# 5 Incentive and Strategic Contracting: Implications for the Franchise Decision[†]

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The modern theory of the internal organization of firms – the ownership, management, and structure of production – has its roots in the writings of Knight (1921) and Coase (1937). Knight emphasized the role of risk and uncertainty and the need to insure workers and consolidate managerial decision making, whereas Coase focused on the costs of transacting in different organizational environments, particularly the costs of writing contracts. Over time, these notions have been expanded and formalized. In the process, two distinct but related branches of literature have emerged. The first concentrates on the tradeoff that a principal must make between providing an agent or team of agents with insurance against risk and giving agents incentives to work efficiently, e.g., Alchian and Demsetz (1972), Mirrlees (1976), and Holmstrom (1982). The second emphasizes the market failures that accompany relationship-specific assets and the associated need to assign property and residual-decision rights correctly, e.g., Williamson (1971, 1979, 1983), Klein, Crawford, and Alchian (1978), Grossman and Hart (1986), and Hart and Moore (1990).

On the empirical side, efforts to test these theories have been channeled into areas that satisfy two criteria. First, the institutional regularities must correspond to the assumptions that underlie the theories and second, sufficient data must be available. Three areas that satisfy these constraints have received a large fraction of the attention of applied contract theorists:

executive compensation, sales-force and franchise contracting, and industrial procurement.

Executive-compensation packages provide a rich setting in which to test the insurance/incentive aspects of contract theory.[1] Incentive pay is a nontrivial fraction of top-management compensation, where it takes the form of, for example, performance-based bonuses, stock ownership, and options to purchase shares in the firm. Furthermore, the details of executive-compensation packages are often publicly available.

Incentive pay is less prevalent, however, for low-level managers and production workers inside the firm. Nevertheless, it surfaces at this level of the hierarchy in at least one area where it takes a somewhat different form.[2] Franchise contracting is a popular method of organization for retail markets. Rather than employ an agent to sell a product and give that agent high-powered incentives within the firm, companies often choose a less integrated form of organization that allows them to share their risks and profits with local managers or agents in a flexible way. In particular, principals can control the incentive/insurance tradeoff and minimize transaction costs by proper choice of contract terms. The principal's problem is thus whether to use internal or external salespeople and how to structure its contracts.

Finally, the theory of relationship-specific investment and the associated need to assign property rights has been most extensively tested in the area of input procurement.[3] When firms require specialized inputs that have higher value inside the buyer/seller relationship than in a more general market, they must decide if they will produce those inputs themselves or purchase them from an independent supplier. In the latter case, they must also decide whether to interact in a spot market or enter into a long-term contract. Moreover, the tradeoff between productive efficiency and the severity of the holdup problem can be dealt with through the choice of the terms of the procurement contract, specifically its length and flexibility.

In this chapter, we look at the second of the above areas of empirical research – franchise contracting and sales-force compensation – and we examine different aspects of the incentive/insurance tradeoff in that context. We review the empirical research that falls within the third area above in Lafontaine and Slade (2007).[4]

As this book is about applications of game theory, we note that the lion's share of theoretical and empirical work in the incentive-contracting

literature considers only vertical aspects of the contracting problem, ignoring horizontal competition. Recently, however, contract theorists and empiricists have attempted to integrate the two, notably in the context of retailing and the franchise decision. We therefore also discuss some models with endogenous prices. When prices are endogenous, it becomes important to specify who chooses each price, principal or agent. We explore the consequences of various assumptions concerning price setting in three different strategic environments. Unfortunately, the evidence that relates to strategic or game-theoretic agency models is scanty. Nevertheless, we discuss the findings from the few studies that we have been able to uncover.

Most studies of incentive contracting also adopt the assumption that the principal, who makes a take-it-or-leave it offer, has all of the bargaining power. There are, however, a few studies that examine the role of the agent in the bargaining game. These yield predictions concerning the effects of agent characteristics, and we briefly discuss the few studies that focus on these effects as well.

Throughout the chapter, we conduct our analyses in two ways. First, we construct the simplest theoretical model that is capable of capturing the effect of our focus. Second, we examine the empirical evidence from published studies that have assessed this aspect of the problem.

The theoretical models that we construct are based on the standard principal/agent paradigm. We make no effort to be theoretically sophisticated. Instead, we choose convenient functional forms that lead to definite solutions to the contracting problem. Furthermore, we construct models that involve only a few parameters, and we examine the models' comparative statics with respect to those parameters. Finally, we use the comparative statics from the theoretical exercise to organize our discussion of the empirical evidence.

The object of our exercise is to determine how well the simple theories perform in predicting the empirical regularities. It turns out that the empirical evidence is very consistent. In other words, coefficients from different studies that focus on a particular aspect of the contracting problem are usually of the same sign. This means that there is a set of stylized facts that should be explained. Unfortunately, the agreement between theoretical predictions and empirical regularities is less satisfactory than the robustness of the empirical findings. For this reason, when we discover that theory and evidence do not agree, we attempt to modify the simple model by

introducing neglected aspects of the problem that move the theory in the direction of the data.

The organization of the chapter is as follows. In the next section, we develop some background material on the environment in which franchising operates and the constraints that franchising data impose on empirical analyses.

In section 2, we decompose the contract choice into components that are amenable to econometric investigation. We make use of a standard agency model to organize our discussion of six aspects of the contracting problem and how each affects the choice of organizational form. These aspects are, in order of our discussion: local-market risk, the importance of the agent's effort, the size of the outlet, the difficulty of monitoring the agent, the importance of the principal's effort, and the division of the agent's effort across tasks. We model each of these factors with a different specification of the effort/sales relationship in an otherwise standard model, and then examine the relevant evidence. We conclude this section by discussing what is, in our view, an important regularity in the data, namely the fact that firms often apply the same contract terms across different individual situations or contexts. We then present results from studies that have relied on this uniformity to assess the effects of the factors above on the chosen contract terms rather than the choice of organizational form.

In section 3, we introduce endogenous prices and downward-sloping demand at the downstream or outlet level. In this context, the effort/output relationship becomes the demand function for the outlet. We develop three models that vary in strategic sophistication and we discuss factors that seem to fit each environment. These factors are: spillovers across units within a chain, the nature of product substitutability, and strategic delegation of the pricing decision.

In section 4, we turn briefly to the agent's role in the contracting problem, which we cast in the context of a cooperative bargaining game. We also discuss the few studies that have attempted to assess contract choice from the agent's point of view. Section 5 summarizes and concludes.

## 1. Background

Manufacturers of retail products must decide whether to sell their products to consumers themselves (vertical integration) or to sell via independent retailers (vertical separation). When manufacturers do not perform the sales

function internally, but want exclusive retailers, they choose some form of franchising or employ an independent sales force.

Within the realm of franchising, there are two commonly used modes. Traditional franchising, which involves an upstream producer and a downstream reseller (e.g., gasoline), accounts for the larger fraction of sales revenues from franchised businesses. Business-format franchising, however, is the form of franchising that accounts for the bulk of both establishments and employment (see e.g. Kosova and Lafontaine, 2012, for an overview of recent U.S. census data on franchising). With this form of franchising, the franchisor provides a trademark, a marketing strategy, and quality control to the franchisee in exchange for royalty payments and up-front fees. Production, however, usually takes place at the retail outlet (e.g., fast-food).[5]

Not all sales agents that are separated from the parent firm are franchisees. Some industrial companies choose between an internal sales force, which is known as "direct" sales, and an external sales representative, often called a dealer. A manufacturer's external sales representative is an independent business entity that offers selling services and earns profits on realized sales. This agency or dealer typically serves a number of non-competing manufacturers whose products form a package or product line. However, the agent is normally each principal's exclusive representative for a designated set of customers.

Both the use of franchising and external sales forces normally involve some form of profit and risk sharing. As a consequence, much of the agency-theoretic literature in the retail-contracting area focuses on explaining the size of the share parameter in a franchise or sales-force contract, where the share parameter determines the partition of residual-claimancy rights between principal and agent. In particular, the literature shows how this parameter should vary as a function of the specific characteristics of the agent, the principal, the outlet, and the market.[6]

In real-world markets, in contrast, instead of offering contracts tailored to the characteristics of each unit, location, and agent, most firms employ a limited set of contracts, often just two — a separated and an integrated contract. In doing this, they reduce the problem of choosing the contract terms for any particular case from a continuum of options to a simpler dichotomous choice.[7] And indeed, much of the empirical literature has analyzed this dichotomous choice between company operation or in-house sales force (vertical integration, which is associated with lower-powered

incentives) and franchising or sales representatives (vertical separation, which is associated with higher-powered incentives) using arguments that were developed to explain how firms should choose the terms of their contracts. In what follows, we focus mostly on the findings from the literature that examines this dichotomy. However, at the end of Section 2, we provide a model to explain why firms employ standard contracts, and discuss in some detail how the dichotomous choice between separation and integration then relates to the issue of high- and low-powered incentives within contracts. We also discuss the more limited literature on the determinants of the terms of franchise contracts at that point.

Our analysis of the empirical evidence concerning retail contracting makes use of two sorts of studies. Data for the first sort are at the level of the upstream firm (or sector) and describe the extent to which managers choose to contract out (i.e., their proportion of franchised units). These data are most often cross sections of either a large number of firms from a broad range of industries or from a number of narrowly defined retail sectors.[8] Data for the second type are either at the level of the downstream unit or the sales force in a district and refer to whether this unit is integrated with the upstream firm. These data are typically cross sections from a few upstream firms in a single industry.[9] In other words, with the first type of study, an observation is an upstream firm, whereas with the second, it is an establishment or a contract. The two sets of studies also differ in that the first involves mostly business-format franchising, whereas the second includes many industries in which the principal is a manufacturer.

Tables 1 to 6 summarize the findings of studies that assess the choice between integration and separation. In all these tables, the signs in the final columns show the observed effect of a variable of interest on the tendency towards vertical separation. A minus sign thus indicates a negative correlation with the extent of franchising in a chain or with the use of "separated" sales representatives in the sales-force-integration problem. Moreover, in all tables, an asterisk next to a plus or minus sign indicates that the finding is statistically significant at the 0.05 level based on a two-tailed test.

In what follows, each table is discussed in the subsection that presents the corresponding theory. One should be aware that the authors of the empirical studies do not always interpret their results in the way that we do. However, since we try to organize the empirical evidence using the framework of our model, we make no attempt to reconcile their interpretations and ours.

## 2. Incentive Factors and Contract Choice

*The Basic Model*

We have identified six factors that frequently surface in empirical investigations of the determinants of retail contracting. These factors are not necessarily the most important, since the list is constrained by considerations of measurability and data availability. To illustrate, the agent's degree of risk aversion plays an important role in the theoretical incentive-contracting literature. Unfortunately, from an empirical standpoint, it has been virtually impossible to measure this factor directly. The few studies that have tried to assess the effect of this factor have focused on contract terms. We discuss these at the end of Section 2.

In performing our analysis, we start from the following standard principal/agent model. An agent exerts an effort level, $a$, that results in an outcome, $q$, according to the relationship

$$q = f(a, \varepsilon, \Theta), \qquad \varepsilon \sim N\left(0, \sigma^2\right). \tag{1}$$

In equation (1), $a$ is agent effort, $\varepsilon$ is a random variable that reflects risk, and $\Theta$ is a vector of parameters. We identify the outcome, $q$, with sales, which is indistinguishable from sales revenue since we normalize product price to one (with some exceptions, clearly noted). The functional form of $f(.)$ will vary depending on the aspect of the incentive-contracting problem that we examine. Indeed, it is our principal method of distinguishing the various factors whose effects we analyze below.[10]

The agent bears a private cost of effort, $C(a) = a^2/2$, and receives utility from his income $y$, $u(y) = -\exp(-ry)$, where $r$ is his coefficient of absolute risk aversion. It is well known that in this setup, the agent behaves as if he were maximizing his certainty-equivalent income, $CE$, which is $\mathrm{E}(y) - (r/2)\mathrm{Var}(y)$, where E is the expectation operator, and Var is the variance function.

The risk-neutral principal offers the agent a contract, $s(q) = \alpha q + W$, where $\alpha$ is a commission rate, and $W$ is a fixed wage. In other words, $\alpha q$ is the agent's incentive pay, whereas $W$ is his guaranteed income. One can write the contract in an alternative but equivalent form that corresponds more closely to a business-format franchise contract by expressing the agent's payment as $s(q) = (1-\rho)q - F$, where $F$ is the franchise fee, and $\rho$ is the

royalty rate. As we want our model to describe both types of franchising as well as industrial salesforce compensation, we choose to use the former notation (with one exception, also clearly noted). Then, the agent's income net of the cost of effort is $y = \alpha q + W - a^2/2$.

The parameter $\alpha$ plays a key role in the analysis as it represents the agent's share of residual claims. Two limit cases are of special interest. When $\alpha = 0$, the agent is a salaried employee who is perfectly insured, whereas when $\alpha = 1$, the agent is the residual claimant who bears all of the risk. One expects that, in general, $0 \le \alpha \le 1$. We identify $\alpha$ with the power of the agent's incentives. Moreover, we assume that inside the firm these incentives are low, whereas the contracts that are written with non-employees are higher powered. In theory, this need not be the case.[11] In practice, however, it is a strong empirical regularity.[12]

Per our description above, we also restrict attention to linear contracts.[13] Clearly, linearity is associated with mathematical tractability, which is desirable from our point of view. Optimal contracts, however, are rarely linear. Nevertheless, linearity is the rule, not the exception, when one examines the contracts that are written in real-world situations.[14]

We do not attempt to explain these two observed phenomena — lower-powered incentives inside firms and linear contracts. Instead, we take them as empirical regularities that can be used to simplify the model. Furthermore, as a way to focus the chapter more specifically on the theories and factors of interest, we relegate most of the mathematical derivations to the appendix.

