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### Payment types and number of franchisees

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# Payment Types and Number of Franchisees

YUNG-HO CHIU and JIN-LI HU

*Current studies of the franchise system usually assume that the number of franchisees is exogenous and irrelevant to the payment types. However, to a franchise system or a franchiser, the optimal number of franchisees is related to the payment types, e.g., franchise fee, royalty, etc. We develop a game-theoretical model and then use 1998 Bond's Franchise Guide Data for US franchise stores in order to test the theoretical predictions. According to our theoretical predictions, the optimal number of franchisees under a royalty is strictly less than that under a franchise fee. This is because royalties distort the effort incentive of franchisees and the franchiser can increase average revenue by having a smaller number of franchisees. A franchise fee will not distort the effort incentive of franchisees and can help achieve a higher profit for both the franchiser and the franchise system. When demand is certain, the optimal royalty rate to the franchise system is zero. Under a royalty payment, the royalty rate will be greater than zero if the franchiser maximises its own profit. Empirical results support our theoretical predictions: there is no significant relationship between franchise fee and number of franchisees. The number of franchisees has a significantly negative relationship with royalties, while it is significantly and positively correlated with the experience of the franchise system, area, training, and advertising fees required by the franchiser.*

## INTRODUCTION

Franchising, as a contractual arrangement between the franchiser and franchisee, is an important source of retail business development. The franchiser is a parent company developing some product or service for sale.

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A franchisee is a firm with a right to duplicate the parent's entire business format at a particular location and for a specified period. A franchisee is required to pay a lump-sum fee or royalty fee for the right to market the product [Rubin, 1978]. Fulop and Forward [1997] categorise the development of franchising into three stages: The first stage is the introduction of license/franchising by Singer Sewing Machine Company in the middle of 1800s. The second stage began in the 1920s and 1930s when similar license/franchising structures were developed by petrol companies, wholesales, and retailers. The third stage dates back to the late 1940s and 1950s when business format franchising was established in the United States. According to Mendelsohn [1992], 140 countries have established this business pattern. Because the pattern of the franchise system allows the sharing of brand name, know-how, technology, quality control, etc., it requires less capital and human resources for individual franchisees.

Four major theories explain the emergence of the franchise system.

1. Resource constraints theory. Emergence of the franchise system is due to scarcity of capital and human resources of the franchiser. Therefore, the franchiser can acquire capital and human resources through the franchise system and the system can reach economies of scale. This theory is advocated by Ozanne and Hunt [1971], Caves and Murphy [1976], Norton [1988], etc.
2. Market power theory. The franchise system is an instrument for an upstream firm to acquire market power over downstream firms, e.g., Inaba [1980], Blair and Kaserman [1982].
3. Agency theory. Many researchers apply the agency theory to explain the existence of franchising, e.g., Rubin [1978], Brickley and Dark [1987], Martin [1988], Norton [1988], Lafontaine [1992] and Martin [1993, 1996]. This theory emphasises the relationships in which one party (the principal) delegates work to another party (agents). It is costly for the principal to monitor the agent. The franchiser has difficulty in monitoring the branches in remote or diversified places, which increases the risk of profit [Martin, 1988]. As a result, the principal designs the franchise system in order to reduce the monitoring cost [Brickley and Dark, 1987]. Moreover, different areas have different risks. Therefore, the franchise system is a hedge instrument to transfer the risk from the franchiser to franchisees. This theory focuses on the efficient contractual relationship between the franchiser and franchisees.
4. Search cost theory. Search cost is another cause for the franchise system to emerge [Minkler, 1992]. If franchisees have more information of the local markets than the franchiser, then the latter has an incentive to recruit franchisees in order to save search cost in local markets.

According to ownership types, outlets in a franchise system can be categorised into company-owned and franchised outlets. Company-owned outlets are under direct command and control by the franchiser. In a franchised outlet, a franchisee owns a franchised outlet and is required to pay a specified payment. In return, the franchiser provides trademarks, brand names, products, know-how, etc., to the franchisees. Franchisees have to not only pay franchise and royalty fees, but also meet the quality requirements.

Franchise and royalty fees are the two most commonly seen franchise payments. The franchise fee is a fixed fee that a franchisee pays to the franchiser. Thus, a franchise fee is a lump-sum transfer payment. A royalty fee is usually a percentage of the sales revenue that a franchisee pays to the franchiser. Thus, a royalty fee is a non-lump-sum transfer payment.

The type of franchise contract distorts the efficiency of a franchise system. Rubin [1978] proposes that the design of the franchise contract solves the principal-agent problem between the franchiser and the franchisees. The franchiser is unable to monitor the true efforts of the franchisees, while there is also a free-riding problem among the franchisees. Therefore, later literature has focused on the franchiser's monitoring schemes on the franchisees' efforts, e.g., Klein [1980], Mathewson and Winter [1985], Brickley and Dark [1987], Norton [1988], Minkler [1990], Lafontaine [1992], Shepard [1993], Scott [1995], Kehoe [1996], Slade [1996], Lafontaine and Slade [1996, 1997], etc. Recently, economists have begun to discuss the effect of the franchise contract (franchise fee and royalty fee, etc.) on the franchisees' efforts, the franchise system's profit, and the franchiser's profit.

Because the franchise fee is a lump-sum transfer payment, it does not distort the effort incentive of the franchisees. However, an increase in the royalty rate decreases the marginal revenues of the franchisees and thus reduces the franchisee's efforts. Lafontaine [1992] collected the data of 548 US chain stores in 1986. With this data set, he then studied the moral hazard problem<sup>1</sup> among the franchiser and the franchisees. He found that the franchiser often reduces the royalty rate to raise the franchisees' effort incentive. Lafontaine concluded that the franchiser can obtain the capital needed or solve the moral hazard problem if the royalty fee rate is minimal or zero.

