The impact of market value concern on new product price strategy with revenue sharing contract

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Abstract
We discuss how market value impacts new-product's pricing strategy. We characterize the equilibrium under a general contract, which shows the pricing strategy may be distorted. However, when a new contract with different slotting allowances is offered by the retailer, pricing distortion can be avoided and supply chain can achieve coordination.

Keywords: Market value, Price distortion, Slotting allowance

Introduction

In today's customer-oriented market, firms must provide products with high performance to attain and retain enough market demand. Demand signaling issue in new product introduction always attracts the attention of academics and practitioners. Based on the wholesale price only contract frame work, Chu (1992) examines signaling of high demand by increasing the wholesale price and advertising. Desai (2000) studies how a high demand supplier can use wholesale price, advertising and slotting allowances to signal its high demand to retailer. These papers establish the important role of wholesale price distortion in signaling product demand to retailers based on wholesale price contract. However, more and more suppliers are listed firms that make their operational decision with the consideration of the supply chain profit and their short-term valuation in the capital market. They need to signal the new product performance and market demand not only to retailers but also to investors. Therefore, it is not clear how the capital value concern of the supplier affects the price strategy of new product launch and whether slotting allowances are still effective for retailer to screen out potentially week new products?

In addition, revenue sharing contract acting as an important tool to achieve supply chain coordination is very common in retail business. For instance, Apple has its retail partners: Best-Buy, Target, Sam's Club and carriers: AT&T in USA. A research note estimates that Apple is receiving $18 per month for each iPhone subscriber, under the revenue sharing agreement between Apple and AT&T (Krazit 2007). In revenue sharing contract, the supplier decides the retail price that is an important demand signal to retailers and capital investors. As we know, charging a high price for a new product can reveal the supplier's confidence in its good performance. On the contrary, too high price may reduce the market demand. According to this information, retailers may estimate the market demand and decide the ordering quantity. Investors may infer the supplier's profit prospect to guide their investment behavior.

In this article, we explore the impact of capital market value concern on the price strategy of new product launch based on revenue sharing contract. We introduce third part-capital market into the supply chain system consisting of a supplier (a listed firm) and a retailer. This capital market, which is composed of homogenous rational investors, values the supplier firm. While the market valuation can be accurate after the retail price of the new product is announced, a discrepancy in the valuation may arise in a shorter term when the investors have not yet observed the sales information. We look for the equilibrium price strategy in asymmetric information of product's performance setting. Interestingly, our study reveals that a supplier firm with a short-term interest in market value may distort his retail price strategy. Finally, our results show that, consisting with the previous studies, slotting allowances still can help retailer screen out the product's performance and achieve the first best.

Literature review

Our work lies at the intersection of new product launch and the capital market interaction in operation management. To clearly describe our contributions, we briefly discuss the relevant aspects of each literature stream.

The continuous development and market introduction of new products are important to the company's performance and market (Blundell et al. 1999). Many scholars focus on the theoretical analysis or empirical research of new product launch and development. Rao and Mahi (2003) empirically study the relationship between the new product launch and the slotting allowances. They find charging and paying of slotting allowances are affected by the relative strength of the players. Additionally, retailers with lower costs receive higher slotting allowances. Bayus et al. (2003) study the effect of new product introductions on three key drivers of firm value: profit rate, profit-rate persistence and firm size. They find new product launch influences profit rate and size but not affect profit-rate persistence. Christen (2005) gives the effect of competition on the acquisition of cost information for pricing new products. He finds cost uncertainty can lessen the destructive effect of price competition when products are close substitutes. Li and Zhu (2009) use decision analytical models to study information acquisition for new product introduction by comparing two approaches: Purchasing all at once or purchasing forecasts sequentially.

However, all of the above literatures do not concern about the firm's capital market value. Some scholars focus on the relationship between the operation decisions and the stock market value of the firm. Chaney et al. (1991) use traditional event-study methodology to study the impact of new product introductions on the market value of firms. Lai et al. (2011) study how a manager's short-term interest in the firm's market value may motivate channel stuffing. Lai et al. (2012) show the buyer's market value concern may affect supply chain's efficiency by the stock decision.

