ceiling is 52 percent points greater than the same proportion in contracts under the 1995 regulation, this difference being statistically significant at the 1% confidence level. Second, 7 out of the 11 input standards in table 2 appear in substantially greater proportion in contracts unde the 2002 regulation, and for 4 of them the difference in proportions is statistically significant. Going into the details, the proportion of clauses requiring dealers to pay an adver-

16

tising fee is 36 percent points greater in contracts under the 2002 regulation. Also, in these contracts, the proportions of clauses requiring dealers to have a minimum operating capital, to achieve customer satisfaction targets, to hire salespeople with a certain qualification, and to implement customer satisfaction programs are, respectively, 26, 24, 21 and 19 percent points greater than in contracts under the 1995 regulation. Finally, the proportion of "general standard" clauses (i.e., clauses assigning to the manufacturer the right to impose *any* service standard) is 52 percent points greater in contracts under the 2002 regulation. The interviews I had with managers of Italian dealership networks provide some further anecdotal support for hypothesis H2. The managers reported that almost no dealer took advantage of the 2002 regulation to sell and advertise out of her territory, and that they do not expect dealers to do so in the future because, to use the colourful expression of one of them, "manufacturers have their ways to prevent them".

4.2 The choice of standards

The freeriding model also explains why the use of a few standards slightly decreased in contracts under the 2002 regulation. In particular, the proportions of clauses requiring dealers to set a minimum advertising budget, to use advertising materials of a certain quality and to employ a minimum num-

17

ber of salespeople are, respectively, 10, 15 and 5 percent points smaller in contracts under the 2002 regulation. This apparently contrasts with the previously observed facts that these contracts more frequently oblige dealers to pay advertising contributions and to employ salespeople with certain qualifications. In other words, one wonders why contracts under the 2002 regulation increased some constraints on the dealers' advertising and salesforce, while simultaneously relaxing other constraints on the same inputs. These facts become clear, however, if one recalls that the 2002 regulation, by increasing the dealers' ability to free-ride, reduced their incentives to provide qualified salespeople and advertising. As a result, the dealers are tempted to "game" ambigous constraints on these inputs. For instance, they may spend the advertising budget to capture other dealers' customers instead of promoting the manufacturer's brand in their territories, exploit ambiguities in the manufacturer's directives on advertising quality to minimize their effort, and choose poorly qualified salespeople or family members to reduce their recruitment and training costs. Not surprisingly, then, manufacturers are now more keen to collect fees from the dealers and use them to advertise directly, or to require that salespeople obtain certain titles before being put on the dealers' payrolls.

4.3 Interbrand competition

Contracts under the 1995 regulation were written in 1995 and never renegotiated until 2002. Similarly, contracts under the 2002 regulation were written in 2002 and still apply today. One may then wonder that the observed variations in contract design are partially due the increase in interbrand competition accumulated between 1995 and 2002, and caused by the entry of new brands (Tata) and the strengthening of old ones (Toyota, Nissan). However, while greater interbrand competition may partially explain the use of input standards by contracts under the 2002 regulation, it seems hardly consistent with the use of price ceilings.[17] The reason is that, similarly to intrabrand competition, interbrand competition tends to eliminate double marginalization, making price ceilings redundant. Therefore, some kind of implicit "no-compete" agreement seems still necessary to explain the greater use of price ceilings in contracts under the 2002 regulation.

4.4 Network reorganization

Between 1995 and 2002, most Italian dealership networks have been reorganized around fewer dealers. The size of the average network has diminished

---

[17] The effect of interbrand competition on dealers' pre-sale effort is similar to the effect of intrabrand competition on after-sale effort and promotions, which is analysed by Caillaud and Rey (1986), Tirole (1988) and Rey and Vergé (2005).