We now turn to the factors of interest, the first of which is local-market risk.

*Local-Market Risk*

One can use the simplest possible form of the effort/sales relationship to capture the effect that risk has on the form of the agent's contract. Specifically, let

$$q = a + \varepsilon. \qquad (2)$$

The random variable, $\varepsilon$, is a proxy for either demand or supply uncertainty. In other words, one can interpret (2) as a demand equation (with price suppressed) where the role of effort is to increase sales. On the other hand, one can view (2) as an effort/output production function.[15]

With this form of the effort/sales function, the agent's certainty-equivalent income is given by

$$CE = \alpha a + W - \frac{a^2}{2} - \frac{r}{2}\alpha^2\sigma^2, \tag{3}$$

where the last term, $-(r/2)\mathrm{Var}(y)$, is the agent's risk premium. Given a contract ($\alpha$, $W$), the agent will choose effort to maximize equation (3), which leads to the first-order condition:

$$a = \alpha. \tag{4}$$

The principal is assumed to maximize the total surplus, which she can extract from the agent with the fixed payment, $W$. Alternatively, $W$ can be used to divide the surplus between principal and agent when some rent is left downstream.[16] We do not model the choice of $W$, which we leave intentionally vague. Then, the principal's problem is to

$$\max_{\propto, a}\left[a - \frac{a^2}{2} - \left(\frac{r}{2}\right)\propto^2 \sigma^2\right] \tag{5}$$

subject to the agent's incentive constraint (4), and a participation constraint that we also do not model.[17]

After equation (4) is substituted into equation (5), the first-order condition for the maximization of (5) with respect to $\alpha$ shows that, in the optimal contract,

$$\alpha^* = \frac{1}{1 + r\sigma^2}. \tag{6}$$

Equation (6) implies that when either risk or the agent's degree of risk aversion increases, $\alpha^*$ falls.

The standard agency model of retail contracting therefore suggests that, as the level of uncertainty increases, so does the cost of agent insurance and thus the desirability of lower-powered incentives, which in the empirical literature translates to a prediction of vertical integration. In other words, the firm will choose to integrate its retail activities more when facing more

uncertainty because the higher-powered incentives used outside the firm expose the agent to the vagaries of the market, and the risk premium that the firm must pay consequently rises.

The notion of uncertainty or risk that is relevant in this context is the risk that is borne by the agent, not by the manufacturer. In other words, it is risk at the outlet or downstream level. Unfortunately, data that measure outlet risk are virtually nonexistent. For this reason, imperfect proxies are employed. The two most common are some measure of variation in detrended sales per outlet, and some measure of failure rate, namely the fraction of outlets that have been discontinued in a particular period of time.[18] Furthermore, data are more often available at the level of the sector rather than at the level of the franchisor or upstream firm. While this is an advantage from the point of view of resolving endogeneity issues, it can be a disadvantage if firm and sector risks are likely to be very different.

Table 1 gives the details of studies that assess the role of risk in determining the tendency towards franchising (i.e., vertical separation). In all but two of these studies, contrary to prediction, increased risk leads to more franchising (increased separation). Moreover, this positive association does not depend on the measure of risk that is used. These results suggest a robust pattern that is unsupportive of the standard agency model.[19]

The finding that risk is positively associated with vertical separation in the data is indeed a puzzle. Moreover, if we allowed effort to interact with risk in the model, we would only make matters worse: with such specifications, increased incentives can cause effort to fall, making high-powered incentives particularly costly to the principal, and thus especially undesirable.

Early literature, e.g. Martin (1988), concluded from this that franchisors shed risk onto franchisees. This could be optimal if franchisors were more risk averse than franchisees. However, if franchisors were indeed more risk averse, there would be less need to balance franchisee incentive and insurance needs, and hence less need to use a share contract to start with. At the extreme, franchising would involve franchisees paying only lump-sum fees to franchisors, a situation that is rarely observed in practice.

Table 1: Risk and the Propensity to Contract Out

| Author | Year | Data | Measure | % Contracted |
|---|---|---|---|---|
| Anderson & Schmittlein | 1984 | Electronics Components by Product Line and Territory | % Forecast Error of Product-Line Sales by Territory | + |
| John & Weitz | 1988 | Industrial Firms with Sales above $50 million | Index Capturing Environmental Uncertainty | – |
| Martin | 1988 | Sectoral Panel — All US Franchising | Coefficient of Variation of Detrended Sectoral Sales | +* |
| Norton | 1988 | Restaurants and Motels by State & Sector | Variance of Detrended % Change in Sectoral Sales by State | +* |
| Lafontaine | 1992 | Bus. Format Franchising Firms from All Sectors | Fraction of Outlets Discontinued in Sector | +* |
| Lafontaine & Bhattacharyya (1) | 1995 | Bus. Format Franchising Firms from All Sectors | Sales Dispersion<br>Fraction of Outlets Discontinued in Sector | +<br>+ |
| Maruyana & Yamashita | 2010 | Bus. Format Franchising Firms from All Sectors in Japan | Chain-specific coefficient of variation of sales per outlet | - |

Note: * indicates a result that is significant at the 0.05 level based on a two-tailed test.
(1): Based on descriptive statistics, not regression analyses.

An alternative, and we believe more satisfactory, explanation for the observed risk/franchising phenomenon surfaces when one considers that market uncertainty can be endogenous and that the power of incentives can influence sales variability. Indeed, franchisees often have superior information concerning local-market conditions (separate from $\varepsilon$). Moreover, since franchising gives retailers greater incentives to react to these conditions, one is likely to find more sales variability across franchised than across company-owned units. In that sense, the positive relationship between risk and franchising can be understood as support for incentive-based arguments for franchising, to which we now turn. [20]

### *Agent or Franchisee Effort*

Not all agents are equally important in determining the success or failure of a retail outlet. For example, consider the case of gasoline retailing. Some station operators are merely cashiers who sit in kiosks and collect payment from customers. Others, in contrast, offer a range of services that can

include pumping gas, washing windows, checking oil, selling tires, batteries, and other automobile-related items, and repairing cars. Still others manage affiliated convenience stores.

To capture the notion that there are varying degrees of agent importance, we amend the effort/sales function as follows,

$$q = \eta a + \varepsilon, \tag{7}$$

while keeping the rest of the model intact. In equation (7), the parameter $\eta$, which is positive by assumption, is a proxy for the importance of the agent's effort in the sales production function.

After performing the same set of calculations as in the previous subsection, one finds that, with the new effort/sales function,

$$\alpha^* = \frac{\eta^2}{\eta^2 + r\sigma^2}. \tag{8}$$

Moreover, differentiating (8) with respect to $\eta$ shows that $d\alpha^*/d\eta > 0$. The theory thus predicts that increases in the importance of the agent's effort should be associated with more separation and higher-powered contracts. In other words, when the agent's job is more entrepreneurial in nature, his payment should reflect this fact.

From a practical point of view, the measures that have been used to capture this effect have been determined both by data availability and by the industry being studied. Proxies for the importance of the agent's effort (or its inverse) have included measures of labor intensity (either employees/sales or capital/labor ratios) as the agent is the one who must oversee the provision of labor.[21] Researchers have also used a measure of the agent's value added, or discretion over input choices, and a variable that captures whether previous experience in the business is required. Finally, studies of gasoline retailing have relied on the presence or number of service bays, and on a dummy variable that distinguishes full from self service, to capture this effect.

Table 2 summarizes the results from studies that have assessed the effect of the importance of the agent's effort. With one exception, in all cases where the coefficient of the importance of the agent's effort variable is statistically significant, its relationship with separation from the parent company is

positive, as predicted by standard agency considerations and other incentive-based arguments. In other words, when the agent's effort plays a more significant role in determining sales, franchising is more likely.

Table 2: The Effect of the Importance of the Agent's Effort on the Propensity to Contract Out

| Author | Year | Data | Measure | % Contracted |
|---|---|---|---|---|
| Caves and Murphy | 1976 | Sectoral Data | "Personalized Service" Dummy Var. | +* |
| Norton | 1988 | Restaurants and Motels by State & Sector | Employees/Sales | +* |
| Lafontaine | 1992 | Bus. Format Franchising Firms from All Sectors | 1- (Sales - Franchisor Inputs) / Sales for Sector | + |
| | | | 2- Previous Experience Required | – |
| Shepard | 1993 | Gasoline Service Stations in Massachusetts | Full Service | + |
| | | | Presence of Service Bays | +* |
| Scott | 1995 | Bus. Format Franchising Firms from All Sectors | Capital/labor Ratio | (–*) |
| Maness (1) | 1996 | Various Retail Chains | Control over Costs | + |
| Slade | 1996 | Gasoline Service Stations in Vancouver | Full Service | +* |
| | | | Presence of Service Bays | +* |
| Blass and Carlton | 2001 | National database of newly constructed gasoline stations in US | Number of Service Bays | +* |
| Lafontaine and Shaw | 2005 | Established Bus. Format Franchising Firms from All Sectors | Previous Experience Required | –* |
| Maruyana & Yamashita | 2010 | Bus. Format Franchising Firms from All Sectors in Japan | Franchisee's Value Added | +* |

Notes: Parentheses in the last column indicate that the variable is an inverse measure of agent effort and is therefore expected to have a sign opposite to the others. * indicates a result that is significant in the original study at the 0.05 level based on a two-tailed test.

(1): Provides descriptive evidence only.

### *Outlet Size*

Modeling the effect of outlet size is less straightforward than for the previous two factors, and model predictions are more sensitive to

specification as a consequence. We confess that the particular specification that we adopt was chosen so that results are consistent with the empirical regularity that we present below. Indeed, it is necessary that we model outlet size as interacting with risk in order to obtain our prediction.[22] With this caveat, we specify the effort/sales relationship as a production function whose arguments are franchisee effort, $a$, and outlet size or capital, $k$,

$$q = \eta a + (\gamma + \varepsilon)k. \tag{9}$$

All other assumptions are as before.

There are two things to note about equation (9). The parameter $\gamma$ measures the direct effect of capital in the production function, whereas $k$ is a proxy for the amount of capital invested. Furthermore, our specification assumes that a larger outlet is associated with increased agent risk. This does not mean that the market is riskier *per se*; it simply means that more capital is subject to the same degree of risk.

After the standard set of manipulations, we obtain

$$\alpha^* = \frac{\eta^2}{\eta^2 + r\sigma^2 k^2}. \tag{10}$$

Note that $\gamma$ does not appear in this solution. Thus outlet size, if it enters the production function in an additive way, has no effect on optimal contract terms. However, when interacted with risk, $k$ does matter. In other words, the amount of capital invested in the outlet rather than its importance in determining sales directly is what matters here.

Furthermore, differentiating $\alpha^*$ with respect to $k$ yields a negative relationship, which implies that the agent should be given lower-powered incentives when the size of the capital outlay increases. This presumes that it is the agent's capital, not the principal's, that is at risk. In other words, the larger the outlet, the more capital the franchisee has at stake and the more insurance he requires.[23] Thus the solution implies a lower share for the agent, or more vertical integration. Furthermore, vertical integration in this context has the added advantage that it substitutes the principal's capital for the agent's.

Unlike the factors discussed above, the measurement of outlet size is fairly straightforward. Common measures have included average sales per outlet and the initial investment required. Table 3 shows that, with only two exceptions, greater outlet size is associated with less separation or increased company ownership. In other words, as the model above predicts, people responsible for large outlets tend to be company employees who receive low-powered incentives.[24]

It is comforting to see that theory and evidence agree. Nevertheless, as noted above, it is possible to argue for the opposite relationship in an equally convincing manner. Indeed, when an outlet is large, the agent has more responsibility. For this reason, outlet size has been used in the empirical literature as a measure of the importance of the agent's input. Not surprisingly then, it is often claimed that an agency model should predict that an increase in size will be associated with more separation and higher-powered incentives (see note 21). Furthermore, as shown in Gal-Or (1995), in a model with spillovers across units of the same chain, smaller outlets have a greater tendency to free ride since outlets with larger market shares internalize more of the externality. In this type of model, small units would be more likely to be vertically integrated.[25] The data, however, contradict this prediction.

Table 3: The Effect of Outlet Size on the Propensity to Contract Out

| Author | Year | Data | Measure | % Contracted |
|---|---|---|---|---|
| Brickley & Dark | 1987 | Selected Franchising Firms | Initial Investment | –* |
| Norton | 1988 | State Level Sectoral Data for Restaurants and Motels | Sales/Outlet | +* |
| Martin | 1988 | Sectoral Panel | Sales/Outlet | –* |
| Brickley, Dark and Weisbach | 1991 | 1- State Level Sectoral Data<br>2- Outlet Data from 36 Chains | Initial Investment<br>Initial Investment | –*<br>–* |
| Lafontaine | 1992 | Bus. Format Franchising Firms from All Sectors | 1- Initial Investment<br>2- Sales/Outlet for Sector | –*<br>–* |
| Thompson | 1994 | Bus. Format Franchising Firms from All Sectors | Initial Investment | –* |
| Scott | 1995 | Bus. Format Franchising Firms from All Sectors | Initial Investment | – |
| Kehoe | 1996 | Individual Hotels from 11 Major Chains | Number of Rooms | –* |
| Slade | 1996 | Gasoline Service Stations in Vancouver | Sales Volume | + |
| Brickley | 1999 | Franchised chains from different industries | Investment required | – |
| Blass and Carlton | 2001 | National database of newly constructed gasoline service stations in US | Sales Volume | –* |
| Lafontaine and Shaw | 2005 | Established Bus. Format Franchising Firms from All Sectors | Number of Employees<br>Investment Required | –*<br>–* |
| Maruyana & Yamashita | 2010 | Bus. Format Franchising Firms from All Sectors in Japan | Sales/Outlet | – |

Note: * indicates a result that is significant in the original study at the 0.05 level based on a two-tailed test.

