Pacific Economic Review

Pacific Economic Review, 15: 5 (2010) pp. 674–684
doi: 10.1111/j.1468-0106.2010.00523.x

GENERAL EQUILIBRIUM ANALYSIS OF HOLD-UP PROBLEM AND NON-EXCLUSIVE FRANCHISE CONTRACT

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Abstract. In this paper, we develop a general equilibrium model that examines the emergence of non-exclusive franchise contracts in the presence of the franchisor hold-up problem. Our model of an endogenous franchising network underscores the trade-off between the cost associated with specifying and enforcing the contractual terms and the cost associated with broadening the relationships with multiple franchisors. We show that when the contracting cost relative to the relational cost is high and when the economies of specialization is low, a non-exclusive franchise contract is an optimal contractual arrangement to mitigate franchisor opportunism.

1. INTRODUCTION

In a typical franchise agreement, the franchisee receives an exclusive right to sell the franchised product. The franchisor supplies inputs such as the use of trademarks, managerial assistance or leasing of equipments for use in the production of franchised products. In return, the franchisor receives a royalty fee from the franchisee. To control the price and maintain the quality standard of the product, the franchisor often imposes various restrictions on the franchisee, including pricing policies, particular methods of operation and marketing schemes. The franchisee might face territorial restrictions to ensure that he or she is not competing directly with other franchisees.

In most franchise networks, there is one franchisor and many franchisees. As the number of franchisees increases, the franchise network expands. However, it is not uncommon for the franchisee to have multiple franchisors for fear of the hold-up problem, which typically arises when the franchisee makes significant franchise-specific investments (Williamson, 1983). These investments might include installing specialized equipment, training employees or other forms of human capital investment that are specific to the franchise business. Because the investment is sunk, the franchisor can expropriate quasi rent from the franchisee through, for example, raising input prices supplied to the franchisee. Additionally, the franchisor can exercise the right to terminate the franchise relationship after appropriating resources that have been invested heavily by the franchisee.[1]

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[1] The power to terminate a franchise relationship by the franchisor has two effects. On the one hand, it reduces agency problem arising from the franchisee as the franchisor can terminate shirking franchisees. On the other hand, it promotes franchisor opportunism (see Brickley *et al*., 1991). Klick *et al*. (2006) empirically examine the impact of the Iowa statute enacted in 1992 that prevents

Klein *et al*. (1978) attribute this hold-up problem to incomplete contracts. Imperfect and incomplete contract terms might create opportunities for the contracted party to engage in a hold-up. In most franchise contracts, the hold-up problem tends to prevail because the duration of a franchise contract is generally long[2] and contractual terms are rarely renegotiated prior to the contract expiration.

To manage the hold-up problem, different contractual arrangements can be made to discourage post-contractual franchisor opportunism. For example, a territorial exclusion clause can be introduced in a franchise contract to prevent a franchisor from appropriating returns after the franchisee has invested in the local market by adding new franchises in the franchise neighbourhood (Mathewson and Winter, 1994). Contract duration can be extended to encourage the contracted parties to commit and to provide the opportunity for the franchisee to recoup his or her investment (Brickley *et al*., 2006; Vazquez, 2007).

In the present study, we consider another contractual arrangement to manage the hold-up problem when the cost of specifying all possible contingencies in the franchise contract is high.[3] Under this contractual arrangement, the franchisee is allowed to contract more than one franchisor. We call it the *non-exclusive franchise contract*. We construct a general equilibrium model that considers the trade-off between the endogenous transaction cost of increasing the precision of the terms stipulated in a franchise contract with a particular franchisor and the endogenous cost of cultivating relationships with many potential franchisors. Increasing the precision of the contractual terms means that the franchise contract would have detailed contingency terms associated with the rights and responsibilities of contractual parties, which could potentially limit franchisor opportunism.

In contrast to the existing published literature where exclusive contracts are generally assumed by definition, our model explains why, in practice, the franchisee is allowed to contract with multiple franchisors. For example, in the soft drink industry, the bottlers (franchisees) are allowed to package different products from competing concentrate producers (franchisors). Credit card issuing banks (franchisees) who sign franchise contracts with payment processing companies such as Visa or MasterCard (franchisors) are granted non-exclusive rights to use their licensed trademark on their cards and the payment systems to process the transactions. From the franchisor's perspective, non-exclusive arrangements can be optimal if the benefit of a broader franchisor network outweighs the cost.

