Universitat Pompeu Fabra

Departamento de Economía y Empresa

The Governance of Vertical Relationships

Giorgio Zanarone*

Tesis Doctoral

Director: Dr. Benito Arruñada Sánchez

Depositada en Mayo 2008

* Dirección: 474 Beacon St., apartment 3F, 02115 Boston, MA (EEUU); Telefono: 001 908 421 0261 or 0034 619 16 89 70; E-mail: giorgio.zanarone@upf.edu.

Table of Contents

Acknowledgements

This thesis collects three articles I have written during my PhD years at Pompeu Fabra and at the MIT Sloan School of Management, which I have visited several times since September 2005. In these years, many people have sustained me through their intellectual support, humanity and friendship. To all of them—including the ones I cannot mention in the modest space of this page—goes my deep gratitude and appreciation.

In particular, I would like to thank Benito Arruñada, my thesis advisor, whose inspiring teaching persuaded me to pursue the doctoral studies, whose creative and nonconformist thinking made me love research, and whose intellectual rigour showed me how research should be done. I am also largely indebted to Robert Gibbons, who advised my work at MIT. His teaching, his encouragement, and the insights from our conversations had enormous influence on my doctoral research and, I believe, on my future research agenda. I would also like to thank Alberto Heimler, who supervised my work when I was an intern at the Italian Antitrust Authority. From him, I learned the use of research in public policy, and the importance of free and critical thinking within a governmental organization. Numerous scholars have also enriched my work through their suggestions and critiques. In particular, I would like to thank Pablo Casas, Gregory Corcos, Ricard Gil, Emmanuel Raynaud, Eric van den Steen and Ernesto Villanueva.

Finally, I would like to thank Zsuzsi, my parents, Giuseppe and Maria Grazia, and Zsuzsi's parents, Endre and Anna, for giving me the love, happiness and serenity,

absent which not a single page of this thesis would have been written; and my friends Pasquale, Fabio, Carlo, Francesco A., Francesco C., Giorgio, Paola, Chiara, Silvia, Enrico, Andrea R., Piero, J. Petrucci, Jimmy, Marco L., Marco C., Nicola, Kati, Ricardo, Einar, Fabrizio, Luca, Andrea N., Andrea M., Sergio, Julie, Gabor, and many others, for being, during all these years, the brothers and sisters I never had.

Foreword

Since the seminal contributions of Coase (1937), Spengler (1950) and Telser (1960), economists have reckoned that transactions between vertically related firms are riddled with conflicts of interests and externalities, which reduce firms' profits and call for appropriate organizational solutions. In the past decades, considerable efforts have been devoted to understand whether vertical relationships should be governed by inter-firm contracting or via vertical integration, and under what respects these two classes of organizational solutions differ from each other. These efforts have generated powerful streams of research, such as transaction cost economics and the property rights and agency theories of the firm.

Transversal to these streams is the notion of relational contracts—informal agreements sustained by the value of future transactions—which, firstly emphasized by sociologists (McAuley (1963)) and legal scholars (McNeil (1978)), has been more recently applied by economists to study the transactions between and within firms (Klein (1980, 1996), Klein and Murphy (1988, 1997), Williamson (1979, 1991), Baker *et al*. (1999, 2002)). As noted by Klein (2000), relational contracts (also known as self-enforcing agreements) can improve our understanding of formal contracts and governance structures, whose "fundamental economic motivation is […] to supplement self-enforcement".[2]

[2] Grandori (2006) distinguishes Klein's interpretation of relational contracts as self-enforcing agreements, in which the parties' compliance is calculative and based on the fear to lose future quasi-rents, from an interpretation of relational contracts as socially enforceable agreements, in which compliance stems from a non-calculative adherence to appropriate codes of behavior.

In this perspective, organizational arrangements that would be irrelevant, or even counterproductive, if used to govern an arm's-length transaction, may be efficient in a long-term relationship, as they reduce the parties' temptation to renege on the informal agreements embedded in it.

Building on Klein's insight, my thesis applies the relational contracting framework to shed light on counterintuitive vertical arrangements observed in the real world. Methodologically, I rely on modeling tools from the recent economic literature on repeated games and relational contracts (Levin (2003), Baker *et al*. (2002, 2006, 2008)) to construct testable predictions, which I confront with the rich empirical evidence on vertical integration and with my own data on the design and management of automobile franchise contracts in Italy. The results seem to confirm Klein's intuition, indicating that formal contract terms and governance structures supplement informal agreements, helping to keep vertical relationships within their "self-enforcing range" (Klein (1996)).

Chapter 1

In Chapter 1, I develop a repeated-game model of trade between an upstream and a downstream firm. When the two firms are in a long-term relationship, it is possible to reward the downstream manager for spending effort in joint production via *implicit incentives*, such as future bonuses. I show that, in this setting, it can be efficient to make the downstream manager a salaried employee, even though that mutes her *explicit incentives* to spend effort. The reason is that, when spillovers between the two firms are substantial, a manager who owns the downstream firm receives scarce benefits from spending effort, while incurring substantial firm-level costs. Therefore, she has a greater temptation to renege on the implicit promise to spend effort than a manager-employee,

whose compensation does not depend on effort. This, in turn, makes the manager-employee's promise to cooperate with the firm more credible. Studies of vertical relationships in several industries, recently reviewed by Lafontaine and Slade (1997, 2007), indicate that, consistent with the model's prediction, when the actions of downstream agents—such as outlet managers and truck drivers—generate important spillovers upstream, these agents tend to be employees of vertically integrated firms, rather than independent entrepreneurs.

Chapter 2

In Chapter 2, I show empirically that, after a 2002 European regulation prohibited to assign car dealers to exclusive territories, automobile franchise contracts in Italy introduced price ceilings and standards on dealers' verifiable marketing and service inputs, such as advertising and salespeople. In addition, contracts imposed quantity floors on the dealers. Consistent with standard economic theory, the introduction of marketing and input constraints suggests manufacturers used exclusive territories to prevent inter-dealer freeriding and induce desired dealer services and, once prohibited, switched to alternative contractual devices to achieve this goal. On the other hand, the fact that price ceilings, which were not used when exclusive territories protected dealers from intrabrand competition, have been introduced after the law eliminated such protection seems counterintuitive. To explain the joint use of quantity floors and price ceilings after the legal change, I adapt Mathewson and Winter's (1984) freeriding model to allow for the possibility that, when explicit restraints on intrabrand competition are not feasible, dealers informally agree with the manufacturer not to compete, in exchange for future discounts on the wholesale price. I show that price ceilings help support such

informal agreement, by reducing the short-run profits dealers can earn in their own territory if they renege on the "no-compete" promise and use extraterritorial sales to "game" the quantity floor.

Chapter 3

In Chapter 3, I analyze empirically how the ex ante allocation of decision rights in automobile franchise contracts affects the way car manufacturers and dealers adapt the terms of exchange ex post, in the course of their relationship. Particularly, I ask whether the manufacturers' decision rights are means to protect their ex ante investments in developing the brand—as property rights models of incomplete contracts *a la* Grossman-Hart-Moore would suggest—or to neutralize contractual hazards that prevent efficient standards from being chosen ex post, as suggested more recently by Baker *et al*. (2006) and Hart and Moore (2008), building on Simon's (1951) theory of the employment relationship. Relying on data from contracts and in-depth interviews with managers, I show that, independent of who is assigned decision rights ex ante, manufacturers dictate performance standards ex post, and dealers implement them in exchange for discounts on the wholesale price of cars, which manufacturers can change at will even after dealers have performed. These facts suggest formal decision rights are not "bargaining chips" used by manufacturers when contracting the terms of trade ex post with dealers, as implied by the property rights models. Instead, they suggest that contracting the terms of trades ex post is costly, and that dealers informally delegate manufacturers to be specialized decision-makers for the whole distribution network. In these asymmetric relational contracts, assigning some formal decision rights to

manufacturers can be efficient, as it provides a last-resort penalty against the dealers' temptation to overturn the decisions they have informally delegated to manufacturers.

Chapter 1. "Fiat" without Authority: Relational Contracts as a Reason for Vertical Integration

Summary

This chapter develops a relational contracting model to explain why, in the presence of interest conflicts and spillovers, firms at different stages in the chain of production vertically integrate. An efficient relational contract requires managers to spend enough effort to maximize aggregate profits, in exchange for future rents. If the manager of a vertically integrated unit reneges and undersupplies effort, she benefits from greater free time, but does not appropriate the associated cost savings at the unit level. Therefore, when the levels of effort that maximize the firm's and the individual unit's profits differ substantially—that is, when interest conflicts and spillovers within the firm are large—a manager's promise to spend effort will be more credible under vertical integration than under separation.

1.1. Introduction

In the last two decades a strong body of empirical evidence has emerged, suggesting that firms at different stages in the chain of production tend to be vertically integrated when the potential interest conflicts between them are strong. For instance, franchisors own retail outlets that generate spillovers on the common brand (Brickley and Dark (1987), Lafontaine and Shaw (2005), Yeap (2006), Arruñada *et al*. (2008)), motor carriers own trucks whose poor maintenance would harm the carrier's service and reputation (Nickerson and Silverman (2003)), and airline companies own regional carriers that serve routes with frequent flight rescheduling, which preserve the network's reputation but cause short-term losses to the regionals (Forbes and Lederman

(2008)).[3] These facts are puzzling, because managers in vertically integrated firms do not appropriate the residual value of the units they manage (Krueger (1991), Maness (1996)) and, therefore, according to standard incentive models (Lutz (1995), Grossman and Hart (1986), Hart (1995)), should have even scarcer incentives to spend effort in joint production than if they owned those units.[4]

To explain why imperfectly aligned incentives lead to vertical integration, transaction cost economists have argued that integrated firms can solve disputes by "fiat" (Coase (1937), Williamson (1971, 2000)) and economize on the costs of inter-firm contracting (Klein *et al*. (1978)). However, their arguments have been criticized on the grounds that vertically integrated firms do not enjoy greater authority over managers than could be allocated via contract (Alchian and Demsetz (1972), Hart (2008)).[5] Consistent with these criticisms, there is empirical evidence that franchisors have great formal authority over their franchisees, even though they do not own their outlets (Hadfield (1990), Arruñada *et al*. (2001, 2005), Zanarone (2007a, b)).

This chapter argues that vertically integrated firms may be able to solve interest conflicts by "fiat" not because they have formal authority over managers but, rather, because they can make the managers' *implicit obligation* to cooperate with the firm more credible.

---

[3] See Lafontaine and Slade (1997, 2007) for detailed reviews of this literature.

[4] Although property rights models such as Grossman and Hart (1986) and Hart (1995) have been mainly applied to study human capital investments, they can also be used to study managerial effort incentives. See Holmstrom (1999) and Gibbons (2005) for detailed discussions of this point.

[5] But see Masten (1988) and Williamson (1991) for legal arguments according to which vertical integration increases a firm's authority over its managers. Also, see Hart and Holmstrom (2002) and Baker *et al*. (2008) for formal models in which integration transfers control over firms' decisions, dispensing managers from performing conflictual tasks.

This argument is illustrated through a simple agency model, in which two units—upstream and downstream—jointly produce a service, and surplus depends on the non-contractible effort spent by the downstream unit's manager. In a one-shot transaction, it is preferable to assign the manager ownership of the downstream unit, as that gives her stronger, though imperfectly aligned, incentives than vertical integration. When the manager and the upstream unit transact repeatedly, they can improve on the spot outcome by entering *relational contracts*, in which the manager promises to spend enough effort to maximize the joint surplus in exchange for future rents. Under both vertical integration and separation, if the manager reneges on her *implicit obligation* to spend effort, she benefits from greater free time. Under vertical separation, however, the shirking manager also appropriates any increase in unit-level profits due to the effort reduction, because she is residual claimant of the downstream unit. Therefore, when the levels of effort that maximize the firm's and the downstream unit's profits differ substantially—that is, when interest conflicts and spillovers within the firm are large—a manager's promise to spend effort will be more credible under vertical integration than under separation.

This result is reminiscent of multi-task agency models, in which spillovers from some agent's tasks on the principal may require to mute the agent's incentives on all tasks (for instance, by giving ownership of the agent's unit to the principal) in order to elicit a balanced allocation of effort. Unlike those static models, however, the one presented here does not require the agent to be risk-averse (Holmstrom and Milgrom (1994), Bai and Tao (2000)), willing to spend significant amounts of effort without incentives (Holmstrom and Milgrom (1991)), or capable to manipulate performance measures (Holmstrom (1999)) to explain why, in the presence of *productive effort*, weak

incentives (vertical integration) may be preferred to stronger ones (vertical separation). Instead, all this model requires is for the agent to be in a long-term relationship with the principal, and for the principal to be able to monitor the agent's behavior, so that implicit agreements over effort are sustainable.[6] The model also provides a coherent explanation for why high costs of monitoring agents directly lead to less vertical integration (Brickley and Dark (1987), Lafontaine (1992), Lafontaine and Slade (1996), Baker and Hubbard (2004), Lafontaine and Shaw (2005), Arruñada *et al*. (2008)). Given that monitoring is essential to sustain relational contracts, and vertical integration is efficient only in the presence of relational contracts, greater monitoring costs should lead, *ceteris paribus*, to less vertical integration.

The works most closely related to this chapter are Klein and Murphy (1997) and Baker *et al*. (2002), both of which interpret vertical integration as an instrument to facilitate relational contracts. However, the mechanisms through which vertical integration facilitates relational contracts in those papers are different from the ones studied here. In Klein and Murphy (1997), vertical integration reallocates reputational capital to maximize the future quasi-rents managers lose from non-performance, whereas, in this chapter, it minimizes the managers' present gains from non-performance for a given reputational capital. In Baker *et al*. (2002), vertical integration reduces the managers' temptation to engage in rent-seeking bargaining over contractible decisions whereas, here, it reduces the managers' temptation to undersupply non-contractible effort.[7]

---

[6] A model that does not require risk-averse managers seems necessary to interpret the positive association between spillovers across units and vertical integration in retail distribution, where, according to the data, managerial risk-aversion does not play a significant role (Lafontaine and Slade (1997, 2007)).

[7] See Garvey (1995) and Halonen (2002) for complementary models in which firms support relational contracts by sharing ownership through joint ventures, rather than by integrating.

The rest of this chapter is organized as follows. Section 1.2 introduces the model's definitions and assumptions. Section 1.3 discusses the choice of organizational form (i.e., between vertical integration and separation) in a spot environment. Section 1.4 discusses the choice of organizational form in a relational contracting environment. Section 1.5 derives testable comparative static predictions. Section 1.6 discusses empirical evidence that supports the model's predictions. Section 1.7 concludes.

