A Location Based Theory of Franchising

(**Forthcoming in the *Journal of Business and Economics Studies***)

Ananish Chaudhuri[1]
Department of Economics
Washington State University

Parikshit Ghosh
Department of Economics
University of British Columbia

Chester Spell
Department of Management and Decision Sciences
Washington State University

[1] Corresponding author: Ananish Chaudhuri
Department of Economics
Washington State University,
2710 University Drive, Richland, WA 99352.
Phone: 509-372-7238
Fax: 509-372-7512
E-mail: achaudh@tricity.wsu.edu

A Location Based Theory of Franchising

Abstract

We develop a simple model to explain the co-existence of company owned stores and franchised outlets. We assume that there are differences in the quality of locations with regards to their potential profitability. While the franchiser knows the distribution of location quality, the franchisee does not. The franchisee also has to accept whatever location he is offered and cannot negotiate the location choice. We show that franchisers will open company-owned stores at more profitable locations while leaving the less profitable ones for franchised outlets. Our model is able to explain the many empirical findings of previous research.

Keywords: Franchising, location, franchise fee, royalty rate

Introduction

A franchise relationship occurs when the owner of a trademark, the franchiser, exchanges the right to the use of that trademark with other agents, franchisees, in return for some consideration. We are more concerned with business format franchising as in the fast food industry rather than product and trademark franchising as in the retail gasoline industry. In a typical business format franchise contract the franchisee pays the franchiser a fixed franchisee fee as well a royalty rate which is a share of total sales revenue. Even though other things such as inputs or certain services may be contracted upon (Shane & Spell, 1998) the generic franchise contract consists of these two components. There are two important issues here – (1) the exact nature and terms of the franchise contract which deals with the rationale behind and the optimality of the franchise fee and the royalty rate; (2) the co-existence of both company owned and franchised outlets.

We address the second issue in this paper. While the existing literature has offered different explanations behind the rationale for franchised outlets, there are not too many papers that provide cogent arguments to show why firms open both company-owned stores and franchised stores at the same time. It is true that any company has to own and operate a critical number of stores to demonstrate its viability as a franchise. But it is not the case that once the franchise concept has been firmly established, firms rely solely on franchised outlets from that point on. Rather franchisers continue to open both types of stores at the same time even after they have become established. Looking at *Entrepreneur Magazine's 21st Annual Franchise 500* for 2000, one observes that even well-known franchisers such as McDonald's or Subway, which are ranked numbers 1 and 2 respectively among fast food chains (SIC Code 5812), continue to open both company-owned and franchised outlets at the same time.

We develop a simple model with differences in location quality and show how a franchiser will choose to open a company owned store at a certain location while opening a franchised outlet at another location. Very similar issues arise in the literature on land tenancy contracts where economists have tried to explain (1) the co-existence of wage, rent and sharecropping contracts and (2) the rationale behind sharecropping contracts since sharecropping leads to sub-optimal use of material inputs. It is instructive to note that the franchise fee is analogous to the fixed rental payment in the land tenancy context while the royalty rate works exactly like a share of output.

Several research streams have attempted to explain the existence of franchising in general and the royalty rate in particular.

Cheung (1969) suggested pure risk sharing to explain the existence of sharecropping. Assuming that both parties are risk averse they both benefit from the insurance that arises from a share contract. Stiglitz (1974) among others formalized this argument in the sharecropping context while Martin (1988) put forth a similar argument to explain franchising.

A second strand in the literature assumes the existence of moral hazard. In the one-sided moral hazard literature it is assumed that the franchiser cannot observe the franchisee in the provision of local inputs. It cannot be observed from the level of sales since there is a random component involved. While it would be optimal to make the franchisee the residual claimant in this context, if the franchisee is risk averse then a share contract arises as a compromise between the need to provide the franchisee with the insurance as well as the need to motivate him. Stiglitz (1974) has argued these points in the sharecropping context; other researchers such as Mathewson & Winter (1985) and Norton (1988) have done so in the franchising context.