### *Costly Monitoring*[26]

The idea that monitoring the agent's effort can be costly or difficult for the principal is central to the incentive-based contracting literature. In fact, if monitoring were costless and effort contractible, there would be no need for incentive pay. The agent's effort level would be known to the principal with certainty, and a contract of the following form could be offered: If the agent

worked at least as hard as the first-best effort level, he would receive a salary that compensated him for his effort, whereas if his effort fell short of this level, he would receive nothing.[27] In equilibrium, the agent would be fully insured, and the first-best outcome would be achieved.

Given the centrality of the notion of costly monitoring, it is somewhat surprising that there exists confusion in the literature concerning the effect of an increase in monitoring cost on the tendency towards company operation. For example, consider the following statements from the empirical literature:

> *The likelihood of integration should increase with the difficulty of monitoring performance.*
> Anderson and Schmittlein (1984, p. 388).

> *Franchised units (as opposed to vertical integration) will be observed where the cost of monitoring is high.*
> Brickley and Dark (1987, p. 408), text in parentheses added.

These contradictory statements imply that monitoring difficulties should both encourage and discourage vertical integration.

To reconcile these predictions, we modify the standard agency model to include the possibility that the principal can use not only outcome (i.e., sales) information to infer something about the agent's effort, but also a direct signal of the agent's effort.[28] Furthermore, the principal can base the agent's compensation on both signals.

We consider two types of signals because, in most real-world manufacturer-retailer relationships, it is possible to supervise the actions of a retailer directly by, for example, testing food quality, assessing the cleanliness of the unit, and determining work hours.[29] This direct supervision provides the manufacturer with information on retailer effort that supplements the information contained in sales data. In general, the informativeness principle (Holmstrom (1979), Milgrom and Roberts (1992, p. 219)) suggests that compensation should be based on both sales data and signals of effort obtained via direct monitoring.

To model this situation, we replace the effort/sales relationship (1) with two functions to denote the fact that the principal receives two noisy signals of the agent's effort.[30] First, the principal observes retail sales of the product, $q$, and second, the principal receives a direct signal of effort, $e$,

$$\begin{aligned} q &= a + \varepsilon_1 \\ e &= a + \varepsilon_2 \end{aligned} \qquad \varepsilon \sim N(0, \Sigma) \tag{11}$$

where $\varepsilon = (\varepsilon_1, \varepsilon_2)^T$, $\Sigma = (\sigma_{ij})$, $\sigma_{ij} = \sigma_{ji}$, and $\sigma_{ii} > \sigma_{ij}$, $i = 1,2$, $j \neq i$.

The principal offers the agent a contract that includes, in addition to the fixed wage $W$, an outcome-based or sales commission rate, $\alpha_1$, and a behavior-based commission rate, $\alpha_2$, related to the direct signal of effort. The agent's certainty-equivalent income is then given by $(\alpha_1 + \alpha_2)a + W - a^2/2 - (r/2)\alpha^T \Sigma \alpha$, where $\alpha$ is the vector of commission rates, $\alpha = (\alpha_1, \alpha_2)^T$. The agent's incentive constraint for this problem is $a = \alpha_1 + \alpha_2$.

As before, the risk-neutral principal chooses the agent's effort and the commission vector to maximize the total surplus subject to the agent's incentive constraint. When the two first-order conditions for this problem are solved, they yield

$$\alpha_1^* = \frac{\sigma_{22} - \sigma_{12}}{\sigma_{11} + \sigma_{22} - 2\sigma_{12} + r\left(\sigma_{11}\sigma_{22} - \sigma_{12}^2\right)}, \tag{12}(a)$$

and

$$\alpha_2^* = \frac{\sigma_{11} - \sigma_{12}}{\sigma_{11} + \sigma_{22} - 2\sigma_{12} + r\left(\sigma_{11}\sigma_{22} - \sigma_{12}^2\right)}. \tag{12}(b)$$

When the noisy signals are uncorrelated, so that $\sigma_{ij} = 0$, equation (12) takes the simpler form

$$\alpha_1^* = \frac{1}{1 + r\sigma_{11} + \sigma_{11}/\sigma_{22}}, \tag{13}(a)$$

and

$$\alpha_2^* = \frac{1}{1 + r\sigma_{22} + \sigma_{22}/\sigma_{11}}. \tag{13}(b)$$

In this form, the solution shows that the optimal contract described in equation (6) must now be amended to account for the relative precision of the two signals. In other words, the new optimal compensation package places relatively more weight on the signal with the smaller variance. Thus equation (6) is a special case of (13)(a) in which $\sigma_{22}$ is infinite (direct monitoring contains no information).

We are interested in the effect of increases in the two sorts of uncertainty on the size of $\alpha_1^*$ since this is the incentive-based pay that appears in the data. Differentiating equation (12)(a) with respect to the two variances shows that $\partial\alpha_1^*/\partial\sigma_{11} < 0$ and $\partial\alpha_1^*/\partial\sigma_{22} > 0$. Increases in the precision of sales data $(1/\sigma_{11})$ thus lead to a higher reliance on outcome-based compensation (higher $\alpha_1^*$) which corresponds to less vertical integration. However, increases in the precision of the direct signal of effort $(1/\sigma_{22})$ lead to less outcome-based compensation (lower $\alpha_1^*$), i.e. more vertical integration.

While the above model does not explicitly include monitoring costs, it should be clear that if the upstream firm can choose some action that reduces $\sigma_{11}$ (increases the precision of sales as a signal of effort) at some cost, it will do so to a greater extent the lower this cost is. The resulting decrease in $\sigma_{11}$ will in turn lead to a greater reliance on sales data in the compensation scheme. In other words, when the cost of increasing the precision of sales data as an indicator of effort is low, we should observe more reliance on sales data in the compensation scheme, which means less vertical integration. On the other hand, when the cost of behavior monitoring, or of reducing $\sigma_{22}$, is low, the firm will perform more of this type of monitoring. A low $\sigma_{22}$ will then lead the firm to choose a lower $\alpha_1$, which amounts to more vertical integration.[31]

To summarize, in this version of the model, the effect of monitoring costs on the degree of vertical integration depends on the type of information garnered by the firm in the process. If monitoring improves the precision of a direct signal of effort, this reduces the need to use sales-based incentive contracting. If, on the other hand, monitoring increases the precision of sales data as a signal of agent effort, it makes incentive contracting more attractive.

Turning to the empirical evidence, we separate the studies in two groups in Table 4 based on their interpretation of monitoring costs. The first part of the table shows results obtained in the sales-force compensation literature,

where the focus has been on the usefulness of observed sales data as an indicator of agent effort. The second part of Table 4 contains empirical results from the franchising literature, where authors have focused on the cost of behavior monitoring.

In the first part of the table, in the first two studies, researchers asked managers to respond to various statements: In Anderson and Schmittlein (1984), they responded to "it is very difficult to measure equitably the results of individual salespeople" while in Anderson (1985), the measure was tabulated from responses to "(1) team sales are common, (2) sales and cost records tend to be inaccurate at the individual level, and (3) mere sales volumes and cost figures are not enough to make a fair evaluation." In John and Weitz (1988), the length of the selling cycle was used on the basis that a long lag between actions and market responses makes it difficult to attribute output to effort. In addition, these authors included a measure of environmental uncertainty, which captures the extent to which agents "control" sales outcomes. Using survey responses as measures of the cost of monitoring sales and inferring agent effort from sales data, researchers have found that higher monitoring costs lead to more vertical integration, as predicted by the model above.

Table 4, Part I: The Effect of Monitoring Difficulty
on the Propensity to Contract Out

| Author | Year | Data | Measure | % Contracted |
|---|---|---|---|---|
| Anderson & Schmittlein | 1984 | Electronics Components by Product Line and Territory | Index indicating that it is difficult to measure results of individuals | –* |
| Anderson | 1985 | Electronics Components by Product Line and Territory | Index indicating that 1) team sales are common, 2) records are inaccurate and 3) sales and cost figures are insufficient for a fair evaluation | –* |
| | | | Importance of non-selling activities | –* |
| John & Weitz | 1988 | Industrial Firms with Sales above $50 million | Length of Selling Cycle | –* |

Note: * indicates a result that is significant in the original study at the 0.05 level based on a two-tailed test.

In part II of Table 4, we include studies where authors have used a variety of measures of behavior-monitoring costs, including some notion of

geographical dispersion (captured in one case by whether the unit is more likely to be in a mostly urban or rural area) or distance from monitoring headquarters. These measures are proxies for the cost of sending a company representative to visit the unit to obtain data on cleanliness, product quality, etc. Outlet density has also been used as an inverse measure of such behavior-monitoring cost. One can see that when behavior-monitoring costs are measured in these ways, in all cases where coefficients are significant, higher monitoring costs lead to more vertical separation. This reflects the fact that when behavior monitoring is costly, firms rely on it less, and rely more on residual claims to compensate their agents. Again the evidence is consistent with the model.

It should be clear then that the two types of measures used in the empirical literature have captured different types of monitoring costs: those related to the fit of sales data to individual effort versus those that relate to information that serves as a substitute for sales data. Taking this difference into account, the seemingly contradictory results obtained and claims made by researchers are in fact consistent with each other as well as with standard downstream incentive arguments for retail contracting.

Table 4, Part II: The Effect of Monitoring Difficulty
on the Propensity to Contract Out

| Author | Year | Data | Measure | % Contracted |
|---|---|---|---|---|
| Brickley & Dark | 1987 | Selected Franchising Firms | Distance From Monitoring Headquarters | +* |
| Norton | 1988 | Restaurants and Motels by State & Sector | Fraction of State Population Rural | +* |
| Minkler | 1990 | Taco Bell Restaurants in Northern California and Western Nevada | 1- Distance From Monitoring Headquarters<br>2- Outlet Density = Number of Outlets within a 5 Mile Radius | +*<br>(+) |
| Brickley, Dark and Weisbach | 1991 | 1- State Level Sectoral Data<br>2- Outlet Data from 36 Chains | Density: Units per Square Mile<br>Density: Company's Units in County | (–*)<br>(–*) |
| Carney and Gedajlovic | 1991 | Canadian Bus. Format Franchising Firms from all Sectors | Density: Proportion of Outlets in Quebec | (–*) |
| Lafontaine | 1992 | Bus. Format Franchising Firms from All Sectors | Number of States in which the Chain has Established Outlets | +* |
| Scott | 1995 | Bus. Format Franchising Firms from All Sectors | Number of States in which the chain has established outlets | +* |
| Kehoe | 1996 | Individual Hotels from 11 Major Chains | Density: Number of Hotels from the Same Chain in Same City | (–*) |
| Lafontaine and Shaw | 2005 | Established Bus. Format Franchising Firms from All Sectors | Number of States the Chain Operates in | +* |

Notes: Parentheses in the last column indicate that the relevant variable is an inverse measure of monitoring cost and is therefore expected to have a sign opposite to the others. * indicates a result that is significant in the original study at the 0.05 level based on a two-tailed test.

### *Principal or Franchisor Effort*

The standard agency model assumes, as we have so far, that only one party, the agent, provides effort in the production (or sales-generation) process. In reality, success at the retail level often depends importantly on the behavior of the upstream firm or principal. For example, franchisees expect their franchisors to exert effort towards maintaining the value of the trade name under which they operate, via advertising and promotions, as well as screening and policing other franchisees in the chain. If this behavior is not easily assessed by the franchisee, there is moral hazard on both sides — the

franchisee's and the franchisor's — and the franchisor, like the franchisee, must be given incentives to perform.[32]

To capture the effect of franchisor effort on the optimal contract, we amend the effort/sales relationship to include not only franchisee effort, *a*, but also franchisor effort, *b*,

$$q = \eta a + \theta b + \varepsilon, \tag{14}$$

where the parameter $\theta > 0$ is a proxy for the importance of the franchisor's effort. Assume that the franchisor's private cost of effort is $C(b) = b^2 / 2$, the same functional form we assumed for the franchisee. The franchisor still chooses the share parameter, $\alpha$, in the first stage, but now the contract must satisfy incentive compatibility for both parties. As before, the first-order condition for the franchisee's effort gives $a = \alpha \eta$. In turn, the first-order condition for the franchisor's choice of effort is $b = (1 - \alpha)\theta$. Substituting these into the total surplus function, one obtains the optimal share parameter

$$\alpha^* = \frac{\eta^2}{\eta^2 + \theta^2 + r\sigma^2}. \tag{15}$$

Differentiating $\alpha^*$ with respect to $\eta$ shows that the optimal share, or the extent of vertical separation, still goes up as the franchisee's input becomes more important. However, differentiating $\alpha^*$ with respect to $\theta$ yields the opposite effect. When the input of the franchisor becomes more important, her share of output, $(1 - \alpha^*)$, or the extent of vertical integration, must rise.