1.2. The environment

Consider two specialized units, upstream and downstream, engaged in the joint production of a service, such as dining, banking or transportation. The service concept is developed by the upstream unit, run by manager U, and the service is delivered to consumers by the downstream unit, run by manager D. The joint surplus depends on D's *non-contractible effort* $d \in \mathbb{R}^+$, and is given by $B(d)+V(d)-C_a(d)-C_p(d)$, where $B(d)$ is the residual value of the upstream unit, $V(d)-C_a(d)$ is the residual value of the downstream unit, and $C_p(d)$ is D's personal cost of effort, which can be interpreted as her private valuation of leisure or, equivalently, as stress caused by the unpleasantness and difficulty of her task. For example, d could be the degree of compliance of a McDonald's restaurant with the brand's outlet design and cleanness standards, $B(d)$ the corresponding value of the McDonald's brand, $V(d)$ the restaurant's long-term revenues from serving customers according to the standards, $C_a(d)$ the restaurant's forgone profit from following the standards, instead of offering a customized service, or a low quality service, and $C_p(d)$ the restaurant manager's stress

from coordinating standard implementation.[8] I assume $B(d)$ and $V(d)$ are increasing in d and concave, $C_a(d)$ and $C_p(d)$ are increasing in d and convex, and $B(0)=V(0)=C_a(0)=C_p(0)=0$.

In this model, the upstream unit is owned by manager U, whereas the downstream unit can be either owned by manager D (*vertical separation*) or manager U (*vertical integration*), in which case D runs the unit as U's employee. I assume ownership of a unit conveys the right to appropriate its residual value (Holmstrom and Milgrom (1991, 1994), Baker *et al*. (2008)), that the units' residual values— $B(d)$ and $V(d)-C_a(d)$ — and D's cost of effort $C_p(d)$ are all non-contractible, and that no contractible measures of effort are available. These assumptions are consistent with the fact that firms tend to appropriate most of the profits generated by the assets they own (Krueger (1991), Maness (1996)). The model's assumptions imply that D's incentives to spend effort are determined by the allocation of ownership rights over the downstream unit, that is, by the choice between vertical integration and separation. The determinants of such choice will be analyzed in the next sections.

[8] The joint surplus may also depend on U's effort and investments to elaborate the service concept. See Lutz (1995) for a complementary model that emphasizes upstream incentives.

1.3. Spot governance

In this section, I assume U and D meet only once, with no opportunities to trade in the future. In this *spot environment*, trade occurs as follows. At stage 0, ownership of the downstream unit is assigned; at stage 1, U makes a take-it-or-leave-it offer to D concerning any contract term necessary to regulate their relationship; at stage 2, D chooses the level of effort d and incurs the cost $C_p(d)$; finally, at stage 3, gross residual values are realized as a function of d.

1.3.2. First best

If effort was contractible, no matter who owns the downstream unit, U and D would agree, at stage 1, that D must choose the level of d that maximizes the joint surplus $JS = B(d) + V(d) - C_a(d) - C_p(d)$. The necessary and sufficient first order condition for this problem is

$$B'(d) + V'(d) = C_a'(d) + C_p'(d) \tag{1.1}$$

yielding effort $d^{FB} > 0$ and surplus $JS^{FB} = B\left(d^{FB}\right) + V\left(d^{FB}\right) - C_a\left(d^{FB}\right) - C_p\left(d^{FB}\right)$. However, since d is non-contractible, U and D cannot, in general, achieve the first best in a spot environment. To achieve the second best, they must choose, at stage 0, between assigning ownership of the downstream unit to U (vertical integration) or D (vertical separation).

1.3.3. Vertical integration

Under vertical integration, U receives, at stage 3, $B(d)+V(d)-C_a(d)-s$ and D receives s, where s is a fixed salary contracted at stage 1. Anticipating this, at stage 2, D chooses d to maximize $s-C_p(d)$, which has a corner solution at $d^{VI}=0$. Hence, at stage 1, U chooses s to maximize $B(0)+V(0)-C_a(0)-s$ subject to D's participation constraint that $s-C_p(0)\geq 0$. As a result, U offers salary $s=0$, and the joint surplus is given by $JS^{VI}=B(0)+V(0)-C_a(0)-C_p(0)=0<JS^{FB}$.

1.3.4. Vertical separation

Under vertical separation, U receives, at stage 3, $B(d)$ and D receives $V(d)-C_a(d)$. Anticipating this, at stage 2, D chooses d to maximize $V(d)-C_a(d)-C_p(d)$. The necessary and sufficient first order condition for this problem is

$$V'(d)=C_a'(d)+C_p'(d) \tag{1.2}$$

yielding effort d^{VS} and joint surplus $JS^{VS}=B\left(d^{VS}\right)+V\left(d^{VS}\right)-C_a\left(d^{VS}\right)-C_p\left(d^{VS}\right)$. We are now ready to state the following

Proposition 1: In a spot environment, vertical separation is more efficient than vertical integration.

Proof: Since $V(d)$ is increasing in *d* and concave, $C_a(d)$ and $C_p(d)$ are increasing in *d* and convex and $V(0)=C_a(0)=C_p(0)=0$, it must be that $d^{VS}>d^{VI}=0$. Given that $B(d)$ is increasing in *d*, the joint surplus under vertical separation is $JS^{VS}=JS(d^{VS})=B(d^{VS})+V(d^{VS})-C_a(d^{VS})-C_p(d^{VS})>JS(0)=0=JS^{VI}$. QED.

This is the result one would expect from a standard agency model: if D spends more effort, in equilibrium, under vertical separation than under integration, but less than the first best under both governance structures, vertical separation should be preferred to integration.

1.4. Relational governance

Although vertical separation is optimal in a spot environment, a comparison of the first order conditions (1.1) and (1.2) suggests it elicits too little effort relative to the first best (that is, $d^{VS}<d^{FB}$), because manager D does not take into account the effect of effort on the upstream unit's value. In this section, I assume that, while D's effort cannot be observed by a court, it can be observed by the upstream manager U (i.e., effort is *observable but not verifiable*). Hence, if U and D repeat their transaction forever (or, equivalently, if they do not know when their last transaction will occur), they can enter *relational contracts*, in which they use their mutual concern for future trade to enforce levels of effort greater than d^{VS}. What determines the choice between vertical integration and separation in a relational contracting environment?

Suppose the relational contract requires D to spend effort d^*, such that $d^{VS}<d^*\le d^{FB}$. At stage 1 of every period *t*, U and D allocate ownership of the

downstream unit, and U offers D a fixed payment w_g, where $g \in \{VI, VS\}$. If either U fails to offer the payment or D fails to accept it, the game moves to stage 4, otherwise it proceeds to stage 2. At stage 2, D chooses *d* and incurs the cost $C_p(d)$. At stage 3, the values $B(d)$ and $V(d) - C_a(d)$ are realized. At stage 4, if U has failed to offer w_g or D has failed to accept it at stage 1, or if D has failed to spend the promised effort d^* at stage 2, the parties declare the relational contract over and revert to spot vertical separation from period *t+1* and thereafter. This relational contract will be self-enforcing if, and only if each party's present gain from reneging is smaller than the present value of her quasi-rents from future trade.[9]

1.4.2. Vertical integration

To simplify notation, denote U and D's per period profits from honoring the relational contract, gross of the fixed transfer w_{VI}, as $U_{VI}^* = B(d^*) + V(d^*) - C_a(d^*)$ and $D_{VI}^* = -C_p(d^*)$, yielding joint surplus $JS^* = U_{VI}^* + D_{VI}^*$. Also, denote their payoffs under spot vertical separation, respectively, as $U^{VS} = B(d^{VS})$ and $D^{VS} = V(d^{VS}) - C_a(d^{VS}) - C_p(d^{VS})$, yielding joint surplus $JS^{VS} = U^{VS} + D^{VS}$.

[9] See Bull (1987), Levin (2003), and Baker, Gibbons and Murphy (2002, 2006) for related models of relational contracts.

Finally, let r be U and D's common interest rate. The relational contract is self-enforcing if, and only if

$$\frac{1+r}{r}\left(U_{VI}^{*}-w_{VI}\right)\geq\frac{1+r}{r}U^{VS} \tag{1.3}$$

$$\frac{1+r}{r}\left(D_{VI}^{*}+w_{VI}\right)\geq\frac{1+r}{r}D^{VS} \tag{1.4}$$

$$-C_{p}\left(d^{*}\right)+\frac{1}{r}\left(D_{VI}^{*}+w_{VI}\right)\geq\frac{1}{r}D^{VS} \tag{1.5}$$

Conditions (1.3) and (1.4) are U and D's participation constraints, whereas condition (1.5) is D's dynamic incentive compatibility constraint. We are now ready to state the following

Lemma 1: Under vertical integration, the relational contract between U and D is self-enforcing if D's reneging temptation, $C_{p}\left(d^{*}\right)$, is not greater than the present value of the parties' aggregate quasi-rent stream, $\frac{1}{r}\left(JS^{*}-JS^{VS}\right)$.

Proof: The largest w_{VI} satisfying both (1.3) and (1.4) is $\overline{w_{VI}}=U_{VI}^{*}-U^{VS}$. Plugging $\overline{w_{VI}}$ into (1.5) and rearranging yields the condition

$$C_{p}\left(d^{*}\right)\leq\frac{1}{r}\left(JS^{*}-JS^{VS}\right) \tag{1.6}$$

Since $\overline{w_{VI}}$ satisfies both (1.3) and (1.4), (1.6) is sufficient for self-enforcement. QED.

1.4.3. Vertical separation

Denote U and D's stage 3 payoffs if they honor the relational contract under vertical separation, gross of the transfer w_{VS}, as $U_{VS}^{*} = B\left(d^{*}\right)$ and $D_{VS}^{*} = V\left(d^{*}\right) - C_a\left(d^{*}\right) - C_p\left(d^{*}\right)$, yielding joint surplus $JS^{*} = U_{VS}^{*} + D_{VS}^{*} = U_{VI}^{*} + D_{VI}^{*}$, as under vertical integration. The relational contract is self-enforcing if, and only if

$$\frac{1+r}{r}\left(U_{VS}^{*} - w_{VS}\right) \geq \frac{1+r}{r}U^{VS} \tag{1.7}$$

$$\frac{1+r}{r}\left(D_{VS}^{*} + w_{VS}\right) \geq \frac{1+r}{r}U^{VS} \tag{1.8}$$

$$D_{VS}^{*} + \frac{1}{r}\left(D_{VS}^{*} + w_{VS}\right) \geq D^{VS} + \frac{1}{r}D^{VS} \tag{1.9}$$

Paralleling the analysis of vertical integration, we can state the following

Lemma 2: Under vertical separation, the relational contract between U and D is self-enforcing if D's reneging temptation $D^{VS} - D_{VS}^{*}$ is not greater than the present value of the parties' aggregate quasi-rent stream $\frac{1}{r}\left(JS^{*} - JS^{VS}\right)$.

Proof: The largest w_{VS} satisfying both (1.7) and (1.8) is $\overline{w_{VS}} = U_{VS}^{*} - U^{VS}$. Plugging $\overline{w_{VS}}$ into (1.9) and rearranging yields the condition

$$D^{VS} - D_{VS}^{*} \leq \frac{1}{r}\left(JS^{*} - JS^{VS}\right) \tag{1.10}$$

Since $\overline{w_{VS}}$ satisfies both (1.7) and (1.8), (1.10) is sufficient for self-enforcement. QED.

Given Lemmas 1 and 2, we can determine the optimal governance structure in a relational contracting environment. It is natural to define such optimal structure as the one that makes the relational contract self-enforcing for the largest range of interest rates (Klein (1996), Baker *et al*. (2002, 2006)). Rearranging (1.6) and (1.10) in terms of the interest rate *r* yields

$$r \leq \frac{JS^{*} - JS^{VS}}{C_{p}\left(d^{*}\right)} \tag{1.11}$$

$$r \leq \frac{JS^{*} - JS^{VS}}{D^{VS} - D_{VS}^{*}} \tag{1.12}$$

We can then state the following

Proposition 2: Vertical integration is the optimal governance structure to support a given level of effort d^{*} through a relational contract if, and only if

$$C_{p}\left(d^{VS}\right) \leq C_{a}\left(d^{*}\right) - C_{a}\left(d^{VS}\right) - \left(V\left(d^{*}\right) - V\left(d^{VS}\right)\right) \tag{1.13}$$

Otherwise, vertical separation is optimal.

Proof: We know from the proof of Lemmas 1 and 2 that the right-hand sides of (1.11) and (1.12) are the largest possible values of *r* such that the relational contract is self-enforcing under vertical integration and separation, respectively. Since the numerators in the right-hand sides of (1.11) and (1.12) are identical, the relational contract is self-enforcing for a larger range of interest rates under vertical integration than separation if, and only if the denominator in the right-hand side of (1.12)—D's reneging temptation under vertical separation—is greater than the denominator in the right-hand side of

(1.11)—D's reneging temptation under vertical integration—, that is, if $D^{VS} - D^{*}_{VS} \geq C_p\left(d^*\right)$. Solving for D^{VS} and D^{*}_{VS} yields condition (1.13). QED.

The main message from Proposition 2 is that, while vertical integration cannot be optimal in a spot environment because it mutes D's incentives to spend effort (Proposition 1), it can be optimal in a relational environment for the very same reason. Under both vertical integration and separation, D has a temptation to trade off effort for leisure. However, under vertical separation, D has an additional temptation to reduce effort in order to increase the downstream unit's value, which is given by the cost saving $C_a\left(d^*\right) - C_a\left(d^{VS}\right)$. If this unit-level cost saving from reducing effort is large relative to the loss, given by $V\left(d^*\right) - V\left(d^{VS}\right)$, D's promise to spend the amount of effort d^* will be more credible under vertical integration than under vertical separation.

1.5. Comparative statics

1.5.1. Costly relational contracts

According to Proposition 1, in the absence of relational contracts, vertical separation is optimal, because it provides manager D with stronger incentives to spend effort than vertical integration. Conversely, when relational contracts are feasible, either integration or separation can be optimal, depending on which governance structure minimizes D's reneging temptation (Proposition 2). In practice, relational contracts may be feasible but costly, as they require U to monitor D's provision of effort, and both parties to develop reputational capital and communication mechanisms that enable informal coordination.