Yet another explanation of share contracts arises when there is moral hazard on the part of both the franchiser and the franchisee. In this case sharing occurs strictly as a result of both parties' need for incentives. Eswaran and Kotwal (1985) and Bhattacharya and Lafontaine (1995) have developed models incorporating moral hazard on both sides.

Capital market imperfections theory argues that firms begin to franchise to overcome capital constraints that restrict the growth of company owned chains. There are several difficulties with this explanation. First, this would imply that as the franchise begins to mature and become more established they should reduce their reliance on franchising as a source of capital. As a result there should be a trend towards more company owned stores. But no such trend is apparent (Lafontaine, 1992). Second it is not unusual for franchisers to provide financing to their franchisees. Out of 157 fast food franchises listed in *Entrepreneur Magazine's 21st Annual Franchise 500* for 2000, 89 franchisers provide financing to the franchisee. Such financing involves the franchise fee and/or loans for buying equipment. These franchisers surely do not use franchising as a source of capital.

Search cost theory (Minkler, 1992) argues that firms franchise to gain access to local market knowledge. This assumes that franchisees are better aware of local conditions than the corporate headquarters and franchising provides a way of tapping into this source of superior knowledge. Monitoring theory (Rubin, 1978) suggests that franchising helps reduce costs of monitoring. By making outlet managers residual claimants on retail outlets, monitoring costs can be reduced.

In this paper we build a model of franchising based on the very plausible and intuitive assumption of differences in location of stores. We assume that that there are variations in location quality, in the sense that certain locations are more lucrative than other locations because they have a greater potential to be profitable. We assume that the franchiser knows the distribution of location types. We show that the franchiser will choose to open a company-owned store at a more profitable location and a franchised outlet at a less profitable one. This view of why both company-owned and franchised outlets co-exist accords well with reality and is borne out by previous research (Lafontaine, 1992, Hunt, 1973, Brickley & Dark, 1987. Mathewon & Winter, 1985 among others). The next section presents our model and the main theoretical results. Then an illustrative example is presented. Conclusions are made in the final section.

Model

The production function at any particular location is given by

$$Y = E(F(L;t)) + \varepsilon$$

L denotes labor input. t is a quality parameter that varies from location to location. ε is a zero mean random variable distributed normally with variance σ^2. We will assume that the variable t is uniformly distributed in the interval [0,T]. Thus for the most lucrative location t=T while for the worst one, t=0. E(.) is the expectation over location quality, t.

We will assume that neither the franchiser and nor the franchisee know the precise value of “t” for a particular location. However the franchiser knows that the location parameter “t’ is distributed uniformly over the range [0,T]. We also assume that the franchisee has to take whatever location he is offered and does not have the luxury of choosing a particular location. The franchiser has sole discretion over which location to award to a potential franchisee. This accords well with existing evidence. McDonald's for instance often requires franchisees to relocate after being awarded a franchise (Kaufmann & Lafontaine, 1994). In any case as long as the franchiser has monopsonistic power (which is entirely plausible) and decides on how to allocate locations to franchise applicants our results hold true.

Finally, we also assume that the franchiser and the franchisee are risk neutral. The assumption of risk neutrality is made for purposes of tractability and does not detract from the generality of our results. We could make both risk-averse without changing the major result derived here. Since our explanation of franchising does not depend on the risk preferences of the agents, it does not matter whether they are assumed to be both risk-averse or both-risk neutral.

The production function described above is assumed to satisfy the following conditions: $F'(L) > 0$; $F''(L) < 0$; $F'(0) = \propto$ and $F'(\propto)=0$

We will also assume that output is increasing in t, i.e. output is higher at a better location.

We normalize the price of the output to 1 so that we can use the terms revenue and output interchangeably.