Although a royalty fee lowers the effort incentives of the franchisees, the franchiser may use the royalty fee revenues to offer public goods to the franchise system and make up for the loss in franchisees' efforts caused by the royalty fee. Assuming that the franchiser is a monopoly and the number of franchisees is exogenous, Lal [1990] conducted theoretical research on royalty fees. When there is no spillover of efforts between the franchiser and the franchisees, a royalty fee reduces the efforts of franchisees. However,

when there is a spillover of efforts between the franchiser and the franchisees, the franchiser can use the royalty fee revenues to promote the brand name, and thus may make up the loss in the efforts of franchisees and the system's profit caused by the royalty fee.

Agrawal and Lal [1995] empirically test Lal's [1990] theory with the data of 43 franchise units in the United States. The questionnaires concern the franchiser's effort in brand name and the franchisees' efforts in service quality. They then use SUR (seemingly unrelated regression) and OLS (ordinary least squares) regressions. Their results show that when there is a spillover between the efforts of the franchiser and franchisees, a royalty fee promotes the franchiser's effort in brand name and thus can enhance the service quality of the franchisees. These empirical findings support the theoretical predictions of Lal [1990].<sup>2</sup>

Scott [1995] empirically studied the franchise contract (franchise and royalty fees) and the ratio of franchise stores to the total number of franchisees. He collected data from 1,022 US franchise units in 1989. The variables are franchise fee, royalty fee, years in the system, number of regions, capital, training, capital/labour ratio, the source of franchisee's equipment, etc. He then applied an OLS regression and the results show royalty fee, years of the franchise system, number of regions, and the source of equipment have no significant correlation with the franchised percentage. However, franchise fee, capital, and training have a significantly positive correlation with the franchised percentage. Moreover, the capital/labour ratio and the franchised percentage have a significantly negative correlation.

Most literature on franchise contract assumes the number of franchisees to be exogenous. Phillips [1991] assumed a monopoly franchiser in order to discuss the relation between resale price maintenance (RPM) and the optimal number of franchised units. His major results are as follows. (1) When the franchiser does not undertake RPM, then to collect more franchise fees for the franchiser, the wholesale price will be lower than the marginal cost. (2) When the franchiser adopts RPM, the competition among the franchisees falls and more franchisees will be recruited. However, many countries in the world consider RPM contracts illegal in general and legal for only a few special cases.

In practice it is very important to determine the optimal number of franchisees under different franchise payment types. However, most existing literature assumes either the number of franchisees to be an exogenous variable [e.g. Lal, 1990; Agrawal and Lal, 1995] or to be irrelevant to franchise contracts [e.g. Phillips, 1991]. In our model, the type of a franchise contract and number of franchisees will be endogenous decision variables for the franchiser. In reality the franchiser has a relatively higher bargaining power over the franchisees and hence usually the

franchiser proposes the franchise contract to a potential franchisee. We will also take the spillover of efforts among the franchisees into account. In addition to theoretical modeling, we will also use 1998 data of US franchise stores to test the propositions derived from our theoretical model.

The next section of this article is the theoretical model in which we apply the game-theoretical approach. The following section is the empirical analysis in which White's heteroscedasticity-consistent covariance matrix is estimated. The final section presents our conclusions.

## THE THEORETICAL MODEL

### *The Basic Model*

The basic model follows the game-theoretical approach. Game theory analyses the strategic interaction among decision-makers. The major difference between a game theory model and a representative (single) decision-maker model is that game theory takes into account every decision-maker's knowledge and expectation of other players.

Suppose there are  $n+1$  players in this game: one franchiser and  $n$  franchisees. The franchiser's strategies are the number of franchisees ( $n$ ), franchise fee ( $T$ ), or royalty rate ( $r$ ). The payoffs are the profits of the franchiser and franchisees. There are two stages in this game. In stage one the franchiser chooses the number of franchisees ( $n$ ) and franchise fee ( $T$ ) or the royalty rate ( $r$ ) in order to maximise his own profit. In stage two each franchisee chooses his service effort ( $e$ ) to maximise his profit.

It is assumed that the cost functions of service efforts are strictly convex. In order to obtain an analytical solution, we assume the cost functions of service effort are

where  $C(0)=0$ ,  $C'(0) > 0$ , and  $C''(0)>0$ . Because franchisees under a

$$C(e) = \frac{c}{2} e^2, \quad c > 0, \quad (1)$$

franchise system also compete with each other, an increase in the number of franchisees will increase competition and decrease individual franchisee's revenue. Thus, revenue for franchisee  $i$  is negatively correlated with the number of franchisees ( $n$ ). However, there is also an external economy effect in this franchise system due to spillover of service efforts, brand reputation, and search cost saving, etc.

Following Lal [1990], we also assume that revenue of franchisee  $i$  increases with his own and the other franchisees' service efforts. The gross revenue function of franchisee  $i$  can be written as

$$R_i = (a-n)(e_i + \beta \sum_{j \neq i} e_j), \quad i = 1, \dots, n, \quad (2)$$

where parameter  $a$  measures the market size; item  $a-n$  implies that the individual franchisee's revenue decreases with the number of franchisees;<sup>3</sup> parameter  $\beta$  is the spillover coefficient of service effort between any two franchisees, with  $0 \leq \beta < 1$ . When all the service efforts are zero, the revenues of all franchisees are also zero.