As a tractable formalization of costly relational contracts, consider the following extension to the model. Assume that, in order to enter relational contracts, U and D must incur a fixed cost *m*. For instance, *m* could be U's cost of developing/purchasing a monitoring technology, or U's cost of credibly signaling his intention to be in a long-term relationship with D. If the level of effort sustainable through the best feasible relational contract is d^*, U and D will enter such contract if, and only if the joint surplus it generates, net of the fixed cost, is greater than the surplus that can be achieved in a spot environment, that is, if

$$JS^* - m \geq JS^{VS} \tag{1.14}$$

If (1.14) does not hold, we know from Proposition 1 that the chosen governance structure will be vertical separation. Conversely, if (1.14) holds, we know from Proposition 2 that the chosen governance structure will be vertical integration if, and only if $D^{VS} - D_{VS}^* \geq C_p\left(d^*\right)$. Assume, now, that the spot and relational joint surpluses are random variables, given by $JS^* + \eta_*$ and $JS^{VS} + \eta_{VS}$, respectively, and that D's reneging temptations under vertical separation and integration are also random variables, given by $D^{VS} - D_{VS}^* + \varepsilon_{VS}$ and $C_p\left(d^*\right) + \varepsilon_{VI}$, where $\eta_*, \eta_{VS}, \varepsilon_{VS}, \varepsilon_{VI}$ are all unobservable and independent, ε_{VS} and ε_{VI} have cumulative distribution function $F(\cdot)$ and η_* and η_{VS} have cumulative distribution function $G(\cdot)$, such that $F'(\cdot) > 0$ and $G'(\cdot) > 0$. Then, the probability to observe vertical integration is

$$\begin{aligned} \Pr(VI) &= \Pr\left(JS^* + \eta_* - m \geq JS^{VS} + \eta_{VS}\right) \Pr\left(D^{VS} - D_{VS}^* + \varepsilon_{VS} \geq C_p\left(d^*\right) + \varepsilon_{VI}\right) = \\ &= \Pr\left(\eta_{VS} - \eta_* \leq JS^* - JS^{VS} - m\right) \Pr\left(\varepsilon_{VI} - \varepsilon_{VS} \leq D^{VS} - D_{VS}^* - C_p\left(d^*\right)\right) = \\ &= G\left(JS^* - JS^{VS} - m\right) F\left(D^{VS} - D_{VS}^* - C_p\left(d^*\right)\right) \end{aligned} \tag{1.15}$$

This implies, in turn, that

$$\frac{\partial \Pr(VI)}{\partial m} = -G'\left(JS^* - JS^{VS} - m\right)F\left(D^{VS} - D_{VS}^* - C_p\left(d^*\right)\right) < 0 \tag{1.16}$$

Intuitively, since an increase in the fixed cost *m* reduces the probability that U and D enter relational contracts, and vertical integration can only be observed in the presence of relational contracts, an increase in *m* should reduce, *ceteris paribus*, the probability to observe vertical integration.

1.5.2. Effort productivity and vertical integration

In this paragraph, I use a linear-quadratic version of the model to study how variations in the productivity of D's effort for the upstream and downstream units affect the choice between vertical integration and separation. Let $B(d) = bd$, $V(d) = vd$, $C_a(d) = \frac{c_a}{2}d^2$ and $C_p(d) = \frac{c_p}{2}d^2$, where $b, v, c_a, c_p > 0$. Substituting these expressions into the first order conditions (1.1) and (1.2) yields $d^{FB} = \frac{b+v}{c_a + c_p}$ and $d^{VS} = \frac{v}{c_a + c_p}$.

Assume, now, that the best feasible relational contract requires D to supply the first best level of effort, d^{FB}. To derive testable comparative statics from Proposition 2, assume D's reneging temptations under vertical integration and separation are random variables given, respectively, by $C_p\left(d^{FB}\right) + \varepsilon_{VI}$ and $D^{VS} - D_{VS}^{FB} + \varepsilon_{VS}$, where ε_{VI} and ε_{VS} are unobservable and independent random terms with cumulative distribution function $F(\cdot)$, such that $F'(\cdot) > 0$. Substituting for the values of d^{FB} and d^{VS} in the linear-quadratic model, the probability that vertical integration is optimal is given by

$$(1.17)\qquad \Pr(VI)=\Pr\left(\varepsilon_{VI}-\varepsilon_{VS}\le D^{VS}-D_{VS}^{FB}-C_p\left(d^{FB}\right)\right)=F\left(\frac{b^2c_a-c_p\left(v^2+2bv\right)}{2\left(c_a+c_p\right)^2}\right)$$

This implies that

$$(1.18)\qquad \begin{aligned}\frac{\partial\Pr(VI)}{\partial v}&=F'(\cdot)\left(\frac{-vc_p-bc_p}{\left(c_a+c_p\right)^2}\right)\\ \frac{\partial\Pr(VI)}{\partial b}&=F'(\cdot)\left(\frac{bc_a-c_pv}{\left(c_a+c_p\right)^2}\right)\end{aligned}$$

An inspection of (1.18) indicates that the partial derivative for *v* is unambiguously negative, implying that vertical integration is more likely to be efficient the less productive D's effort is for the downstream unit (smaller *v*). On the other hand, the sign of the partial derivative for *b* is ambiguous. In particular, it is positive if, and only if

$$(1.19)\qquad \frac{b}{v}>\frac{c_p}{c_a}$$

In words, when the portion of D's effort that spills over the upstream unit is large relative to the portion that benefits the downstream unit (i.e., $\frac{b}{v}$ is large enough), D's present cost savings from reneging on the promised effort under vertical separation, given by the term $C_a\left(d^{FB}\right)-C_a\left(d^{VS}\right)$ from (1.13), are large relative to the value reduction she bears, given by the term $V\left(d^{FB}\right)-V\left(d^{VS}\right)$. In these conditions, an increase in the marginal spillover effect (greater *b*) makes D's promise to spend effort more credible under vertical integration than under separation.

1.6. Empirical evidence

This section discusses several empirical works that support the model's predictions, the most recent of which are summarized in Table 1.1 All these works focus on long-term business relationships, such as the ones between franchisors and outlet managers, motor carriers and truck drivers, or major and regional airlines. Consistent with the model, implicit contracts are likely to be important in governing these relationships.

Effect of the manager's effort on the upstream unit (spillover)

Consistent with the idea that, when the manager's effort generates greater spillovers on the upstream unit (b grows) and spillovers are substantial ($\frac{b}{v} > \frac{c_p}{c_a}$), the downstream unit should be vertically integrated, Forbes and Lederman (2008) find that flight routes connecting US airports with worse weather conditions, and where the major carrier's

Table 1.1. Recent evidence on the model's predictions: the effect of managerial effort upstream (*b*) and downstream (*v*), and of relational contracting costs (*m*), on vertical integration

Empirical study	Year	Industry	Task of downstream manager	Observed variations	Change in model's parameters			Spillover large?	Effect on VI
					B	*v*	*m*		
Forbes & Lederman	2008	Air transportation	Implement flight rescheduling	Route in bad weather airport; Hub = endpoint	+			Yes	+
Yeap	2006	Chain restaurants	Control service quality	In-house production; Dine-in service; High price	+			Yes	+
Nickerson & Silverman	2003	Trucking	Maintain truck	Less-than-truckload service; Heavy advertising	+			Yes	+
Brickley *et al*.	2003	Commercial banking	Check borrower's solvency	Rural office		+		No	–
Woodruff	2002	Footwear retailing	Fit models to store	Frequent fashion change		+		No	–
Lafontaine & Shaw	2005	Retailing	Manage outlet	Franchisor operates in more states			+	Yes	–
Corts & Singh	2004	Offshore drilling	Contain drilling costs	Repeated past interaction			–	Yes	+

hub represents one of the endpoints, tend to be served by regional airlines that are owned by the major. In airports with bad weather conditions, it is crucial for a network's reputation that regional carriers coordinate flight rescheduling with the major in order to avoid excessive delays and cancellations (greater *b*). Moreover, efficient rescheduling matters more to the network's reputation in the major carrier's hub, or in airports where the major operates more flights. Yeap (2006) finds that chain restaurants with in-house food production, dine-in service and high prices, where the quality of customer service and the restaurant's cleanness and comfort are more critical to the chain's brand (greater *b*), are more likely to be vertically integrated. Brickley and Dark (1987) find that vertical integration is more frequent than franchising in industries where retail outlets serve non-repeat customers and, therefore, the outlet manager's effort increases the value of the common brand more than the individual outlet's profits (greater *b*). Arruñada, Vázquez and Zanarone (2008) find that car dealerships in areas with greater outlet density, where a dealer's effort to capture customers benefits neighboring dealers, tend to be vertically integrated.[10] Lafontaine (1992) and Lafontaine and Shaw (2005) find that, in franchise networks, greater value of the common brand (greater *b*) leads to more vertical integration.[11] Finally, Nickerson and Silverman (2003) find that motor carriers tend to own trucks when they provide less-than-truckload services, in which shipments must be coordinated and, therefore, breakdowns due to poor truck maintenance are detrimental to the carrier's reputation, and when they invest more in advertising to build a brand name (greater *b*). All these works study industries where

[10] An exception to these patterns is Brickley (1999), who finds no significant relationship between spillovers across retail outlets and the extent of vertical integration.

[11] The positive empirical association between brand value and vertical integration can also be interpreted via two-sided models, in which integration gives upstream managers stronger incentives to spend brand-maintenance effort (Lutz (1995)).

downstream firms operate under the upstream firm's brand name and, therefore, spillovers are likely to be substantial (i.e., it is likely that $\frac{b}{v} > \frac{c_p}{c_a}$). According to the model, these are the types of industries in which a marginal increase in the impact of manager's effort on the brand (greater *b*) should lead to more vertical integration, which is consistent with the data.

Effect of the manager's effort on the downstream unit

The data also support the model's prediction that greater productivity of the manager's effort for the downstream unit should decrease the extent of vertical integration. In particular, Shepard (1993) finds that gasoline stations offering repair services, where the effort of local managers is more important to enhance outlet profits, are less likely to be vertically integrated. Brickley, Linck and Smith (2003) find that Texan bank offices in rural areas, where managers must gather information on small-business clients with unaudited accounts in order to make lending decisions (greater *v*), tend to be independently owned, whereas urban offices, where managers face large, audited clients and, therefore, make lending decisions following standardized procedures elaborated by the bank's headquarter, tend to be vertically integrated.[12] Finally, Woodruff (2002) finds that Mexican shoe manufacturers, who change models and style frequently and, therefore, need outlet managers to spend more effort investigating customer tastes, are less likely to own the outlets.[13] Consistent with the model, the Mexican retailers studied by Woodruff (2002) sell non-branded shoes and,

[12] Brickley, Linck and Smith (2003) also find similar, though slightly weaker evidence for Californian banks.

[13] Woodruff (2002) explains these data in terms of a property rights model, in which the outlet manager's effort in learning customer tastes is interpreted as a human capital investment.

therefore, an increase in the productivity of their effort affects outlet profits, not the reputation of the manufacturers they serve—that is, frequent fashion changes measure increases in v, rather than b.

The costs of relational contracting

The model predicts that vertical integration should be less frequently observed as the costs of entering relational contracts increase. A natural example is given by monitoring costs, since relational contracts require the upstream unit to monitor the effort of the downstream unit's manager (although not in a court-verifiable way). The model would then predict that a greater cost of monitoring the downstream manager leads to less vertical integration.[14] Consistent with that, several papers on franchising find that retail outlets that are more distant from the franchisor's headquarters (Brickley and Dark (1987), Arruñada, Vázquez and Zanarone (2008)) or geographically dispersed (Lafontaine (1992), Lafontaine and Shaw (2005))—and, therefore, more difficult to monitor—tend to be vertically separated. Also, Baker and Hubbard (2004) find that, after the introduction of on-board computers, which allow to monitor the drivers' truck maintenance, trucks were more likely to be owned by the carrier, rather than the driver.

Another possible interpretation for the costs of relational contracting is in terms of signaling and communication costs, which parties must incur in order to initiate a long-term relationship and reach an informal agreement on their implicit obligations. In particular, one could argue that parties who have transacted frequently in the past can implement relational contracts at lower signaling and communication costs. The model

[14] Lafontaine and Slade (1996) obtain a similar prediction using a static model with risk-averse downstream agents. Given the scarce empirical support for the risk-aversion assumption in retail contracting, it seems desirable to obtain this prediction without risk-averse agents.

would then predict that, as the frequency of past transactions increases, vertical integration is more likely. Evidence supportive of this prediction is provided by Corts and Singh (2004), who find that oil companies and drillers that interact repeatedly and, therefore, rely more on relational contracts, allocate residual claims to the oil company—a solution that resembles vertical integration as defined in this chapter.[15]

1.7. Conclusion

This chapter has developed a relational contracting model to explain why, in the presence of interest conflicts and spillovers, firms at different stages in the chain of production vertically integrate. The proposed explanation is that vertical integration may strengthen the managers' *implicit incentives* to perform. If the manager of a vertically integrated firm's unit reneges on her implicit obligation to spend effort, she benefits from greater free time, but does not appropriate the associated increase in unit-level profits. Therefore, when the levels of effort that maximize the firm's and the individual unit's profits differ substantially—that is, when interest conflicts and spillovers between units are large—a manager's promise to spend effort will be more credible under vertical integration than under separation. As shown in section 1.6, a rich body of empirical evidence from numerous industries is consistent with the model's predictions.

[15] See Corts (2007) for an alternative interpretation of this result.

Chapter 2. Vertical Restraints in the Shadow of the Law: Evidence from Automobile Franchising

Summary

This chapter shows that, after a 2002 European regulation prohibited the use of dealer-exclusive territories, automobile franchise contracts in Italy introduced price ceilings and standards on verifiable marketing and service inputs, such as advertising and salespeople. The introduction of standards suggests manufacturers used exclusive territories to induce desired dealer services and, once prohibited, switched to alternative contractual devices to achieve this goal. Moreover, the introduction of price ceilings despite free intrabrand competition is consistent with the hypothesis that manufacturers tried to enforce exclusive territories through an implicit agreement with dealers, and used price ceilings to reduce the dealers' short-run gains from reneging on it.