by 18%, passing from 188 to 154 dealers (see table 2).[18] It could then be argued that contracts under the 2002 regulation have introduced price ceilings to prevent double marginalization in smaller, less competitive networks, rather than to support implicit "no-compete" agreements. The predicted effect of this network reorganization on the use of input standards would be more ambiguous: on one hand, larger networks may require standards to reduce freeriding (Brickley (1999), Arruñada, Garicano and Vázquez (2001)) and, on the other, smaller networks may also require standards to reduce the negative effect of double marginalization on dealers' effort. To control for the possible effect of network size on contract design, I estimate, for each vertical restraint in Table 2, the probability that it is included in a contract as a function of both regulatory regime and network size. The model is

$$VR_i = \alpha + \delta REG_i + \beta SIZE_i + \varepsilon_i \qquad (7)$$

VR_i is a dummy variable taking value 1 if a given vertical restraint is included in contract i, and 0 otherwise. REG_i is a dummy variable taking value 1 if contract i falls under the 2002 regulation, and 0 if it falls under the 1995 regulation. $SIZE_i$ is the number of dealers in the network disciplined by contract i. Finally, ε_i is a random error term. Data on network size in 1995 were not

---

[18]   These data have been provided by FEDERAICPA, the Italian federation of car dealers.

available for one of the 19 manufacturers in the sample, so the number of observations used to estimate model (7) is 36, rather than 38. I estimate this model using both a linear probability and a logit specification. To estimate the linear probability model, I use the Weighted Least Squares method (WLS), in order to correct for the eteroschedasticity caused by the binary nature of the dependent variable.[19] The WLS estimates are displayed in Table 4 and the logit estimates in Table 5. Since the logit estimates are entirely consistent with the WLS ones, in what follows I will mainly refer to the latter, which are easier to interpret.

<TABLE 3 HERE>

<TABLE 4 HERE>

The regression results indicate that, even controlling for network size, contracts under the 2002 regulation make greater use of price ceilings and standards on pre-sale inputs than contracts under the 1995 regulation, suggesting that the regulatory change had an autonomous impact on the choice of vertical restraints, and that such impact is consistent with a "no compete" agreement, as predicted by hypothesis H2. In contrast, the network size coefficient is eco-

---

[19] Because of the binary nature of the dependent variable, the variance of the error term in a linear probability model changes across observations. WLS weights each observation by the estimated standard deviation of the error term, thus constraining the model to be omoschedastic. For a similar methodology, see Arruñada, Garicano and Vázquez (2001).

nomically and statistically insignificant in the price ceiling regression and in most input standard regressions (with the exception of customer satisfaction targets), suggesting that, in contrast to the legal regime, network size is not an important predictor of either type of provision.

5 Conclusion

This paper uses a natural experiment, created by the change in an aspect of European competition policy, to test two theoretical propositions. First, that vertical restraints are chosen to support relational contracts, rather than dictate the terms of spot market exchange (Klein (1995), Lafontaine and Reynaud (2002), Baker, Gibbons and Murphy (2006)). Second, that, in contrast with Klein and Murphy's (1988) critique of Telser's (1960) and Matthewson and Winter's (1984) earlier models, restraints on intrabrand competition are necessary, in explicit or implicit form, to reduce freeriding within the network and provide dealers with indirect incentives to exert pre-sale effort. The paper shows that, after a 2002 European regulation prohibited to limit intrabrand competition between car dealers, Italian dealership contracts substantially increased their use of price ceilings and several types of constrains on pre-sale inputs, such as advertising and salespeople. This result is inconsistent with

a spot contracting environment, and also with a relational contracting environment in which dealers promise to spend effort and manufacturers monitor their performance, for, in both cases, intrabrand competition would make price ceilings superflous. Instead, the data suggests that price ceilings and input constraints are used as "last resorts" against the dealers' temptation to renege on an implicit "no-compete" agreement.

