Franchisee's Service and Franchisor's Royalty Choice

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Abstract

This paper examines two royalty structures when a franchisee's effort induces the demand function to shift upward. Sales-based Royalties (=SBR) is stronger incentive scheme than Margin-based Royalties (=MBS). Double marginalization occurs in Sales-based royalties. Under such circumstance, if the slope of the demand facing the franchisee is less than one, the franchisor charges sales-based royalty to its franchisee. However, if the slope of the demand facing the franchisee is greater than one, the franchisor charges margin-based royalty to its franchisee. We also show that the franchisee's effort level under SBR is always higher than that under MBR, regardless of the slope of the demand.

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1. Introduction

Recently, franchise contracts have become a major type of arrangements in the retail industry, especially in widely spreading convenience stores, retailing, business aids and services, and restaurants.

The franchisee typically pays a franchise fee, and royalty as well as the prices of products purchased from the franchisor. The royalty fee among these is a major source of revenue for the franchisor. Therefore, the franchisor's selection of the royalty structure is an important element in the franchise contract.

In America, for example, almost all franchisors assess royalties based on sales (hereafter SBR) achieved by franchisees. In Japan, however, a different type of royalty structure is adopted by many convenience store chains (hereafter, CVS chains). Under this structure, franchisors assess royalties based on gross margin, i.e., sales minus cost of goods sold (hereafter, margin-based royalties (MBR[2])).

[Table 1 here]

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[2] In Japan, MBR is adopted by many prominent convenience store chains. For more detail, see Lal. et al. (2000), Maruyama (2005) and Nariu et al. (2008).

According to the JFA (Japan Franchise Association), the franchise business in Japan included about 1,200 franchise brands and roughly 240,000 outlets in 2006. Their total sales during 2006 amounted to about 20 trillion yen, which corresponded to one third of the total retail sales.

Regretably, there are a handful of antecedents to this paper in the literature modeling a comparative analysis between SBR and MBR. In spite of the widespread adoption of the SBR in the franchise industry, there has been no previous research on what advantages the SBR holds vis-à-vis the MBR. This paper focuses on why almost all franchisors charge SBR to their franchisees. Previous research into royalty structure has modeled royalties as a fixed percentage of the franchisee's sales (Lal, 1990). The comparison between MBR and SBR was initially analyzed to explain the merit of MBR (Lal et al., 2000). Jeon and Park (2002) also analyzed the merit of MBR with a perishable good which is the main item in Japanese convenience stores. Meanwhile, Maruyama (2005) showed the equivalence between MBR and SBR under a double-sided moral hazard. He also showed that when the efforts of both parties are perfectly complementary under a double-sided moral hazard, the first-best outcome is attainable by adopting MBR or SBR. In addition, Nariu et al. (2008) considered a case in which the franchisee dealt with two different kinds of goods; one provided from its franchisor, the other purchased from an independent manufacturer. Under such a circumstance, the franchisor can attain the first-best outcome by adopting MBR. However, the franchisor is completely unable to control the wholesale price of the product bought from the manufacturer under SBR. Therefore, the franchisor cannot achieve the first-best outcome via SBR.

In comparison with previous research, this paper shows why some franchisors adopt SBR and the others employ MBR in franchise contracts. We show that the franchisor's choice between margin-based royalty and sales-based royalty is dependent on the effects of double marginalization as well as incentive intensity and slope of demand. Under such circumstances, if the slope of the demand curve facing the franchisee is less than one, it is efficient for the franchisor to charge sales-based royalty to its franchisee. However, if the slope of the demand curve facing the franchisee is greater than one, it is efficient for the franchisor to charge margin-based royalty to its franchisee.

The rest of this paper is organized as follows. In Section 2, we describe a model. Section 3 analyzes SBR and MBR. Section 4 analyses our main results. Finally, discussion and conclusions are dealt with in Section 5.

2. The Model

We consider a franchise contract between a franchisor and a franchisee where the franchisor produces the final product sold at the retail outlets. For simplicity, we make the assumption that the franchisee transacts only the product produced by its franchisor. The demand is affected not only by the retail price but also by the franchisee's service. The demand is specifically described by

$$q = a - bp + e \qquad (1)$$

where q is the sales volume, p is the retail price, e is the effect of the franchisee's service on demand,

and a and b are positive constant. If the franchisee makes efforts for service, it induces the demand function to shift upwards. However, it costs $e^2/2$.