2.1. Introduction

Several works have studied vertical restraints as mechanisms to coordinate the price and service decisions of independent dealers. According to these models, restraints on intrabrand competition, such as exclusive territories and resale price maintenance, prevent dealers from freeriding on pre-sale services—attention to the customer, local advertising, and the like—and, combined with quantity floors or non-linear pricing to avoid double marginalization, give dealers the incentives to efficiently choose price and service effort (Telser (1960, 1990), Marvel and McCafferty (1984), Matthewson and Winter (1983, 1984), Rey and Tirole (1986)).[16] Klein and Murphy (1988) extended this approach, arguing that, even when contractual restraints on competition are not

[16] Winter (1993) shows that restraints on intrabrand competition can improve the dealers' choice of price and services even in the absence of inter-dealer freeriding.

enforceable, manufacturers can elicit dealer cooperation via implicit agreements sustained by the threat of termination.[17] In this relational contracting environment, vertical restraints can create, on one hand, quasi-rents that persuade dealers to cooperate and, on the other hand, safeguards that reduce their short-run temptation to renege (Klein and Murphy (1988), Klein (2000), Baker *et al*. (2006)).[18]

Despite this rich theoretical literature, there is still limited evidence on how real-world vertical agreements deal with the freeriding problem (Ippolito (1991), Brickley (1999), Arruñada *et al*. (2001)), and no evidence at all on Klein and Murphy's (1988) hypothesis that vertical restraints facilitate implicit cooperation. This chapter fills the gap, providing unique data on how Italian car dealership contracts responded to a 2002 European regulation, which prohibited the use of dealer-exclusive territories and other restrictions on intrabrand competition. To my knowledge, this is the first systematic account of how vertical restraints in an industry interact with the legal system and with each other to coordinate dealer behavior.

For each of 19 car manufacturers, I compare the Italian dealership contracts they used before and after the regulatory change, and I find 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 dealers' verifiable inputs, such as salespeople and advertising.

---

[17] See, also, Klein (1980).

[18] On the relational nature of vertical agreements see, also, Hadfield (1990), Klein (1995) and Lafontaine and Raynaud (2002).

The introduction of standards suggests that, consistent with economic theory, manufacturers used exclusive territories to prevent freeriding and induce desired dealer services and, once prohibited, switched to alternative contractual devices to achieve this goal. Moreover, consistent with Klein and Murphy's (1988) view of vertical restraints as means to facilitate relational contracts, the use of quantity floors and, despite free intrabrand competition, of price ceilings, suggests manufacturers tried to enforce exclusive territories through an implicit agreement with dealers, circumventing the legal prohibition. Quantity floors insure that, if such agreement is honored, dealers have incentives to sell the efficient amount of cars. However, since sales out of territory cannot be contractually restricted, dealers have an opportunity to "game" the quantity floor by selling in their neighbors' territory, while enjoying monopolistic profits at home. Price ceilings reduce such profits and, through that channel, reduce the dealers' present gain from reneging on the implicit "no-compete" agreement.

The rest of this chapter is organized as follows. Section 2.2 presents a simple model of car distribution to illustrate how the optimal mix of vertical restraints depends on whether intra-brand competition can or cannot be prevented by contract. Section 2.3 describes the data. Section 2.4 discusses the empirical results and how they relate to the theoretical predictions. Section 2.5 concludes.

2.2. Vertical restraints in car distribution: a simple model

Consider a car manufacturer, M, whose automobiles are sold at two identical outlets. The outlets serve identical pools of consumers, who evaluate cars by visiting the closest

outlet, and then purchase from the one offering the lowest price. Denote by $s_j \in \mathbb{R}^+$ the effort outlet *j*'s salespeople spend to persuade consumers from location *j* to buy, 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 $q_{ii} = q(p_{ii}, s_i)$ for every $i, j \in \{1,2\}$ and $i \neq j$, where $q_s(\cdot) > 0, q_{ss}(\cdot) < 0, q_p(\cdot) < 0, q_{pp}(\cdot) < 0$ and $q_{sp}(\cdot) = q_{ps}(\cdot) = 0$. Conversely, with intrabrand competition

$$q_{ij} = q_{jj} = \begin{cases} q(p_{ij}, s_j) & \text{if } p_{ij} < p_{jj} \\ \frac{1}{2} q(p_{ij}, s_j) & \text{if } p_{ij} = p_{jj} \\ 0 & \text{if } p_{ij} > p_{jj} \end{cases} \tag{2.1}$$

for every $i \neq j$. The cost of spending effort at outlet *i* is $C(s_i)$, where $C(0) = 0$, $C_s(\cdot) > 0$ and $C_{ss}(\cdot) > 0$.

2.2.2. First best

If M could directly sell to consumers, he would choose price and effort at both outlets to maximize

$$p_{11} q(p_{11}, s_1) + p_{22} q(p_{22}, s_2) - C(s_1) - C(s_2) \tag{2.2}$$

Since the two outlets are identical, the first best levels of price and effort are given, respectively, by $p_{11}^{FB} = p_{22}^{FB} = p^{FB}$ and $s_1^{FB} = s_2^{FB} = s^{FB}$, which generate output per outlet $q^{FB} = q(p^{FB}, s^{FB})$ and joint surplus $JS^{FB} = 2\{p^{FB} q^{FB} - C(s^{FB})\}$.

2.2.3. Dealership contracts

From now on, I will assume M must delegate the choice of price and effort at outlets 1 and 2 to dealers D_1 and D_2, respectively. I also assume that, for every *i* and *j*, $p_{ii}, p_{ij}, q_{ii}, q_{ij}, s_i$ and $C(s_i)$ are D_i's private information. In this section, I focus on a spot environment, in which manufacturer and dealers meet only once. The game is as follows. At stage 1, M offers a take-it-or-leave-it contract to the dealers, which includes a wholesale price p_M and, possibly, a set of vertical restraints. At stage 2, if D_1 and D_2 have accepted M's offer, they simultaneously choose effort s_1 and s_2 at costs $C(s_1)$ and $C(s_1)$, respectively; otherwise, each party receives her reservation payoff, which I normalize to zero. At stage 3, D_1 chooses p_{11} and p_{12} and, simultaneously, D_2 chooses p_{22} and p_{21}. At stage 4, M receives $p_M(q_{11}+q_{12}+q_{21}+q_{22})$ and dealer D_i receives $(p_{ii}-p_M)q_{ii}+(p_{ij}-p_M)q_{ij}$.

No vertical restraints available

If the stage 1 contract solely consists of a wholesale price—that is, if vertical restraints are not available—, dealers compete *a la* Bertrand at stage 3, which results into the Nash equilibrium price $p_{11} = p_{12} = p_{21} = p_{22} = p_M$. Anticipating zero revenues, at stage 2, D_i chooses effort to maximize $-C(s_i)$, which has a corner solution at $s_i = 0 < s^{FB}$, for every *i*. At stage 1, then, M chooses the wholesale price to maximize $2p_M q(p_M, 0)$, which yields price p_M^{CO} and surplus $JS^{CO} = 2p_M^{CO} q(p_M^{CO}, 0) < JS^{FB}$.

All vertical restraints available

Suppose, now, that, in addition to a wholesale price, the stage 1 contract can include vertical restraints. These can aim to prevent intrabrand competition (exclusive territories, quantity ceilings), increase sales and reduce retail prices (quantity floors, price ceilings), and constrain dealers' verifiable inputs and services, such as salespeople or advertising (service standards).[19] I do not consider here two-part tariffs as an additional type of vertical restraints, because they are not used in car distribution and, therefore, are not relevant for the empirical analysis in sections 3 and 4. Including two-part tariffs into the model would be straightforward and would not affect the results.[20] For simplicity, I assume both exclusive territories and quantity ceilings completely eliminate competition between dealers. Given that M does not observe sales and retail prices, I assume she enforces quantity floors and ceilings by requiring dealers to purchase a minimum or maximum amount of cars, and enforces price ceilings by publishing maximum allowed prices (for instance, on the internet) and relying on customers' incentives to report prices above the ceiling. Finally, I formalize service standards as verifiable programs that have the same effect on sales per outlet and on the dealers' costs as $\underline{s}$ units of effort. I assume $\underline{s} < s^{FB}$ to capture the idea that these contractible standards are imperfect substitutes for dealer effort (Meese (2004)). Given

[19] In this model, price floors cannot be enforced because neither M nor the courts observe retail prices, and customers don't have an incentive to report prices below the floor. Even when they are technically enforceable, price floors are regarded with suspicion by antitrust authorities. Indeed, they are per se illegal in Europe and were so in the US until 2007. See Rey and Vergé (2008) and Lafontaine and Slade (2008) for recent reviews of antitrust policy towards vertical restraints in Europe and in the US.

[20] Economists have emphasized several reasons for why two-part tariffs may not be observed in dealership contracts, such as dealer risk-aversion (Rey and Tirole (1986)); the need to provide manufacturers with incentives for brand-maintenance and monitoring effort (Lafontaine (1992), Mathewson and Winter (1994)); and the risk that, once dealers pay a franchise fee, courts may be more inclined to overturn disciplinary dealer terminations as expropriatory and contrary to good faith (Klein (1980, 1995)).

these 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 (alternatively, an exclusive territory or a quantity ceiling) and a quantity floor.

Proof: in appendix.

The intuition behind this result is well known (see, for instance, Telser (1960, 1990), Mathewson and Winter (1983, 1984) and Tirole (1988)). 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 imposing to the dealers a quantity floor equal to the first best level of output.

Vertical restraints on intrabrand competition unavailable

We know from Proposition 1 that, without vertical restraints on intrabrand competition, freeriding occurs and, therefore, a spot contract cannot achieve the first best. The second-best spot contract is given by the following

Proposition 2: When vertical restraints cannot be used to prevent intrabrand competition, the optimal spot contract imposes a service standard on the dealers.

Proof: We know from the previous analysis that, when there is free intrabrand competition and no service standard is imposed, the dealers spend zero effort in equilibrium. Conversely, a service standard can force dealers to spend effort $\underline{s}$, where, by assumption, $0 < \underline{s} < s^{FB}$. Therefore, imposing the service standard is efficient. QED.

Suppose, now, that manufacturer and dealers repeat their transaction infinitely—or, equivalently, that they do not know when their last transaction will occur. Moreover, assume the manufacturer can observe whether dealers compete with each other or not, although he cannot prove it to the satisfaction of a court. In this relational environment, provided that they are patient enough, the parties can implement implicit restraints on intrabrand competition, using their concern for future trade to enforce them. The optimal mix of explicit vertical restraints is, then, given by the following

Proposition 3: When implicit restraints on intrabrand competition are sustainable, the optimal contract imposes a quantity floor to insure that, if honored, the implicit "no-compete" agreement leads to the first best. Moreover, the optimal contract imposes a price ceiling and a service standard to minimize the dealers' temptation to renege on the implicit "no-compete" agreement.

Proof: in appendix.

Intuitively, if both dealers honor the implicit "no-compete" agreement, a quantity floor equal to the first best level of output gives them incentives to choose price and effort efficiently, as in Proposition 1. However, if a dealer honors the agreement, the other dealer has an opportunity to "game" the quantity floor by selling in her neighbor's territory, while enjoying monopolistic profits at her own location. A price ceiling and a service standard reduce such monopolistic profits and, through that channel, reduce the dealer's present gain from reneging on the implicit "no-compete" agreement and "gaming" the quantity floor, which makes the implicit agreement more easily sustainable. Unlike Proposition 1, this result has not been analyzed in previous works on vertical restraints. However, it can be considered as a formal example of Klein and

Murphy's (1988) general argument that vertical restraints are chosen to facilitate relational, implicit agreements.

Summing up, the model in this section predicts that, when vertical restraints on intrabrand competition are feasible, efficient dealer price and effort can be assured by using such restraints in combination with quantity floors (Proposition 1). When explicit restraints on competition are not feasible—for instance, because they are prohibited by the law, or too costly to enforce in court—service standards should be used, which impose verifiable constraints on the dealers' inputs and represent imperfect substitutes for their effort (Proposition 2). Since this is a second-best solution, manufacturers and dealers with sufficient reputational capital may try, instead, to enforce restraints on intrabrand competition *implicitly* and combine them with quantity floors to restore the first best. In that case, they should include service standards and price ceilings in the explicit contract, to reduce the dealers' reneging temptation (Proposition 3). These predictions are summarized in Table 2.1.

Table 2.1. Predicted change in the mix of vertical restraints when manufacturers cannot limit intrabrand competition by contract

Feasible set of vertical restraints	Predicted mix of vertical restraints	
	No implicit agreements	*Dealers implicitly agree not to compete*
Restraints on Intrabrand Competition Available	Restraints on Intrabrand Competition and Quantity Floors (first best)	—
Restraints on Intrabrand Competition Unavailable	Service Standards (second best)	Quantity floors, Service Standards and Price Ceilings (first best)

2.3. Data

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, however, the European Commission passed a stricter regulation, which eliminated the so called "location clauses", that is, contractual provisions preventing dealers from selling, advertising and opening new outlets out of their territory.[21] 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.[22] Having closed all the avenues to prevent intrabrand competition contractually, 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.[23] For each of 19 car manufacturers, I examine two contracts, the first in force between 1995 and 2002 and disciplined by the expired EC Regulation 1475/1995, and the second in force since 2002 and disciplined by the current EC

---

[21] To be precise, the EC Regulation 1400/2002 requires that manufacturers who impose "location clauses" allow dealers to resell automobiles to any party of their choice, including unauthorized retailers. Fearing the proliferation of such unauthorized, uncontrollable resellers, all manufacturers but Suzuki chose to abandon the location clause system after the 2002 regulation was passed. For more details on the 1400/2002 regulation, see Tongue (2003, 2006).

[22] Under the 2002 regulation, manufacturers can still require dealers to achieve sales targets. However, they are obliged to take the whole European Union, rather than the dealers' narrow territories, as the reference market to verify fulfillment of the target.

[23] 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 wholesale price, vertical restraints, incentives and rules for contract termination apply to all Ford dealers in Italy.

Regulation 1400/2002. This results in a sample of 38 contracts.[24] To complement the information provided by the contracts, I have also conducted in-depth interviews with several top managers of car manufacturers and dealers, as well as with a lawyer, who has represented numerous manufacturers and dealers in court and has assisted them in preparing dealership contracts.[25] Overall, manufacturers in this survey realized, in 2004, 85% of new car sales in Italy (83% in the whole European Union), making my sample of contracts largely representative of the industry.[26] 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 language. Since I could not confirm this information for all 19 manufacturers, I will conservatively refer to Italy when analyzing the data. However, it is useful to keep in mind that the results in this chapter hold the promise to extend to the entire European automobile industry. Table 2.2 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 minimum advertising budgets and minimum required numbers of salespeople.

---

[24] The contracts in this study represent the following manufacturers: Ford, Opel-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, they typically use different dealership contracts. For instance, the Jaguar and Land Rover contracts are different from the Ford one, even though Jaguar and Land Rover belonged to the Ford group when the contracts were collected.

[25] The managers who participated in the interviews represent the Italian networks of Peugeot, Citroen, Renault, Volkswagen, Audi, Skoda, Jaguar, Porsche, Nissan, Honda, Fiat, Alfa Romeo, Lancia and Volvo.