If the franchiser adopts a franchise fee, then the profit maximization problem for franchisee  $i$  can be written as

$$\max_{e_i} \pi_i = (a-n)(e_i + \beta \sum_{j \neq i} e_j) - \frac{c}{2} e_i^2 - T, \quad i = 1, \dots, n. \quad (3)$$

If the franchiser uses a royalty fee, then the profit maximization problem for franchisee  $i$  can be written as

$$\max_{e_i} \pi_i = (1-r)(a-n)(e_i + \beta \sum_{j \neq i} e_j) - \frac{c}{2} e_i^2, \quad i = 1, \dots, n. \quad (4)$$

where  $1-r$  represents the net revenue share of franchisee  $i$ . We follow the solution concept of the Subgame-Perfect Nash Equilibrium (SPNE) and apply backward induction to solve this game.

#### *The Optimal Number of Franchisees under the Franchise Fee*

We first consider the case when the franchiser charges the franchise fee. In stage 2, franchisee  $i$  chooses his service effort ( $e_i$ ) to maximize his profit ( $\pi_i$ ). The profit maximization problem for franchisee  $i$  can be expressed as

$$\max_{e_i} \pi_i = (a-n)(e_i + \beta \sum_{j \neq i} e_j) - \frac{c}{2} e_i^2 - T, \quad i = 1, \dots, n. \quad (5)$$

Simultaneously solving  $n$  franchisees' profit maximization problems, we obtain the best response of  $n$  franchisees in stage two as

$$e_i = \frac{a-n}{c}, \quad i = 1, \dots, n. \quad (6)$$

Note that

$$\frac{\partial e_i}{\partial T} = 0,$$

i.e., a franchise fee will not distort franchisee  $i$ 's marginal revenue of service effort and his service effort. Moreover,

$$\frac{\partial e_i}{\partial n} < 0,$$

i.e., an increase in the number of franchisees will decrease the marginal revenue of service effort for franchisee  $i$  and hence decrease service effort for franchisee  $i$ . Substituting the best response of franchisees as in Equation 6 into the profit maximization problem for franchisee  $i$  as in Equation 5, we express the profit function for franchisee  $i$  as

$$\pi_i = \frac{1}{2c}(a-n)^2[1+2\beta(n-1)]-T, \quad i=1, \dots, n. \quad (7)$$

In stage one the franchiser chooses the number of franchisees ( $n$ ) and franchise fee ( $T$ ) to maximise his profit. Note that the franchise fee is a transfer payment between a franchisee to the franchiser and therefore the net value of the franchise fee in a franchise system is zero. The franchiser's profit ( $\Pi$ ) maximisation problem can be written as

$$\begin{aligned} \max_{n,T} \Pi &= nT \\ \text{s.t. } \pi_i &= \frac{1}{2c}(a-n)^2[1+2\beta(n-1)]-T \geq 0, \quad i=1, \dots, n. \end{aligned} \quad (8)$$

The optimal franchise fee is

$$T^* = \{\pi_i^* = \frac{1}{2c}(a-n)^2[1+2\beta(n-1)] = \pi_i^*, \quad i=1, \dots, n\};$$

that is, the franchiser can fully exploit franchisee profits by imposing a franchise fee. Thus, the franchiser's profit maximization problem under the franchise fee is

$$\max_n \Pi = n \frac{1}{2c}(a-n)^2[1+2\beta(n-1)]. \quad (9)$$

We can obtain the optimal number of franchisees by solving Equation 9. The optimal number of franchisees under the franchise fee is then denoted by  $n^T$ .



*The Optimal Number of Franchisees under a Royalty Fee*

We discuss second the case when the franchiser adopts a royalty fee. The game structure is still similar to that in the previous section. In stage 2 franchisee  $i$  chooses his service effort ( $e_i$ ) to maximize his profit ( $\pi_i$ ). The profit maximization problem for franchisee  $i$  can be written as

$$\underset{e_i}{\text{Max}} \pi_i = (1-r)(a-n)(e_i + \beta \sum_{j \neq i} e_j) - \frac{c}{2} e_i^2, \quad i = 1, \dots, n. \quad (10)$$

Simultaneously solving  $n$  franchisees' profit maximization problems, we obtain the best response of  $n$  franchisees in stage two as

$$e_i = (1-r) \frac{a-n}{c}, \quad i = 1, \dots, n. \quad (11)$$

Note that

$$\frac{\partial e_i}{\partial r} < 0;$$

this is because the royalty fee decreases a franchisee's marginal revenue of service effort, and thus service effort decreases with the royalty rate. Moreover,

$$\frac{\partial e_i}{\partial n} < 0;$$

an increase in the number of franchisees raises competition and decreases marginal revenue of service effort, and thus service effort decreases the number of franchisees. Substituting the best response of franchisees as in Equation 11 into the profit maximization problem of franchise  $i$  as in Equation 10, we express the profit function for franchise  $i$  as

$$\pi_i = (1-r)^2 (a-n)^2 \frac{1}{2c} [1 + 2\beta(n-1)], \quad i = 1, \dots, n. \quad (12)$$

In stage one the franchiser chooses the number of franchisees ( $n$ ) and royalty rate ( $r$ ) to maximize his own profit. In stage one the franchiser's profit ( $\Pi$ ) maximization problem becomes

$$\begin{aligned} \underset{n,r}{\text{Max}} \Pi &= r \sum_{i=1}^n R_i = \frac{n}{c} r(1-r)(a-n)^2 [1 + \beta(n-1)], \\ \text{s.t. } \pi_i &= (1-r)^2 (a-n)^2 \frac{1}{2c} [1 + 2\beta(n-1)] \geq 0, \quad i = 1, \dots, n. \end{aligned} \quad (13)$$