This paper examines a three-stage game. In stage one, the franchisor offers its franchisee a franchise contract. The contract consists of a royalty type and a wholesale price for the final product. In stage two, the franchisee decides on the service level that induces the demand function to shift upward. Finally, the franchisee chooses the retail price in order to maximize its profits.

3. MBR vs. SBR

3.1 Margin-based Royalty

At stage three, the franchisee chooses the retail price in order to maximize to its profits as follows;

$$\max_p \quad \pi^M = (1-r^M)(p-w)q - \frac{e^2}{2} = (1-r^M)(p-w)(a-bp+e) - \frac{e^2}{2} \tag{2}$$

where r^M is the royalty rate for MBS and w is the wholesale price.

By differentiating Eq. (2) with respect to p and solving the first-order condition, we obtain the equilibrium retail price:

$$p^M = \frac{a+e+bw}{2b} \tag{3}$$

Substituting Eq. (3) into Eq. (1) and Eq. (2), the sales quantity and the franchisee's payoffs are given by:

$$q^M = \frac{a+e-bw}{2b} \tag{4-1}$$

$$\pi^M = \frac{(1-r^M)(a+e-bw)^2}{4b} - \frac{e^2}{2} \tag{4-2}$$

At stage two, the franchisee selects e for a given w selected by the franchisor. The franchisee chooses its service level as follows;

$$\max_e \quad \pi^M = \frac{(1-r^M)(a+e-bw)^2}{4b} - \frac{e^2}{2} \tag{5}$$

By differentiating Eq. (5) with respect to e and solving the first-order condition, we obtain the equilibrium service level:

$$e^M = \frac{(1-r^M)(a-bw)}{2b+r^M-1} \tag{6}$$

Substituting Eq. (6) into Eq. (3), Eq. (4-1) and Eq. (4-2), the retail price, the sales quantity and the franchisee's payoffs are given by:

$$p^M = \frac{(a+(b+r^M-1)w)}{2b+r^M-1} \tag{7-1}$$

$$q^M = \frac{b(a-bw)}{2b+r^M-1} \tag{7-2}$$

$$\pi^M = \frac{(1-r^M)(a-bw)^2}{2(2b+r^M-1)} \tag{7-3}$$

We now turn to the first-stage game. For simplicity, the marginal cost of the product to the franchisor is constant and assumed to be zero without loss of generality. At stage one, the franchisor chooses the wholesale price w in order to maximize its payoffs as follows;

$$\max_w \quad y^M = wq + r^M (p-w)q = \frac{b(a-bw)\left((ar^M + (2b + r^M - br^M - 1)w)\right)}{(2b + r^M - 1)^2}. \tag{8}$$

By differentiating Eq. (8) with respect to *w* and solving the first-order condition, we obtain the equilibrium wholesale price as a solution of the first-stage game:

$$w^{M*} = \frac{a(2b-1)(1-r^M)^2}{2b\theta^M} \tag{9}$$

where $\theta^M \equiv (2b + r_M - br_M - 1)$. Substituting Eq. (9) into Eq. (7-1), Eq. (7-2), Eq. (7-3) and Eq. (8), the equilibrium retail price, the sales quantity, and their payoffs are given by:

$$p^{M*} = \frac{\left(a(\theta^M + b(1-r^M)\right)}{2b\theta^M} \tag{10-1}$$

$$q^{M*} = \frac{ab}{2\theta^M} \tag{10-2}$$

$$e^{M*} = \frac{a(1-r^M)}{2b\theta^M} \tag{10-3}$$

$$y^{M*} = \frac{a^2}{4\theta^M} \tag{10-4}$$

$$\pi^{M*} = \frac{\left(a^2(1-r^M)(2b + r^M - 1)\right)}{8(\theta^M)2} \tag{10-5}$$