Model setup

We consider a retailer (she) that procures a new product from a supplier (he) for a selling event. Due to his more complete knowledge of the product's attributes and quality, the supplier has a better knowledge about the product performance through prelaunch research. In the selling event, the supplier decides the retail price p, and the retailer decides the ordering level q, the unit production cost for the supplier is c and the unit holding cost for the retailer is h. After the products are sold, the supplier and the retailer obtain their own profit through the revenue sharing contract with revenue sharing ratio $\mu \in (0,1)$ to the retailer. The production and the ordering decision need to be carried out before the demand is realized.

The retailer may estimate market demand from the retail price announced by the supplier, and then decide the ordering quantity. Ex-ante, the product performance is uncertain, denoted by i, which is high (H) with probability $\lambda \in (0,1)$ and low (L) with probability $1-\lambda$. We define the supplier with a high (low) product performance to be the high (low) type one. The high type supplier (HTS) and the low type supplier (LTS) manufacture a product with performance θ_i, $i \in (H, L)$. Obviously, $\theta_H > \theta_L$. The product demand D is affected by the retail price p and the quality performance θ. We assume a linear demand function with the following form,

$$D_i = \alpha - \beta p_i + \gamma \theta_i, \quad i \in (H, L)$$

where $\alpha > 0$ represents the potential market demand base that is independent of pricing and quality performance factors. The parameter $\beta > 0$ represents the sensitivity of the demand to the retail price. The parameter $\gamma > 0$ represents the sensitivity of the demand to the quality performance. In this article, we assume the salvage value of leftover ordering quantity is zero.

Deviating from the classical supply chain framework, we include a capital market that values the supplier. The capital market consists of homogeneous, rational and risk-neutral investors. Their valuation of the retailer firm is the expectation of the supplier's ending-period profit conditional on the price information they can access. As the product performance θ is the supplier's private information, a discrepancy of the valuation may arise in the short-term when the market sales have not been realized. We use $g \in (H, L)$ to denote the market belief of the performance signal to formulate the short-term market value. The supplier cares not only about the true profit the firm will make but also about the market value in the short-term. To model the supplier's incentive scheme, we apply a simple objective function (which has been similarly applied in the literature; see, e.g., Liang and Wen 2007, Lai et al. 2012): the supplier places a weight $\phi \in (0,1)$ on the short-term market value and a weight $1-\phi$ on the long term true profit.

The timeline of the model goes as follows: Frist, the supplier announces the retail price of the new product. According to this price, the retailer infers the type of the supplier and decides the ordering level. At the same time, the capital market observes the price and values the supplier's firm, which forms the short-term market value. As time goes on, the demand is realized and the true value of the supplier's firm is known, which forms the long-term payoff.

Model analysis

In the section, we give the price strategy of the model in two scenarios: symmetric information and asymmetric information.

Symmetric information

In this case, we represent the supplier's profit function, the retailer's profit function and the total profit function, respectively, to be Π_S^i, Π_R^i and Π_T^i. Because the retailer knows the supplier's type in this scenario, she can order $q_i = \alpha - \beta p_i + \gamma\theta_i$ according to the accurate demand information.

$$\Pi_S^i = (1-\mu) p_i(\alpha - \beta p_i + \gamma\theta_i) - c(\alpha - \beta p_i + \gamma\theta_i) \tag{1}$$
$$\Pi_R^i = \mu p_i(\alpha - \beta p_i + \gamma\theta_i) - h(\alpha - \beta p_i + \gamma\theta_i) \tag{2}$$
$$\Pi_T^i = p_i(\alpha - \beta p_i + \gamma\theta_i) - (h+c)(\alpha - \beta p_i + \gamma\theta_i) \tag{3}$$

We can easy get the optimal price strategies for the supplier and the supply chain satisfy $p_i^* = \frac{\alpha + \gamma\theta_i}{2\beta} + \frac{c}{2(1-\mu)}$, $p_T^* = \frac{\alpha + \gamma\theta_i}{2\beta} + \frac{h+c}{2}$. It is obvious that if the supply chain can achieve coordination, the optimal price for the supplier can also make the supply chain achieve the optimal state. Let $p_i^* = p_T^*$, we have $\mu^* = \frac{h}{h+c}$.