Solving the above franchiser's profit maximization problem, we get the optimal royalty rate as  $r^*=1/2 > 0$ . Moreover, the franchiser is not able to fully exploit franchisee profits. Substituting the optimal royalty rate  $r^*=1/2$  into Equation 13, we can express the franchiser's profit maximization problem as

$$\begin{aligned} \underset{n}{\text{Max}} \Pi &= r \sum_{i=1}^n R_i = \frac{n}{4c} (a-n)^2 [1 + \beta(n-1)], \\ \text{s.t. } \pi_i &= (a-n)^2 \frac{1}{8c} [1 + 2\beta(n-1)] \geq 0, \quad i = 1, \dots, n. \end{aligned} \quad (14)$$

Solving the above franchiser's profit maximization problem, we can obtain the optimal number of franchisees under a royalty fee, denoted by  $n^r$ .

**[Proposition 1]** *Other things being equal, compared to a royalty fee, a franchise fee will bring higher franchise system profits.*

**[Proof]** Given any number of franchisees ( $n$ ), the system profit under franchise fee ( $\Omega^T$ ) is

$$\Omega^T(n) = \Pi^T(n) + \sum_{i=1}^n \pi_i^T(n) = n \frac{1}{2c} (a-n)^2 [1 + 2\beta(n-1)]. \quad (15)$$

When the franchiser maximizes his profit, the optimal royalty rate ( $r^*$ ) is strictly larger than zero and the system profit ( $\Omega_r$ ) is

$$\Omega^r(n) = \Pi^r(n) + \sum_{i=1}^n \pi_i^r(n) = n \frac{1}{2c} (1-r^*)(a-n)^2 [1 + r^* + 2\beta(n-1)]. \quad (16)$$

Therefore, given the same  $n$ ,

$$\Omega^T(n) - \Omega^r(n) = n \frac{1}{2c} [r^* 2\beta(n-1) + r^*] > 0.$$

That is, under the same number of franchisees, the system profit under a franchise fee is strictly larger than that under the royalty fee. Hence, the maximum system profit under a franchise fee is strictly larger than that under a royalty fee. According to Equations 8 and 9, we know that under a franchise fee, the franchiser's profit maximisation problem will be equivalent to the system profit maximisation problem. Therefore, the system profits will be the same under these two problems as depicted by Equations 8 and 9. The system profit under a franchise fee will hence be strictly larger than that under a royalty fee.  $\square$

The intuitions of Proposition 1 are as follows: Any positive royalty rate decreases the service efforts and hence reduces the system profits. Therefore, a franchiser can fully exploit franchisee profits by a franchise fee or maximise the system profit by not adopting a royalty fee.

We apply a numerical simulation to compare  $n^T$  and  $n^r$ . Excluding negative roots, complex roots, and local minima, we find that there is a unique numerical solution under every franchise contract. The numerical examples are listed in Table 1. We obtain Propositions 2 and 3 from the results in Table 1.

**[Proposition 2]** *The optimal number of franchisees under a royalty fee is strictly less than that under a franchise fee.*

The intuition implied by Proposition 2 is as follows: a royalty fee reduces franchisees' efforts and thus the franchiser has to reduce the number of franchisees in order to reduce competition among franchisees and thus increase the individual franchisee's revenues. Phillips [1991] finds that an RPM agreement can reduce competition among the franchisees. We find that a reduction in franchisees can also reduce competition among the franchisees.

TABLE 1  
THE OPTIMAL NUMBER OF FRANCHISEES UNDER  
DIFFERENT SPILLOVER COEFFICIENTS ( $a=10$ ,  $c=2$ )

Spillover coefficient of service effort ( $\beta$ )	The optimal number of franchisees under a franchise fee ( $n^T$ )	System profit under a franchise fee ( $\Omega^T$ )	Optimal number of franchisees under a royalty fee ( $n^r$ )	System profit under a franchise fee ( $\Omega^r$ )
0.1	4.31662	57.9794	3.94845	37.7704
0.3	4.84406	106.4450	4.53601	61.3063
0.5	5.00000	156.2500	4.77370	85.9546
0.7	5.07350	206.3430	4.89735	110.8770
0.9	5.11616	256.5400	4.97253	135.9030

Lafontaine [1992] finds that the efforts of franchisees become lower as the royalty rate rises. Therefore, the franchiser will lower the royalty fee rate to promote franchisees' efforts. Proposition 2 tells us that a royalty fee reduces individual franchisees' efforts and thus lowers the maximum profit that the franchiser may appropriate. Although Lafontaine [1992] does not consider the problem of the optimal number of franchisees, his empirical findings support Propositions 1 and 2 from our theoretical model.

**[Proposition 3]** *If the spillover coefficient of service efforts increases, then the optimal number of franchisees under franchise and royalty fees will increase.*

An increase in the number of franchisees will enhance the competition among the franchisees and hence decrease a franchisee's revenues. The spillover effect among franchisees can offset the disadvantage from increasing the number of franchisees. Therefore, the franchiser will introduce more franchisees as the spillover coefficient becomes higher.

If the franchiser proposes a two-part tariff franchise contract, that is, a contract with both franchise and royalty fees, then without uncertainty the franchiser's best response is to use only the franchise fee, no matter whether his goal is to maximize his own or the franchise system's profit. Therefore, the results will be the same even if we allow the franchiser to adopt a two-part tariff contract in the theoretical model.