In the present paper, we use the Smithian framework pioneered by Yang (1988, 2001) and Yang and Ng (1993) to endogenize the hold-up problem. This

franchise termination at will on the franchise network. Interestingly, the study finds evidence that franchisee opportunism was generally a more important problem than franchisor opportunism as the increase in franchisor operated units was not large enough to offset the decline in franchised units at the passage of the law.

[2] Brickley *et al*. (2006) find that 93% of the franchises in their sample have contract durations of either 5, 10, 15 or 20 years, and more than 50% of the franchises have contract duration of 10 years.

[3] For the hold-up risk to exist, contracts between two parties must be incomplete; that is, some contingencies are unforeseeable or they might simply be too costly to specify.

analytical framework is extremely powerful because the framework assumes there is no ex-ante dichotomy between pure consumers and producers. Individuals make *inframarginal* decisions about their level and pattern of specialization. Unlike existing neoclassical models, a franchise network is not exogenously given; instead, it emerges from the division of labour when the relevant transaction cost is sufficiently low. In this framework, the transaction cost is the key ingredient for the network properties of the equilibrium structure.

The remainder of the paper is organized as follows. Section 2 presents the Smithian model of the franchising network and derives the optimal franchising agreements that trade off the endogenous contracting cost and relational cost when hold-up risk is present. Section 3 concludes.

2. GENERAL EQUILIBRIUM MODEL OF FRANCHISING NETWORK

Consider an economy with a continuum of ex-ante identical consumer–producers of mass M. There is one consumer good, y, and one intermediate good (intangible know-how), x. In producing y, an intermediate good x is required, which can either be self-provided or purchased from the market. The decision problem of an individual consumer–producer in autarky is:

$$\max_{l_x, l_y} u = y \tag{1a}$$

subject to, respectively, the production function of x, the production of y and the endowment constraint:

$$x^s = (l_x)^b,\ y = (x^d l_y)^a,\ l_x + l_y = 1. \tag{1b}$$

x^s is the total quantity of good x produced; x^d is the amount of good x required in the production of y; y is the amount of good y produced; l_x and l_y are the labour hours devoted to the production of goods x and y; and the parameters a and b represent the degree of economies of specialization. For $a > 1$, the marginal labour productivity dy/dl_y increases with the individual level of specialization in its production. Furthermore, the average labour productivity, y/l_y, also increases with the person's level of specialization in the production of good y. The solution to the decision problem (eqn 1) yields the corner equilibrium per capita real income in autarky structure (A):

$$U_A = [b^b/(1+b)^{(b+1)}]^a. \tag{2}$$

We now consider the case of division of labour, where a franchise arrangement is made between two parties. To facilitate the arrangement in the division of labour, the specialist producer of franchised good y (or the franchisee), establishes a contract with the specialist producer of intermediate good x (or the franchisor). This contract is described by $\{n, r\}$, where n is any positive integer and $r \in [0, 1]$. n captures the level of exclusivity of the agreement; it refers to the maximum number of potential specialist producers of x that the specialist producer of y is allowed to establish contracts with under the contract. If $n = 1$, the franchise contract is exclusive. If $n > 1$, the franchise contract is non-exclusive. r captures the precision of the terms stipulated in the franchise contract, such as outlining detailed terms to protect against risks and to provide for all possible contingency. In other words, it measures the degree of contract completeness. $1 - r$ represents the probability of the franchisor failing to deliver the intermediate good of a given quality, which is caused by some anticipated hold-up problem or the opportunistic behaviour of the franchisor. Hence, the higher the r, the higher the degree of contract completeness and the lower the risk of hold-up. When the contract is complete, $r = 1$.[4]

Under this contract, the franchisor provides an input to the franchisee. Although the franchisee faces the risk of coordination failure of the transaction, he or she can enhance the transaction efficiency, through: (i) increasing r; or (ii) investing time and effort to cultivate relationships with more than one potential franchisor so that he or she can switch to other should the exchange fail. Therefore, the franchisee must optimally trade off the cost associated with specifying and enforcing the contractual terms and the cost associated with broadening the relationships with multiple suppliers of franchised inputs.