Under the condition of symmetric information, we can get the optimal retail price for the supply chain. Because the new product's information is known by the retailer and investors in this scenario, the weight on the short-term market value doesn't play a part in the supply chain. However, when the supplier's type is private, things would be different.

Asymmetric information

Under the condition of asymmetric information, the LTS has the motivation to mimic the HTS for better profit. Now, we represent Π_S^{ij} to be the profit function of the type i to mimic the type j, $i, j \in (H, L)$ .To simplify the notation, we reduce the superscript ij of $\pi_S^{ij}(\cdot)$ to i whenever $i = j$. However, when the HTS (LTS) mimics the LTS (HTS), the quantity level the retailer orders should be decided by supplier's signal $\theta_L (\theta_H)$. With our assumption, the supplier's profit depends partially on the firm's short-term payoff and partially on the firm's long-term payoff. Then

$$\Pi_S^{HL} = \phi\Pi_S^L + (1-\phi)[(1-\mu) p(\alpha - \beta p + \gamma\theta_L) - c(\alpha - \beta p + \gamma\theta_L)] = \Pi_S^L \tag{4}$$

$$\begin{aligned} \Pi_S^{LH} &= \phi\Pi_S^H + (1-\phi)[(1-\mu) p(\alpha - \beta p + \gamma\theta_L) - c(\alpha - \beta p + \gamma\theta_H)] \\ &= \Pi_S^L + \phi(1-\mu) p\gamma(\theta_H - \theta_L) - c\gamma(\theta_H - \theta_L) \end{aligned} \tag{5}$$

Π_S^i, Π_R^i and Π_T^i we get above should also be applied to this situation. Clearly, HTS hasn't incentive to mimic LTS to gain the profit advantage.

According to equation (5), we can easy figure out the maximizer p_{LH}^* of $\Pi_S^{LH}(p)$ is $p_{LH}^* = \frac{\alpha + \gamma[\phi\theta_H + (1-\phi)\theta_L]}{2\beta} + \frac{c}{2(1-\mu)} \in [p_L^*, p_H^*]$. At the same time, we can get the relation between Π_S^{LH} and Π_S^L satisfies $\Pi_S^L > \Pi_S^{LH}$, when $\phi < \frac{c}{(1-\mu)p} = \phi^0$; $\Pi_S^L \le \Pi_S^{LH}$, when $\phi \ge \phi^0$. Considering the interest of market value, if the supplier's weight on the short-term market is no more than ϕ^0, the LTS does not have motivation to mimic the HTS, we can solve the problem as symmetric information scenario; otherwise, the mimicking motivation of LTS emerges. All the below analysis is based on the condition $\phi \geq \phi^0$.

Proposition 1. *There exists a unique* $\underline{p} > p_{LH}^*$ *satisfies* $\Pi_S^{LH}(\underline{p}) = \Pi_S^L(p_L^*)$, *and a unique* $\overline{p} > p_H^*$ *satisfies* $\Pi_S^H(\overline{p}) = \Pi_S^L(p_L^*)$.

Proof. Through the above analysis, it is directly seen that $\Pi_S^L(p_L^*) < \Pi_S^{LH}(p_{LH}^*)$. For $\Pi_S^{LH}(p)$ is a concave function in p, there exists a unique $\underline{p} > p_{LH}^*$ that satisfies $\Pi_S^{LH}(\underline{p}) = \Pi_S^L(p_L^*)$. Similarly, we can show that there exists a unique $\overline{p} > p_H^*$ that satisfies $\Pi_S^H(\overline{p}) = \Pi_S^L(p_L^*)$. □