We will develop our theoretical results using a general production function. Later in an illustrative example we use a Cobb-Douglas production function to illustrate the validity of the results that we have derived.

Returns from different contracts

Our story starts at a point where the franchise concept and its long-term viability have been firmly established. A franchiser now has two distinct options at a given location – (1) to open a company owned store; and (2) to open a franchised store.

We now consider the profits to the franchiser from opening a company owned store. Workers, at the company owned store, are hired at a fixed exogenously given wage rate of w. However since workers have little incentive to provide optimal labor, if workers are hired then they need to monitored. We will assume that there is a fixed cost (M) of monitoring. We can think of M as the remuneration of the manager or supervisor hired to supervise the fixed-wage workers at the company owned site. We assume that M is dictated by labor market conditions that determine managerial compensation and is independent of t, the site location.

So the profit from a company owned store at a given location t is

$\Pi_O(t) = E\{F(L^*(t);t) - wL^*(t) - M\}$ where L^* is the optimum amount of labor input that maximizes the owner's returns and $L^* = \arg\max_L F(L;t) - wL - M$. E denotes that this is the expected return.

It is clear by looking at the returns function that $\Pi_O(t)$ is increasing in t. However we cannot pin down the curvature of the returns function unless we impose further assumptions on the production function. We refrain from doing so at this point. In the next section, we show an illustrative example where we use a Cobb-Douglas production function to support our arguments. In that example the returns function is monotonic increasing and convex in t, the location parameter.

Next let us look at the profits from a franchise contract at the same location t.

The usual franchise contract takes the form of a fixed franchise fee (α) and a royalty rate (β). The returns to the franchiser can be expressed as $E\{\alpha + (1-\beta)\{F(L;t)\}$. The franchiser's aim then is to maximize his returns while guaranteeing the franchisee a return that covers his opportunity costs. The opportunity cost of the franchisee is what he could have earned in an alternative venture. The franchiser must provide the franchisee with at least this amount or more for the franchisee to accept a franchise contract. Also the franchise fee must be such that even the franchisee at the worst location t=0 is willing to accept the franchise contract. However since the franchisee gets only a share of the revenue, i.e. out of every \$1 generated the franchisee gets only \$$\beta$ ($0<\beta<1$), we need to impose an additional constraint on the franchisee – the moral hazard constraint - which takes the form

$\beta F'(L) - w = 0$.

This is because the franchisee, in reality, is faced with the following problem

$\text{Max}_L\ -\alpha + \beta F(L) - wL = 0$

It is assumed that under the franchise contract it is the franchisee that hires workers at the exogenous wage rate of w.

Obviously the solution to this problem leads to a sub-optimal use of the labor input, say L'.

The royalty rate β in the above problem is determined from the moral hazard constraint where it is determined by equating the slope of the revenue function to the slope of the cost function. The standard approach then is to choose a franchise fee that extracts the maximum possible rent from the franchisee.

Two issues arise here:

First, the standard approach in the contract theory literature is that the franchise fee should be set so that that there are no rents left downstream. That is, the franchiser should not allow the franchisee to enjoy a return that exceeds his alternative earnings. This is the expected zero profit condition for the franchisees which says that any possible downstream rents will be competed away if there is an excess supply of potential franchisees.

The second issue is the lack of a menu of contracts. Why doesn't the franchiser offer a location specific menu to the franchisee?

As for the first issue, Kaufman and Lafontaine (1994) show that the franchiser often does not extract the maximum possible surplus from the franchisee conceding both ex-ante and ex-post rent downstream. Kaufman and Lafontaine show that McDonald's, the epitome of business format franchising, leaves both ex-ante and ex-post rent to the downstream franchisee. According to their calculations the present value of ex-ante rent conceded by McDonald's is around $300K - $455K 1982 dollars. Ex post rent are even larger. They explain this by saying that franchisees' wealth constraints prevent the up-front extraction of the full present value of the ex-post rent.