Table 5 shows the results of studies that consider how the importance of the franchisor's inputs affects the optimal contract choice. The importance of these inputs is measured by the value of the trade name (proxied by the number of outlets in the chain or the difference between the market and the book value of equity), the amount of training or advertising provided by the franchisor, or the number of years spent developing the business format prior to franchising. The table shows that, in all cases where franchisor inputs are more important, less vertical separation is observed, as predicted.

Table 5: The Effect of the Importance of the
Franchisor's Effort on the Propensity to Contract Out

| Author | Year | Data | Measure | % Contracted |
|---|---|---|---|---|
| Lafontaine | 1992 | Bus. Format Franchising Firms from All Sectors | 1- Weeks of Training<br>2- Lagged No. of Outlets<br>3- % Time Not Franchising | –*<br>–*<br>–* |
| Muris, Scheffman & Spiller (1) | 1992 | Soft-Drink Bottling | National Accounts | – |
| Minkler and Park | 1994 | Panel of Publicly Traded Bus. Format Franchising Firms from All Sectors | Market Minus Book Value of Equity | –* |
| Thompson | 1994 | Bus. Format Franchising Firms from All Sectors | Number of Years in Business Prior to Franchising | –* |
| Scott | 1995 | Bus. Format Franchising Firms from All Sectors | Days of Training | – |
| Pénard, Raynaud & Saussier | 2003 | Bus. Format Franchising Firms from All Sectors | Years before Franchising | –* |
| Lafontaine & Shaw | 2005 | Established Business Format Franchising Firms from All Sectors | 1- Franchisor Media Advertising<br>2- Number of Years in Business Prior to Franchising<br>3- Days of Training | –*<br>–*<br>–* |
| Maruyana & Yamashita | 2010 | Bus. Format Franchising Firms from All Sectors in Japan | Proportion of Years in Business Prior to Franchising | –* |

Note: * indicates a result that is significant in the original study at the 0.05 level based on a two-tailed test.
(1): Descriptive evidence.

One proxy for the importance of the franchisor's input that has been used in the literature but is not included in Table 5 is the chain's number of years of franchising (or business experience). The idea is that more years in franchising (or business) lead to a better known, and thus more valuable, trade name. However, this variable is also a proxy for the extent to which franchisors have access to capital as well as for learning and reputation effects. Furthermore, the empirical results that pertain to this variable are mixed. Using panel data at the franchisor level, Lafontaine and Shaw

(2005) find that, after the first few years in franchising, the proportion of corporate units within chains levels off and becomes quite stable. They conclude that a firm's years in franchising is not a major determinant of the extent of vertical integration that established franchised chains opt for.[33]

*Multiple Tasks*

In many retailing situations the agent performs more than one task. For example, a service-station operator might repair cars as well as sell gasoline, a publican might offer food services as well as beer, and a real-estate agent might rent houses as well as sell properties. Generally, when this is the case, the optimal contract for one task depends on the characteristics of the others. See Holmstrom and Milgrom (1991 and 1994).

There are many possible variants of multi-task models. We develop a simple version that illustrates our point. Suppose that there are $n$ tasks and that the agent exerts effort, $a_i$, on the $i^{th}$ task. Effort increases output according to the linear relationship

$$q = a + \varepsilon \qquad \text{where} \qquad \varepsilon \sim N(0, \Sigma), \tag{16}$$

where $q$, $a$, and $\varepsilon$ are vectors of outputs, efforts, and shocks, respectively, and $\Sigma$ is the variance/covariance matrix of $\varepsilon$. The agent's cost of effort is given by $(a^T a)/2$, so the risk premium is $-(r/2)\alpha^T \Sigma \alpha$. First-order conditions for the maximization of the agent's certainty-equivalent income with respect to the vector of effort levels yield $a_i = \alpha_i$, $i = 1, ..., n$.

The principal chooses the vector of commissions, $\alpha$, to maximize the total surplus, which after substitution of the incentive constraint is

$$\alpha^T j - \frac{\alpha^T \alpha}{2} - \left(\frac{r}{2}\right)\alpha^T \Sigma \alpha, \tag{17}$$

where $j$ is a vector of ones. First-order conditions for this maximization can be manipulated to yield:

$$\alpha^* = (I + r\Sigma)^{-1} j. \tag{18}$$

In the special case where $n = 2$ and $\sigma_{11} = \sigma_{22} = \sigma^2$, equation (18) simplifies to

$$\alpha_i^* = \frac{1}{1 + r\left(\sigma^2 + \sigma_{12}\right)}, \qquad i = 1,2. \tag{19}$$

If one compares equations (6) and (19) it is clear that, when a second task is added, the power of the agent's incentives in the optimal contract falls (rises) if the associated risks are positively (negatively) correlated. This occurs for pure insurance reasons. In other words, positive correlation means higher risk, whereas negative correlation offers risk diversification for the agent.

In this simple model, tasks are linked only through covariation in uncertainty. There are, however, many other possible linkages. For example, the level of effort devoted to one task can affect the marginal cost of performing the other, and, when prices are endogenous, nonzero cross-price elasticities of demand for the outputs can link the returns to effort.

Slade (1996) develops a model that incorporates these three effects and shows that, if an agent has full residual-claimancy rights on outcomes for a second task, the power of incentives for a first task (here gasoline sales) should be lower when the tasks are more complementary. Her empirical application of the model to retail gasoline supports the model's prediction. Specifically, she finds that when the second activity is repairing cars, which is less complementary with selling gasoline than managing a convenience store, agent gasoline-sales incentives are higher powered.

*Within-Firm Contract Uniformity*

As mentioned earlier, most theoretical contracting models, like our models above, imply that the principal should tailor the terms of the contract to suit the characteristics of the agent, the outlet, and the market. In other words, equation (1) should be viewed as the output/effort relationship for a particular franchisee and franchisor pair, and a particular local market/establishment. It is clear then that the optimal share parameter, $\alpha^*$, should differ by outlet within a chain as well as across chains. Contracts that are observed in practice in franchising, in contrast, are remarkably insensitive to variations in individual, outlet, and market conditions.[34] Indeed, most firms use a standard business-format franchise contract — a single combination of royalty rate and franchise fee — for all franchised units joining the chain at a point in time. The same lack of variation is observed in sales force management, where commission rates are set at the sales team level (see Lo, Ghosh and Lafontaine, 2011), and in traditional franchising, where a manufacturer often charges the same wholesale price to

all of her leased operations.[35] Arrunada, Garicano and Vasquez (2001: 263) similarly document that while the contracts of car dealers are renewed every year, they "present no variation among dealers of the same brands." When contracts are uniform, the only choice that the principal makes in the end for a particular outlet is whether to franchise it or to self operate. In other words, when the characteristics of individual units differ, the upstream firm chooses to vertically integrate those units with characteristics that require less high-powered incentives, and to franchise those that require more, which explains the focus in empirical work on the choice between integration and separation rather than on the terms of the contract.

Models that emphasize incentive issues for both parties — double-sided moral-hazard models — provide one possible explanation for this lack of contract fine tuning within firms. These models recognize that, with most franchising arrangements, not only does the agent have to provide effort, but also the principal must maintain the value of the trade name, business format, and company logo. With moral hazard on the part of both parties, even when both are risk neutral, an optimal contract involves revenue sharing.[36] Moreover, in such a double-sided moral-hazard context, Bhattacharyya and Lafontaine (1995) show that, under specific assumptions concerning functional forms, the benefits of customizing contracts can be quite limited, if not zero. This implies that the optimal contract is insensitive to many relationship-specific circumstances.[37] In addition, their model might at least partially explain the persistence of uniform contract terms over time found by Lafontaine and Shaw (1999), and even across markets (Lafontaine and Oxley, 2004). Indeed, in the Bhattacharyya and Lafontaine model, the terms of the optimal contract remain unchanged even as the franchise chain grows.

Other reasons that have been advanced in the literature to explain the lack of customization involve the high costs of customizing, either the direct cost of designing and administering many different contracts, as in Holmström and Milgrom (1987), or the high potential for franchisor opportunism that arises when contracts can vary, as in McAfee and Schwartz (1994).

Whatever the reason for the lack of customization in franchise contracting, it remains that most of the empirical research has focused either on the discrete choice to operate a unit as a franchise or not (when the data consist of individual contracts) or on the fraction of a franchisor's units that are franchised (when the data are at the upstream firm level). One might therefore ask if the same factors that lead to granting higher-powered incentives in the fine-tuning case also lead to a higher fraction of franchised

outlets in the uniform-contract case. We now construct a formal model in which this is the case.

Suppose that each outlet or unit is associated with some characteristic *x* that affects its profitability, and let the expected profitability of that unit depend on the power of the agent's incentives as well as on this characteristic. One can express this relationship as $\mathrm{E}\pi(\alpha, x)$. We assume that a) the expected profit function is concave, and b) $\mathrm{E}\pi_{\alpha x} > 0$. In other words, as *x* increases, the marginal profitability of higher-powered incentives also increases.[38]

With the fine-tuning model in which contracts are outlet specific, the principal's problem is to choose $\alpha_i$ to maximize $\mathrm{E}\pi(\alpha_i, x_i)$ for each unit *i,* subject to the agent's incentive constraint. The first-order condition for this maximization can be solved to yield the optimal contract, $\alpha_i^*(x_i)$. Moreover, assumption b) guarantees that $d\alpha_i^*/dx_i > 0$.

Now suppose that fine tuning is sufficiently expensive so the principal offers only two contracts, a franchise contract with $\alpha > 0$ and a vertical integration contract with $\alpha = 0$. In this case, the power of incentives ($\alpha$) is the same for all franchisees. If the principal has *n* units, one can order those units such that $x_1 \geq x_2 \geq \ldots x_n$. Now the principal's problem is to

$$\max_{\alpha, i^*} \left[ \sum_{i \leq i^*} \mathrm{E}\pi(\alpha, x_i) + \sum_{i > i^*} \mathrm{E}\pi(0, x_i) \right]. \qquad (20)$$

Given $i^*$, the optimal contract $\alpha^*(i^*)$ can be obtained from the first-order condition, $\sum_{i \leq i^*} \mathrm{E}\pi_\alpha = 0$, and given $\alpha$, the optimal $i^*$ satisfies (i) $\mathrm{E}\pi(\alpha, x_{i^*}) - \mathrm{E}\pi(0, x_{i^*}) \geq 0$, and (ii) $\mathrm{E}\pi(\alpha, x_{i^*-1}) - \mathrm{E}\pi(0, x_{i^*-1}) < 0$.[39] In this uniform-contract situation, an exogenous increase in *x* at some of a firm's units leads to both higher powered incentives (higher $\alpha^*$) and to a larger fraction of outlets franchised (lower $i^*$). This model then implies the comparative statics that really have been tested in much of the empirical literature, where the dependent variable has been the fraction of franchised outlets or the decision to franchise or not a particular establishment.

### *Studies Focused on Contract Terms*

Taking within-firm contract uniformity as a starting point has led a number of authors, notably Lafontaine (1992a and 1993), Sen (1993), Rao and Srinivasan (1995), Wimmer and Garen (1996), Gagné et al. (1997),

Lafontaine and Shaw (1999), Brickley (2002), Vasquez (2005) and Maruyana and Yamashita (2010) to examine factors that directly affect the franchise contract share parameter, $\alpha$, using franchise-chain level data. Three principal conclusions arise from this set of studies. First, the effects of factors such as risk, the importance of the agent's or the principal's inputs, outlet size, and monitoring difficulty are consistent generally with those that we have discussed. In other words, factors that tend to increase the degree of separation also tend to increase the agent's share of residual claims. Second, these factors explain a much larger proportion of the variation in the extent of vertical integration than of the variation in share parameters.[40] Thus it appears that firms, in responding to risk, incentive, and monitoring-cost issues, adjust the extent to which they use franchising rather than adjusting the terms of their franchise contracts. In that sense, the theoretical models seem to be missing some important aspects of the upstream/downstream relationship. Our simple model in the previous subsection, which allows variation to be addressed by the franchise decision rather than by variation in contract terms, may be a useful starting point for further analyses. Third, and finally, upfront franchise fees are in general not negatively correlated with royalty rates, despite the fact that the standard principal-agent model suggests that they should be.[41] Instead, upfront franchise fees seem to be set at levels that compensate the franchisor for expenses incurred in setting up a franchised unit.[42]

Lafontaine and Shaw (1999), who have access to panel data on contract terms, show that these are not only the same for all franchisees that join a chain at a point in time, as established in the earlier literature, but that they are quite persistent over time as well. In fact, they show that firm fixed effects account for about 85% of the variation in royalty rates and franchise fees, and that a very small proportion of this firm-level heterogeneity is related to sectoral differences. They conclude that royalty rates are principally determined by differences across firms, differences that likely arise from unobserved heterogeneity in production and monitoring technologies, as well as potential quality differences. One other potential source of heterogeneity relates to franchisor headquarters: Brickley (2002) shows that franchisors headquartered in states with termination laws – namely laws that make franchisee termination more costly – charge higher royalty rates and lower franchise fees. This implies that the institutional context within which the franchisor operates also affects the setting of their fees, and likely accounts for some of the franchisor specific effects that Lafontaine and Shaw identified in their data.

Lafontaine and Shaw (1999) also find that contract terms do not follow any systematic pattern up or down over time, and that they do not vary in a systematic way as firms age or grow. Lafontaine and Oxley (2004) moreover find that U.S. franchisors expanding into the Mexican market tend to use the same contract terms as in the U.S. This lack of change in fees over time, and lack of customization as a franchise chain expands internationally further suggest that the fundamentals of the production technology play an important role in the setting of franchise contract terms.