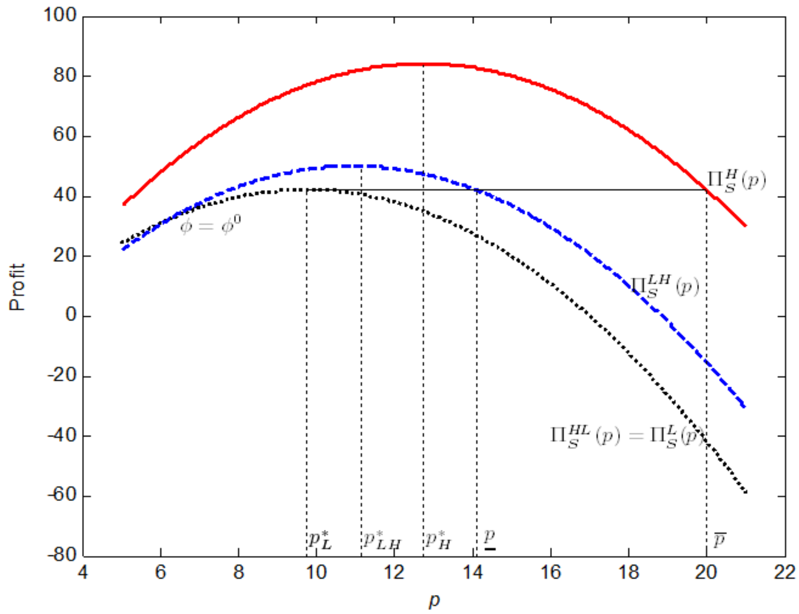

Figure 1 - Demonstration of supplier's profit

Notes. The parameters are $\alpha = 15, \beta = 1, \gamma = 2, c = 2, h = 1, \theta_H = 4, \theta_L = 1, \mu = 0.2, \phi = 0.4$

We depict $\underline{p}$ and $\overline{p}$ in Figure 1. Now, we explain the implications of Proposition 1 by assuming some given market believe (Δp) that is known to the supplier.

After making a charge p, the worst outcome for the HTS is to be valued by the market as a LTS, which lead to an expected payoff $\Pi_S^{HL}(p) = \Pi_S^L(p)$, then resulting in a payoff $\Pi_S^L(p_L^*)$ by maximizing $\Pi_S^L(p)$. We know, $\underline{p}$, as defined in Proposition 1, represents the largest price the LTS is willing to charge to be considered as a HTS. On the other hand, $\overline{p}$ represents the largest price the HTS is willing to charge to achieve a correct market recognition. Therefore, the strategy of the supplier is consistent with the market belief if the price is between $\underline{p}$ and $\overline{p}$.

Proposition 2. *A separating equilibrium of any type* i *exists corresponding to any* $\Delta p \in [\underline{p}, \overline{p}]$. *If* *the market holds a belief as* $g(p)=\begin{cases}H, if\ \ p=\Delta p\\ L, otherwise\end{cases}$, *where* $\Delta p=\max\{\underline{p}, p_H^*\}$, *then the supplier's price strategy follows* $p(i)=\begin{cases}\Delta p, if\ \ i=H\\ p_L^*, if\ \ i=L\end{cases}$.

Proof. The HTS solves the following problem: $\max\begin{cases}\max\limits_{p\geq\Delta p}\Pi_S^H(p)\\ \max\limits_{p<\Delta p}\Pi_S^L(p)\end{cases}$. When $\overline{p}>p_H^*>\Delta p$, the optimal solution of $\max\limits_{p\geq\Delta p}\Pi_S^H(p)$ is p_H^*, and we know $\max\limits_{p<\Delta p}\Pi_S^L(p)\leq\Pi_S^L(p_L^*)=\Pi_S^H(\overline{p})\leq\Pi_S^H(p_H^*)$, so the optimal price of the HTS is p_H^*. However, in the case of $\Delta p\geq p_H^*$, the optimal solution of $\max\limits_{p\geq\Delta p}\Pi_S^H(p)$ is Δp, it is easy to notice that when $\overline{p}>\Delta p\geq p_H^*$, $\max\limits_{p<\Delta p}\Pi_S^L(p)\leq\Pi_S^L(p_L^*)=\Pi_S^H(\overline{p})$ $\leq\Pi_S^H(\Delta p)$, so the optimal price is Δp. Hence, the HTS charges p_H^* if $\Delta p\leq p_H^*$ and charges Δp otherwise. It is straightforward from the above reasons that if $\Delta p>\overline{p}$, the HTS would charge p_L^* for $\Pi_S^L(p_L^*)=\Pi_S^H(\overline{p})\geq\Pi_S^H(\Delta p)$. So a separating equilibrium exists only if $\Delta p\leq\overline{p}$. Similarly we can prove the optimal price is p_L^* for the LTS and a separating equilibrium exists only if $\Delta p\geq\underline{p}$.