Kaufmann and Lafontaine add that their result that there are ex-ante rent left downstream in franchising is not confined to McDonald's. This is supported by the existence of queues of potential franchisees as noted by Mathewson and Winter (1985). It is also consistent with Smith (1982) who argues that car dealerships are "awarded at below market clearing prices". Finally the notion that there are ex-ante rent in other franchised outlets is consistent with the lack of negative correlation between franchise fees and royalty rate as shown by Banerjee and Simon (1992) and Lafontaine (1992).

Thus, it would appear that a franchisee, in securing a franchise contract, is guaranteed a return that exceeds his opportunity cost. Again with an excess supply of franchisees one would expect this rent to be competed away. However, the entire rent may not be extracted because franchisers desire highly motivated entrepreneur-franchise managers who require little supervision and possess high levels of human capital (Kaufmann and Lafontaine, 1994). The franchise fee is then independent of the site location.

As for the second issue, with heterogeneous outlets one should find firms using a variety of contracts - one for every different situation, not simply one franchise and one "wage" contract for managers of company owned outlets. Lafontaine (1992) says that franchisers justify offering only one contract because developing and enforcing a variety of contracts would be too costly. Similarly, federal and state disclosure requirements might have influenced franchisers to adopt this practice. Franchisers may also reduce their need for a variety of contracts by choosing the location and density of stores.

Other possible explanations for the lack of highly customized contracts include the high transactions costs of designing many different contracts (Holmstrom & Milgrom, 1987) and the high administrative costs associated with differentiation (ibid, Lafontaine, 1992). Bhattacharya and Lafontaine (1995) point out that the benefits from differentiating contracts terms across franchisees may not be very large. They suggest that even if the cost of differentiation were low, the benefits form customizing contracts to fit each different franchisee may be too small to make customization worthwhile.

Whatever the reasons, the preponderance of evidence shows the use of one uniform franchise contract for all franchisees. This is especially true for all agents who contract with a given principal. In business-format franchising, for example, authors have noted how franchisers tend to use the same royalty rate and franchise fee combination with all of their franchisees (Murrell, 1983, Lafontaine, 1992, Sen, 1993).

Let us now consider the returns from a franchised store.

$\Pi_F(t) = E\{\alpha + (1-\beta)F(L';t)\}$

Again from eyeballing this return function it is easy to see that $\Pi_F(t)$ is increasing in t.

Equilibrium in this model is characterized by the franchiser choosing a form of contract that maximizes his returns, i.e. at location t, the franchiser has returns equal to Max $\{\Pi_O(t), \Pi_F(t)\}$. The form of the contract chosen depends on whether the maximal element is $\Pi_O(t)$, or $\Pi_F(t)$. We are now ready to state the main proposition of this paper, which along with the example that follows, shows how both franchised outlets and company-owned stores can co-exist in equilibrium.

<u>Proposition 1:</u> *The equilibrium may be characterized by the existence of both company-owned stores as well as franchised outlets. There exists a level of quality $t^* \in [0,T]$, such that for $0 < t < t^*$, a franchised store is opened, while for $t^* < t < T$, a company-owned store is opened. However for a low enough value of T, the set of locations with company-owned stores may be empty. Generally speaking, if a company owned store is opened it will be opened at a more profitable location than a franchised outlet.* [1]

We provide a proof of this proposition in the Appendix.

Figure 1 depicts this relationship. Above a certain level of location quality t=t*, outlets will tend to be company owned; below t=t* stores would be franchised.

Figure 1 about here

As noted previously the set of locations that support a company owned store may be empty. This is also illustrated in the figure for a particular quality level t=T. In this where the two functions have no intersection for any t < T, all outlets would be franchised. In the next section we show an illustrative example which shows how both company owned stores and franchised stores may co-exist.