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

Table 2.2. Vertical restraints before and after the 2002 regulation prohibited exclusive territories

Clause assigning to manufacturer right to impose	*Proportion in contracts under 1995 regulation*	*Proportion in contracts under 2002 regulation*	*Difference in proportions (2002-1995)*
Exclusive territory	1	0	-1
Quantity floor	1	1	0
Price ceiling	0.05	0.57	0.52***
Advertising contribution	0.15	0.52	0.36***
Advertising quality	0.68	0.52	-0.15
Advertising budget	0.26	0.15	-0.10
Size of personnel	0.52	0.47	-0.05
Qualification of personnel	0.15	0.36	0.21
Mandatory training	0.68	0.73	0.05
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
General duty to respect standards	0.10	0.63	0.52***
Number of contracts		19	

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

2.4. Hypotheses and results

The model predicts that, when vertical restraints on intrabrand competition are available, manufacturers should use them to reduce their incentives 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 (Table 2.2). When restraints on intrabrand competition are illegal, the model suggests two hypotheses, depending on whether the parties have enough reputational capital to restrict intra-brand competition implicitly. If manufacturers cannot restrict intrabrand competition implicitly, so that dealers have an incentive to freeride, contracts under the 2002 regulation should impose verifiable standards to guarantee a minimum level of customer service (**H1**). Conversely, if manufacturers can restrict intrabrand competition implicitly, contracts under the 2002 regulation should impose quantity floors and, to reduce the dealers' temptation to compete, service standards and price ceilings (**H2**). Note that both hypotheses predict greater use of standards under the 2002 regulation, although for slightly different reasons—preventing a *horizontal externality* according to H1, and a *vertical externality* according to H2.

2.4.2. The use of service standards

Consistent with both hypotheses H1 and H2, after the European Commission made exclusive territories illegal, car manufacturers switched to various types of verifiable standards to elicit dealer provision of services. As shown in Table 2.2, 7 out of 10

standards appear in greater proportion in contracts under the 2002 regulation than in contracts under the 1995 one, 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 advertising fee is 36 percent points greater in contracts under the 2002 regulation, suggesting manufacturers have responded to the dealers' diminished incentives to advertise by performing more advertising directly and charging dealers accordingly. Also, the proportions of clauses requiring dealers to have a minimum operating capital, to achieve customer satisfaction targets, to hire salespeople with prescribed qualifications, and to implement customer satisfaction programs are, respectively, 26, 24, 21 and 19 percent points greater in contracts under the 2002 regulation. Finally, the proportion of "general standard" clauses (i.e., clauses assigning to the manufacturer the right to impose *any* service standard of his choice) is 52 percent points greater in contracts under the 2002 regulation. The need to prevent inter-dealer freeriding also explains why the use of a few standards slightly decreased after the legal change. In particular, the proportions of clauses requiring dealers to set a minimum advertising budget, to use advertising materials of prescribed quality and to employ a minimum number 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 qualified salespeople. In other words, one wonders why contracts under the 2002 regulation increased some constraints on the dealers' advertising and sales force, while simultaneously relaxing other constraints on the same inputs. The reason becomes 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 in their territory. As a result, the dealers are tempted to "game" ambiguous 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 own territories; they may exploit ambiguities in the manufacturer's directives on advertising quality to minimize their effort; and they may choose poorly qualified salespeople or family members to reduce their recruitment and training costs. Not surprisingly, then, manufacturers are now less keen to use these provisions, preferring, instead, to collect fees from the dealers and use them to advertise directly, or to require that salespeople obtain verifiable qualifications before being put on the dealers' payrolls.

2.4.3. The use of quantity floors and price ceilings

All contracts under the 2002 regulation—as the ones under the 1995 regulation—impose a quantity floor on the dealers. Moreover, the proportion of contracts imposing a price ceiling under the 2002 regulation 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. These results are consistent with hypothesis H2, according to which, once explicit restraints on intrabrand competition are prohibited by the law, manufacturers try to enforce them implicitly. Price ceilings, which would seem redundant in a regime of free intrabrand competition, are used to reduce the dealers' short-run temptation to renege on the implicit agreement. More precisely, price ceilings reduce the monopolistic profit dealers would make in their own territory if they chose to also sell in their neighbor's one, using extraterritorial sales to

"game" the quantity floor. The interviews I had in 2006 with managers of Italian dealership networks provide some further anecdotal support for this interpretation. The managers reported that almost no dealer to date took advantage of the 2002 regulation to open outlets and sales points out of her territory, and that they do not expect this to occur in the future because, to use the colourful expression of one of them, despite the European regulation, "dealers cannot afford to declare war to manufacturers".

2.4.4. Network consolidation

Between 1995 and 2002, most Italian dealership networks have been reorganized around fewer dealers, in response to the increase in interbrand competition caused by the entry of new brands (Tata) and the strengthening of old ones (Toyota, Nissan). As a result, the size of the average network has diminished by 18%, passing from 188 to 154 dealers.[27] It could then be argued that contracts written after 2002 have introduced price ceilings to prevent double marginalization in smaller, less competitive networks, rather than to respond to the regulatory change. The effect of network consolidation on the use of service standards would be less clear *a priori*. On one hand, larger networks may require standards to reduce freeriding (Brickley (1999), Arruñada *et al*. (2001)); on the other hand, 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 2.2, the probability that it is included in a contract as a function of both regulatory regime and network size. The model is

[27] This data has been provided by FEDERAICPA, the Italian federal association of car dealers.

(2.3) $$\Pr(VR_i) = \alpha + \delta REG_i + \beta SIZE_i + \varepsilon_i$$

where VR_i is a dummy variable taking value 1 if vertical restraint *VR* 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*; and ε_i is a random error term.[28] Data on network size under the 1995 regulation were not available for one of the 19 manufacturers in the sample, so the number of observations used to estimate equation (2.3) is 36, rather than 38. I estimate this linear probability model by Weighted Least Squares (WLS), in order to correct for the heteroschedasticity caused by the binary nature of the dependent variable (Table 2.3).[29] As a robustness check, I also re-estimate the model using a logit specification (Table 2.4). Since the logit estimates are entirely consistent with theWLS ones, in what follows I will mainly refer to the latter, which are easier to interpret.

The regression results indicate that, even controlling for network size, contracts under the 2002 regulation make greater use of price ceilings and service standards 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 an implicit "no compete" agreement, as predicted by hypothesis H2. In contrast, the network size coefficient is economically and statistically insignificant in the price ceiling regression and in most service standard regressions (with the exception

[28] When contract *i* falls under the 2002 (1995) regulation, $SIZE_i$ equals the manufacturer's sales at the end of 2001 (1994).

[29] 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 homoschedastic. For a similar methodology, see Arruñada *et al*. (2001).

of customer satisfaction targets), suggesting that, unlike the legal regime, network size is not an important predictor of either type of provision.

2.5. Conclusion

This chapter has shown that, after a 2002 European regulation prohibited the use of dealer-exclusive territories, automobile franchise contracts introduced price ceilings and standards on verifiable marketing and service inputs, such as advertising and salespeople. In addition, contracts continued to impose quantity floors on the dealers, as they did before the regulatory change. The introduction of standards suggests manufacturers used exclusive territories to induce desired dealer services and, once prohibited, had to switch to alternative contractual devices to achieve this goal. The use of quantity floors and, despite free intrabrand competition, of price ceilings, also suggests that, after the legal prohibition, manufacturers tried to enforce exclusive territories through an implicit agreement with dealers. Quantity floors insure that, if such agreement is honored, dealers have incentives to sell the efficient amount of cars. Price ceilings reduce the short-run profit dealers can earn in their own territory if they renege on the implicit agreement and "game" the quantity floor, selling in their neighbor's territory as well. This result is consistent with a view of vertical restraints as means to facilitate relational contracts (Klein and Murphy (1988)).

Table 2.3. Vertical restraints before and after the 2002 regulation prohibited exclusive territories, controlling for network size (WLS regressions)

	Independent variables		
Probability that contract allows manufacturer to impose:	*Constant*	*Legal change* (1 for 2002 regulation, 0 for 1995 regulation)	*Network size* (100s dealers per network)
Price ceiling	0.05 (0.16)	0.49*** (0.13)	0.005 (0.08)
Advertising contribution	0.15 (0.15)	0.38*** (0.14)	0.006 (0.07)
Advertising quality	0.53*** (0.16)	-0.09 (0.16)	0.07 (0.04)
Advertising budget	0.01 (0.14)	-0.02 (0.12)	0.1 (0.07)
Size of personnel	0.36* (0.19)	0.01 (0.16)	0.07 (0.07)
Qualification of personnel	0.35* (0.20)	0.12 (0.14)	-0.09 (0.1)
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)
Number of contracts		36	

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

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 2.4. Vertical restraints before and after the 2002 regulation prohibited exclusive territories, controlling for network size (logit regressions)

	Independent variables		
Probability that contract allows manufacturer to impose:	*Constant*	*Legal change* (1 for 2002 regulation, 0 for 1995 regulation)	*Network size* (100s dealers per network)
Price ceiling	-2.23 (1.42)	2.96*** (1.13)	-0.0035 (0.006)
Advertising contribution	-1.78* (1.01)	1.86** (0.81)	0.0009 (0.004)
Advertising quality	0.04 (0.92)	-0.37 (0.70)	0.003 (0.004)
Advertising budget	-2.46** (1.06)	-0.12 (0.89)	0.006 (0.004)
Size of personnel	-0.52 (0.84)	0.90 (0.68)	0.002 (0.003)
Qualification of personnel	-0.41 (1.20)	0.79 (0.82)	-0.007 (0.006)
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)
Number of contracts		36	

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

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Appendix 2A: Proof of Proposition 1

Sufficiency: Suppose that, at stage 1, M offers to both dealers a contract consisting of a wholesale price p_M, a restraint on intrabrand competition, and a quantity floor equal to q^{FB}. If the dealers accept this contract, their marginal cost is 0 for sales below q^{FB}, and p_M for sales above. This implies that, for every *i*, D_i chooses price and effort to maximize

(2.4) $$p_{ii}q(p_{ii},s_i)-C(s_i)$$

if the quantity floor is binding, and

(2.5) $$(p_{ii}-p_M)q(p_{ii},s_i)-C(s_i)$$

if the floor is not binding. Summing up (2.4) for both dealers yields the first best program in (2.1), which implies that, if the quantity floor is binding, the dealers choose the first best effort and retail price. To see that the floor is binding, compute the first order conditions of (2.5) and denote the solutions by $p^*(p_M)$ and $s^*(p_M)$. By differentiating the first order conditions and rearranging, one can check that $\frac{dp^*(p_M)}{dp_M}>0$ and $\frac{ds^*(p_M)}{dp_M}<0$, which implies that $p^*(p_M)>p^{FB}$, $s^*(p_M)<s^{FB}$ and, consequently, $q\left(p^*(p_M),s^*(p_M)\right)<q^{FB}$ for any $p_M>0$. Since M's participation constraint requires that he sets $p_M>0$ at stage 1, the floor is binding and, therefore, a contract consisting of a restraint on intrabrand competition and a quantity floor equal to q^{FB} is sufficient to achieve the first best. QED.

Necessity: Suppose, first, that the stage 1 contract does not include restraints on intrabrand competition. To elicit some effort from dealers, the contract can include a quantity floor equal to q^{FB} or a service standard. With the quantity floor, at stage 3, Bertrand competition drives retail prices down to the dealers' marginal cost, which is 0 because the floor is binding. Knowing this, both dealers spend zero effort at stage 2, as in the case in which no vertical restraints are imposed (section 2.2.3). At stage 1, the dealers anticipate that, if they accept the quantity floor contract, they will receive a gross profit equal to $-p_M q^{FB}$. To make them accept this contract, M must either set $p_M = 0$ or offer a reimbursement equal to $p_M q^{FB}$. Since, in either case, the joint surplus is 0, we can conclude that a quantity floor alone cannot achieve the first best. On the other hand, we know from Proposition 2 that a contract imposing a service standard cannot achieve the first best either, because the level of effort enforceable through a service standard is $\underline{s} < s^{FB}$. Since both types of contracts that do not include restraints on intrabrand competition yield smaller joint surplus than in the first best, these restraints are necessary for the first best. Suppose, now, that the stage 1 contract contains a restraint on intrabrand competition, but not a quantity floor. In this case, dealers choose price and effort to maximize the expression in (2.5). Since M cannot use two-part tariffs, she must offer $p_M > 0$, and the dealers will set $p^*(p_M) > p^{FB}$ and $s^*(p_M) < s^{FB}$, which is inefficient. Therefore, quantity floors are also necessary for the first best. QED.

Appendix 2B: Proof of Proposition 3

Suppose the relational contract works as follows. At stage 1 of any period *t*, M offers to D_1 and D_2 a wholesale price p_M^{RC} and a quantity floor q^{FB}. In exchange, D_1 and D_2 do not compete (i.e., they only sell to customers from their own location). If all parties honor this relational contract, we know from Proposition 1 that D_1 and D_2 have an incentive to choose the first best effort and price at stages 2 and 3. Therefore, M's per period profit is given by $2p_M^{RC}q^{FB}$, and each dealer's profit is given by $\left(p^{FB}-p_M^{RC}\right)q^{FB}-C\left(s^{FB}\right)$. If anyone reneges—that is, if M fails to offer (D_1 and D_2 fail to accept) p_M^{RC}, or if D_1 and D_2 compete for each other's customers—all parties revert, from period *t+1* and thereafter, to the best spot contract, which imposes a service standard on the dealers (Proposition 2). In that case, M, who has all the bargaining power, offers D_1 and D_2 a reimbursement equal to their cost of implementing the standard, $C\left(\underline{s}\right)$. As a result, D_1 and D_2 receive 0 profits and M receives per period profits equal to $JS^{SP}=2p_M^{SP}q\left(p_M^{SP},\underline{s}\right)$, where $p_M^{SP}=\arg\max_{p_M}\left\{2p_Mq\left(p_M,\underline{s}\right)\right\}$. Without additional vertical restraints, the "no-compete" relational contract is self-enforcing if, and only if

$$\frac{1+r}{r}2p_M^{RC}q^{FB}\geq\frac{1+r}{r}JS^{SP} \tag{2.6}$$

$$\frac{1+r}{r}\left[\left(p^{FB}-p_M^{RC}\right)q^{FB}-C\left(s^{FB}\right)\right]\geq 0 \tag{2.7}$$

$$(2.8)\quad -C\left(s^{FB}\right)+\frac{1}{r}\left[\left(p^{FB}-p_M^{RC}\right)q^{FB}-C\left(s^{FB}\right)\right]\geq\left(p\left(p_M^{BR}\right)-p_M^{BR}\right)q^{BR}-C\left(s\left(p_M^{BR}\right)\right)$$

where r is the parties' common interest rate and p_M^{BR} and q^{BR} will be defined momentarily. Conditions (2.6) and (2.7) are the manufacturer's and dealers' participation constraints, respectively. Condition (2.8) is the dealers' dynamic incentive compatibility constraint.[30] If D_i honors the promise not to compete while D_j decides to renege, D_j's best response is to fulfill the quantity floor by capturing D_i's sales at location *i* and act as a monopolist at location *j*, where she chooses price and effort to maximize (2.5), given the wholesale price p_M. M would set the wholesale price for these sales above the quantity floor at $p_M^{BR}=\arg\max_{p_M}\left\{2p_Mq\left(p\left(p_M\right),s\left(p_M\right)\right)\right\}$, and D_j would set location *j* price and effort $p\left(p_M^{BR}\right)$ and $s\left(p_M^{BR}\right)$, respectively, yielding output $q^{BR}=q\left(p\left(p_M^{BR}\right),s\left(p_M^{BR}\right)\right)$. Define the optimal contract as the one that maximizes the "self-enforcing range" of the implicit "no-compete" agreement (Klein (1996)), that is, the one that makes condition (2.8) loosest. Since (2.8) becomes looser as p_M^{RC} decreases, the optimal wholesale price is the one that satisfies (2.6) with equality, that is, $p_M^{RC}=\frac{JS^{SP}}{2q^{FB}}$. Plugging it into (2.8) and rearranging yields the unique self-enforcement condition

$$(2.9)\qquad 2\left[\left(p\left(p_M^{BR}\right)-p_M^{BR}\right)q^{BR}+C\left(s^{FB}\right)-C\left(s\left(p_M^{BR}\right)\right)\right]\leq\frac{1}{r}\left(JS^{FB}-JS^{SP}\right)$$

[30] See Bull (1987), Levin (2003) and, especially, Baker *et al*. (2002, 2006) for related models of relational contracts.