6 Appendix A: proof of proposition 1

6.1 Sufficiency

Suppose M imposes a restraint on intrabrand competition and a quantity floor, which obliges D_1 and D_2 to buy at least q^{FB} units of product at price p_M. As a result, the dealers incur a fixed sunk cost equal to $p_M q^{FB}$, and a marginal cost equal to 0 if they sell up to q^{FB}, and to p_M if they sell more. Thus, for every i, D_i will choose s_i and p_{ii} to maximize

$$p_{ii} q\left(p_{ii}, s_i\right) - C\left(s_i\right) \tag{A1}$$

if the quantity floor is binding, and

$$\left(p_{ii} - p_M\right) q\left(p_{ii}, s_i\right) - C\left(s_i\right) \tag{A2}$$

if the floor is not binding. Summing up (A1) for both dealers yields the first

best program in section 2.2. Therefore, to prove that a restraint on intrabrand competition and a quantity floor suffice for the first best, we only need to show that $q^{MO} \leq q^{FB}$, where q^{MO} is the output that solves (A2). The necessary and sufficient first order conditions for (A2) are, for every i

$$q\left(p_{ii}, s_i\right) + \left(p_{ii} - p_M\right) q_p\left(p_{ii}, \cdot\right) \quad = \quad 0 \tag{A3}$$

$$\left(p_{ii} - p_M\right) q_s\left(s_i, \cdot\right) - C_s\left(s_i\right) \quad = \quad 0 \tag{A4}$$

whose solution is given, at both outlets, by $s^{MO}\left(p_M\right)$ and $p^{MO}\left(p_M\right)$. By differentiating (A3) and (A4), imposing $p_{11} = p_{22}$ and $s_1 = s_2$ and rearranging, one can check that $s^{MO}\left(p_M\right)$ decreases in p_M, $p^{MO}\left(p_M\right)$ increases in p_M, $s^{MO}\left(p_M\right) \leq s^{FB}$ and $p^{MO}\left(p_M\right) \geq p^{FB}$, with the inequalities holding strictly for $p_M > 0$. At stage 1, M will offer $p_M^{MO} = \arg\max_{p_M} \left\{2p_M q\left(p^{MO}\left(p_M\right), s^{MO}\left(p_M\right)\right)\right\}$, subject to D_1, D_2 and M receiving at least their reservation payoffs, which are 0. To satisfy M's participation constraint, it must be $p_M^{MO} \geq 0$, which implies that $p^{MO}\left(p_M^{MO}\right) \geq p^{FB}$ and $s^{MO}\left(p_M^{MO}\right) \leq s^{FB}$ and, therefore, $q^{MO} \leq q^{FB}$. To see that a restraint on intrabrand competition and a wholesale price $p_M = 0$ also suffice for the first best, note that, in that case, the dealers would simply maximize (A2), which is the first best program, and, at stage 1, M would charge them an upfront fee between 0 and JS^{FB}. QED.

6.2 Necessity

Suppose, first, that intrabrand competition is allowed. Then, we know from paragraph 2.3 that, without vertical restraints, the dealers will set $p = p_M^{CO}$ and $s = 0$, yielding output $q\left(p_M^{CO}, 0\right) < q^{FB}$. To align their incentives, M can impose a quantity floor, a standard on pre-sale inputs, or both. If M imposes a floor equal to q^{FB}, Bertrand competition at stage *3* will drive resale prices down to 0, because the floor is binding. Anticipating this, the dealers will optimally set $s_1 = s_2 = 0$ at stage *2*. Thus, at stage *1*, the dealers will anticipate a net payoff equal to $-p_M q^{FB} \leq 0$. To satisfy their participation constraints, M will have to either set $p_M = 0$, or offer a reimbursement equal to $p_M q^{FB}$. In both cases, the joint surplus will be $0 < JS^{FB}$. If M, instead, imposes a standard on pre-sale inputs, D_1 and D_2 will pay $C\left(\underline{s}\right)$ upfront and exert effort $\underline{s}$, which yields anticipated gains equal to $-C\left(\underline{s}\right)$. To satisfy the dealers' participation constraint, at stage *1*, M will reimburse them $C\left(\underline{s}\right)$ and charge the wholesale price $p_M^{SP} = \arg\max_{p_M}\{p_M q\left(p_M, \underline{s}\right)\}$. As a result, the joint surplus will be $2p_M^{SP} q\left(p_M^{SP}, \underline{s}\right) - C\left(\underline{s}\right) = JS^{SP} < JS^{FB}$, because $\underline{s} < s^{FB}$. This proves that restraints on intrabrand competition are necessary for the first best.