Our conclusion that franchisers will choose to open company owned stores at more lucrative locations and offer franchise contracts at less lucrative ones accords well with established reality. From the U.S. Department of Commerce publication *Franchising in the Economy 1986-88*, one finds that average sales of company owned stores are greater than average sales of franchised stores. We use data from 1986-88 since this was the last year this report was published and hence the last years for which we have data available.

Table 1 about here

As can be seen in the figure the average sales for company-owned stores exceeds those of franchised outlets in every category listed. Moreover these differences are statistically significant. The null hypothesis is that the average sales at company-owned stores and franchised stores are equal while the alternative hypothesis is that average sales at company-owned stores are higher. A T-test yields T-stat of 2.197 for 1986 with a corresponding p-value of 0.021. For 1987 the T-stat is 2.27 with a p-value of 0.018. Finally for 1988, the relevant T-stat is 2.314 and the p-value is 0.017.

Table 2 about here

Also Hunt (1973) conducted a survey of franchisees and found that 13% of them had received inquiries from their franchisers that wanted to buy back the outlets. Hunt tested the hypothesis that "the franchisers were primarily seeking to buy back the more profitable units" and found that this hypothesis was supported by the data.

Before moving on it is instructive to look at the comparative static effects of an increase in the monitoring cost M.

Proposition 2: *Suppose the equilibrium consists of both types of contracts being offered. Then an increase in the monitoring cost M leads to a decrease in the set of locations with company-owned stores and an increase in the set of locations with franchised outlets.*

To see this relationship, refer to Figure 1. Note that a rise in monitoring costs shifts the $\Pi_O(t)$ curve down, while the $\Pi_F(t)$ curve is unaffected. The result follows.

Again this result accords well with reality. The monitoring cost literature (Rubin, 1978; Mathewson & Winter, 1985) holds that outlets with low monitoring cost should be company-owned while those with higher monitoring costs should be franchised. Distance from monitoring headquarters is often suggested as an indicator of relative monitoring costs. This view is corroborated by Brickley and Dark (1987) who find that outlets physically close to monitoring headquarters are more likely to be company-owned than outlets further away from the headquarters.

An illustrative example

Consider the following production function $Y = (1+ t)L^{1/2}$

Then L*(t) for a company owned store is given by $L^*(t) = \{\frac{1+t}{2w}\}^2$

For the sake of convenience assume, without any loss of generality, that the royalty rate is ½. It could be any other fraction.

Then it is easy to see that the optimal labor input at a franchised outlet L'(t) is given by $L'(t) = \{\frac{1+t}{4w}\}^2$

On substituting the two expressions into the returns function from the two sources we get

$$\Pi_O(t) = \frac{(1+t)^2}{4w} - M$$

and $$\Pi_F(t) = \frac{(1+t)^2}{8w} + \alpha$$

Both the $\Pi_O(t)$ and $\Pi_F(t)$ functions are monotonic increasing and convex in the location parameter t. Figure 1 depicts the two functions as being monotonic increasing and convex.

It is easy to check that there is an unique intersection between the $\Pi_O(t)$ and $\Pi_F(t)$ curves at $t^* = \{8w(\alpha+M)\}^{1/2} - 1$

Consider the following two cases:

1. If $T > \{8w(\alpha+M)\}^{1/2} - 1$, then there exists a t* such that for $0 < t < t^*$, we will see a franchised outlet, while for $t^* < t < T$, we will see a company owned store. Such a situation is depicted in Figure 1.

2. If $T < \{8w(\alpha+M)\}^{1/2} - 1$, then the two curves have no intersection in the relevant region and we will expect to see only franchised outlets.