Thus we come to the conclusion that a separating equilibrium exists corresponding to any $\Delta p\in[\underline{p},\overline{p}]$. That is, under this market belief, the LTS has no incentive to charge Δp to mimic the HTS and the HTS has no incentive to deviate from Δp. The market belief is consistent with the supplier's price strategy, thus the separating equilibrium holds. □

In the equilibrium, the HTS charges a price Δp and the LTS charges a price p_L^*, consistent with the market belief. Notice that for the LTS, pricing distortion does not occur. In contrast, for the HTS, overpricing occurs when $\underline{p}>p_H^*$. Next, we establish a further result of the HTS's equilibrium pricing decision.

Proposition 3. *There exists a unique threshold* $\phi_{th}=\dfrac{(1-\mu)\gamma(\theta_H-\theta_L)+4\beta c}{2(1-\mu)(\alpha+\gamma\theta_H)+2\beta c}\in[\dfrac{c}{(1-\mu)\underline{p}},1]=[\underline{\phi},1]$ *at which* $\underline{p}=p_H^*$, *so that the HTS's price strategy follows* $p(H)=\begin{cases}p_H^*, when\ \ \phi\leq\phi_{th}\\ \underline{p}, when\ \ \phi>\phi_{th}\end{cases}$.

Proof. According to the definition of $\underline{p}$, when $\phi=\underline{\phi}=\dfrac{c}{(1-\mu)\underline{p}}$, $\underline{p}=p_L^*<p_H^*$. When $\phi=1$, we get $p_{LH}^*=p_H^*$, so $\underline{p}>p_{LH}^*=p_H^*$. For $\Pi_S^{LH}(\underline{p})=\Pi_S^L(p_L^*)$, we define $U(\underline{p},\phi)=\Pi_S^{LH}(\underline{p},\phi)-\Pi_S^L(p_L^*)=0$. It is obvious that $\dfrac{\partial U(\underline{p},\phi)}{\partial\phi}>0$ and $\dfrac{\partial U(\underline{p},\phi)}{\partial\underline{p}}<0$. Hence, $\underline{p}$ increases in ϕ. So there exists a unique threshold $\phi_{th} \in [\underline{\phi},1]$ at which $\underline{p} = p_H^*$. To characterize ϕ_{th}, we should use the above conclusion. When $\phi = \phi_{th}$, $\Pi_S^{LH}(\underline{p}) = \Pi_S^L(p_L^*)$ is equivalent to $\Pi_S^{LH}(p_H^*) = \Pi_S^L(p_L^*)$. Adding p_L^*, p_H^* into it and rearranging, we can obtain the value of $\phi_{th} = \dfrac{(1-\mu)\gamma(\theta_H - \theta_L) + 4\beta c}{2(1-\mu)(\alpha + \gamma\theta_H) + 2\beta c}$. □

From the above results, we know how ϕ impacts the supplier's equilibrium pricing decision. We find no matter how ϕ changes, the optimal price decision for the LTS is p_L^*. The HTS's overpricing decision depends on his interest in the market value ϕ. When $\phi \le \phi_{th}$, the HTS doesn't overprice; when $\phi > \phi_{th}$, the HTS makes an overpricing decision. In the following subsection, we introduce a menu of contracts offered by the retailer to eliminate the phenomenon of overpricing.

Design of contracts

The previous subsection has shown that the weight on short-term market value may lead to the phenomenon of overpricing. As we know, slotting allowances are lump-sum, up-front transfer payments from supplier to retailer when the supplier launches a new product. The previous results with wholesale price only contract by Chu (1992) and Desai (2000) show that slotting allowance can eliminate the overpricing phenomenon in the new product launching process without market value concern. In the following, we show a menu of contracts with slotting allowance can still be effective based on the revenue sharing contract with market concern.