Suppose, now, that the contract imposes a restraint on intrabrand compe-

tition, but neither a quantity floor nor a wholesale price $p_M = 0$. Then, we know from (A3) and (A4) that the output will be $q \left(p^{MO} \left(p_M \right), s^{MO} \left(p_M \right) \right)$, which is smaller than to q^{FB} for any $p_M > 0$. QED.

7 Appendix B: proof of propositions 3 and 4

7.1 Proposition 3

Suppose the relational contract works as follows. D_1 and D_2 promise not to compete, so that $q_{12} = q_{21} = 0$. In the stage *1* contract, M offers them a wholesale price $p_M \geq 0$. Also, he promises to pay them a bonus B if they do not compete. If all parties honor their promises, we know from proposition 1 that either a quantity floor equal to q^{FB} or a wholesale price $p_M = 0$ will suffice for the first best. Without loss of generality, assume the stage *1* contract imposes a quantity floor, so that, if everybody honors her promise, M's per period gross profit is $\pi_M^{FB} = 2 p_M q^{FB}$, and the gross profits of both D_1 and D_2 are $\pi_D^{FB} = \left(p^{FB} - p_M \right) q^{FB} - C \left(s^{FB} \right)$. If anybody reneges on her promise, M, D_1 and D_2 will revert, forever after, to the best spot contract from proposition 2, receiving net profits JS^{SP} and 0, respectively.[20] If D_j honors her promise not to compete, D_i's *best response* is to set $p_{ij} = p^{FB} - \varepsilon \approx p^{FB}$, giv-

---

[20] The idea that, once a relational contract is broken, the parties revert to the best spot contract has been emphasized by Baker, Gibbons and Murphy (2002, 2006).

ing her location j profit $\left(p^{FB} - p_M\right) q^{FB}$, and set p_{ii} and s_i to maximize (A2) in appendix A, giving her location i profit $\pi_D^{MO} = \left(p^{MO}\left(p_M\right) - p_M\right) q^{MO} - C\left(s^{MO}\left(p_M\right)\right)$, where $q^{MO} = q\left(p^{MO}\left(p_M\right), s\left(p_M\right)\right)$. For the relational contract to be self-enforcing, it must be

$$\frac{1+r}{r}\left(\pi_M^{FB} - 2B\right) \geq \frac{1+r}{r}JS^{SP} \tag{B1}$$

$$\frac{1+r}{r}\left(\pi_D^{FB} + B\right) \geq 0 \tag{B2}$$

$$-2B + \frac{1}{r}\left(\pi_M^{FB} - 2B\right) \geq \frac{1}{r}JS^{SP} \tag{B3}$$

$$-C\left(s^{FB}\right) + B + \frac{1}{r}\left(\pi_D^{FB} + B\right) \geq \pi_D^{MO} \tag{B4}$$

where r is the parties' common interest rate. Summing up the participation constraints B1 and B2 (for both dealers) yields the necessary condition $JS^{FB} \geq JS^{SP}$, which is satisfied by definition of first best. Summing up the dynamic incentive compatibility constraints B3 and B4 (for both dealers) and rearranging yields the unique necessary condition for self-enforcement

$$r \leq \frac{JS^{FB} - JS^{SP}}{2\left[\pi_D^{MO} + C\left(s^{FB}\right)\right]} \tag{B5}$$

Assume $B = \pi_D^{MO} + C\left(s^{FB}\right)$ and $p_M = p^{FB} + \frac{\pi_D^{MO}}{q^{FB}}$. If (B5) holds, these values of B and p_M guarantee that (B1) through (B4) hold as well, so (B5) is also a sufficient condition for self-enforcement.[21] Define the optimal contract

---

[21] This result is a special case of Theorem 3 in Levin (2003). Se, also, Baker, Gibbons and Murphy (2002, 2006).