In the salesforce literature, it is the internal sales force that is paid a commission rate that can be observed and thus examined empirically, while dealers, like franchisees in traditional franchising, are full residual claimants. A number of studies of sales-force compensation, e.g. John and Weitz (1989), Oliver and Weitz (1991), Coughlan and Narasimhan (1992), Umanath et al. (1993), Joseph and Kalwani (1995), Godes (2004), and Lo et al. (2011) thus have examined the determinants of the commission rate, in addition to, or instead of, the decision to vertically integrate the salesforce. Some of this salesforce compensation literature considers not only the effect of risk, but also the effect of risk aversion as a factor explaining the commission rate. Per equation (6), risk aversion, like risk itself, is expected to have a negative effect on the commission rate. However, the issue of contract uniformity arises here as well - firms generally set the terms of their contract at the salesforce rather than the salesperson level (Lo et al (2011)). This makes individual characteristics a problematic determinant of an individual salesperson's compensation scheme. Still, Lo et al. (2011) find that less risk averse agents get paid higher commission rates. Because commission rates are the same for all members of a sales team, they argue that this negative relationship is not a sign that the commission rate is adjusted to the traits of the individual agent, per equation (6), but rather that firms whose sales jobs involve much risk, i.e. rapid technological change and volatile demand, choose to offer high commission contracts which in turn attract on average less risk averse sales people.

Finally, a number studies examine the use of various franchise contract terms other than royalty rates and franchise fees. For example, Dnes (1993) focuses on franchisor control of leases, and on non-compete covenants, tie-in clauses, and clauses governing the transfer of franchisee assets upon termination. He argues that these clauses act together to protect each party from the potentially opportunistic behavior of the other. Mathewson and Winter (1994) show that certain contract clauses, especially exclusive territories and various forms of quantity forcing, tend to occur together in franchise contracts.[43] Brickley (1999) finds evidence that franchisors impose

restrictions on passive ownership, rely on area-development plans, and require mandatory advertising contributions more often when the potential for franchisee free riding is high. He also finds that these contract clauses are complementary. Lafontaine and Raynaud (2002) for their part discuss how several components of the business-format franchise relationship work together to ensure that the relationship is self-enforcing, and that this self-enforcement mechanism in turn complements residual claims in generating the right set of incentives for franchisees. Arrunada, Garicano and Vasquez (2001) describe in some detail the allocation of decision rights between car retailers and manufacturers in Spain, grouping them among completion, monitoring and termination rights. They find evidence that manufacturers with more valuable brands (higher quality cars) and larger networks allocate fewer rights to their dealers. They also find evidence of complementarities among the different types of decision rights and financial incentives. Lin, Thomas and Kalnins (2011) similarly argue that performance and ownership incentives are complementary ways to deal with of underinvestment incentives locally. Finally, Zanarone (2009) shows how car manufacturers in Italy modified several aspects of their contractual relationships with their dealers – including the introduction of price ceilings and the imposition of some standards on services and inputs – in response to a prohibition against the use of exclusive territories.[44] Thus the theme of complementarity among contract clauses and contracting practices more generally arises in studies of traditional as well as business format franchising.

### 3. Adding Strategic Considerations to Contract Choice

The standard incentive cum insurance model of retail contracting does not usually consider the competitive environment in which the principal/agent relationship operates. Instead, this relationship is modeled as if the market were perfectly competitive and price were exogenous to the firm. Alternatively, the franchisor is modeled as a monopolist, an assumption that also eliminates the importance of rivals. Most industries in which franchising is prevalent, however, are better characterized as differentiated-products monopolistically-competitive markets. Usually, there are several firms that produce similar but not identical products, and firms as well as units within firms face downward-sloping demand. In the next three subsections, we consider the consequences of endogenous prices.

In all three subsections, we assume that the effort/sales relationship, which becomes the demand equation at the level of the retail unit, is linear.

Furthermore, we assume that units are homogeneous so that demand is symmetric and takes the form

$$q = 1 - p + \delta\bar{p} + a + \varepsilon \qquad (21)$$

where p is own price, $\bar{p}$ is the price at a rival unit of the same or a different chain,[45] and δ, which can be positive or negative, determines the strength of the competitive or spillover effect (the externality).

With this setup, it is important to specify who chooses the prices. There are at least three possibilities: i) the principal chooses $p$ and $\bar{p}$; ii) the principal chooses $p$ and a rival principal chooses $\bar{p}$, which the principal considers to be exogenous (a monopolistically competitive or large $n$ model, where $n$ is the number of players); and iii) the agent chooses $p$ and a rival agent chooses $\bar{p}$, which is endogenous to the problem (a fully strategic or small $n$ model).[46]

Franchises are legally independent entities and, as such, they usually choose prices at their own units. However, it is possible that the upstream firm can find ways to ensure that the agent chooses the price that the principal favors. For example, principals can use self-enforcing or relational contracts to achieve their objectives.[47] Moreover, Bonnet and Dubois (2008) find that, in the French bottled water market, a contract that consists of a two-part tariff with RPM fits the data better than any other contract considered (e.g., a linear contract or two-part tariff without RPM). [48]

In what follows, we consider the three price-setting arrangements above in different contexts, in each case choosing the setup that we feel best illustrates the factor that we wish to model.

*Spillovers Within Chains*

One reason for the prevalence of chains rather than independent sales outlets is that there are externalities that are associated with the brand or chain name. Although spillovers can be beneficial, they can also create problems for both franchisees and franchisors. For example, one form that a spillover can take is a demand externality. With this sort of spillover, a low price at one outlet in a chain increases demand, not only at that outlet but also for other franchisees in the same chain. Conversely, a high price can cause customers to switch their business to another chain rather than merely seek a different unit of the same chain.

In order to emphasize the fact that, in this context, spillovers are negative, we change δ in equation (21) to -μ with μ > 0, such that:

$$q = 1 - p - \mu\bar{p} + a + \varepsilon \tag{22}$$

where $\bar{p}$ is the price at a rival unit of the same chain, or the average price at rival units, and the parameter $\mu$ represents the extent of negative demand spillovers. With this formulation, a high price at a given unit causes erosion in the sales of all members of the chain. We also assume that the franchisor chooses both downstream prices as well as the share parameter. All other model assumptions are as before.

None of the modifications of the model affects the agent's incentive constraint, which still yields $a = \alpha$. Using this to eliminate $a$, one finds that, in a symmetric equilibrium,

$$\alpha^* = \frac{1}{2\left(1 + r\sigma^2\right)\left(1 + \mu\right) - 1}, \tag{23}$$

and $d\alpha^* / d\mu < 0$. Thus, when there are demand externalities of the type one normally associates with branding, integration becomes more desirable. This is because the chain internalizes spillovers external to the individual unit.

There are, of course, other sorts of spillovers such as franchisee free riding. Indeed, as noted by Klein (1980), Brickley and Dark (1987), and Blair and Kasserman (1994), once an agent is given high-powered incentives via a franchise contract, the franchisee can shirk and free ride on the trade name. The problem is due to the fact that the cost of the agent's effort to maintain the quality of the trademark is private, whereas the benefits of these activities accrue, at least partially, to all members of the chain. Here, the spillover works through effort, not price.

Whether the externality works through price and/or effort, spillover problems are exacerbated in situations where consumers do not impose sufficient discipline on retailers, namely in cases of non-repeat businesses. The franchisor may therefore decide to operate individual units directly when they are in transient-customer locations, such as those around freeway exits, or to operate a higher proportion of outlets directly when they are in markets that are subject to significant non-repeat business.

Table 6 summarizes the evidence from those studies that have examined the effect of non-repeat business on the propensity to franchise. This table shows that the evidence on non-repeat is mixed. One explanation for this may be that franchisors find other ways to control franchisee free-riding, for example by using approved-supplier requirements or self-enforcing contracts. If so, the role of the franchisor in maintaining service quality and trademark reputation should be particularly important in sectors where most business is transient. This, in turn, brings us back to the issue of fran- chisor incentives in a double-sided moral-hazard model of franchise contracting. In fact, measures of the value of the trade name have been used in the literature to test both the notion that franchisors must be given more incentives to perform when the trade name is very valuable (see Table 5) and the notion that franchisee free-riding opportunities are greater under those circumstances. Furthermore, both sides of this coin lead to the same prediction — that chains will rely more on vertical integration when the trade name is very valuable — and are thus empirically indistinguishable. The results in Table 5 are consistent with this prediction, whereas the results in Table 6 overall do not support the non-repeat component of the free-riding model.

Table 6: The Effect of Non-Repeat Business on the Propensity to Contract Out

| Author | Year | Data | Measure | % Contracted |
|---|---|---|---|---|
| Brickley & Dark | 1987 | 1- Franchising Firms from All Sectors<br>2- Outlets from 36 Franchising Firms in Various Sectors | Dummy Variable for Non Repeat Sectors<br>Highway Dummy Variable | –*<br>+* |
| Norton | 1988 | Restaurants and Motels by State & Sector | Tourism: Household Trips in the State | +* (in motels)<br>- (in restaurants) |
| Brickley, Dark and Weisbach | 1991 | 1- State Level Sectoral Data<br>2- Outlet Data from 36 Chains | Non-Repeat Industry Dummy<br>Non-Repeat Industry Dummy | + (at means)<br>+ (at means) |
| Minkler | 1990 | Taco Bell Restaurants in Northern California and Western Nevada | Highway Dummy Variable | – |
| Brickley | 1999 | Franchise Chains from all Sectors | Non-repeat Industry Dummy Variable<br>Survey Data: How Local are your Customers | +<br>+ |
| Maruyana & Yamashita | 2010 | Bus. Format Franchising Firms from All Sectors in Japan | Non-repeat Industry Dummy Variable | –* |

Note: * indicates a result that is significant in the original study at the 0.05 level based on a two-tailed test.

### *Product Substitution*

In some franchising industries, products are easily distinguishable from one another. For example, most customers have definite preferences between McDonald's hamburgers and KFC's chicken.[49] There are, however, other industries in which the services that the agents provide are perhaps the only things that distinguish the output of one firm from that of another. Real-estate franchises, for example, fall in the latter group. Given that, across industries, there are varying degrees of differentiation among products that are provided within the industry, one can ask how those differences affect contract choice.

The situation just described is the converse of the spillover case. Specifically, one can revert to demand equation (21) with a positive coefficient on $\overline{p}$. In the current context, here are two differences between equations (21) and (22). First, $\overline{p}$ here is the price charged by a rival chain,

whereas before it was the price charged in another unit of the same chain. Second, $\delta$ here represents the degree of substitutability between the products of the two chains. We assume that $\delta$ is positive, but less than 1 so that products or services are substitute, but the cross-price effect is less than the own-price effect.

The principal now chooses price, $p$, and the share parameter, $\alpha$, given rival choices, $\overline{p}$ and $\overline{\alpha}$, in a monopolistically competitive environment. With these modifications, the corresponding equation for the optimal contract is

$$\alpha^* = \frac{1}{\left(1 + r\sigma^2\right)(2 - \delta) - 1} \tag{24}$$

and $d\alpha^* / d\delta > 0$. In other words, as products become closer substitutes, the power of the agents' incentives should be increased. This is true because it becomes more important to induce the agent to promote the product so that sales will not be eroded by customers switching to rival brands. Indeed, one can interpret the substitution effect as yet another measure of the importance of the agent's effort. The higher the degree of substitutability, the harder is the agent's task of preventing the erosion of sales. As in our discussion above concerning franchisee or agent effort, therefore, the principal now has an additional motive for emphasizing high-powered incentives relative to other objectives.

Note that in modeling competition, we have implicitly assumed that the random variables that are associated with own and rival demand are uncorrelated. If, however, these variables were correlated, and if the agent had private information about his own demand realization, the tendency towards separation would be strengthened with increased numbers of competitors.[50] Indeed, in Gal-Or (1995)'s model, demand correlation is information that the principal can use to reduce the agent's informational rent and thus the need to integrate.

Given that most agency-theoretic models neglect the demand side of the market, it is not surprising that most empirical studies rely solely on attributes of the upstream firm and its outlets and ignore the firm's competitors. To our knowledge, Coughlan (1985) and Slade (1998) are the only studies that have looked at contract choice as a function of the demand characteristics that agents face. Coughlan finds that firms are more likely to use a middleman (separation) to enter a foreign market if they sell highly substitutable products, and to sell directly (integration) if their product is

more unique. Similarly, Slade relates outlet-level own and cross-price elasticities of demand to the contracts under which outlets operate. As the model predicts, she finds that higher cross-price elasticities are associated with higher-powered incentives for the agent.[51]

*Strategic Delegation of the Pricing Decision*

We have assumed thus far that, when prices are endogenous, the principal chooses the retail price herself. In reality, however, with franchising, whether traditional or business-format, the principal usually delegates the pricing decision to the agent. We now examine the principal's incentive to delegate in a more sophisticated strategic setting.