3.2 Sales-based Royalty

At stage three, the franchisee chooses the retail price in order to maximize to its profits as follows;

$$\max_p \quad \pi^s = \left((1-r^s)\,p - w\right) q - \frac{e^2}{2} = \left((1-r^s)\,p - w\right)(a - bp + e) - \frac{e^2}{2} \tag{11}$$

where the superscript *S* implies that the franchisor adopts the sales-based royalty and r^S denotes the royalty rate. By differentiating Eq. (11) with respect to p and solving the first-order condition, we obtain the retail price:

$$p^S = \frac{a + e\,\dfrac{bw}{1-r^S}}{2b} \tag{12}$$

Substituting Eq. (12) into Eq. (1) and Eq. (11), the sales quantity and the franchisee's payoffs are given by:

$$q^S = \frac{a + e\,\dfrac{bw}{1-r^S}}{2b} \tag{13-1}$$

$$\pi^S = \frac{(1-r^s)\left[(a+e)^2 - 2bw(a+e) + \dfrac{(bw)^2}{1-r^S}\right]}{4b} - \frac{e^2}{2} \tag{13-2}$$

At stage two, the franchisee selects *e* for a given *w* selected by the franchisor. The franchisee chooses its service level as follows;

$$\max_e \quad \pi^S=\frac{(1-r^S)\left((a+e)^2-2bw(a+e)+\frac{(bw)^2}{1-r^S}\right)}{4b}-\frac{e^2}{2} \tag{14}$$

By differentiating Eq. (14) with respect to *e* and solving the first-order condition, we obtain the franchisee's service level *e* as a solution of the second-stage game:

$$e^S=\frac{a(1-r^S)-bw}{2b+r^S-1} \tag{15}$$

Substituting Eq. (15) into Eq. (12), Eq. (13-1) and Eq. (13-2), the retail price, the sales quantity and the franchisee's payoffs are given by:

$$p^S=\frac{(a-w)+\frac{bw}{1-r^S}}{2b+r^S-1} \tag{16-1}$$

$$q^S=\frac{b\left(a-\frac{bw}{(1-r^S)}\right)}{2b+r^S-1} \tag{16-2}$$

$$\pi^S=\frac{\left(a-\frac{bw}{(1-r^S)}\right)^2}{2(2b+r^S-1)} \tag{16-3}$$

At stage one, the franchisor chooses the wholesale price in order to maximize its payoffs as follows;

$$\max_w \quad y^S=wq+r^s pq=\frac{\left(b(a(1-r^s)-bw(ar^s+(1-r^s)+(2b+r^s-br^s-1)w)\right)}{(1-r^s)^2(2b+r-1)^2} \tag{17}$$

By differentiating Eq. (17) with respect to *w* and solving the first-order condition, we obtain the equilibrium wholesale price as a solution of the first-stage game:

$$w^{S*}=\frac{a(2b-1)(1-r^S)^2}{2b\theta^S} \tag{18}$$

where $\theta^S \equiv (2b+r^S-br^S-1)$. Substituting Eq. (18) into Eq. (16-1), Eq. (16-2), Eq. (16-3) and Eq. (17), the retail price, the sales quantity, and their payoffs are given by:

$$p^{S*}=\frac{(a(\theta^S+b(1-r^M))}{2b\theta^S} \tag{19-1}$$

$$q^{S*}=\frac{ab}{2\theta^S} \tag{19-2}$$

$$e^{S*}=\frac{a(1-r^S)}{2b\theta^S} \tag{19-3}$$

$$y^{S*}=\frac{a^2}{4\theta^S} \tag{19-4}$$

$$\pi^{S*}=\frac{(a^2(1-r^S)(2b+r^S-1))}{8(\theta^S)^2} \tag{19-5}$$

4. Main Result

In this section, we introduce some propositions which relate to the franchisor's royalty choice and performances of both MBR and SBR.

Specifically, we set two assumptions to guarantee that the wholesale price is positive and the second-order condition is satisfied as follows;

Assumption 1. $b>1/2$

Assumption 2. $r^M > r^S$

where r^M and r^S imply royalty rates for MBR and SBR, respectively. Assumption 2 is not an unreasonable assumption considering 30~40% royalties typically observed for MBR chains and 2~3% royalties for SBR chains.