The decision problem for franchisor x is:

$$\max_{l_x} u = y^d \tag{3a}$$

$$\text{subject to: } x^s = (l_x)^b, l_x = 1, x^s = py^d, \tag{3b}$$

where the relative price $P = p_y/p_x$. $x^s = py^d$ is the budget constraint. The decision problem for franchisee y is:

$$\max_{l_y} u = y \tag{4a}$$

$$\text{subject to: } y + y^s = P(x^d l_y)^a, l_y + l_c + l_s = 1, py^s = x^d. \tag{4b}$$

For $l_i \in [0, 1]$ and $i = y,c,s$. l_c is the labour cost exerted to cultivate n potential suppliers of intermediate good x, where:

$$l_c = cn. \tag{4c}$$

c is the relation transaction cost coefficient, for $c \in [0, 1]$. Because l_c is increasing in n, it can be regarded as the networking decision variable of the network effect. If c is small, the cost of exploiting the network effect is small. l_s is labour cost exerted in specifying and enforcing the terms of the contract with the incumbent franchisor x, where:

[4] We do not explicitly model franchise-specific investment made by the franchisee for two reasons. First, we adopt the line of reasoning of Klein *et al*. (1978) that the hold-up problem is a derivative of the incomplete contract. Second, relation-specific investment is irrelevant in our static framework and we are only concerned about endogenous transaction costs caused by contract incompleteness.

$$l_s = sr, \tag{4d}$$

s is the contracting cost coefficient. Given n potential x specialists, the aggregate reliability of y specialist receiving intermediate input x is:

$$P = 1 - (1 - r)^n. \tag{4e}$$

Hence, $1 - P$ represents the aggregate risk of coordination failure. The expected number of consumer goods produced is: $E[y + y^d] = P(x^d l_y)^a + (1 - P)0$. We specify the contracting cost coefficient s as a function of n:

$$s = \rho n^m, \tag{4f}$$

where ρ is a positive constant and it is a contracting efficiency parameter. $m \in [0, 1]$ implies that as n increases, the total cost of contracting increases but the average contracting cost coefficient for each potential franchisor, s/n, decreases because as the number of potential franchisor increases, the franchisee accumulates experiences in constructing the contract. m can be interpreted as the elasticity of the contract cost coefficient s relative to the number of potential franchisor, n, as $m = (ds/s)/(dn/n)$.

The solutions to the optimization problems (eqns 3 and 4) yield the optimal amount of consumer goods that are supplied to the market and are self-produced, y^s and y, respectively, and the optimal amount of intermediate good demanded by the franchisee, x^d:

$$y^s = (aPp^a(l_y)^a)^{1/(1-a)},\ y = (1-a)a^{a/(1-a)}(Pp^a(l_y)^a)^{1/(1-a)},\ x^d = (aPp(l_y)^a)^{1/(1-a)}. \tag{5}$$

The market clearing condition yields the relative number of franchisors and franchisees:

$$M_x/M_y = x^d = (aPp(l_y)^a)^{1/(1-a)}. \tag{6}$$

Note that $M_x/M_y < 1$ because we allow the franchisee to engage with multiple franchisors. Substituting the optimal level of y, y^s and x^d into the utility functions yields the expected indirect utility functions for the specialists.