When price is exogenous, it is possible to normalize it to one and make no distinction between rewarding the agent on the basis of revenues or sales. With endogenous prices, in contrast, particularly when the agent chooses price, it is important to be more specific about the agent's compensation. We therefore adopt an alternative notation that conforms more closely with actual compensation schemes in franchised chains. We maintain the demand assumption of the previous subsection (i.e., equation 21) and assume that the franchisee now pays the franchisor a royalty, $\rho$, per unit sold as well as a fixed franchise fee, $F$.[52] The retailer's surplus is then

$$(p-\rho)(1-p+\delta\bar{p}+a)-F-\frac{a^2}{2}-\frac{r}{2}(p-\rho)^2\sigma^2. \qquad (25)$$

The agent now chooses effort, $a$, and price, $p$, to maximize this surplus, given rival choices, $\bar{p}$ and $\bar{a}$, where the rival is again a franchisee from another chain in the same industry.

The two first-order conditions for the maximization of (25) imply the retail reaction functions,

$$p=\frac{1+r\sigma^2\rho+\delta\bar{p}}{1+r\sigma^2}, \qquad (26)$$

which are clearly upward sloping. Furthermore, in a symmetric equilibrium, the retail price is

$$p_D^*=\frac{1+r\sigma^2\rho}{1+r\sigma^2-\delta}, \qquad (27)$$

where the subscript D stands for delegation.

Comparative statics results, with $\rho$ exogenous to the retailer, yield $dp/dr<0$, $dp/d\sigma^2<0$, $dp/d\delta>0$, and $dp/d\rho>0$. Finally, if the retailer is risk neutral or there is no risk, the equilibrium retail price is[53]

$$p_D^* = \frac{1}{1-\delta}. \tag{28}$$

We compare the delegated situation to the integrated, in which the retailer is a salaried employee whose wage is $F$ and $\rho$ is equal to 0. In this case, the manufacturer (who is, as always, assumed to be risk neutral) chooses the retail price $p$, given rival price $\overline{p}$, which is chosen by the rival manufacturer. In a symmetric equilibrium of the integrated game, the retail price is

$$p_I^* = \frac{1}{2-\delta}, \tag{29}$$

where the subscript $I$ stands for integrated. Clearly, if the retailers are risk neutral, principals prefer the delegated situation. Indeed, since reaction functions slope up, when a principal increases the royalty rate to her franchisee, not only does her retailer raise price but also the rival retailer responds with a price increase. In equilibrium, prices and profits are higher as a consequence.

Under agent risk neutrality then, delegation is a dominant strategy. However, as $r\sigma^2$ increases, the advantages of delegation fall. This occurs because the higher retail price is accompanied by an increase in the proportion of the franchisee's income that is variable, thereby increasing the risk that the retailer must bear and the risk premium he therefore requires. At some level of risk and/or risk aversion, the retailer's need for compensation for bearing increased risk makes vertical separation unattractive, and the firm chooses to vertically integrate instead. On the other hand, for given risk and risk aversion levels, the more substitutable the products of the competing chains (the higher is $\delta$), the more firms benefit from delegation (franchising) and thus the more likely it will be chosen. Overall then, this model predicts that vertical separation will be preferred when products are highly substitutable and there is little risk or risk aversion. It is interesting to note that once again we come face to face with the prediction that franchising should be discouraged by local market risk.

As we have already discussed, however, the data are inconsistent with this prediction.

One can test the hypotheses from the model above individually; in earlier subsections, we have discussed the relevant literature and main results. Alternatively, a joint test can be constructed from the observation that delegation is more apt to occur when reaction functions are steep. As with the product-substitutability model, however, these tests require information about outlets and their competitors. Slade (1998), who has such data, finds that steeper reaction functions increase the probability of delegation, as predicted.

Other authors have evaluated strategic delegation of the pricing decision empirically e.g., Brenkers and Verboven (2006), Berto Villas-Boas (2007), and Bonnet and Dubois (2008). However, rather than focusing on the extent of delegation, those authors have attempted to determine which contract, out of a menu of possible contracts, would be offered to retailers.

## 4. The Agent's Choice

Implicitly, we have thus far assumed that the principal has all of the bargaining power and that the agent's choice is simply to accept or reject the principal's offer. We have also implicitly assumed that the contract is designed so that the agent will accept it. Even with these assumptions, the agent's characteristics will affect the optimal contract terms and thus also the decision to franchise or not. Indeed, the agent's degree of risk aversion is central to the incentive/insurance tradeoff. As we have noted, however, it is difficult to evaluate the effect of that factor empirically. The effect of other factors mentioned above can also depend on the agent's ability, experience, and training. For example, outlet size is often measured by sales or the amount of capital required, which can be influenced by agent characteristics such as their experience or ability level.

In this section, however, we go further and assume that the agent has some bargaining power. It then becomes necessary to be explicit about the bargaining game. Assume for the purpose of illustration that the Generalized Nash Bargaining solution is adopted, which is the solution to a cooperative bargaining game. [54] This introduces two new factors that can influence the outcome of the contracting game: the bargaining strengths of the principal and the agent, and their outside options.

Consider first the bargaining strengths. When the principal has all of the bargaining power, the agent should be brought down to his reservation utility. This can be accomplished, in our original notation, through an appropriate choice of the fixed wage, *W*. When the agent has some bargaining power, in contrast, some rent should be left downstream. We have, however, already allowed for this possibility. In particular, we have not endogenized the wage, which determines the division of the surplus, but have purposely left that choice open. Moreover, there is some evidence that rents are indeed left downstream, (e.g., Kauffman and Lafontaine 1994 and, for a survey, Lafontaine and Slade, forthcoming), suggesting either a bargaining game with a franchisee who has some bargaining power, or an efficiency-wage story (the interpretation we have emphasized so far).

Consider next the two outside options. The principal's outside option, or alternative to franchising, is to operate the outlet herself (vertical integration), as we have been discussing, or, when franchising is traditional, to vertically integrate or to interact with the agent in an arm's length market. We have discussed the factors that affect the choice of vertical integration versus franchising extensively above. The alternative of arm's length market interaction is discussed in Lafontaine and Slade (2007).

The agent's outside option, which is either to accept a wage elsewhere or to enter the market as an independent entrepreneur, has been given much less attention in the literature. Still, some authors have examined this question empirically. Before discussing the effects of variation in the value of these options, however, we must be precise about the institutional setting. As we have mentioned previously, most of the models that we have discussed are based on the implicit assumption that contract terms will be fine tuned based on the characteristics of the agent, the principal, the outlet, and the market. In such models, when the agent's characteristics, and thus his outside option, are enhanced, he will be offered more favorable terms.[55] As we noted earlier, however, contracts that are observed in practice are remarkably insensitive to the above factors. Instead, a more realistic assumption is that the principal offers the same contract to all agents. In this case, the effect of an increase in the agent's outside option is ambiguous. In particular, a high outside option suggests that the probability that the agent will be offered a franchise contract becomes greater, since his effort is now more valuable.[56] Indeed, the same characteristics that lead to a higher outside option also suggest that the agent's productivity must be greater. On the other hand, a high outside option diminishes the probability that he will accept the contract, since the contract terms are fixed. Thus, all else equal,

those agents with high value elsewhere will reject the standard contract whereas those with lower alternative value will accept it.

Many of the empirical studies that we have discussed implicitly assess the agent's role (as measured by his characteristics) in the contract-choice problem. Indeed, as we described above, both outlet size and the importance of the agent's effort can be affected by those characteristics. However, a few studies focus explicitly on this aspect of the problem. For example, Affuso (2002) introduces the agent's age and previous wage into an otherwise standard contract-choice equation. She finds that they both have a positive effect on the probability of franchising. It thus seems that, in her data, the probability-of-offer effect dominates the probability-of-acceptance effect, suggesting that in fact the principal's bargaining power is greater than that of the agent.[57]

The agent's alternative to franchising, however, is not usually salaried employment within the same firm. Instead he is an entrepreneur who must decide whether to operate in the market as an independent good or service provider, or to seek affiliation with a national or regional chain. On this margin, Kaufmann (1999) finds that the training benefits associated with the franchising option are an important consideration. Specifically, 70% of the individuals who purchased franchises in their data did so in sectors they had no expertise in, whereas only 50% of those who started or purchased independent businesses operated in sectors they had no prior experience in. Of course, if the franchisor is the source of market intelligence and training in a new domain for the franchisee, the franchisor again is likely to also have greater bargaining power.

Similarly, Williams (1998) uses Census data on the characteristics of business owners, from the 1987 US census, to document differences in human capital between individuals who choose to purchase a franchise and those who opt for independent business ownership. He finds that on average those who opt for franchising are more educated, and they have more work experience than those that choose to go into business on their own. He also finds that being black increases the likelihood that an individual chooses to purchase a franchise, whereas prior business ownership reduces it. Williams finds also that franchisees are especially likely to mention that they needed managerial assistance to start their businesses, and that they obtained such assistance from another business entity, most likely their franchisor. Finally, he shows that those individuals who choose franchising in his data are substantially better off as franchisees – i.e. they earn higher profits than they would have if they had chosen to start their own business. In that sense,

Williams' results confirm again that market intelligence and training are important reasons for individuals who choose to go into franchising.

As Mazzeo (2004) points out, chain affiliation reduces consumer uncertainty about quality, especially in transient-customer locations and industries. Furthermore, there are economies of scale in marketing, procurement, and other shared facilities that are associated with chain membership. These are the benefits of affiliation that must be weighed against the costs, which are the royalties and fees that the agent must now pay to the chain, and the operational requirements and associated costs imposed by the chain. In his analysis of rural motels, Mazzeo finds that larger motels and those that are located near freeway exits are more apt to be franchised, which provides support for the size and repeat-business effects that we discussed above.[58] In addition, he finds that increased local-market risk encourages franchising relative to independent business ownership. Note that Williams (1998) also finds a similar tendency towards more franchising than independent business ownership in those industries characterized by more variable sales.

As mentioned by Mazzeo (2004), the fact that risk encourages agents to seek affiliation with a chain provides yet another explanation for the puzzling finding that risk encourages franchising rather than vertical integration. Indeed, if the effect of risk is stronger for the agent's choice (franchising versus independence) than for the principal's (integration versus franchising), a plausible assumption if the agent is more risk averse, risk will be found to have a perverse effect in studies focusing on only the latter decision.

Finally, rather than examining the effect of the agent's bargaining power on the likelihood of franchising, Argyres and Bercovitz (2011) consider how it may affect the terms of the contract. They focus specifically on contract duration and the stringency of non-compete clauses, but also examine termination or non-renewal rates. They find evidence that the presence, in a franchise system, of a franchisee association – which they associate with increased franchisee bargaining power – is associated with longer duration contracts and less stringent non-compete requirements. It is also associated with a reduced rate of termination and non-renewal.

Consideration of the agent's role in determining the vertical relationship, per the above discussion, however, leads us to an important problem that is potentially damaging to much of the empirical literature that we have discussed — endogenous matching. A typical study among those we described in Sections 2 and 3 regresses a zero/one choice, or the fraction of

outlets under franchising and company ownership, on some subset of the characteristics of the principal, the agent, the outlet, and the market. However, as Ackerberg and Botticini (2002) note, it is possible, and in fact likely, that some characteristics are unobserved and that some of those unobserved characteristics lead certain types of agents to choose to contract with certain types of principals. A characteristic that comes to mind as having these properties is the degree of agent risk aversion ($r$ in our model). Indeed, agents who can tolerate risk might tend to choose riskier markets and contracts, while those who are more risk averse might gravitate towards less risk in both choices. Other characteristics we have explored in this section include education, prior business ownership, and prior experience in the industry. Endogenous matching between principals and agents leads to biased coefficients in the contract-choice equation (unless all factors affecting the match are all controlled for in the contract-choice equation). In that sense, it can also provide another explanation for the puzzling positive relationship between local-market risk and franchising that is found in the data.

Ackerberg and Botticini discuss a possible solution to the endogenous-matching problem. Their solution involves consideration of a matching equation and requires instruments that affect matching but not contract choice. They apply their estimation technique to a problem of agricultural contracting using market dummies and their interaction with agent wealth as instruments in the matching equation. They find that, after controlling for matching, there is strong evidence that risk sharing is an important determinant of contract choice, much stronger than what they find in their naïve estimations.

While endogenous matching is an important issue, in contexts such as those considered in the franchising and sales force literature, we have already mentioned that the terms of the contract tend to be uniform across the large numbers of agents that principals deal with. In such contexts, Lo et al. (2011) argue that contract terms are set by firms with the specific goal of attracting the set of agents best suited to the task. In other words, they suggest that when firms will offer a single contract, they set the terms of the contract to select the right set of agents. This argument is similar to Ackerberg and Botticini (2002) as it implies a need to correct for selection in the estimation of the choice of contract decisions. However, the firm here is expected to actively engage in selection. Lo et al. (2011) indeed show that firms whose sales jobs involve much risk, i.e. rapid technological change and volatile demand, choose to offer high commission contracts. This, they also show, in turn attracts less risk averse sales people, who can

bear risk without imposing high costs on the firm. Similarly, a franchisor can choose the terms of the contract to attract the right set of individuals, allowing her to franchise extensively even if the business is quite risky.

## 5. Final Remarks

Our survey of retail contracting under exclusive marks has highlighted the existence of many stylized facts and the robust nature of the evidence. Indeed, in almost every case where a factor is statistically significant, its effect on the power of agent incentives in real-world contracts is the same across studies. In other words, in spite of the fact that researchers assess different industries over different time periods using a number of proxies for a given factor, their empirical findings are usually consistent with one another.