as the one minimizing the denominator in (B5), which represents the dealers' reneging temptation. Also, assume $\underline{s} > s^{MO}(p_M)$, that is, the level of pre-sale effort enforceable through an input standard is greater than the one a dealer would spontaneously choose after reneging. Then, the analysis in appendix A guarantees that an input standard and a price ceiling equal to p^{FB} minimize the dealers' temptation and, therefore, must both be in the optimal relational contract. Suppose, now, that, instead of imposing a quantity floor, the stage *1* contracts sets $p_M = 0$. To assure that (B5) suffices for self-enforcement, it would be enough to replace $p_M q^{FB}$ with an appropriate fee to be paid by the dealers, and the optimal contract would still impose an input standard and a price ceiling. However, it is easy to check that, with $p_M = 0$, π_D^{MO} and, therefore, the dealers' reneging temptation, would be greater than with any $p_M > 0$.[22] This gives us a novel reason for not observing manufacturers "selling the business" to their dealers: by doing so, they may increase the dealers' temptation to renege on an implicit "no-compete" agreement.[23] QED.

---

[22] One may wonder whether a wholesale price greater than $p^{FB} + \frac{\pi_D^{MO}}{q^{FB}}$, accompanied by an appropriate explicit transfer at stage *1*, could reduce the dealers' temptation to zero, making input standards and price ceilings redundant. This is not possible because, if D_i reneges and the p_M is high enough to reduce her purchases to zero, both M and D_i would renegotiate to a lower p_M. To be precise, they would renegotiate to $p_M = \arg\max_{p_M} \{p_M q^{MO}(p_M)\}$.

[23] Other reasons emphasized in the literature are the dealers' risk aversion (Rey and Tirole, 1986); the need to provide manufacturers with ex post incentives for brand-maintenance and monitoring effort (Lafontaine (1992) and Matthewson and Winter, 1994); the idea that, if

7.2 Proposition 4

Suppose M sets $p_M = p^{FB}$ in the stage *1* contract and promises to pay the dealers a bonus B if they exert pre-sale effort s^{FB}. The analysis proceeds as in the proof of proposition 3, except that the dealers' reneging temptation (i.e., the denominator of (B5)) is now equal to $C\left(s^{FB}\right)$. A service standard will convert this temptation into $C\left(s^{FB}\right) - C\left(\underline{s}\right) < C\left(s^{FB}\right)$. To prove that this relational contract is better than the one in proposition 3, it is sufficient to replace $C\left(s^{MO}\left(p_M\right)\right)$ in π_D^{MO} with $C\left(\underline{s}\right)$, and check that the resulting expression is strictly greater than $C\left(s^{FB}\right) - C\left(\underline{s}\right)$. QED.

---

the dealers have paid a franchise fee, courts may be less inclined to enforce disciplinary terminations as expropriatory and contrary to good faith (Klein, 1980, 1995).

References

ARRUÑADA, B., GARICANO, L. and L. VÁZQUEZ (2001), "Contractual Allocation of Decision Rights and Incentives: The Case of Automobile Distribution," *Journal of Law, Economics and Organization* 15: 56-73.

BAKER, G., GIBBONS, R. and K. J. MURPHY (2006), "Contracting for Control," unpublished manuscript, Harvard Business School.

BAKER, G., GIBBONS, R. and K. J. MURPHY (2002), "Relational Contracts and the Theory of the Firm," *Quarterly Journal of Economics* 117: 39-83.

BRICKLEY, J., A., (1999) "Incentive Conflicts and Contractual Restraints: Evidence from Franchising," *Journal of Law and Economics* 42: 745-774.

GIBBONS, R. (2005), "Four Formal(izable) Theories of the Firm?" *Journal of Economic Behavior and Organization* 58: 200-245.

HOLMSTROM, B. and P. MILGROM (1991), "Multi-task Principal-Agent Analysis: Incentive Contracts, Asset Ownership, and Job Design," *Journal of Law, Economics and Organization* 7: 24-52.

KLEIN, B. (1995), "The Economics of Franchise Contracts," *Journal of Corporate Finance* 2: 9-37.

KLEIN, B. (1980), "Transaction Cost Determinants of "Unfair" Contractual Arrangements," *American Economic Review* 70: 356-362.