Proposition 1. Under Eq. (1), Assumption 1 and 2, we obtain the following characterizations.

1. If $b<1$, the franchisor charges Sales-based Royalty to the franchisee.

2. If $1<b$, the franchisor charges Margin-based Royalty to the franchisee.

Proposition 1 states that, in equilibrium, when the franchisor sets the royalty structure, he faces two problems; double marginalization and franchisee's incentive intensity. If the slope of the demand curve facing the franchisee is less than one, the franchisor charges SBR to its franchisee. In other word, when $b<1$, the franchisor consider incentive intensity more important than double marginalization. Reversely, if the slope of the demand curve facing the franchisee is more than one, the franchisor charges MBR to its franchisee.

Proposition 2. Under Eq. (1), Assumption 1 and 2, the equilibrium is characterized as follows.

1. The franchisee sets retail prices

$$p^{S*}= p^{M*}+\frac{ab(r^M-r^S)}{2(\theta^S+\theta^M)}.$$

2. The franchisee decides on its service level

$$e^{S*}= e^{M*}+\frac{ab}{2(\theta^S+\theta^M)}.$$

3. The franchisee sets the sales volume

$$q^{S*}= q^{M*}+\frac{ab(1-b)(r^M-r^S)}{2(\theta^S+\theta^M)}.$$

4. The franchisor sets wholesale prices

$$w^{S*}= w^{M*}+\frac{a(2b-1)\left(r^S(1-r^S)\theta^M-b(r^M-r^S\right)}{2(\theta^S+\theta^M)}.$$

5. The franchisor and the franchisee profits are

$$y^{S*}= y^{M*}+\frac{a^2\,(1-b)(r^M-r^S)}{4((\theta^S)^2+(\theta^M)^2)}.$$

and

$$\pi^{S*} = \pi^{M*} + \frac{a^2\, b^2\, (2b-1)(r^S(r^M - r^S)(r^M + r^S - r^M r^S)}{8((\theta^S)^2 + (\theta^M)^2)}\ .$$

What is important to note from Proposition 2 is that, in equilibrium, the franchisee's service level under SBR is always higher than that under MBR, regardless of the value of the price sensitivity of the demand. However, part 3 of Proposition 2 states that, in equilibrium, the franchisor's action is congruous with a social welfare standpoint. It is closely connected with the fact that the smaller b is, the larger the effect of double marginalization on demand becomes. On the other hand, the larger b is, the larger the effect of incentive intensity on demand is. Therefore, the franchisor adopts SBR, when $b<1$, and the reverse is also true.

The analysis in this paper seems to illustrate that it is definitely necessary for the franchisor to use royalty clauses when the franchisor needs to increase the franchisees' services[3].

5. Discussion and Conclusion

We examine why some franchisors charge SBR to their franchisees and why others employ MBR to their franchisor. We also show that the franchisor's choice between MBR and SBR is dependent on the effects of double marginalization as well as the franchisee's incentive intensity on demand. In other words, if the slope of the demand facing the franchisee is less than one, the franchisor charges sales-based royalty to its franchisee. However, if the slope of the demand facing the franchisee is greater than one, the franchisor charges margin-based royalty to its franchisee.

We have proposed a modeling framework that provides insight about royalty modes. The general franchising model includes a fixed franchise fee. In reality, it is natural to regard the fixed franchise fee as a kind of sunk cost. If we consider it within this model, the franchisor will adopt only SBR to its franchisee. Easily speaking, SBR gives the franchisee a stronger incentive than MBR does. The reason is that the double marginalization effect is lost by the fixed franchise fee in both royalty modes.

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Table 1. Main CSV chains in Japan and Royalty Structures

Name	Royalty Structures		
	MBR	SBR	Others
7-Eleven	•		
Lawson	•		
Family Mart	•		
Daily Yamazaki	•		
Circle K	•		
Sunkus	•		
Mini Stop	•		
Hot Spar	•		
Seiko Mart	•		
Coco Store[5]			•
Three Eight		•	
Seven On	•		
Am Pm	•		

4 Source: Japan Franchise Association (2006)

5 Coco Store combined the SBR and the fixed royalty.