The theories, on the other hand, are much more fragile. In fact, in order to obtain a tractable model, it is important to use simple specifications for agent utility, risk preference, and the effort/output relationship. Furthermore, model predictions can depend nontrivially on those assumptions. In addition, the way in which unobservable risk interacts with the tangible variables is crucial, as we have demonstrated in our discussion of outlet size. Nevertheless, we hope that our attempt to organize the evidence in a unified framework will be helpful to theorists in that it gives them a set of stylized facts to explain.

One theoretical prediction, however, is not fragile; it surfaces over and over again. We refer to the effect of risk on agent incentives. Whether one considers the simplest incentive/insurance model, or embeds this model in one with endogenous prices and strategic delegation or one with multiple tasks and linked efforts, the theory predicts that more risky units should tend to be integrated with the upstream firm. The evidence, however, strongly rejects this prediction. We have suggested several possible explanation for the discrepancy between theory and evidence: endogenous output variability and delegation in a situation where agents have private information about local-market conditions, the role of the agent in choosing whether to enter the market as an independent or a franchisee, and endogenous matching or selection with unobserved risk aversion. However, as shown in Allen and Lueck's (1995) survey of the sharecropping literature, a similar empirical finding surfaces in the sharecropping context, an area where exogenous output fluctuations are apt to dominate endogenous fluctuations and where the agent's role in determining how he will enter is apt to be more

constrained.[59] Although all three factors could explain the empirical regularity in franchising, only endogenous matching seems applicable to sharecropping. Given the central role that agent risk plays in the theoretical incentive-contracting literature, and given the strength of the empirical evidence, we believe that this puzzle deserves further attention from theorists.

As for applied researchers, we hope to have provided them with a framework and a sense of where more empirical work would be most beneficial. In particular, certain research areas have received less attention than others, and there are a number of reasons why. Some areas, such as variation in risk aversion across agents, await potentially better measures. Others, in contrast, are less problematic, and we highlight three of them here.[60] First, multiple tasks are clearly important aspects of most jobs, and, although a multitask model is frequently used to organize empirical work on incentives within firms, whether public or private, there have been few efforts to assess multitasking in the retail-contracting literature. Second, although strategic considerations are less apt to surface in business-format franchising, since those markets are reasonably competitive,[61] many traditional franchising markets, such as automobiles and gasoline, are much more concentrated upstream. It would therefore be interesting to know more about what role, if any, strategic considerations play in determining contract choice in traditional franchising markets and other markets where distribution is at some level exclusive (e.g. beer, movies, and so on). Finally, the role of the agent in choosing an organizational form, as well as the implications of that choice for selection, endogenous matching, and the effects of risk aversion, are interesting issues in need of much further investigation.

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## Appendix: Algebraic Derivations

In each case below, the agent (A) maximizes his certainty-equivalent income, $\mathrm{E}(y)-(r/2)Var(y)$, whereas the principal (P) maximizes the expected total surplus — expected output minus the agent's cost of effort minus the agent's risk premium — $\mathrm{E}(q)-a^2/2-(r/2)Var(y)$. With one exception, noted below, the agent's compensation is given by

$S(q) = \alpha q + W$. The cases differ according to the specification of the function that maps effort into output, $q = f(a, \varepsilon, \Theta)$.

*Risk:*

$$q = a + \varepsilon.$$

*A:* $$\max_a \left\{ \alpha a + W - \frac{a^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right\}$$

The resulting first-order condition (foc) is: $a = \alpha$. Substituting the agent's effort choice into the principal's problem yields:

*P:* $$\max_\alpha \left\{ \alpha - \frac{\alpha^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right\}, \quad foc: \ 1 - \alpha - r\alpha\sigma^2 = 0,$$

$$\alpha^* = \frac{1}{1 + r\sigma^2},$$

$$\frac{d\alpha^*}{dr} = -\frac{\sigma^2}{\Gamma^2} < 0, \quad \frac{d\alpha^*}{d\sigma^2} = -\frac{r}{\Gamma^2} < 0, \quad \text{where} \quad \Gamma = 1 + r\sigma^2.$$

*Agent Effort:*

$$q = \eta a + \varepsilon.$$

*A:* $$\max_a \left\{ \alpha\eta a + W - \frac{a^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right\}, \quad foc: \ a = \alpha\eta.$$

*P:* $$\max_\alpha \left\{ \eta^2\alpha - \frac{\alpha^2\eta^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right\}, \quad foc: \ \eta^2 - \alpha\eta^2 - r\alpha\sigma^2 = 0,$$

$$\alpha^* = \frac{\eta^2}{\eta^2 + r\sigma^2},$$

$$\frac{d\alpha^*}{d\eta} = \frac{2\eta r\sigma^2}{\Gamma^2} > 0, \quad \text{where} \ \Gamma = \left(\eta^2 + r\sigma^2\right).$$

*Outlet Size:*

$$q = \eta a + (\gamma + \varepsilon)k.$$

$$A: \qquad \max_a \left[ \alpha(\eta a + \gamma k) + W - \frac{a^2}{2} - \frac{r}{2}\alpha^2\sigma^2k^2 \right] \qquad foc:\ a = \alpha\eta.$$

$$P: \qquad \max_\alpha \left[ \eta^2\alpha - \frac{\alpha^2\eta^2}{2} - \frac{r}{2}\alpha^2\sigma^2k^2 \right] \qquad foc:\ \eta^2 - \alpha\eta^2 - r\alpha\sigma^2k^2 = 0,$$

$$\alpha^* = \frac{\eta^2}{\eta^2 + r\sigma^2k^2},$$

$$\frac{d\alpha^*}{dk} = -\frac{2\eta^2 r\sigma^2 k}{\Gamma^2} < 0, \qquad \text{where } \Gamma = \eta^2 + r\sigma^2k^2.$$

*Costly Monitoring:*

This result is derived in Lafontaine and Slade (1996).

*Franchisor Effort:*

$$q = \eta a + \theta b + \varepsilon.$$

This problem has two incentive constraints:

$$A: \qquad \max_a \left[ \alpha(\eta a + \theta b) + W - \frac{a^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right] \qquad foc:\ a = \alpha\eta.$$

$$P: \qquad \max_b \left[ (1-\alpha)(\eta a + \theta b) - \frac{b^2}{2} \right] \qquad foc:\ b = (1-\alpha)\theta.$$

The franchisor chooses $\alpha$ to maximize total surplus, equal to $\eta a + \theta b - \frac{a^2}{2} - \frac{b^2}{2} - \frac{r}{2}\alpha^2\sigma^2$, subject to the two incentive constraints. After substituting, we have:

$$\max_{\alpha} \left\{ \alpha\eta^2 + (1-\alpha)\theta^2 - \frac{\alpha^2\eta^2}{2} - \frac{(1-\alpha)^2\theta^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right\}$$

$$foc:\ \eta^2 - \theta^2 - \alpha\eta^2 + (1-\alpha)\theta^2 - r\alpha\sigma^2 = 0,$$

$$\alpha^* = \frac{\eta^2}{\eta^2 + \theta^2 + r\sigma^2},$$

$$\frac{d\alpha^*}{d\theta} = -\frac{2\eta^2\theta}{\Gamma^2} < 0,\ \ \frac{d\alpha^*}{d\eta} = \frac{2\eta(\theta^2 + r\sigma^2)}{\Gamma^2} > 0, \quad \text{where } \Gamma = \left(\eta^2 + \theta^2 + r\sigma^2\right).$$

*Multiple tasks:*

$$q = a + \varepsilon, \qquad \varepsilon \sim N(0, \Sigma), \qquad C(a) = \frac{a^T a}{2},$$

where *q, a,* and $\varepsilon$ are vectors, as is $\alpha$. However, *W* remains a scalar.

A: $$\max_{a} \left\{ \alpha^T a + W - \frac{a^T a}{2} - \frac{r\alpha^T \Sigma \alpha}{2} \right\} \qquad foc:\ \ a = \alpha.$$

After substituting, we have:

P: $$\max_{\alpha} \left\{ \alpha^T j - \frac{\alpha^T \alpha}{2} - \frac{r\alpha^T \Sigma \alpha}{2} \right\} \qquad foc:\ \ j - \alpha - r\Sigma\alpha = 0.$$

Hence, $\alpha^* = (I + r\Sigma)^{-1} j$, where *j* is a vector of ones. When n = 2, this becomes

$$\alpha_i^* = \frac{1 + r\sigma_{jj} - r\sigma_{12}}{(1 + r\sigma_{11})(1 + r\sigma_{22}) - r^2\sigma_{12}^2}.$$

Setting $\sigma_{11} = \sigma_{22} = \sigma^2$ yields:

$$\alpha_i^* = \frac{1 + r\sigma^2 - r\sigma_{12}}{(1 + r\sigma^2)^2 - r^2\sigma_{12}^2} = \frac{1}{1 + r(\sigma^2 + \sigma_{12})}$$

so that

$$\frac{d\alpha_i^*}{d\sigma_{12}} = -\frac{r}{(1+r(\sigma^2+\sigma_{12}))^2} < 0.$$

*Spillovers Within Chains:*

$$q = 1 - p - \mu\bar{p} + a + \varepsilon.$$

where $\bar{p}$ is the price at another outlet in the same chain.

$$A: \quad \max_a \left[\alpha(1-p-\mu\bar{p}+a) + W - \frac{a^2}{2} - \frac{r}{2}\alpha^2\sigma^2\right] \qquad foc: \ a = \alpha.$$

The principal chooses $p=\bar{p}$ and $\alpha$ to

$$P: \quad \max_{p,\alpha} \left[(1-(1+\mu)p+\alpha)p - \frac{\alpha^2}{2} - \frac{r}{2}\alpha^2\sigma^2\right],$$

$$\underset{p}{foc}: \ 1-2(1+\mu)p+\alpha = 0, \qquad p^* = \frac{1+\alpha}{2(1+\mu)},$$

$$\underset{\alpha}{foc}: \ p - \alpha - r\alpha\sigma^2 = 0.$$

Substituting for p yields:

$$\alpha^* = \frac{1}{2(1+r\sigma^2)(1+\mu)-1},$$

$$\frac{d\alpha^*}{d\mu} = -\frac{2(1+r\sigma^2)}{\Gamma^2} < 0 \quad \text{where} \quad \Gamma = 2\left(1+r\sigma^2\right)(1+\mu) - 1.$$

*Product Substitution:*

$$q = 1 - p + \delta\bar{p} + a + \varepsilon$$

where $\bar{p}$ is now the price at a rival chain.

$$A: \quad \max_{a} \left[ \alpha(1 - p + \delta\bar{p} + a) + W - \frac{a^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right] \qquad foc: \ a = \alpha.$$

$$P: \quad \max_{p,\alpha} \left[ (1 - p + \delta\bar{p} + \alpha)p - \frac{\alpha^2}{2} - \frac{r}{2}\alpha^2\sigma^2 \right]$$

$$\underset{p}{foc}: \ 1 - 2p + \delta\bar{p} + \alpha = 0.$$

Using symmetry to set $p = \bar{p}$ yields:

$$p^* = \frac{1 + \alpha}{2 - \delta}.$$

$$\underset{\alpha}{foc}: \ p - \alpha - r\alpha\sigma^2 = 0.$$

Substituting for p yields:

$$\alpha^* = \frac{1}{(1 + r\sigma^2)(2 - \delta) - 1},$$

$$\frac{d\alpha^*}{d\delta} = -\frac{(1 + r\sigma^2)}{\Gamma^2} > 0, \quad \text{where} \quad \Gamma = \left(1 + r\sigma^2\right)(2 - \delta) - 1.$$

*Strategic Delegation of the Pricing Decision:*

$$q = 1 - p + \delta\bar{p} + a + \varepsilon,$$

where $\bar{p}$ is again the price at a rival chain. In this case, the agent is compensated by residual claims after he pays a royalty ρ per unit to the franchisor, as well as a franchise fee F. Thus we have:

$$A: \quad \max_{a,p} \left[ (p - \rho)(1 - p + \delta\bar{p} + a) - F - \frac{a^2}{2} - \frac{r}{2}(p - \rho)^2\sigma^2 \right]$$

$$\underset{a}{foc}: \ a = p - \rho,$$

$$\underset{p}{foc}: \ 1 - 2p + \delta\bar{p} + a + \rho - r(p - \rho)\sigma^2 = 0.$$

Substituting for $a$ yields:

$$p = \frac{1+\delta\bar{p}+r\rho\sigma^2}{1+r\sigma^2},$$

$$\frac{dp}{d\bar{p}} = \frac{\delta}{\Gamma} > 0, \quad \frac{dp}{d\delta} = \frac{\bar{p}}{\Gamma} > 0, \quad \frac{dp}{dr} = \frac{\sigma^2(\rho-1-\delta\bar{p})}{\Gamma^2} < 0,$$

$$\frac{dp}{d\sigma^2} = \frac{r(\rho-1-\delta\bar{p})}{\Gamma^2} < 0, \quad \frac{dp}{d\rho} = \frac{r\sigma^2}{\Gamma} > 0,$$

where $\Gamma = 1+r\sigma^2$. Using symmetry to set $p=\bar{p}$ yields:

$$\begin{aligned} p_D^* &= \frac{1+r\rho\sigma^2}{1-\delta+r\sigma^2} \\ &= \frac{1}{1-\delta} \quad \text{when } r\sigma^2 = 0. \end{aligned}$$

By contrast, under vertical integration, assuming that $a = 0$ and $\rho = 0$, we have

$$P: \quad \max_p \left[(1-p+\delta\bar{p})p - F\right], \qquad foc: \quad 1-2p+\delta\bar{p} = 0.$$

Setting $p=\bar{p}$ yields $p_I^* = \frac{1}{2-\delta} < 1 < \frac{1}{1-\delta} = p_D^*$. Thus $p_I^* < p_D^*$ when $r\sigma^2$ is small.