Conclusion

In this paper we have developed a simple model explaining the co-existence of company owned stores and franchised outlets on the basis of differences in location quality. We show that franchisers will choose to open company owned stores in more profitable locations while leaving franchisees to open stores in less lucrative sites. The validity of our theoretical results are borne out by empirical evidence showing that company owned stores have higher sales volume than franchised outlets. We also show how the chances of opening a company owned store decreases with increasing monitoring costs - yet another empirical regularity reported in the literature (Lafontaine, 1992, Rubin, 1978, Hunt, 1973, Brickley & Dark, 1987, Mathewson & Winter, 1985). We believe this paper fills an important void by providing a comprehensive theoretical model that explains a number of oft reported empirical facts as they relate to business format franchising.

References

Banerjee, S. & Simon, C. (1992) Franchising vs. ownership: a contacting explanation. Unpublished manuscript, University of Chicago Graduate School of Business

Bhattacharya, S. & Lafontaine, F. (1995). Double sided moral hazard and the nature of share contracts. *Rand Journal of Economics,* 26: 761-81

Brickley, J.A. & Dark, F.A. (1987). The choice of organizational form: the case of franchising. *Journal of Financial Economics*, 18: 401-20

Cheung, S.N.S. (1969). *The theory of share tenancy*, University of Chicago Press

Entrepreneur Magazine. *21st Annual Franchise 500 for 2000*. http://www.entrepreneurmag.com

Eswaran, M. & Kotwal, A. (1985). A theory of contractual structure in agriculture. *American Economic Review*, 75: 352-67

Holmstrom, B. & Milgrom, P. (1987). Aggregation and linearity in the provision of intertemporal incentives. *Econometrica*, 55: 303-328

Hunt, S. (1973). The trend towards company operated units in franchise chains. *Journal of Retailing*, Summer, 3-12

Kaufman, P. & Lafontaine, F. (1994). Costs of control: source of economic rents for McDonald's franchises. *Journal of Law and Economics*, 37: 417-53

Lafontaine, F. (1992). Agency theory and franchising: some empirical results. *Rand Journal of Economics*, 23: 263-83

Lafontaine, F. (1995). Pricing decisions in franchised chains: A look at the restaurant and fast food industry. NBER Working Paper 5247, September 1995

Lafontaine F., & Shaw, K. (1995). Firm specific effects in franchise contracting: sources and implications. mimeo, University of Michigan and NBER, December

Martin, R.E. (1988). Franchising and risk management. *American Economic Review*.78: 954-68

Mathewson, G.F. & Winter, R.A. (1985). The economics of franchise contracting. *Journal of Law and Economics*. 28: 506-26

Minkler, A. (1992). Why firms franchise: a search cost theory. *Journal of Institutional and Theoretical Economics*. 148: 240-59

Murrell, P. (1983). The economics of sharing: A transactions cost analysis of contractual choice in farming. *Bell Journal of Economics*. 14: 283-93

Norton, S.W. (1988). An empirical look at franchising as an organization form. *Journal of Business*. 61:197-217

Rubin, H. (1978). The theory of the firm and the structure of franchise contracts. *Journal of Law and Economics*. 21: 223-233

Sen, K.C. (1993). The use of initial fees and royalties in business-format franchising. *Managerial and Decision Economics*. 24: 58-77

Shane, S. & Spell, C. (1998). Factors for new franchise success. *Sloan Management Review*. 39: 3, 43-50

Smith, R. (1982). Franchise regulation: An economic analysis of state restrictions on automobile distribution. *Journal of Law and Economics*. 25: 125-57

Stiglitz, J. (1974). Incentives and risk-sharing in sharecropping. *Review of Economic Studies*, 41: 219-55

TABLE 1

Average Sales Per Establishment 1986-88 (Thousands of Dollars)