Next, we assume that there is free entry into both occupations. That is, each individual consumer–producer can freely choose to become a franchisor or a franchisee. This implies that in equilibrium, the franchisor and the franchisee yield the same utility. The utility equalization condition yields the corner equilibrium expected indirect utility, which is a function of a, m, c, ρ, n and r, and the corner equilibrium relative price p:

$$U_D(a, m, c, \rho, n, r) = (1-a)^{1-a} a^a P(l_y)^a \tag{7}$$

$$p = p_y/p_x = \frac{1}{(1-a)^{1-a} a^a P(l_y)^a}. \tag{8}$$

The corner equilibrium in this structure is characterized by the optimal degree of competition n^* and optimal degree of contract completeness r^*. These can be obtained by deriving the first-order condition for the following optimization problem:

$$\max_{r\in[0,1],n\in Z^+} \ln U_D = B + \ln P + a\ln(l_y) \tag{9}$$

subject to: $P = 1 - (1 - r)^n$, $l_y = 1 - sr - cn$ and $s = \rho n^m$,

where $B = (1 - a)\ln(1 - a)^{1-a} + a\ln a$. Solving the optimization problem (eqn 9) can be quite tricky as we need to consider possible corner solutions of r and n. The Lagrangian of equation 9) is given by:

$$\begin{aligned} L = &(1-a)\ln(1-a)^{1-a} + a\ln a + \ln(1-(1-r)^n) + a\ln(1-\rho n^m r - cn) \\ &+ \lambda_1 r + \lambda_2(1-r) + \lambda_3(n-1) \end{aligned} \tag{10}$$

From (14), we have eight Kuhn–Tucker conditions:

$$\frac{\partial L}{\partial n} = \frac{-(1-r)^n \ln(1-r)}{1-(1-r)^n} + \frac{-a(\rho m n^{m-1} r + c)}{1-\rho n^m r - cn} + \lambda_3 = 0, \tag{11}$$

$$\frac{\partial L}{\partial r} = \frac{n(1-r)^{n-1}}{1-(1-r)^n} + \frac{-a\rho n^m}{1-\rho n^m r - cn} + \lambda_1 - \lambda_2 = 0, \tag{12}$$

$$\lambda_1 r = 0, \lambda_2(1-r) = 0, \lambda_3(n-1) = 0, \tag{13}$$

$$\lambda_1 \geq 0, \lambda_2 \geq 0, \lambda_3 \geq 0. \tag{14}$$

It can be easily shown that only two Kuhn–Tucker conditions exist without leading to contradiction. They are:

(i) $\lambda_1 = 0$, $\lambda_2 = 0$, $\lambda_3 > 0$, which implies $0 < r^* < 1$ and $n^* = 1$; and
(ii) $\lambda_1 = 0$, $\lambda_2 = 0$, $\lambda_3 = 0$, which implies $0 < r^* < 1$ and $n^* > 1$.

We have an exclusive franchising agreement in (i) because $n^* = 1$. We have a non-exclusive franchising agreement in (ii) because it allows the franchisee to contract with multiple franchisors ($n^* > 1$). Now let us examine these two optimal contracts individually.

2.1. *Exclusive franchise contract: $0 < r^* < 1$ and $n^* = 1$*

In this contract, the optimal choice of n is at its minimum. The optimal choice of r is derived based on the first-order condition $\partial L/\partial r|_{n^*=1} = 0$:

$$r^* = \frac{1-c}{(1+a)\rho}. \tag{15}$$

Differentiating r^* with respect to ρ, a and c show that:

$$\partial r^*/\partial\rho < 0, \partial r^*/\partial a < 0 \text{ and } \partial r^*/\partial c < 0. \tag{16}$$

As the cost of specifying and enforcing contractual terms with the incumbent franchisor, ρ, falls, the franchisee chooses to have a higher degree of precision of contractual terms. As the degree of economies of specialization, a, rises, labour productivity increases. The franchisee is willing to trade off additional labour cost with a lower degree of contract completeness. When the relational cost, c, increases, the franchisee must lower the labour cost, l_c, because the opportunity cost of having a precise contract increases, which implies a lower r^*.