Vertical restraints in addition to the quantity floor should be included in the contract if they reduce the left-hand side in (2.9), which represents the dealers' aggregate reneging temptation. Since $p_M^{BR} > 0$ and, therefore, $p\left(p_M^{BR}\right) > p^{FB}$, a price ceiling equal to p^{FB} reduces the reneging temptation and should be included in the optimal contract. Similarly, since $s\left(p_M^{BR}\right) < s^{FB}$, a service standard forcing dealers to spend $\underline{s}$ units of effort should also be in the optimal contract, under the additional assumption that $\underline{s} > s\left(p_M^{BR}\right)$. QED.

Chapter 3. The Role of Decision Rights in Incomplete Contracts: Lessons from Automobile Franchising

Summary

Automobile franchise contracts allocate between manufacturers and dealers the rights to choose future terms of trade. Independent of who is assigned these rights, manufacturers dictate performance standards, and dealers implement them in exchange for discounts on the wholesale price of cars, which manufacturers can change at will even after dealers have performed. These practices suggest formal decision rights are not instruments to efficiently divide surplus when contracting the terms of trade ex post, as implied by models in the property rights tradition. They suggest, instead, that contracting the terms of trades ex post is costly, and that manufacturers act as specialized decision-makers for the dealership network as a whole. In this context, formal decision rights may be a last resort against the manufacturers' temptation to impose opportunistic decisions and the dealers' temptation to reject efficient but costly ones.

3.1. Introduction

Recent empirical works have shown that long-term contracts between firms allocate the *rights to choose future terms of trade* in a variety of contexts, from technology alliances (Lerner and Merges (1998), Elfenbein and Lerner (2003)), to relationships between large retailers and suppliers (Arruñada (2000)), car dealerships (Arruñada *et al*. (2001, 2005), Zanarone (2007)) and business-format franchising (Hadfield (1990)). Some of these works have also found that the allocation of decision rights varies *systematically* with contract characteristics (Lerner and Merges (1998), Elfenbein and Lerner (2003), Arruñada, *et al*. (2001)) and the regulatory environment (Zanarone

(2007)), which suggests decision rights play a role in incomplete contracts. What is such role?

This question has been addressed by two streams of theoretical literature. According to a "property rights" stream, contracts are ex ante incomplete, but can be efficiently renegotiated once uncertainty on the environment is resolved. By shifting bargaining power between the parties, decision rights affect the expected division of surplus from contract renegotiation and, through that channel, their incentives to invest in the relationship ex ante. Therefore, decision rights are allocated to optimize the parties' ex ante incentives to invest (Grossman and Hart (1986), Hart and Moore (1990), Aghion and Tirole (1994), Hart (1995), Baker *et al*. (2002)). According to an alternative stream of literature, bargaining and contracting costs prevent the parties from efficiently renegotiating the terms of trade ex post (Williamson (2000), Hart (2008)). In this environment, decision rights are not allocated to improve investment incentives but, rather, to minimize the ex post inefficiencies (Simon (1951), Matouschek (2004), Baker *et al*. (2006), Hart and Moore (2008)).[31] Assessing the empirical relevance of the "ex ante" and "ex post" groups of theories—and of specific theories in each group—requires information the existing studies do not provide, regarding how, given the allocation of decision rights in a long-term contract, the parties adapt terms of trade and divide surplus in the course of their relationship.

This chapter aims to fill the gap, providing new data on automobile franchising in Italy. According to these data, franchise contracts evenly allocate between car manufacturers and dealers the rights to set standards—such as showroom design and

[31] See Gibbons (2005) for an extensive discussion of the "ex post" and "ex ante" streams of literature on incomplete contracts.

advertising expenditures. Irrespective of who is assigned these decision rights, however, manufacturers do not bargain with dealers but, rather, *dictate* standards to them, offering in exchange discounts on the list price of cars. Moreover, manufacturers offer these discounts even when they have the right to impose standards—except when standards are essential to protect the brand, in which case manufacturers simply threaten to terminate non-compliant dealers. However, contrary to what one would expect if contracts over standards were fully enforceable in court, manufacturers retain the right to change the dealers' discounts even after standards have been implemented as required.

These facts suggest that, in contrast with the "ex ante" property rights theories, manufacturers and dealers do not renegotiate their contracts with dealers ex post and do not use decision rights as means to affect the division of surplus from renegotiations. Instead, manufacturers act as specialized decision makers for the dealership network, elaborating standards, communicating them to dealers, and rewarding implementation through discounts. The discretionarity of these discounts also suggests the dealers' reward is not guaranteed by courts but, rather, by the manufacturers' concern for trading with dealers in the future and for keeping a good reputation in the market for franchises. In these *asymmetric relational contracts*, formal decision rights, and the threat of disciplinary termination they entail, seem to play the role of a last-resort penalty. When the dealers' temptation to reject efficient but costly standards is high, and the manufacturers' temptation to impose opportunistic ones is low, the right to terminate dealers substitutes the promise of discounts as a means to keep the relational contract within its "self-enforcing range" (Klein (1996, 2000), Baker *et al*. (2006)). This interpretation of decision rights seems consistent with previous works on automobile

franchising, according to which decision rights are allocated to car manufacturers when dealers have greater incentives to free-ride on the brand (Arruñada *et al*. (2001), Zanarone (2007)).

The rest of this chapter is organized as follows. Section 3.2 develops an elemental property rights model of automobile franchising and derives its predictions on how manufacturers and dealers should define the terms of trade ex post. Section 3.3 describes the incomplete contracts between car manufacturers and dealers in Italy, and in what sense their features differ from the ones predicted by the property rights model. Section 3.4 discusses an alternative theoretical framework that can explain such features. Section 3.5 concludes.

3.2. Decision rights and ex post adaptation in a property rights model

This section develops a simple property rights model of automobile franchising and derives its predictions on how manufacturers and dealers should adapt the contract terms ex post, once uncertainty on the environment is resolved.[32] In the spot version of the model, manufacturers and dealers meet once and can only enforce explicit contracts. In the relational version, adapted from Baker *et al*. (2002), they meet repeatedly and, therefore, can also enforce implicit contracts. Although spot and relational property rights models—as well as spot models with different specifications (Whinston (2003))—predict different allocations of decision rights, the analysis presented here

[32] I define the model in terms of automobile franchising to facilitate comparison with the empirical section of this chapter. However, the model is fairly general and can be applied to different types of incomplete contract.

highlights that they yield similar predictions on how the contract terms are adapted ex post.

3.2.2. The environment

Consider a car manufacturer, M, who produces cars, which dealer D purchases and resells to final consumers. After observing the state of the world *s*, M and D must choose a local decision *d*—showroom design, advertising expenditure, and the like—which influences their gross profits from the relationship $\pi_M(d,s)$ and $\pi_D(d,s)$. As standard in property rights models, I assume *d* cannot be contracted before *s* is observed, but becomes costlessly contractible afterwards, and that $\pi_M(d,s)$ and $\pi_D(d,s)$ are both non-contractible. Before observing *s* and choosing *d*, M and D choose the non-contractible action vectors $\mathbf{a}_M$—e.g., investments in monitoring technology and brand development— and $\mathbf{a}_D$—e.g., efforts directed at acquiring knowledge of local customers—incurring private costs $c_M(\mathbf{a}_M)$ and $c_D(\mathbf{a}_D)$, respectively. For any state *s*, these actions affect the probability $q_s(\mathbf{a}_M,\mathbf{a}_D)$ that it will occur in the future. Before choosing $\mathbf{a}_M$ and $\mathbf{a}_D$, M and D write a contract $g \in \{M,D\}$, in which they allocate the *right to choose the decision d* to either M ($g = M$) or D ($g = D$). The stage game can be thus summarized as follows:

1- Allocation of decision right $g \in \{M,D\}$ contracted

2- Non-contractible action vector $\mathbf{a}_i \in \mathbf{A}_i$ chosen by party $i \in \{M,D\}$ at cost $c_i(\mathbf{a}_i)$

3- State of the world $s \in S$ realized and observed by M and D

4- Contractible decision $d \in \Delta$ chosen

5- Non-contractible gross profit $\pi_i(d,s)$ received by party $i \in \{M,D\}$

3.2.3. Spot model

Assume M and D meet only once. Since *d* is ex post contractible, at stage 4, after observing the state of the world, M and D agree on the first best decision $d^{FB}(s) = \arg\max_d \left\{ \sum_i \pi_i(d,s) \right\}$ and on a price $p^g(s) \in \mathbb{R}$ that M pays to D. Assuming Nash bargaining, this price is equal to

$$(3.1) \qquad p^g(s) = \frac{1}{2}\left[\pi_M\left(d^{FB}(s),s\right) - \pi_M\left(d^g(s),s\right) + \pi_D\left(d^g(s),s\right) - \pi_D\left(d^{FB}(s),s\right) \right]$$

where $d^g(s) = \arg\max_d \left\{ \pi_g(d,s) \right\}$ is the decision the party who has been assigned the decision right at stage 1 would choose if bargaining failed.

Anticipating the bargaining outcome, M and D choose, at stage 2, the actions

$$(3.2) \qquad \begin{aligned} \mathbf{a}_M^g &= \arg\max_{\mathbf{a}_M} \left\{ M = \sum_s q_s\left(\mathbf{a}_M, \mathbf{a}_D^g\right)\left[\pi_M\left(d^{FB}(s),s\right) - p^g(s) \right] - c_M\left(\mathbf{a}_M\right) \right\} \\ \mathbf{a}_D^g &= \arg\max_{\mathbf{a}_D} \left\{ D = \sum_s q_s\left(\mathbf{a}_M^g, \mathbf{a}_D\right)\left[\pi_D\left(d^{FB}(s),s\right) + p^g(s) \right] - c_D\left(\mathbf{a}_D\right) \right\} \end{aligned}$$

which yield expected profits $M\left(\mathbf{a}_M^g, \mathbf{a}_D^g\right)$ and $D\left(\mathbf{a}_M^g, \mathbf{a}_D^g\right)$. At stage 1, M and D choose the allocation of decision rights that optimizes both parties' stage 2 actions, which is given by $g^{SP} = \arg\max_g \left\{ S\left(\mathbf{a}_M^g, \mathbf{a}_D^g\right) = M\left(\mathbf{a}_M^g, \mathbf{a}_D^g\right) + D\left(\mathbf{a}_M^g, \mathbf{a}_D^g\right) \right\}$. As a result, M and D

earn expected profits $M^{SP} = M\left(\mathbf{a}_M^{g^{SP}}, \mathbf{a}_D^{g^{SP}}\right)$ and $D^{SP} = D\left(\mathbf{a}_M^{g^{SP}}, \mathbf{a}_D^{g^{SP}}\right)$, and the expected surplus is $S^{SP} = M^{SP} + D^{SP}$.

This model has two testable implications on the structure of ex post bargaining, which are summarized in the following

Proposition 1: (i) For any state *s*, the party who is assigned the decision right *receives* a price for agreeing on the efficient decision $d^{FB}(s)$; (ii) the decision $d^{FB}(s)$ and the price $p^g(s)$ are specified in a *contract* at stage 4.

Proof: in appendix.

The intuition behind Proposition 1 is straightforward. If decision rights are "bargaining chips", as assumed by the property rights model, they should increase a party's share of the surplus. Moreover, since the model is spot and does not allow for implicit contracts sustained by concerns for future trade, M and D should formalize their agreement in a contract to make it enforceable.

3.2.4. Relational model

Suppose M and D repeat the spot game forever. Given the allocation of decision rights *g*, and for any realized state *s*, M and D implicitly agree to replace the bargaining price $p^g(s)$ with a price $\tau^g(s) \in \mathbb{R}$, which gives them more efficient incentives to choose the non-contractible actions at stage 2. Baker *et al*. (2002) show that, in this relational property rights model, the optimal *ex ante contract* allocates decision rights to minimize the parties' temptation to reject $\tau^g(s)$ in states in which it is unfavorable and

insist on the spot bargaining price $p^g(s)$. This section complements their analysis, showing that the optimal *ex post contract* should also be chosen to minimize the parties' temptation to renege on the implicit agreement.[33]

Assume the best price schedule sustainable under allocation g generates ex ante actions $\mathbf{a}_M^{Rg}, \mathbf{a}_D^{Rg}$ and per period profits $M^{Rg} = M\left(\mathbf{a}_M^{Rg}, \mathbf{a}_D^{Rg}\right)$ and $D^{Rg} = D\left(\mathbf{a}_M^{Rg}, \mathbf{a}_D^{Rg}\right)$, such that $M^{Rg} + D^{Rg} = S^{Rg} \geq S^{SP}$. Also, assume that, if either M or D reneges on the relational contract, both parties revert to the optimal spot governance structure g^{SP} forever after and that, to distribute surplus, M pays D, at stage 1 of each period, a fixed transfer $w^g \in \mathbb{R}$ (Levin (2003)). Then, the optimal ex post contract (i.e., the one that minimizes the parties' reneging temptation) is defined by the following

Proposition 2: For any allocation of the decision right $g \in \{M, D\}$, the efficient implicit agreement requires M and D to sign an explicit contract, at stage 4, according to which, if $d^{FB}(s)$ is chosen, M pays $\tau^g(s)$ to D.