Sector	1986 Company Owned	1986 Franchisee Owned	1987* Company Owned	1987* Franchisee Owned	1988* Company Owned	1988* Franchisee Owned
Automotive Products & Services	783	235	828	238	875	254
Business Aids & Services	350	238	384	242	413	249
Construction, Home Improvement, Maintenance & Cleaning Services	1807	180	1902	179	1938	188
Convenience Stores	750	694	788	715	818	749
Educational Products & Services	387	90	443	86	479	89
Restaurants (All Types)	772	621	788	635	811	648
Hotels, Motels & Campgrounds	4413	1548	4369	1535	4229	1553
Laundry & Dry-cleaning	253	121	266	136	257	148
Recreation, Entertainment & Travel	1735	377	1854	416	1768	496
Rental (Auto-Truck)	1439	372	1508	372	1574	376
Rental (Equipment)	460	200	338	200	342	202
Retailing (non-food)	652	461	688	481	715	486

Retailing (Food Other than Convenience Stores)	793	487	842	480	873	449
Miscellaneous	587	182	582	194	573	226

* Estimated by respondents

From “Franchising in the Economy 1986-1988”, U.S. Department of Commerce, International Trade Administration, Office of Service Industries, February 1988. Prepared by Andrew Kostecka, Finance and Management Industries Division

TABLE 2

	1986		1987		1988	
	Company Owned	Franchisee Owned	Company Owned	Franchisee Owned	Company Owned	Franchisee Owned
MEAN SALES	1084.36	414.71	1112.86	422.07	1118.93	436.64
STANDARD DEVIATION	1076.93	374.79	1076.18	372.17	1037.48	375.42
COEFFICIENT OF VARIATION	0.99	0.90	0.96	0.88	0.92	0.86
T-stat	2.197		2.27		2.314	
P-value (1-tailed)	0.021		0.018		0.017	

Null Hypothesis: H_0: Average sales at company-owned stores = average sales at franchised stores