Substituting r^* into $\partial L/\partial n$ and setting $\partial L/\partial n = 0$ yields the value of λ_3. It can be shown that λ_3 is strictly positive if:

$$m > m' \equiv -\frac{1}{1-c}\left[(1+a)c + ((1+a)\rho + c - 1)\ln\left(\frac{(1+a)\rho + c - 1}{(1+a)\rho}\right)\right]. \tag{17}$$

Because m' is always negative, the sufficient conditions for λ_3 to be positive are:

$$m > 0, (1+a)\rho + c > 1 \text{ and } c < 1. \tag{18}$$

The conditions in equation 18 are also the sufficient conditions for the corner equilibrium: $n^* = 1$ and $r^* = (1 - c)/[(1 + a)\rho]$. Substituting n^* and r^* into the indirect utility function (eqn 7) yields corner equilibrium utility for structure D:

$$U_{D,n^*=1} = (1-a)^{(1-a)} a^{2a} \left(\frac{1}{\rho}\right)\left(\frac{1-c}{1+a}\right)^{(1+a)}. \tag{19}$$

It can be shown that:

$$\partial U_{D,n^*=1}/\partial\rho < 0, \partial U_{D,n^*=1}/\partial c < 0, \partial U_{D,n^*=1}/\partial m = 0. \tag{20}$$

Because $\partial U_A/\partial b < 0$, we establish the following proposition:

Proposition 1. *If parameters a, ρ, m and c satisfy the following conditions in the optimization problem (eqn 9):*

$$m > 0, (1+a)\rho + c > 1, c < 1,$$

we have an exclusive franchising agreement as the optimal number of potential x specialists, n, is 1 and the optimal degree of precision of contractual terms in the franchise contract r* is (1 − c)/[(1 + a)ρ]. The general equilibrium is division of labour with an exclusive franchising agreement if the relational cost coefficient c or the contracting cost coefficient s (= ρ) is sufficiently small, or if the degree of economies of specialization of the intermediate good x, a, is sufficiently large. Otherwise, the general equilibrium is autarky.*

2.2. *Non-exclusive franchise contract: 0 < r* < 1 and n* > 1*

Now let us turn to the second Kuhn–Tucker condition where optimal r and n are the interior solutions of the following first-order conditions:

$$\frac{\partial L}{\partial n} = \frac{-(1-r)^n \ln(1-r)}{1-(1-r)^n} + \frac{-a(\rho m n^{m-1} r + c)}{1-\rho n^m r - cn} = 0, \tag{21a}$$

$$\frac{\partial L}{\partial r} = \frac{n(1-r)^{n-1}}{1-(1-r)^n} + \frac{-a\rho n^m}{1-\rho n^m r - cn} = 0. \tag{21b}$$

Note that it is impossible to derive analytical solutions of the comparative statics. To obtain the comparative statics, we perform numerical simulation of equation (21).[5] Simulation results show that when m is relatively small:

$$\partial r^*/\partial m \gtrless 0, \partial n^*/\partial m \gtrless 0, \tag{22a}$$

$$\partial r^*/\partial c \leq 0, \partial n^*/\partial c \leq 0, \tag{22b}$$

$$\partial r^*/\partial \rho \leq 0, \partial n^*/\partial \rho \geq 0, \tag{22c}$$

$$\partial r^*/\partial a \leq 0, \partial n^*/\partial a < 0. \tag{22d}$$

When m is close to 1:

$$\partial r^*/\partial m \gtrless 0, \partial n^*/\partial m \leq 0, \tag{23a}$$

$$\partial r^*/\partial c \leq 0, \partial n^*/\partial c \leq 0, \tag{23b}$$

$$\partial r^*/\partial \rho \leq 0, \partial n^*/\partial \rho \geq 0, \tag{23c}$$

$$\partial r^*/\partial a \leq 0, \partial n^*/\partial a < 0. \tag{23d}$$

By the application of the envelop theorem:

$$\frac{\partial U_{D,n^*>1}}{\partial m} = \frac{-ar}{1-\rho n^m r - cn} \rho n^m \ln n. \tag{24}$$

The result of the numerical simulation shows that, if n^* is sufficiently small,

$$\partial U_{D,n^*>1}/\partial m \geq 0. \tag{25a}$$

That is, when the degree of endogenous competition is not too intense, the optimal level of contract completeness, r^*, increases as the elasticity coefficient m increases. The increase in r^*, in turn, increases the real per capita income because it lowers the cost for the franchisee to enlarge his or her network of potential franchisors. Conversely, if n^* is sufficiently large,

$$\partial U_{D,n^*>1}/\partial m < 0. \tag{25b}$$

[5] Results of the numerical simulation can be provided upon request.