#### EMPIRICAL ANALYSIS

##### *Construction of the Econometric Model*

In this section we apply econometric methods to see whether or not the theoretical propositions are supported by empirical findings. Franchising is essentially a marketing technique used to distribute a product or service. A franchiser and a franchisee have an ongoing agreement and usually the franchise fee and/or royalty fee are included in a franchise agreement. A franchise fee is a lump-sum payment and a royalty fee is a percentage of monthly or annual sales. Through the payment to the franchiser, a franchisee obtains the right to join the franchise system, attend training provided by franchisers, utilise the trademark, and receive franchisers' support in selecting store location, rent or finance. Support from the franchiser ensures that franchisees will start the business smoothly and improve the service quality.

Different franchise systems result in different optimal numbers of franchisees, no matter whether the franchiser maximises his own or the system's profit. According to Propositions 1 and 2, a franchise fee will not distort the effort of franchisees and a royalty fee reduces franchisees' efforts

due a portion of the revenue generated by such effort goes to the franchiser. A franchise fee will bring a higher franchise system profit than a royalty fee. Therefore, we expect that the franchiser can increase average revenue by having a smaller number of franchisees. In other words, if the franchiser maximises the channel profit, then the number of franchisees and royalty rate should be negatively correlated. There should be more franchised units under the franchise fee system than the royalty fee system.

Lafontaine [1992], Shepard [1993] and Scott [1995] suggest that franchising's existence is based on outlet heterogeneity (e.g., the density dispersion of outlets, the experience of franchisers, etc.) and the variety of contracts (e.g., franchise fee and royalty fee, etc.). Therefore, in addition to franchise and royalty fees, five more factors will also influence the proportion of franchised and company-owned outlets [Scott, 1995]: (1) the density or physical dispersion of outlets, (2) the experience of franchisers, (3) firm-specific investment, (4) capital-intensive production, and (5) the franchiser and franchisees' inputs (e.g., training, technical assistance, advertisement, etc.).

First, the more scattered are the locations of the outlets, the more costly it is to monitor on-site performance of a company employee and hence the more likely it is to expand franchising [see Caves and Murphy, 1976; Rubin, 1978; Brickley and Dark, 1987; Martin, 1988; Norton, 1988; Minkler, 1990; Brickley, Dark and Weisbach, 1991; etc.]. Second, based on life-cycle theory, Caves and Murphy [1976] and Martin [1988] find that a franchiser may rely more heavily on franchising in its developmental stage in order to reduce risk. The positive value for the coefficient of age would support this hypothesis. Third, initial investment is measured as the dollar value of the initial and added equipment. Investment in specific production assets generate a stream of quasi-rents which can be expropriated by an opportunistic franchiser. While the threat of losing this stream of quasi-rents gives franchisees the incentive not to debase product quality, it may also make prospective franchisees reluctant to invest in the first place [Scott, 1995]. The expected sign for the coefficient of firm-specific investment is negative.

Fourth, as the production process becomes more capital-intensive, monitoring the quality of the output becomes simpler. This then reduces the franchiser's policing costs and makes franchising more viable. Fifth, the franchiser provides inputs (such as training, technical assistance and advertisement) to franchisees. This helps solve the problem of monitoring quality at retail outlets, and the franchiser is then more likely to expand the franchise system.

Based on the above literature review, there are eight major factors in determining the number of franchisees: (1) age, (2) area, (3) cash

investment, (4) franchise fee, (5) royalty fee, (6) capital/labour ratio, (7) training and (8) advertising. The functional form of the econometric model is assumed as follows:

$$FS=f(\text{Age}, \text{Area}, \text{Cash}, \text{Fran}, \text{Roy}, \text{K/L}, \text{Training}, \text{Adv}) \quad (17)$$

where

*FS*=number of franchisees;

*Age*=number of years that the company has been in franchising;

*Area*=number of states in which the franchiser has retail outlets;

*Cash*=average cash investment needed to open up a franchised unit (\$000);

*Fran*=franchise fee;

*Roy*=royalty fee;

*K/L*=average total investment by franchising divided by average number of full-time employment per outlet;

*Training*=number of hours of training provided by the franchiser;

*Adv* = percentage of franchise total revenue that is required to be contributed to advertising.

The relationships of the dependent variable and various independent variables in Equation 17 are summarised below:

*Dependent variable: number of franchisees (FS).* Number of franchisees is the number of franchised units and is treated as a dependent variable in regression equations.

*Independent variable.* The relationships between the dependent variable and independent variables discussed in this study are summarized as follows:

1. *Age* (the experience of franchisers). The coefficient of *Age* is predicted to be positive or negative in the regressions. Scott [1995] believes that as the franchiser learns more about local market conditions over time, it is less likely to rely on franchised outlets in a particular location. However, Minkler [1990] predicts that the more experience the franchise has in a market, the more likely it is to own the outlets. Therefore, the sign of the *Age* coefficient may be either positive or negative.
2. *Area*. Greater dispersion in locations implies more supervisors and higher monitoring costs since time is lost moving between locations. Shirking incentives decrease by the franchise agreement since the franchisee has a claim on the residual. Hence, more remote locations are likely to be franchised and geographically-concentrated are more likely