Proof: in appendix.

Intuitively, if M and D specify, ex post, the desired decision and payment in a contract, the party without decision right will gain less from rejecting such payment in states in which it is unfavorable because, even if she does so, she has to bargain with the other party and pay a price in order to obtain the desired decision. A testable implication of this result is that, *in the relational property rights model, as in the spot one, we should observe the parties agreeing ex post on a decision and a price, and formalizing*

[33] Ex post contracts are feasible because the decision d is contractible once s is realized.

their agreement in a contract—although the price $\tau^g(s)$ in the relational model is different, in general, from the price $p^g(s)$ in the spot model.

3.3. Decision rights and ex post adaptation in automobile franchising

In this section, I analyze the interplay between decision rights and the ex post adaptation of terms of trade in automobile franchising, and I compare it with predictions of the property rights model.

Automobile franchise contracts are fundamentally *incomplete* in that, instead of defining specific *terms of trade*, they allocate between car manufacturers and dealers the rights to choose them in the future. Contracts are negotiated by manufacturers and dealer associations at the outset and modified only after major shocks, like network restructuring or regulatory changes.[34] Due to European regulatory provisions, the same contract applies to all the dealers of a given manufacturer. Table 3.1 summarizes the allocation of decision rights in the franchise contracts currently used by 19 manufacturers selling their products in Italy.[35] These manufacturers realized, in 2004, 85% of new car sales in Italy (83% in the whole European Union) and, therefore, are largely representative of the industry.[36]

---

[34] Each distribution network has a dealer association, and, in turn, the network-level associations are federated into a larger association, FEDERAICPA, which acts as a national coordinator.

[35] The contracts in this study represent the following brands: 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, that 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.

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

Many of the managers who accepted to hand me the contracts reported that, due to the existence of a common antitrust regulator, manufacturers actually use the same dealership contract all over the European Union. However, since I could not confirm this information for all 19 contracts, I will conservatively refer to Italy when analyzing the data. Table 3.1 indicates that decision rights are allocated quite evenly in these contracts, the average decision right being assigned to the manufacturer in 50% of the contracts, and to dealers in the other 50%.

While decision rights are assigned in advance, the specific performance required from dealers—sales targets, standards for outlet maintenance and customer relationship management, and the like—and the monetary transfers between the parties—wholesale prices and incentives—are frequently revised and adapted to market conditions, some every year (sales targets), some others every one or two years (showroom design). When terms of trade are modified, they are usually reported in annexes to the franchise contract, although, on fewer occasions, they are recorded in private letters and e-mails. To analyze how manufacturers and dealers adapt the terms of trade ex post, I have conducted, in the winter of 2006, a series of in-depth interviews with managers of car manufacturers, dealers and dealer associations, as well as with a reputed field lawyer, who assisted several manufacturers and dealers in court and prepared dealership contracts for numerous brands.[37] While networks for which interview responses and contracts are available do not perfectly match, the managers' answers are remarkably consistent, strongly suggesting that the automobile industry has *common practices* for adapting the terms of dealership contracts. Managers explicitly confirmed this, reporting

[37] The managers who participated in the survey represent the Italian networks of Peugeot, Citroen, Renault, Volkswagen, Audi, Skoda, Jaguar, Porsche, Nissan, Honda, Fiat, Alfa Romeo, Lancia and Volvo.

that identical practices emerge from their periodic meetings with colleagues in the industry.

Table 3.1. Decision rights and procedure to define sales targets in car dealership contracts

Clause assigning to manufacturer right to impose:	Proportion of clause in contracts
Wholesale price	1
Showroom design	0.73
Advertising contribution	0.52
Advertising quality	0.52
Advertising budget	0.15
Size of personnel	0.47
Qualification of personnel	0.36
Mandatory training of personnel	0.73
Minimum operating capital	0.36
Customer satisfaction programs	0.47
Customer satisfaction targets	0.52
Dealers' working hours	0.15
General duty to respect standards	0.63
Clause requiring negotiation and arbitration to define sales target	1
Number of contracts	19

3.3.2. The ex ante and ex post structure of dealership contracts

Following European competition law, *all 19 franchise contracts* in the survey require that, every year, dealers agree with the manufacturer on a minimum number of cars they must sell (the sales target). In case of disagreement, the dispute is deferred to an independent arbitrator, whose decision cannot be appealed (Table 3.1).[38] During interviews, managers of both manufacturers and dealers explained that, despite this mandatory negotiation and arbitration procedure, sales targets are computed every year according to a *formula prepared and periodically revised by manufacturers*. This formula typically computes a dealer's sales target as a weighted average of the brand's local and national market shares, it applies to the whole distribution network, and is normally accepted by individual dealers without bargaining or invoking arbitration.

As shown in Table 3.1, franchise contracts allocate among manufacturers and dealers the *rights to choose* future performance standards other than sales targets, which are not regulated by European law. For instance, 15% contracts in the sample assign to manufacturers the right to impose a minimum advertising budget on dealers, implying that, in the networks governed by those contracts (and only in those), manufacturers can sue or terminate dealers for failure to spend in advertising as much as they ask.[39] The same interpretation applies to the other decision rights. During interviews, managers consistently reported that standards are, in fact, elaborated by manufacturers, who

---

[38] See EC Regulation 1400/2002. The contracts also require that manufacturers and dealers agree on the arbitrator's name and, in case of disagreement, defer its choice to the local Chamber of Commerce.

[39] EU competition law limits the freedom of car manufacturers to terminate dealers at will, requiring a two years advance notice (see EC Reg. 1400/2002). By exerting decision rights, however, manufacturers can impose on dealers an obligation to adopt their decisions, which gives them a cause to terminate the contract with immediate effect in case of non-compliance.

dictate them to dealers via *unilateral letters* and *e-mails* that do not require signature or counterproposals. In the manufacturers' words, "standards are non-negotiable," "setting standards is a prerogative of the manufacturer" and "not negotiating standards is part of the manufacturer's corporate identity"; in the dealers' words, "standards are unilateral," and "standards are not negotiated, but imposed". Manufacturers fix standards unilaterally even when the franchise contract does not explicitly assign them the right to do so, in which case dealers could reject their decisions without risking to be sued for damages or terminated. In support of this statement, several dealers showed me "intra-network" letters and operating manuals with requirements that, according to the franchise contract, manufacturers had no right to impose, such as increasing the amount of fuel injected in cars prior to delivery, committing to deliver cars to customers within 5 days from announced date, or owning, rather than renting, the machinery and tools in repair workshops.

Dealers who comply with standards receive from the manufacturer a discount on the list price of each car they purchase, which is revised every year and reported in an annex to the franchise contract. Performance discounts are granted even when the manufacturer has a contractual right to impose standards, except when these are considered *essential* to protect the brand, as in the case of signs that carry the manufacturer's trademark or fundamental showroom features. For these "essential" standards, manufacturers do not offer a discount, relying, instead, on the power to terminate non-performing dealers, which is embedded in their decision rights, to insure compliance. In *all the contract annexes* in force during 2002, discounts were defined as *percentages of the list price of cars*, which, according to the franchise contracts, manufacturers have the right to modify at will and without advance notice (Table 3.1).

Managers confirmed, in the course of our interviews, that defining performance incentives this way is a common practice in the industry.

3.3.3. Dealership contracts and the property rights model

Table 3.2 summarizes the practices described so far and compares them with predictions of the property rights model discussed in Section 2. According to such model, the terms of trade are ex post contractible. Therefore, manufacturers and dealers should bargain over sales targets and standards and, after reaching an agreement, should formalize it in a court-enforceable contract, together with the payments each party is entitled to. Moreover, payments should flow from the party who does not have the decision right (and, therefore, has less bargaining power) to the party who does.

The data do not seem to support these predictions. First, while manufacturers and dealers, represented by their associations, bargain ex ante over the allocation of decision rights, they *do not bargain ex post over the decisions*. Instead, manufacturers define sales targets, service standards and discounts unilaterally, and dictate them to dealers without asking for their approval or counterproposal, which suggests the relationship between the parties is strongly asymmetric. Moreover, manufacturers unilaterally adapt the terms of trade *even when dealers are assigned decision rights* in the franchise contract, suggesting decision rights do not modify the asymmetry between the parties. Second, the payments dealers receive for adopting standards seem *discretionary*, rather than obligatory: while discounts are formalized in contract annexes, they are defined as percentages of the list price of cars, which manufacturers can change at will even after dealers have implemented the required standards. However, if standards were contracted

Table 3.2. Ex ante decision rights and ex post decisions in automobile franchising: Data versus predictions of property rights model

	Who makes decisions ex post?		Which party is compensated ex post?		How is dealer's compensation defined ex post?	
Decision right assigned ex ante to	*Property rights model*	*Data* (100% interviews)	*Property rights model*	*Data* (100% interviews & annexes)	*Property rights model*	*Data* (100% interviews & annexes)
Manufacturer	Both parties, by agreement	Manufacturer	Manufacturer	Dealer	Contracted before performance (obligatory)	Fixed by manufacturer after performance (discretionary)
Dealer	Both parties, by agreement	Manufacturer	Dealer	Dealer	Contracted before performance (obligatory)	Fixed by manufacturer after performance (discretionary)

ex post, as in the property rights model, we would not expect manufacturers to be free to renege on compensation. Finally, manufacturers often grant discounts to dealers for adopting standards they have a contractual right to choose, in which case they could ask dealers to pay for "soft" standards, or impose their preferred ones without compensation.

3.4. An alternative hypothesis: decision rights as last resorts in asymmetric relational contracts

The data suggest that, in contrast with a basic assumption of the property rights model, manufacturers and dealers behave as if the terms of trade were *ex post non-contractible*, and delegate the task of designing and enforcing them to the manufacturers, who are better informed on the long-term benefits of different standards and, therefore, are in the position to serve as specialized decision-makers for the network as a whole.[40] The fact that manufacturers invariantly dictate standards to dealers despite the even split of decision rights in franchise contracts also suggests such delegation is *informal*, rather than formal (Baker *et al*. (1999)): dealers focus on sales, relying on manufacturers to set efficient standards and fairly distribute their benefits, and manufacturers focus on standard elaboration, relying on dealers to implement them without frictions (Hadfield (1990)). Consistent with this hypothesis, even when they are assigned decision rights, manufacturers offer discounts to dealers for implementing several types of standards.

[40] Aghion and Tirole (1997) formally analyze asymmetric business relationships in which the uninformed party must rely on the informed one to initiate decisions.

This creates a stream of quasi-rents that persuades dealers to accept the manufacturers' decisions. However, to guarantee that manufacturers also have long-term gains from the relationship with dealers, discounts are not offered for standards that strongly benefit dealers by promoting the common brand (the so called "essential" standards). In these cases, manufacturers simply threaten disciplinary termination if dealers do not comply.

In these asymmetric, relational contracts, decision rights can be understood as last legal resorts against the dealers' non-compliance (Klein (1996, 2000), Baker *et al*. (2006)). When the standards required by manufacturers are particularly complex and burdensome, dealers may refuse to implement them despite the promised stream of discounts. To limit the dealers' reneging temptation, manufacturers can use the power of disciplinary termination embedded in their decision rights, imposing an immediate penalty against non-compliance. While reducing the dealers' reneging temptation to reject costly standards, however, decision rights give manufacturers a temptation to represent standards as essential when they are not and to enforce them under the threat of termination. Any reputational loss opportunistic manufacturers may suffer would come with a lag, giving them a short-run temptation to abuse their discretion. If this is the case, one would expect manufacturers to be assigned the right to set standards when dealers and their associations are sophisticated enough to detect opportunism and harm the manufacturers' reputation in the market for franchises—that is, when the manufacturer's reneging temptation is small—and when standards generate low benefits/high costs for dealers in the short run—that is, when the dealers' reneging temptation is large. While the data in this chapter do not permit to verify this hypothesis, previous empirical works on automobile franchising seem to support it, as

they find that decision rights are allocated to car manufacturers when dealers gain more from freeriding on the network's common standards due to intra-brand competition (Arruñada *et al*. (2001)) and "pro-dealer" regulations (Zanarone (2007)).

3.5. Conclusion

As shown in previous empirical works, automobile franchise contracts assign the rights to choose future terms of trade to car manufacturers when dealers have more incentives to freeride on the network's common standards (Arruñada *et al*. (2001), Zanarone (2007)). Do they do so to protect the manufacturers' ex ante investments in the brand—as property rights models of incomplete contracts would suggest—or to neutralize contractual hazards that prevent efficient standards from being chosen? In this chapter, I have addressed this question empirically. Using contractual data and in-depth interviews with managers, I have found that, independent of who is assigned decision rights, dealers adopt the standards dictated by manufacturers and receive, in exchange, a discount on the wholesale price of cars, which manufacturers can change at will even after the required standards are implemented. These practices suggest that, in contrast with the property rights model, manufacturers and dealers do not negotiate the terms of trade ex post. Instead, dealers informally delegate the manufacturers to serve as specialized decision-makers for the whole distribution network, to set standards and to reward their adoption through discounts. In these asymmetric relational contracts, a balanced allocation of formal decision rights between manufacturers and dealers creates a last-resort safeguard against the dealers' temptation to reject efficient but costly standards, and the manufacturers' temptation to impose opportunistic ones, helping to

keep both parties within their "self-enforcing range" (Klein (1996, 2000), Baker *et al*. (2006)).

Appendix 3A: Proof of Proposition 1

Part (i): Since each party earns a (weakly) greater profit if her preferred decision, rather than the first best decision is chosen, (3.1) implies that

$$\begin{aligned} p^g(s) &\geq 0 \text{ if } g = D \\ p^g(s) &\leq 0 \text{ if } g = M \end{aligned} \tag{3.3}$$

That is, M (D) pays D (M) when D (M) has the decision right.

Part (ii): suppose that, at stage 4, M and D do not formalize their agreement in a contract. If D (M) chooses $d^{FB}(s)$ before M (D) pays, M's (D's) best response is to pay nothing. Anticipating this, D (M) chooses $d^D(s)$ ($d^M(s)$) instead of $d^{FB}(s)$. Similarly, if M (D) pays $p^D(s)$ ($p^M(s)$) before D (M) chooses *d*, D's (M's) best response is to choose $d^D(s)$ ($d^M(s)$) instead of $d^{FB}(s)$. In either case, the ex post surplus is $\sum_i \pi_i\left(d^D(s), s\right) < \sum_i \pi_i\left(d^{FB}(s), s\right)$ when D has the decision right and $\sum_i \pi_i\left(d^M(s), s\right) < \sum_i \pi_i\left(d^{FB}(s), s\right)$ when M has the decision right, which is inefficient. QED.