Now, we introduce a menu of contracts $(\mu_i, t_i)(i \in (H, L))$ offered by the retailer to screen out the private information of the supplier, in which t_i is the slotting allowance. Note that the retailer must have enough power to make the supplier to choose the contracts. Now, the supplier with different signals may choose different contracts to maximize the profit. Then, we represent $(\Pi)_S^{ij}$ to be the optimal value of the profit function of the type i to choose the contracts (μ_j, t_j), $i, j \in (H, L)$. At the same time, we reduce the superscript ij of $(\Pi)_S^{ij}(\cdot)$ to i whenever $i = j$. Rewriting the profit functions of the retailer and the supplier, we have

$$(\Pi)_R^i = \mu_i p_i^*(\alpha - \beta p_i^* + \gamma\theta_i) - h(\alpha - \beta p_i^* + \gamma\theta_i) + t_i \tag{6}$$

$$(\Pi)_S^i = (1-\mu_i) p_i^*(\alpha - \beta p_i^* + \gamma\theta_i) - c(\alpha - \beta p_i^* + \gamma\theta_i) - t_i \tag{7}$$

$$(\Pi)_S^{HL} = (\Pi)_S^L \tag{8}$$

$$\begin{aligned}(\Pi)_S^{LH} = {} & \phi[(1-\mu_H) p_{LH}^*(\alpha - \beta p_{LH}^* + \gamma\theta_H) - c(\alpha - \beta p_{LH}^* + \gamma\theta_H) - t_H] \\ & + (1-\phi)[(1-\mu_H) p_{LH}^*(\alpha - \beta p_{LH}^* + \gamma\theta_L) - c(\alpha - \beta p_{LH}^* + \gamma\theta_H) - t_H]\end{aligned} \tag{9}$$

However, it is not difficult to find that p_i^*, p_{LH}^* calculated above can also apply to equations (6)-(9), and $p_L^* = p_{HL}^* < p_{LH}^* < p_H^*$.When the retailer offers the contracts (μ_i, t_i), her wants to maximize the profit. We present the retailer's contract design problem as the following optimization model:

$$\max(\Pi)_R = \lambda[\mu_H p_H^*(\alpha - \beta p_H^* + \gamma\theta_H) - h(\alpha - \beta p_H^* + \gamma\theta_H) + t_H] \\ +(1\text{-}\lambda)[\mu_L p_L^*(\alpha - \beta p_L^* + \gamma\theta_L) - h(\alpha - \beta p_L^* + \gamma\theta_L) + t_L] \tag{10}$$

s.t.

$$\text{(I.C. H)} \quad (\Pi)_S^H \geq (\Pi)_S^{HL} \tag{11}$$

$$\text{(I.C. L)} \quad (\Pi)_S^L \geq (\Pi)_S^{LH} \tag{12}$$

$$\text{(I.R. H)} \quad (\Pi)_S^H \geq S \tag{13}$$

$$\text{(I.R. L)} \quad (\Pi)_S^L \geq S \tag{14}$$

The above parameter S is the supplier's reserved profit. The object function (10) is the retailer's expected optimal profit. Constraints (11) and (12) are the incentive compatibility restrictions which ensure both the HTS and the LTS don't have the incentive to mimic each other. Constraints (13) and (14) are individual rationality restrictions to show the supplier's profit should no less than the reserved profit.

Proposition 4. *When the powerful retailer offers a menu of contracts* (μ_i^*, t_i^*), *where* $\mu_i^* = \dfrac{h}{h+c}$ *and* $t_i^* = (1-\mu_i^*)p_i^*(\alpha - \beta p_i^* + \gamma\theta_i) - c(\alpha - \beta p_i^* + \gamma\theta_i) - S$, *the supply chain can achieve coordination, and pricing distortion does not occur.*