- to be retained as company-owned outlets [Martin, 1988]. A positive relationship between *Area* and number of franchisees is expected.
3. *Cash* (cash investment). The expected sign for the coefficient of firm-specific investment is negative, if franchisees' fear of being held up by an opportunistic franchiser increases with their up-front cash investment [Scott 1995].
  4. *Fran* (franchise fee). If franchisees cannot use the trademark of a franchiser or franchisers do not provide any further support after the establishment of franchised units, then a franchise fee paid by franchisees is considered as a sunken cost. Franchisees have no incentive to increase the franchiser's profit. Moreover, franchisees have a free rider problem and do not necessarily meet the standard quality required by the franchiser. This results in reducing the quality of all franchised units, increasing the costs of monitoring franchisees, decreasing sales and competitiveness, and dropping the business in whole-franchised units. In this circumstance, the franchiser should intend to reduce or not to increase the number of franchisees in this system. As a result, it is concluded that the relationship between franchise fee and the number of franchisees is negative or insignificant.
  5. *Roy* (royalty fee). The result of franchisees' effort belongs to franchisers while the royalty fee is higher [Lafontaine, 1992]. This reduces the franchisees' interest in making an effort on the franchise business. In order to stimulate franchisees' effort, franchisers usually reduce the royalty fee. When a royalty fee is minimal or approximately zero, the franchisers can easily obtain capital from potential investors and resolve the moral hazard problem. Proposition 2 indicates that a royalty fee reduces the number of franchisees. As a result, it is concluded that the relationship between a royalty fee and the number of franchisees is negative.
  6. *K/L* (capital/labor). There should be a negative relationship between the capital/labor ratio and number of franchisees. This implies that monitoring a company manager is easier for more capital-intensive production processes [Scott, 1995].
  7. *Training*. The franchiser provides training to franchisees. Training from the franchiser ensures that franchisees shall start the business smoothly and improve service qualities. The number of franchisees and training should then have a positive relationship. However, greater asset specificity creates a bilateral monopoly and leads to greater reliance on internal organisation [Williamson, 1981]. Training can also induce more direct ownership, making the *Training* coefficient negative. As a result, the relation between number of franchisees and training can be either positive or negative.
  8. *Adv* (advertising). The number of franchisees and *Adv* should have a positive relationship. Since advertisement reduces the free-riding

problem among franchisees, the franchiser will likely expand franchising [Brickley and Dark, 1987].

#### *Data Source*

The data are obtained from *Bond's Franchise Guide* [Bond, 1998]. Specific definitions of the variables used in the empirical work are contained in Table 2. The material differentiation among firms is expected to result in a biased estimation. In order to prevent significant variation from incurring in this study, we therefore select only 8 similar categories out of the above 54 distinct categories as samples in this empirical analysis. There are 317 sampled firms in eight selected distinct categories: (1) Food: donuts/cookies/bagels, (2) Food: candy, (3) Food: coffee, (4) Food: ice cream/yogurt, (5) Food: pretzels, (6) Food: quick service/take-out, (7) Food: restaurant/family style, (8) Food: specialty foods. Due to the missing values in different independent variables, the usable number of sampled firms goes down from 317 to 234.

#### *Empirical Analysis Result*

Let us first consider potential econometric problems before attempting to interpret these results. Given the data's cross-section, there are two possible problems that should be addressed—heteroscedasticity and multi-collinearity.

TABLE 2  
DATA SOURCE AND DESCRIPTION

Variable	Meaning	Date source and description
<i>FS</i>	Number of franchise chain stores	Bond 1998.
<i>Age</i>	The experience of franchisers	Bond 1998.
<i>Area</i>	The number of states in which the franchiser has retail outlets	Bond 1998.
<i>Cash</i>	Average cash investment needed to open up a franchise unit (\$1,000)	Bond 1998.
<i>FRAN</i>	Franchise fee	Bond 1998.
<i>ROY</i>	Royalty fee	Bond 1998.
<i>K/L</i>	Average total investment by franchising divided by average number of full-time employment per outlet	Bond 1998.
<i>Training</i>	Number of hours of training provided by the franchiser	Bond 1998.
<i>Adv</i>	Percentage of franchise total revenue that is required to be contributed to advertising	Bond 1998.

*Adv* = 1 if franchise agreement contains an advertising fee; otherwise, *Adv* = 0.

*Note:* The above data includes all retail industries.



When heteroscedasticity exists, the OLS estimators are still unbiased, but are not efficient. Moreover, when multi-collinearity exists, the estimates of the regression coefficients are highly imprecise. Thus, we use the Breusch-Pagan test to test for the presence of heteroscedasticity and apply the Variance Inflation Factor (VIF) to detect multi-collinearity, where VIF are reported in Table 3. The largest VIF is 1.4890.<sup>4</sup> These estimates support the contention that multi-collinearity is not a serious problem in this data set. However, the computed values of the Breusch-Pagan test statistics (=18.1548) for the linear models are larger than the critical values at the five per cent level of significance. Therefore, we cannot reject the alternate hypothesis of heteroscedasticity at the five per cent level of significance. Because of the heteroscedasticity problem, we use White's heteroscedasticity-consistent covariance matrix estimators<sup>5</sup> to estimate the regression.

The results of White's heteroscedasticity-consistent covariance matrix estimators on Equation 17 are summarised in Table 3. As depicted in Table 3, the *F*-test (=14.27) is significant at the 0.1 per cent level. The results confirm that the joint explanatory power of the explanatory variables is highly significant.