## Notes

† This chapter is a revised and updated version of "Incentive Contracting and the Franchise Decision" published in the earlier edition of this volume. This revision builds on some of our recent work, most notably Lafontaine and Slade (2007) and (2012).

1 For early contributions on this topic, see, for example, Murphy (1984), Jensen and Murphy (1990), Kaplan (1994), and Garen (1996).

2 For other areas, see e.g. Lazear (1996) on the effect of piece rates on production-worker productivity. For a broader discussion of the effect of human-resource management practices on production-worker productivity, see e.g. Ichniowski, Shaw and Prennushi (1997).

3 For example, see Monteverde and Teece (1982), Anderson and Schmittlein (1984), Masten (1984), Anderson (1985), Masten and Crocker (1985), Joskow (1988), Klein (1988), and Crocker and Reynolds (1992). For surveys of this empirical literature, see Shelanski and Klein (1995), Crocker and Masten (1996), and Rindfleisch and Heide (1997), and, more recently, Macher and Richman (2008) and Joskow

(2010).

[4] See also Lafontaine and Slade (2012) for a review of empirical literature on inter-firm contracts.

[5] The distinction between these two types of franchising can be blurry because business-format franchisors can sell inputs to franchisees (e.g. Baskin-Robbins), and traditional franchisors offer training and ongoing business support to their dealers as well. See Dnes (1992, 1993) for more on this.

[6] See for example Rubin (1978), Mathewson and Winter (1985), Lal (1990), and Bhattacharyya and Lafontaine (1995). Also see Stiglitz (1974) for the earliest application of agency theory to explain the use and properties of another type of share contract, namely sharecropping.

[7] In business-format franchising, different franchisors choose different contract terms — different royalty rates and franchise fees — but a given franchisor offers the same terms to all potential franchisees at a given point in time. This makes the franchise versus company-operation dichotomy a meaningful one; if contracts were allowed to vary for each franchisee, then, assuming that the company manager is paid a fixed salary, company ownership would be a limit case where the royalty rate is zero and the franchise fee negative. Of course, such a limit case would hardly ever be observed. In reality, the dichotomy involves more than just differences in the compensation scheme of the unit manager; it also involves differences in asset ownership and in the distribution of responsibilities between upstream and downstream parties. Similarly, in traditional franchising, the distinction between integration and separation is well defined. This distinction again involves differences in the distribution of power between manufacturer and retailer. See, for example, Smith II (1982), Slade (1998) and Arrunada et al (2001).

[8] For example, Brickley and Dark (1987), John and Weitz (1988), Martin (1988), Norton (1988), Lafontaine (1992a), and Scott (1995).

[9] For example, Anderson and Schmittlein (1984), Barron and Umbeck (1984), Anderson (1985), Brickley and Dark (1987), Minkler (1990), Muris, Scheffman and Spiller (1992), Shepard (1993), and Slade (1996 and 1998).

[10] Note that, as we assume that the error term enters all of our functional forms in some additive way, our assumption that $\varepsilon \sim N(0,\sigma^2)$ also implies that $q$ is normally distributed.

[11] See e.g. Lutz (1995) for a discussion of this issue in the context of franchising.

[12] For a possible explanation, see Holmstrom and Milgrom (1994).

[13] We use the word linear here as has traditionally been done in the share-contract literature. The contracts, however, typically include a fixed component and are thus affine.

[14] For possible explanations, see Holmstrom and Milgrom (1987), Romano (1994), and Bhattacharyya and Lafontaine (1995).

[15] In franchising applications, see Lal (1990) for an example of the first type of interpretation, and Bhattacharyya and Lafontaine (1995) for an example of the second.

[16] See Kaufmann and Lafontaine (1994) for evidence that there are rents left downstream at McDonald's. The authors argue that they serve an incentive role similar to that of efficiency wages. Michael and Moore (1995) find evidence that such rents are present in other franchised systems as well.

[17] The participation constraint is normally used to determine $W$, not $\alpha$.

[18] On the relative merits of these measures, see Lafontaine and Bhattacharyya (1995).

[19] See Allen and Lueck (1992, 1995) and Leffler and Rucker (1991) for evidence that risk-sharing also does not explain contract terms well in sharecropping and in timber harvesting respectively. Prendergast (2002) reviews the empirical evidence on risk sharing across a number of contexts.

[20] See Lafontaine and Bhattacharyya (1995) and Prendergast (2002) for formal models.

[21] See Lafontaine and Sivadasan (2009) for an approach to model the role of management labor in affecting labor productivity in these types of businesses.

[22] If one assumes that $k$ enters (9) only in an additive way, then changes in $k$ have no effect on the optimal share parameter, $\alpha$. If one assumes that $k$ multiplies $a$, then its effect is the same as that of $\eta$ in the previous subsection, such that increases in $k$ lead to higher values of $\alpha$, the reverse of what we obtain with our formulation. With a combination of interactive terms with risk and franchisee effort, we would get two opposing effects, and the sign of the net effect would depend on the specific parameters of the problem.

[23] See Brickley and Dark (1987) for more on this argument, which they refer to as the "inefficient risk-bearing" argument against franchising.

[24] Consistent with the above evidence, on a sectoral basis, company units have higher sales (are larger) than franchised units (US Dept. of Commerce, 1988). Moreover, Muris, Scheffman and Spiller (1992) argue that the increase in the efficient size of bottling operations led soft-drink manufacturers to buy back several of their independent bottlers and enter into joint-venture agreements with many others.

[25] This result also depends on the assumption that information flows are superior within the firm.

[26] This subsection is based on Lafontaine and Slade (1996).

[27] The first-best effort level is defined as the level that the principal would choose if she were not constrained by incentive considerations in maximizing the total surplus.

[28] One alternative source of information that we do not consider arises when uncertainty is correlated across agents in a multi-agent setting. In that case, the optimal contract for agent *i* includes some measure of other agents' performance in addition to his own, as in Holmstrom (1982). Empirically, however, explicit relative-performance contracts are not used in franchising.

[29] The type of mechanism that we have in mind is sometimes called "behavior-based" compensation, as opposed to "outcome-based" compensation. See Anderson and Oliver (1987).

[30] The model is similar to Holmstrom and Milgrom (1991), who model multiple tasks and signals.

[31] In mapping our results from more or less sales-based compensation to more or less vertical integration, we are implicitly assuming that behavior monitoring takes place to a greater extent, and behavior-based compensation is used more, inside the firm. With complete separation, in contrast, the agent is the residual claimant, and there is no (or very little) behavior monitoring or behavior-based compensation. See Holmstrom and Milgrom (1991) for a discussion of these issues. See Bradach (1997) for descriptions of business practices in five franchised restaurant chains that suggest that these assumptions are realistic.

[32] See e.g. Rubin (1978), Mathewson and Winter (1985), Lal (1990) and Bhattacharyya and Lafontaine (1995) for more on this. Consistent with the argument that the franchisor must be given incentives in these types of businesses, there is only one franchise agreement among those studied by Dnes (1993) that does not involve any ongoing royalties or company ownership on the part of the franchisor. Dnes (1993) notes that "Franchisees (in this system) do complain of insufficient effort by the franchisor in supporting the development of their businesses." (p. 386; text in parentheses added).

[33] For a review of the empirical literature on the "ownership redirection hypothesis", according to which franchising is just a transitory phase for firms that face capital constraints, see Dant, Kaufmann and Paswan (1992).

[34] For a detailed description of the level of franchise fees and royalty rates in a large sample of US franchisors, and their evolution over time, see Blair and Lafontaine (2005), chapter 3.

[35] In the U.S., the Robinson-Patman Act requires wholesale-price uniformity, at least locally. This is not true, however, in Canada. Nevertheless, price uniformity across buyers is common there as well (e.g., in gasoline markets; see Slade (1996 and 1998b) on this). Also, the Robinson-Patman act does not explain contract uniformity in business-format franchising, as it applies to the sale of commodities, which do not include franchising rights. See McAfee and Schwartz (1994) as well as Bhattacharyya and Lafontaine (1995) for further arguments against legal constraints as the main source of contract uniformity in business-format franchising. Also see Emerson (2011) for more on the legal treatment of discrimination in franchise networks.

[36] See e.g. Rubin (1978), Lal (1990), and Bhattacharyya and Lafontaine (1995). Carmichael (1983) has shown that with two agents or more, and moral hazard on the principal's side as well as the agents', the first best can be achieved with a contract based on relative outputs. However, we do not observe this type of contract in franchising. Why this is the case is beyond the scope of the present paper.

[37] More specifically, Bhattacharyya and Lafontaine (1995) show that, when the production function is Cobb-Douglas and the cost-of-effort function is exponential, the optimal share parameter is independent of the scale of operation, and, as a result, of the level of demand and the degree of competition in the market. The share parameter is also independent of both parties' cost-of-effort parameters.

[38] For example, $x$ might be the distance of the franchisee from the franchisor headquarter.

[39] We are assuming an interior solution with $1 < i^* < n$. Assumption b) guarantees that the left-hand

side of (i) is greater than the left-hand side of (ii) for any *i*.

[40] See notably Lafontaine (1992a) and Marunaya and Yamashita (2010) on this.

[41] This prediction results from the fact that, in most theoretical models, the principal is assumed to extract all rent from the agent, an assumption that we have not exploited. Two studies that find statistically significant negative correlations between fees are Lafontaine and Shaw (1999) and Vasquez (2005). In the former case, this arises from the inclusion of ongoing fixed payments in the measurement of the franchise fee, while in the latter case, it is due to the inclusion of some measure of profits from sales of inputs to franchisees in the notion of royalty rate used. Both ongoing fixed fees and input sales have been shown to be substitutes for royalty. See Blair and Lafontaine (2005) for more on this.

[42] See Lafontaine (1992a), Dnes (1993) and Lafontaine and Shaw (1999) on this issue.

[43] See Athey and Stern (1998) for theoretical arguments as to why one might expect such complementarities.

[44] See Blair and Lafontaine (2005) for more on various aspects of the franchise relationships. Also see Lafontaine and Slade (forthcoming) for a detailed review of empirical evidence concerning inter-firm contracts.

[45] When there are several agents, one can interpret $\overline{p}$ as an average rival price.

[46] There are, of course, many variations on this theme. For example, if rival effort, $\overline{a}$, entered the agent's demand equation, agents could play a game in efforts.

[47] Self-enforcing contracts are not legally binding. However, in a dynamic setting, a principal can use measures such as efficiency rents and the threat of termination to ensure that the agent complies with the principal's wishes.

[48] For our purposes, it is simpler to assume that the franchisor chooses price. There is some evidence that franchisors try to control franchisee prices, usually exerting downward pressure on franchisee prices (see e.g. Ozanne and Hunt, 1971). Rules against resale price maintenance made this difficult in the U.S. until 1997, when the U.S. Supreme Court decided in *State* Oil *v. Khan* that maximum resale price maintenance would no longer be a *per se* violation of antitrust law. See Blair and Lafontaine (1999) for more on this decision and its likely impact on franchising. Note that in 2007, in *Leegin Creative Leather Products, Inc. v. PSKS, Inc.,* 551 U.S. 877 (2007), the U.S. Supreme Court decided that minimum resale price maintenance would now also be a rule of reason offense.

[49] In fact, results in Kalnins (2004) suggest that consumers have strong preferences even within the hamburger category, for specific brands.

[50] Here the increase in the cross-price elasticity would be due to an increase in the number of competitors.

[51] When our evidence is from very few studies, we do not use a table.

[52] Our specification of a per unit royatly does not fully correspond to the reality of royalties on sales revenue, but it simplifies the analysis. Moreover, with traditional franchising, $\rho$ can be interpreted as the wholesale price that the retailer pays to the manufacturer for the product, and $F$ as the fixed rent that he pays for the use of the retail outlet, which we assume is owned by the upstream firm. If there were no rent, or equivalent fixed payment, dealings between principal and agent would be arms length, and the principal would maximize the wholesale, not the total, surplus.

[53] Most of the theoretical papers on this subject assume that there is no uncertainty and thus no moral hazard, e.g., McGuire and Staelin (1983), Vickers (1985), Bonanno and Vickers (1988), and Rey and Stiglitz (1995).

[54] This assumption implies that the profit of the principal minus her outside option, all raised to the power $\gamma$, which is the principal's relative bargaining power, times the profit of the agent minus his outside option, all raised to the power $1 - \gamma$, is maximized.

[55] For example, even if the franchisee is kept at his reservation utility level, the terms of the contract will have to provide greater expected returns for the franchisee whose reservation utility is greater, as the franchisee otherwise would refuse the contract. The greater expected returns for the franchisee can be achieved with a lower royalty rate, or lower franchise fee, or both. See Lafontaine and Slade (2007, Section 2) for more on this.

[56] If one interprets α in the incentive model as the probability that a contract will be offered, this can be modeled as an increase in η in a model of the importance of the agent's effort, as described in Section 2.

[57] This is not Affuso's interpretation of her results.

[58] Note that, on both margins, i.e. the vertical integraion versus franchising and the franchising versus independent business ownership, higher values of these variables are hypothesized to lead to more company control

[59] In particular, an independent farmer with land is not apt to decide to enter as a sharecropper.

[60] In fact, any factor for which we show no table has received little attention.

[61] Strategic considerations could still surface in local business-format-franchising markets.