Proof. From equation (8), constraints (11) and (14), we get constraint (13), so constraint (13) is redundant. From constraint (14) we get $t_L \leq (1-\mu_L)p_L^*(\alpha - \beta p_L^* + \gamma\theta_L) - c(\alpha - \beta p_L^* + \gamma\theta_L) - S$ .We can notice that $(\Pi)_R$ increases in t_L , so the retailer's optimal slotting allowance for the LTS is

$$t_L^* = (1-\mu_L)p_L^*(\alpha - \beta p_L^* + \gamma\theta_L) - c(\alpha - \beta p_L^* + \gamma\theta_L) - S \tag{15}$$

Adding equations (8) and (15) to constraint (11), and rearranging, we can get that

$$t_H \leq (1-\mu_H)p_H^*(\alpha - \beta p_H^* + \gamma\theta_H) - c(\alpha - \beta p_H^* + \gamma\theta_H) - S \tag{16}$$

However, t_H should be the bigger the better for the retailer. If the inequality sign in (16) can take to equality sign, we have

$$t_H = (1-\mu_H)p_H^*(\alpha - \beta p_H^* + \gamma\theta_H) - c(\alpha - \beta p_H^* + \gamma\theta_H) - S \tag{17}$$

Now, we can verify that t_H^* is the retailer's optimal slotting allowance for the HTS. That is to say, if equation (17) can be held, constraint (12) will be held either. From equations (15) and (17) we know $(\Pi)_S^L = (\Pi)_S^H = S$. It is easy to get that

$$(\Pi)_S^{LH} = [(1-\mu_H)p_{LH}^* - c](\alpha - \beta p_{LH}^* + \gamma\theta_H) - t_H + (1-\phi)(1-\mu_H)p_{LH}^*\gamma(\theta_L - \theta_H) \\ < [(1-\mu_H)p_{LH}^* - c](\alpha - \beta p_{LH}^* + \gamma\theta_H) - t_H < (\Pi)_S^H = (\Pi)_S^L$$

So, we know when equations (15) and (17) are satisfied, all the constraints (11)-(14) can also be held. So t_L^* and t_H^* should be the optimal slotting allowances offered by the retailer. Adding equations (15) and (17) to the objective function (10) and rewriting, we have

$$\max(\Pi)_R = \lambda[p_H^*(\alpha - \beta p_H^* + \gamma\theta_H) - (h+c)(\alpha - \beta p_H^* + \gamma\theta_H) - S] \\ + (1\text{-}\lambda)[p_L^*(\alpha - \beta p_L^* + \gamma\theta_L) - (h+c)(\alpha - \beta p_L^* + \gamma\theta_L) - S]$$

Adding p_i^* to $(\Pi)_R$ and making $\dfrac{\partial(\Pi)_R}{\partial\mu_i} = 0$, we get $\mu_H^* = \mu_L^* = \dfrac{h}{h+c}$. □

According to Proposition 4, the contracts (μ_i^*, t_i^*) can help the retailer screen out the private information of the supplier. However, when the HTS chooses the contract (μ_H^*, t_H^*) and the LTS chooses the contract (μ_L^*, t_L^*), for $(\Pi)_S^L = (\Pi)_S^H = S$, the supplier can only get reserved profit. So, for a retailer with little negotiation power, the supplier is not willing to choose the contracts. Hence, offering different slotting allowances is only applicative for a powerful retailer, which can help her screen out potentially week new product and eliminate the overpricing behavior.

Conclusion and further research

In this paper, we discuss the supplier's pricing strategy may be distorted when he places a weight on the short-term market value. Then, we prove when a menu of contracts with different slotting allowances is offered by a powerful retailer to screen out the private information of the supplier, the pricing distortion does not occur and the supply chain can achieve coordination finally.

However, we come to our conclusions by making several assumptions. First, we only consider the influence of price and quality performance on demand. Second, we assume that the supplier cares about his market value but the retailer does not. In practice, both of them may be interested in their market values. Third, we assume that the supplier with different quality performances has the same weight on the short-term market value.

At last, our study focuses on a specific revenue sharing contract and we apply a one-period model. An interesting and more realistic research is to extend our study to a repeated game in which the supplier introduces a new product to the retailer in each period. This kind of model may require us to explore how a supplier establishes a reputation with the retailer. Any other points with a longer time horizon are interesting for our future research.

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