KLEIN, B. and K. M. MURPHY (1988), "Vertical Restraints as Contract Enforcement Mechanisms," *Journal of Law and Economics* 31: 265-297.

LAFONTAINE, F. (1992), "Agency Theory and Franchising: Some Empirical Results," *RAND Journal of Economics* 23: 263-283.

LAFONTAINE, F. and E. RAYNAUD (2002), "Residual Claims and Self-Enforcement as Incentive Mechanisms in Franchise Contracts: Substitutes or Complements?" In BROUSSEAU, E. and G. M. GLACHANT, "The Economics of Contracts: Theories and Applications," New York: Cambridge University Press.

LAFONTAINE, F. and M. SLADE (1997), "Retail Contracting: Theory and Practice," *Journal of Industrial Economics* 45: 1-25.

LEVIN, J. (2003), "Relational Incentive Contracts," *American Economic Review* 93: 835-857.

LUTZ, N. (1995), "Ownership Rights and Incentives in Franchising," *Journal of Corporate Finance* 2: 103-131.

MANESS, R. (1996), "Incomplete Contracts and the Choice Between Vertical Integration and Franchising," *Journal of Economic Behavior and Organization* 31: 101-115.

MASTEN, S., E. (1988), "A Legal Basis for the Firm," *Journal of Law, Economics and Organization* 4: 181-198.

MATTHEWSON, G. and R. WINTER (1994), "Territorial Restrictions in Franchise Contracts," *Economic Inquiry* 32: 181-192.

MATTHEWSON, G. and R. WINTER (1985), "The Economics of Franchise Contracts," *Journal of Law and Economics* 28: 503-526.

MATTHEWSON, G. and R. WINTER (1984), "An Economic Theory of Vertical Restraints," *Rand Journal of Economics* 15: 27-38.

MATTHEWSON, G. and R. WINTER (1983), "Vertical Integration by Contractual Restraints in Spatial Markets," *Journal of Business* 56: 497-517.

REY, P. and J. TIROLE (1986), "The Logic of Vertical Restraints," *American Economic Review* 76: 921-939.

REY, P. and T. VERGÉ (2005), "The Economics of Vertical Restraints," in BUCCIROSSI, P., "Handbook of Antitrust Economics," MIT Press.

TELSER, L. (1990), "Why Should Manufacturers Want Fair Trade II?" *Journal of Law and Economics* 33: 409-417.

TELSER, L. (1960), "Why Should Manufacturers Want Fair Trade?" *Journal of Law and Economics* 3: 86-108.

TIROLE, J. (1988), "The Theory of Industrial Organization," Cambridge 1988, MIT Press.

TONGUE, A. (2006), "The Block-Exemption Half-Way to 2010," ICDP Research Report 07/06.

TONGUE, A. (2003), "Understanding 1400/2002: What it is, what it Means", ICDP Research Report 01/03.

WINTER, R. (1993), "Vertical Control and Price versus Non-Price Competition," *Quarterly Journal of Economics* 108: 61-76.

WILLIAMSON, O. E. (1991), "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives," *Administrative Science Quarterly* 36: 269-296.

WILLIAMSON O. E. (1985), "The Economic Institutions of Capitalism," New York, NY Free Press.

Table 1. Predicted Choice of Vertical Restraints

Assumptions	Predictions	
	Spot Contracts	*Relational Contracts*
Restraints on Intrabrand Competition Available	Restraints on Intrabrand Competition and Quantity Floors	Restraints on Intrabrand Competition and Quantity Floors
Restraints on Intrabrand Competition Unavailable and Effort Monitorable	Standards on Pre-sale Inputs	Quantity floors, Price Ceilings and Standards on Pre-sale Inputs
Restraints on Intrabrand Competition Unavailable and Effort Non-monitorable	Standards on Pre-sale Inputs	Standards on Pre-sale Inputs

Table 2. Observed Vertical Restraints Before and After Legal Change (and Descriptive Statistics for Network Size)