Appendix 3B: Proof of Proposition 2

Suppose, first, that the implicit agreement requires M and D to sign a contract at stage 4. This agreement is self-enforcing if, and only if M (D) is better off paying

(accepting) $\tau^g(s)$ and earning the continuation payoff forever after than bargaining for $p^g(s)$ and earning the spot payoff forever after, that is, iff

$$-\tau^g(s)+\frac{1}{r}\left[M^{Rg}-w^g\right]\geq -p^g(s)+\frac{1}{r}M^{SP} \tag{3.4}$$

$$\tau^g(s)+\frac{1}{r}\left[D^{Rg}+w^g\right]\geq p^g(s)+\frac{1}{r}D^{SP} \tag{3.5}$$

for every $s\in S$. Conditions (3.4) and (3.5) are satisfied in every state only if they are satisfied in the state in which they are tightest. Summing up (3.4) and (3.5) for such state and rearranging yields the unique necessary conditions

$$\underset{s}{Max}\left\{\tau^M(s)-p^M(s)\right\}-\underset{s}{Min}\left\{\tau^M(s)-p^M(s)\right\}\leq\frac{1}{r}\left(S^{RM}-S^{SP}\right) \tag{3.6}$$

$$\underset{s}{Max}\left\{\tau^D(s)-p^D(s)\right\}-\underset{s}{Min}\left\{\tau^D(s)-p^D(s)\right\}\leq\frac{1}{r}\left(S^{RD}-S^{SP}\right) \tag{3.7}$$

depending on whether M (condition (3.6)) or D (condition (3.7)) has the decision right, respectively. These conditions are also sufficient for self-enforcement because, if they hold, one can use the fixed transfer w^g to insure that both parties' individual self-enforcement constraints hold as well (Baker *et al*. (2002), Levin (2003)).

Suppose, now, that the implicit agreement simply requires M (D) to pay (accept) $\tau^g(s)$ if $d^{FB}(s)$ is implemented, without need to sign a contract at stage 4. In this case, the party without decision right still has an opportunity to renege on the payment $\tau^g(s)$ once $d^{FB}(s)$ has been implemented, that is, between stage 4 and stage 5. When M has the decision right, this implicit agreement is self-enforcing if, and only if

(3.8) $$-\tau^{M}(s)+\frac{1}{r}\left[M^{RM}-w^{M}\right]\geq -p^{M}(s)+\frac{1}{r}M^{SP}$$

(3.9) $$\tau^{M}(s)+\frac{1}{r}\left[D^{RM}+w^{M}\right]\geq \frac{1}{r}D^{SP}$$

which yields the unique condition

(3.10) $$\underset{s}{Max}\left\{\tau^{M}(s)-p^{M}(s)\right\}-\underset{s}{Min}\left\{\tau^{M}(s)\right\}\leq \frac{1}{r}\left(S^{RM}-S^{SP}\right)$$

When D has the decision right, the implicit agreement is self-enforcing if, and only if

(3.11) $$-\tau^{D}(s)+\frac{1}{r}\left[M^{RD}-w^{D}\right]\geq \frac{1}{r}M^{SP}$$

(3.12) $$\tau^{D}(s)+\frac{1}{r}\left[D^{RD}+w^{D}\right]\geq p^{D}(s)+\frac{1}{r}D^{SP}$$

which yields the unique condition

(3.13) $$\underset{s}{Max}\left\{\tau^{D}(s)\right\}-\underset{s}{Min}\left\{\tau^{D}(s)-p^{D}(s)\right\}\leq \frac{1}{r}\left(S^{RD}-S^{SP}\right)$$

Condition (3.10) is tighter than (3.6), implying that, when M has the decision right, an implicit agreement that requires M and D to contract $\tau^{M}(s)$ and $d^{FB}(s)$ at stage 4 generates less reneging temptation than an implicit agreement that does not. Similarly, condition (3.13) is tighter than (3.7), implying that, when D has the decision right, an implicit agreement that requires M and D to contract $\tau^{D}(s)$ and $d^{FB}(s)$ at stage 4 generates less reneging temptation than an implicit agreement that does not. QED.

Bibliography

AGHION, P., and J. TIROLE, (1997), "Formal and Real Authority in Organizations," *Journal of Political Economy* 105: 1-29.

AGHION, P., and J. TIROLE, (1994), "The Management of Innovation," *Quarterly Journal of Economics* 109: 1185-1209.

ALCHIAN, A., and H. DEMSETZ, (1972), "Production, Information Costs and Economic Organization," *American Economic Review* 62: 777-795.

ARRUÑADA, B., (2000), "The Quasi-Judicial Role of Large Retailers: An Efficiency Hypothesis on their Relation with Suppliers," *Revue d'Economie Industrielle* 92: 277-296.

ARRUÑADA, B., L. GARICANO, and L. VÁZQUEZ, (2005), "Completing Contracts Ex Post: How Car Manufacturers Manage Car Dealers," *Review of Law and Economics* 1: 149-173.

ARRUÑADA, B., L. GARICANO, 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.

ARRUÑADA, B., L. VÁZQUEZ, and G. ZANARONE, (2008), "Institutional Constraints on Organizations: The Case of Spanish Car Dealerships," forthcoming in *Managerial and Decision Economics*.

BAI, C., and Z. TAO, (2000), "Contract Mixing in Franchising as a Mechanism for Public-Good Provision," *Journal of Economics and Management Strategy* 9: 85-113.

BAKER, G., R. GIBBONS, and K. J. MURPHY, (2008), "Strategic Alliances: Bridges between Islands of Conscious Power," unpublished manuscript, Harvard Business School.

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

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

BAKER, G., R. GIBBONS, and K. J. MURPHY, (1999), "Informal Authority in Organizations," *Journal of Law, Economics and Organization* 15: 56-73.

BAKER, G., and T. HUBBARD, (2004), "Contractibility and Asset Ownership: On-Board Computers and Governance in U.S. Trucking," *Quarterly Journal of Economics* 119: 1443-1479.

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

BRICKLEY, J., and F. DARK, (1987), "The Choice of Organizational Form: The Case of Franchising," *Journal of Financial Economics* 18: 401-420.

BRICKLEY, J., J. LINCK, and C. SMITH, (2003), "Boundaries of the Firm: Evidence from the Banking Industry," *Journal of Financial Economics* 70: 351-383.

BULL, C., (1987), "The Existence of Self-Enforcing Implicit Contracts," *Quarterly Journal of Economics* 102: 147-159.

COASE, R., (1937), "The Nature of the Firm," *Economica* 4: 386-405.

CORTS, K., (2007), "The Interaction of Implicit and Explicit Contracts in Construction and Procurement Contracting," unpublished manuscript, Rotman School of Management (http://www.rotman.utoronto.ca/kenneth.corts/implicit_explicit_june_07.pdf, accessed on April 15, 2008).

CORTS, K., and J. SINGH, (2004), "The Effect of Repeated Interaction on Contract Choice: Evidence from Offshore Drilling," *Journal of Law, Economics and Organization* 20: 230-260.

ELFENBEIN, D., and J. LERNER, (2003), "Ownership and Control Rights in Internet Portal Alliances," *RAND Journal of Economics* 34: 356-369.

FORBES JANUSZEWSKI, S., and M. LEDERMAN, (2008), "Adaptation and Vertical Integration in the Airline Industry," unpublished manuscript (http://weber.ucsd.edu/~sjanusze/www/FL_regionals.pdf, accessed on April 15, 2008).

GARVEY, G., (1995), "Why Reputation Favors Joint Ventures Over Vertical and Horizontal Integration: A Simple Model," *Journal of Economic Behavior and Organization* 28: 387-397.

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

GRANDORI, A., (2006), "Innovation, Uncertainty and Relational Governance," *Industry and Innovation* 13: 127-133.

GROSSMAN, S. J., and O. HART, (1986), "The Costs and Benefits of Ownership: a Theory of Vertical and Lateral Integration," *Journal of Political Economy* 94: 691-719.

HADFIELD, G., (1990), "Problematic Relations: Franchising and the Law of Incomplete Contracts," *Stanford Law Review* 42: 927-992.

HALONEN, M., (2002), "Reputation and the Allocation of Ownership," *Economic Journal* 112: 539-558.

HART, O., (2008), "Reference Points and the Theory of the Firm," forthcoming in *Economica*.

HART, O., (1995), "Firms, Contracts, and Financial Structure," Oxford: Oxford University Press.

HART, O., and B. HOLMSTROM (2002), "A Theory of Firm Scope," unpublished manuscript, Harvard University (http://econ-www.mit.edu/files/1078, accessed on April 15, 2008).

HART, O., and J. MOORE, (2008), "Contracts as Reference Points," *Quarterly Journal of Economics* 123: 1-48.

HART, O., and J. MOORE, (1990), "Property Rights and the Nature of the Firm," *Journal of Political Economy* 98: 1119-1158.

HOLMSTROM, B., (1999), "The Firm as a Subeconomy," *Journal of Law, Economics and Organization* 15: 74-102.

HOLMSTROM, B., and P. MILGROM, (1994), "The Firm as an Incentive System," *American Economic Review* 84: 972-991.

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

IPPOLITO, P., (1991), "Resale Price Maintenance: Economic Evidence from Litigation," *Journal of Law and Economics* 34: 263-294.

KLEIN, B., (2000), "The Role of Incomplete Contracts in Self-Enforcing Relationships," *Revue d'Economie Industrielle* 92: 67-80.

KLEIN, B., (1996), "Why Hold-Ups Occur: The Self-Enforcing Range of Contractual Relationships," *Economic Inquiry* 34: 444-463.

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., R. CRAWFORD, and A. ALCHIAN, (1978), "Vertical Integration, Appropriable Rents and the Competitive Contracting Process," *Journal of Law and Economics* 21: 297-326.

KLEIN, B., and K. M. MURPHY, (1997), "Vertical Integration as a Self-Enforcing Contractual Arrangement," *American Economic Review* 87: 415-420.

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

KRUEGER, A., (1991), "Ownership, Agency and Wages: An Examination of Franchising in the Fast-Food Industry," *Quarterly Journal of Economics* 106: 75-101.

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 E. Brousseau and J-M. Glachant (eds.), *The Economics of Contracts: Theories and Applications*. New York: Cambridge University Press, 315-336.

LAFONTAINE, F., and K. SHAW, (2005), "Targeting Managerial Control: Evidence from Franchising," *Rand Journal of Economics* 36: 131-150.

LAFONTAINE, F., and M. SLADE, (2008), "Exclusive Contracts and Vertical Restraints," in P. Buccirossi (ed.), *Handbook of Antitrust Economics*. Cambridge: MIT Press, 391-415.

LAFONTAINE, F., and M. SLADE, (2007), "Vertical Integration and Firm Boundaries: The Evidence," *Journal of Economic Literature* 45: 629-685.

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

LAFONTAINE, F., and M. SLADE, (1996), "Retail Contracting and Costly Monitoring: Theory and Evidence," *European Economic Review* 40: 923-932.

LERNER, J., and R. MERGES, (1998), "The Control of Technology Alliances: An Empirical Analysis of the Biotechnology Industry," *Journal of Industrial Economics* 46: 125-156.

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.

MACAULAY, S., (1963), "Non-Contractual Relations in Business: A Preliminary Study," *American Sociological Review* 28: 55-67.

MCNEIL, I., (1978), "Contracts: Adjustments of Long-Term Economic Relations under Classical, Neoclassical and Relational Contract Law" *Northwestern University Law Review* 72: 854-906.

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

MARVEL, H., and S. McCAFFERTY, (1984), "Resale Price Maintenance and Quality Certification," *RAND Journal of Economics* 15: 340-359.

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

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

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

MATHEWSON, F., and R. WINTER, (1984), "An Economic Theory of Vertical Restraints," *RAND Journal of Economics* 15: 27-38.

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

MATOUSCHEK, N., (2004), "Ex post Inefficiencies in a Property Rights Theory of the Firm," *Journal of Law, Economics and Organization* 20: 125-147.

MEESE, A., (2004), "Property Rights and Intrabrand Restraints," *Cornell Law Review* 89: 553-620.

NICKERSON, J., and B. SILVERMAN, (2003), "Why Aren't All Truck Drivers Owner-Operators? Asset Ownership and the Employment Relation in Interstate for-Hire Trucking," *Journal of Economics and Management Strategy* 12: 91-118.

REY, P., and J. TIROLE, (1987), "The Logic of Vertical Restraints," *American Economic Review* 76: 921-939.

REY, P., and T. VERGÉ, (2008), "The Economics of Vertical Restraints," in P. Buccirossi (ed.), *Handbook of Antitrust Economics*. Cambridge: MIT Press, 353-391.

SHEPARD, A., (1993), "Contractual Form, Retail Price and Assets Characteristics in Gasoline Retailing," *RAND Journal of Economics* 24: 58-77.

SIMON, H., (1951), "A Formal Theory of the Employment Relationship," *Econometrica* 19: 293-305.

SPENGLER, J., (1950), "Vertical Integration and Antitrust Policy," *Journal of Political Economy* 58: 347-352.

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: 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.

WHINSTON, J., (2003), "On the Transaction Cost Determinants of Vertical Integration," *Journal of Law, Economics and Organization* 19: 1-23.

WILLIAMSON, O., (2000), "The New Institutional Economics: Taking Stock, Looking Ahead," *Journal of Economic Literature* 38: 595-613.

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

WILLIAMSON, O., (1979), "Transaction Cost Economics: The Governance of Contractual Relations," *Journal of Law and Economics* 22: 233-261.

WILLIAMSON, O., (1971), "The Vertical Integration of Production: Market Failure Considerations," *American Economic Review* 61: 112-123.

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

WOODRUFF, C., (2002), "Non-Contractible Investments and Vertical Integration in the Mexican Footwear Industry," *International Journal of Industrial Organization* 20: 1197-1224.

YEAP., C., (2006), "Residual Claims and Incentives in Restaurant Chains," U.S. Census Bureau, Center for Economic Studies, Working Paper, no. CES 06-18.

ZANARONE, G., (2007a), "Vertical Restraints in Relational Contracts," unpublished manuscript (www.econ.upf.edu/~zanarone, accessed on April 15, 2008).

ZANARONE, G., (2007b), "The Role of Decision Rights in Incomplete Contracts: Lessons from Automobile Franchising," unpublished manuscript (www.econ.upf.edu/~zanarone, accessed on April 15, 2008).