The relationship between franchise fee and number of franchisees is insignificant at the five per cent level in the empirical model. This result is consistent with Proposition 1. The relationship between royalty fee and number of franchisees is negative and significant in the empirical model at the ten per cent level. This indicates that a royalty fee reduces the effort of franchisees. Consequently, in order to achieve their own profit and expand

TABLE 3  
WHITE'S REGRESSION ESTIMATES OF FRANCHISEES  
– NUMBER IN FRANCHISE SYSTEMS

	Parameter estimate	<i>t</i> -test	<i>P</i> -value	Variance inflation
Constant	-773.92	-2.251**	0.025	0.000
<i>Age</i>	22.38	2.519**	0.0125	1.1487
<i>Area</i>	41.59	3.446***	0.0007	1.1254
<i>Cash</i>	-0.004	-1.045	0.2972	1.4890
<i>FRAN</i>	-0.117	-1.149	0.2517	1.4811
<i>ROY</i>	-2,447.64	-1.712*	0.088	1.0153
<i>K/L</i>	0.009	1.339	0.1819	1.0067
<i>Train</i>	0.309	2.380**	0.00182	1.0420
<i>Adv</i>	197.32	1.772*	0.0778	1.0550
Adjusted <i>R</i> <sup>2</sup>	0.3366			
<i>F</i> -value	14.27***			
Number of firms	234			

\* Significant at 10% level.

\*\* Significant at 5% level.

\*\*\* Significant at 1% level.

the franchise system, franchisers should reduce the number of franchisees in order to lessen competition among franchisees and increase average profit. The empirical relationship between royalty fee and the number of franchisees is consistent with our Proposition 2 and Lafontaine [1992] where a royalty fee reduces individual franchisees' efforts.

In Table 3 there exists a positive and significant relationship between *Age* and number of franchisees at the one per cent level. This outcome is the same as Martin [1988], Lafontaine [1992] and Scott [1995] in which the number of franchisees increases as a franchise system becomes mature. However, it is inconsistent with Minkler's [1990] result. The relationship between area and the number of franchises is significantly positive at the five per cent level. The more regions in North America where the franchiser operates, the more likely the franchiser will increase number of franchisees. In other words, the geographical dispersion increase franchisers' propensity to franchise. This is consistent with Brickly and Dark [1987], Norton [1988], Martin [1988], Brickley, Dark and Weisbach [1991], Lafontaine [1992], Lafontaine [1993] and Scott [1995]. Training provided by the franchiser has a significantly positive effect on number of franchisees at the five per cent level. Moreover, advertising fees required by the franchiser have a significantly positive effect on number of franchisees at the ten per cent level. This is consistent with Brickley and Dark [1987] in which franchisees share advertising fees in order to solve the free-riding problem. The coefficient on average cash investment has the theoretically predicted sign, but it is insignificant. The capital-intensive coefficient has a sign opposite to theoretical prediction, but it is insignificant.

#### CONCLUDING REMARKS

Most existing literature assumes the number of franchisees to be exogenous or irrelevant to the types of franchise contracts. This article's contribution is to make the number of franchisees and the type of franchise contract as the decision variables of the franchiser at the same time. An increase in the number of franchisees raises the competition among the franchisees and reduces the average revenue. In our theoretical model, we also take the spillover of efforts among the franchisees into account. We first build a game-theoretical model and apply the solution concept of SPNE to solve this game by backward induction. We then set up an econometric model and use 1998 data of United States franchise stores to test the propositions derived from our theoretical model.

Our theoretical model predicts that there will be fewer franchisees under a royalty fee than under a franchise fee. This is because the franchiser wants to increase the average revenue by decreasing the number of franchisees in order to make up the loss due to the distortion of the royalty fee on the effort

incentives of the franchisees. A franchise fee does not distort the effort incentives of the franchisees and brings a higher profit for both the franchiser and the system. If the franchiser adopts a franchise fee, then there will be more franchisees and a higher system profit can be achieved.

We use 1998 data of United States franchise systems and then apply White's heteroscedasticity-consistent covariance matrix estimators to do empirical analysis. Our empirical findings show that the relation between franchise fee and franchised stores is not significant. The royalty fee and number of franchisees have a significantly negative correlation. Our empirical findings support our theoretical predictions.

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#### NOTES

1. Moral hazard occurs when one party to a contract has an incentive after the contract is made to alter behaviour in a way that harms the other party to the contract.
2. However, Lal [1990] and Agrawal and Lal [1995] do not discuss the cases when the franchiser uses the franchise fee revenues to provide public goods (e.g., brand name) for the franchise system. Since a franchise fee will not distort the effort incentives of the franchisees, the maximum system profit and franchisees efforts should be higher if the franchiser uses franchise fee revenues to provide public goods rather than using royalty fee revenues.
3. The first item ( $a-n$ ) on the right-hand side of Equation 2 can be viewed as a generalised reduced form for the downstream oligopoly market. It can be applied to many situations. For example, the RPM described by Phillips [1991] is equivalent to taking the average revenue as a non-decreasing function of the number of franchised; that is, the first item in Equation 2 will become  $(a-0 \times n)$ . After the franchiser eliminates the negative impact of increasing franchisees on the average revenue, the optimal number of franchisees can increase.
4. As a rule of thumb, a severe multi-collinearity problem exists if any VIF of these coefficients is greater than ten.
5. White has shown that the heteroscedasticity-consistent covariance matrix estimators can be performed so that asymptotically valid statistical inferences can be made about the true parameter value. For details, see White [1980] or Greene [1997].