When the degree of endogenous competition is intense, an increase in m reduces r^* because the total costs of specifying and enforcing the contract with n franchisors are very high. This creates an incentive to broaden the relationship with more franchisors, which adversely affects the franchisee's welfare. Meanwhile, we can show that the higher the contracting cost with the incumbent franchisee, ρ, and the higher the relational cost coefficient c, the lower the corner equilibrium value of real per capita income in the division of labour as

$$\partial U_{(D,n^*>1)}/\partial \rho < 0 \tag{25c}$$

$$\partial U_{(D,n^*>1)}/\partial c < 0 \tag{25d}$$

Using the results in equation 25, we establish the following proposition:

Proposition 2. *If the contracting cost coefficient ρ or the relational cost coefficient c is sufficiently small, or if the coefficient of economies of specialization of intermediate goods b is sufficiently large, the general equilibrium is division of labour with more than one potential franchisor. Otherwise, the general equilibrium is autarky. When the number of potential franchisors is large, the level of division of labour reduces as m increases. When the number of potential franchisors is small, the level of division of labour increases as m increases.*

The results of the numerical simulation further demonstrate how the franchisee substitutes between increasing competition among franchisors and increasing the level of contract completeness. When c is small and ρ is large, the franchisee prefers contracting with many franchisors using less precise contracts and, therefore, the general equilibrium structure is division of labour with $n^* > 1$. Our numerical simulation shows that an increase in m when n^* is small increases the likelihood that the general equilibrium structure is division of labour with $n^* > 1$. This gives us a final proposition.

Proposition 3. *The corner equilibrium of division of labour with non-exclusive franchise contract ($n^* > 1$) is the general equilibrium when: (i) the ratio ρ/c is relatively large; (ii) the economies of specialization for the final good a is relatively small; and (iii) the number of potential franchisors is small. Otherwise, division of labour with exclusive franchise contract ($n^* = 1$) is the general equilibrium.*

When the number of potential franchisors is small, the total relational cost is small and, therefore, the non-exclusive franchising arrangement is preferred. In some markets, non-exclusive franchises are adopted because of the need to diversify and minimize business risk, and because of the need to undertake multitasking. For example, there are a sizable number of non-exclusive franchise liquor stores outside of metropolitan areas that operate in conjunction with other businesses, such as those selling groceries and hardware, because of a greater risk in selling liquor products alone and the need to generate additional income from selling other goods. Resultantly, the non-exclusive retail sales agent must devote time to other tasks when managing a greater variety of products and, therefore, the production of the franchised goods might exhibit a lower degree of specialization.

Although it is not uncommon for a franchisee to establish contracts with multiple franchisors, often the reason goes beyond mitigating hold-up risk. For example, in the carbonated soft drink industry, the bottlers (franchisees) purchase concentrate from the concentrate producers (franchisors) like Coke and Pepsi. They then add carbonated water and high-fructose corn syrup, and bottle it before delivery to the customers. In the franchise agreement, bottlers are allowed to package different products from *competing franchisors* as long as the product is not a *competing brand*. For example, a Coke bottler could not sell Pepsi-Cola but it could distribute 7UP (produced by PepsiCo) if it chooses not to carry Sprite (produced by the Coca Cola Company). Furthermore, franchised bottlers enjoy a great deal of freedom in decision-making, such as in choices on local advertising campaigns and promotions, and retail pricing. In this type of franchise contract, the level of exclusivity is low and the strategic alliances are formed to entice a larger market share of the franchisor's products.

3. CONCLUDING REMARKS

In this paper, we develop a general equilibrium model of a franchising network. We consider how hold-up risk borne by the franchisee is managed through a non-exclusive franchise contract when the cost of specifying detailed terms to limit franchisor opportunism is high. Under this contractual arrangement, we show that there is a substitution between increasing competition among franchisors and increasing the level of contract completeness. A non-exclusive franchise contract is optimal if: (i) the contracting cost relative to the cost of cultivating relationships with many potential franchisors is sufficiently high; (ii) the economies of specialization is small; and (iii) the degree of endogenous competition among potential franchisors is not too intense.

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