H_a: Average sales at company-owned stores > average sales at franchised stores

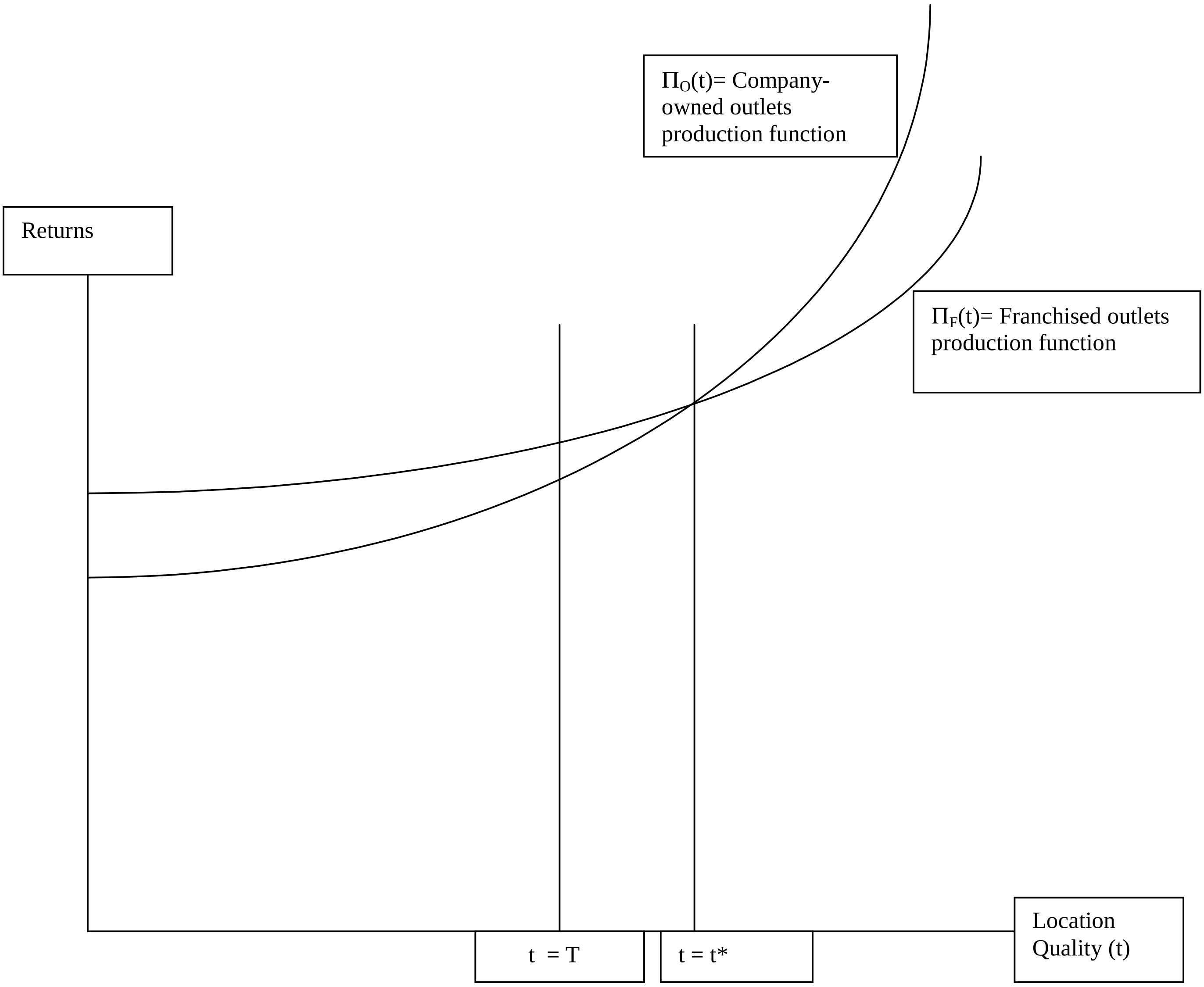

Figure 1. The profits of franchised and company-owned outlets as a function of location quality t. If t is less than t* the outlet will be franchised, otherwise company-owned. If no locations have quality above level T as shown, then there will be no company owned outlets.

APPENDIX

Proof of Proposition 1:

Consider the return to the franchisor from a franchised outlet (since returns from both company-owned stores and franchised stores are expected values we drop the expectation sign below)

$$\begin{aligned}
\Pi_F(t) &= \alpha + (1-\beta)F(L'(t)) \\
&= \alpha + F(L') - \beta F(L'(t)) \\
&= \alpha + \{F(L'(t)) - wL'(t)\} - \{\beta F(L'(t)) - wL'(t)\} \\
&< \alpha + \{F(L^*(t)) - wL^*(t)\} - \{\beta F(L'(t)) - wL'(t)\} \\
&\qquad \text{since } L^* = \arg\max_L F(L) - wL - M \\
&= \alpha + \Pi_O(t) + M - \{\beta F(L'(t)) - wL'(t)\}
\end{aligned}$$

Notice that the expression $\{\beta F(L'(t)) - wL'(t)\}$increases unboundedly as t increases. Instead of L'(t) which maximizes this expression for every t, fix an arbitrary L and increase t, and notice that the value of the expression $\{\beta F(L'(t)) - wL'(t)\}$ goes to $\propto$.

Hence for a sufficiently high value of t, $\Pi_F(t) < \Pi_O(t)$.

However depending on the distribution of t, it may be the case that the set of locations with company owned stores is empty.

ENDNOTE

[1] In order for Proposition 1 to hold, it must be the case that the two functions $\Pi_O(t)$ and $\Pi_F(t)$ obey the single crossing property. It is easy to show, with an additional assumption on the production function, that the two functions are monotonic increasing in the location parameter "t" and that they intersect only once. Moreover many commonly used single input production functions like the Cobb-Douglas ($F(L)=L^{\alpha}$) or the Logarithmic ($F(L) = \log L$) will satisfy the single crossing property. The reader can easily verify that this is true for our illustrative example in Section 3. We have omitted a formal proof of the single crossing property. We would be happy to include the proof if deemed necessary. Omitting a formal proof does not detract from the generality of our results.