#### REFERENCES

- Agrawal, D. and R. Lal, 1995, 'Contractual Arrangements in Franchising: An Empirical Investigation', *Journal of Marketing Research*, Vol.32, No.2 pp.213-21.
- Blair, R. and D. Kaserman, 1982, 'Optimal Franchising', *Southern Economic Journal*, Vol.50, No.2, pp.494-505.
- Bond, R., 1998, *Bond's Franchise Guide*, Oakland, CA: Source Book Publications.
- Brickley, J.A. and F.H. Dark, 1987, 'The Choice of Organization Form: The Case of Franchising', *Journal of Financial Economics*, Vol.18, No.2, pp.401-20.
- Brickley, J.A., F.H. Dark and M.S. Weisbach, 1991, 'The Economic Effects of Franchise Termination Laws', *Journal of Law and Economics*, Vol.34, No.1, pp.101-32.
- Caves, R.E. and W.F. Murphy, 1976, 'Franchising: Firms, Market, and Intangible Assets', *Southern Economic Journal*, Vol.42, No.2, pp.572-86.
- El-Ansary, A. and L.W. Stern, 1972, 'Power Measurement in the Distribution Channel', *Journal of Marketing Research*, Vol.9, No.1, pp.47-52.

- Fama, E.F. and M.C. Jensen, 1983, 'Agency Problems and Residual Claims', *Journal of Law and Economics*, Vol.26, No.2, pp.327-49.
- Fulop, C. and J. Forward, 1997, 'Insights into Franchising: A Review of Empirical and Theoretical Perspectives', *The Service Industries Journal*, Vol.17, No.4, pp.603-605.
- Gallini, N.T. and N.A. Lutz, 1992, 'Dual Distribution and Royalty Fees in Franchising', *Journal of Law, Economics, and Organization*, Vol.8, No.3, pp.471-501.
- Greene, W.H., 1997, *Econometric Analysis*, New York: Macmillan.
- Inaba, F.S., 1980, 'Franchising: Monopoly by Contract', *Southern Economic Journal*, Vol.47, No.1, pp.65-72.
- Kehoe, M.R., 1996, 'Franchising, Agency Problems, and the Cost of Capital', *Applied Economics*, Vol.28, No.11, pp.1485-93.
- Klein, B., 1980, 'Transaction Cost Determinants of 'Unfair' Contractual Arrangements', *American Economic Review*, Vol.70, No.2, pp.356-62.
- Lafontaine, F., 1992, 'Agency Theory and Franchising: Some Empirical Results', *Rand Journal of Economics*, Vol.23, No.2, pp.263-83.
- Lafontaine, F., 1993, 'Contractual Arrangements as Signaling Devices: Evidence from Franchising', *Journal of Law, Economics and Organization*, Vol.9, No.2, pp.256-89.
- Lafontaine, F. and M.E. Slade, 1996, 'Retail Contracting and Costly Monitoring: Theory and Evidence', *European Economic Review*, Vol.40, No.3-5, pp.923-32.
- Lafontaine, F. and M.E. Slade, 1997, 'Retail Contracting: Theory and Practice', *Journal of Industrial Economics*, Vol.45, No.1, pp.1-25.
- Lal, R., 1990, 'Improving Channel Coordination Through Franchising', *Marketing Science*, Vol.9, No.4, pp.299-318.
- Martin, R.E., 1988, 'Franchising and Risk Management', *American Economic Review*, Vol.78, No.5, pp.954-68.
- Martin, R.E., 1993, 'Franchising, Liquidity Constraints and Entry', *Applied Economics*, Vol.25, No.9, pp.1269-77.
- Martin, R.E., 1996, 'The Market for Franchise Opportunities', *Bulletin of Economic Research*, Vol.48, No.2, pp.97-114.
- Mathewson, G.F. and R.A. Winter, 1985, 'The Economics of Franchise Tying Contracts', *Journal of Law and Economics*, Vol.28, No.3, pp.503-26.
- Mendelsohn, M., 1992, *Franchising in Europe*, London: Cassell.
- Minkler, A.P., 1990, 'An Empirical Analysis of a Firm's Decision to Franchise', *Economics Letters*, Vol.34, No.1, pp.77-82.
- Minkler, A.P., 1992, 'Why Firms Franchise: A Search Cost Theory', *Journal of Institutional and Theoretical Economics*, Vol.148, No.2, pp.240-59.
- Norton, S.W., 1988, 'An Empirical Look at Franchising as an Organizational Form', *Journal of Business*, Vol.61, No.2, pp.197-218.
- Ozanne, U.B., and S.D. Hunt, 1971, *The Economic Effects of Franchising*, Washington, DC: US Government Printing Office.
- Phillips, O.R., 1991, 'Vertical Restrictions and the Number of Franchises', *Southern Economic Journal*, Vol.58, No.2, pp.423-9.
- Rubin, P.H., 1978, 'The Theory of the Firm and the Structure of the Franchise Contract', *Journal of Law and Economics*, Vol.21, No.1, pp.223-33.
- Scott, F.A., 1995, 'Franchising vs. Company Ownership as a Decision Variable of The Firm', *Review of Industrial Organization*, Vol.10, No. 1, pp.68-81
- Sen, K.C., 1993, 'The Use of Initial fees and Royalties in Business Format Franchising', *Managerial and Decision Economics*, Vol.14, No.2, pp.175-90.
- Shepard, A., 1993, 'Contractual Form, Retail Price, and Asset Characteristics', *Rand Journal of Economics*, Vol.22, No.1, pp.120-35.
- Slade, M.E., 1996, 'Multitask Agency and Contract Choice: An Empirical Assessment', *International Economic Review*, Vol.37, No.2, pp.465-86.
- White, H., 1980, 'A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity', *Econometrica*, Vol.48, No.4, pp.817-38.
- Williamson, O.E., 1981, 'The Modern Corporation: Origins, Evolution, Attributes', *Journal of Economic Literature*, Vol.19, No.4, pp.1537-68.
- Williamson, O.E., 1985, *The Economic Institution of Capitalism*, New York: The Free Press.