	Proportion in Contracts under 1995 Regulation (19 Contracts)	*Proportion in Contracts under 2002 Regulation* (19 Contracts)	*Difference in Proportions (2002-1995)*
Exclusive Territory	1	0	-1
Quantity Floor	1	1	0
Price Ceiling	0.05	0.57	0.52[***]
Min Advertising Contribution	0.15	0.52	0.36[**]
Min Advertising Quality	0.68	0.52	-0.15
Min Advertising Budget	0.26	0.15	-0.10
Min Size of Personnel	0.52	0.47	-0.05
Min Qualification of Personnel	0.15	0.36	0.21
Mandatory Training	0.68	0.73	0.05
Min Operating Capital	0.10	0.36	0.26[*]
Customer Satisfaction Programs	0.27	0.47	0.19
Customer Satisfaction Targets	0.27	0.52	0.24
Min Weekly Hours	0	0.15	0.15[*]
General Duty to Respect Standards	0.10	0.63	0.52[***]
	Mean 1995	*Mean 2002*	*Difference in means (2002-1995)*
Network Size (Dealers per Network)	187.72	154	-33.72

Notes: [***] Significant at 1% level. [**] Significant at 5% level. [*] Significant at 10% level.

Table 3. Observed Vertical Restraints Before and After Legal Change, Controlling for Network Size (WLS Regressions)

Dependent Variables	Constant	Independent Variables	
		Legal Change (1 for 2002 Regulation, 0 for 1995 Regulation)	Network Size (100 Dealers per Network)
Price Ceiling	0.05 (0.16)	0.49*** (0.13)	0.005 (0.08)
Min Advertising Contribution	0.15 (0.15)	0.38*** (0.14)	0.006 (0.07)
Min Advertising Quality	0.53*** (0.16)	-0.09 (0.16)	0.07 (0.04)
Min Advertising Budget	0.01 (0.14)	-0.02 (0.12)	0.1 (0.07)
Min Size of Personnel	0.36* (0.19)	0.01 (0.16)	0.07 (0.07)
Min Qualification of Personnel	0.35* (0.20)	0.12 (0.14)	-0.09 (0.1)
Min Operating Capital	0.15 (0.11)	0.26* (0.13)	-0.02 (0.03)
Customer Satisfaction Programs	0.30 (0.23)	0.18 (0.15)	-0.03 (0.1)
Customer Satisfaction Targets	0.68*** (0.22)	0.24 (0.15)	-0.2*** (0.1)
General Duty to Respect Standards	0.06 (0.13)	0.50*** (0.13)	0.02 (0.06)
Observations		36	

Notes: Each row an equation. Standard errors in parentheses.

* Significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Observed Vertical Restraints Before and After Legal

Change, Controlling for Network Size (Logit Regressions)

Dependent Variables	Constant	Independent Variables	
		Legal Change (1 for 2002 Regulation, 0 for 1995 Regulation)	*Network Size* (Dealers per Network)
Price Ceiling	-2.23 (1.42)	2.96*** (1.13)	-0.0035 (0.006)
Min Advertising Contribution	-1.78* (1.01)	1.86** (0.81)	0.0009 (0.004)
Min Advertising Quality	0.04 (0.92)	-0.37 (0.70)	0.003 (0.004)
Min Advertising Budget	-2.46** (1.06)	-0.12 (0.89)	0.006 (0.004)
Min Size of Personnel	-0.52 (0.84)	0.90 (0.68)	0.002 (0.003)
Min Qualification of Personnel	-0.41 (1.20)	0.79 (0.82)	-0.007 (0.006)
Min Operating Capital	-1.77 (1.18)	1.59* (0.90)	-0.001 (0.005)
Customer Satisfaction Programs	-0.47 (1.01)	0.87 (0.75)	-0.004 (0.005)
Customer Satisfaction Targets	1.40 (1.26)	1.14 (0.81)	-0.01** (0.008)
General Duty to Respect Standards	-2.46** (1.17)	2.62*** (0.93)	0.001 (0.004)
Observations		36	

Notes: Each row an equation. Standard errors in parentheses.

* Significant at 10%; ** significant at 5%; *** significant at 1%