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Incentives for Resale Price Maintenance from a Risk Perspective: Using a Real Options Analysis

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Abstract

Looking at the situation from a risk perspective and using real options as an analogy, this study delves into the incentives for manufacturers to impose resale price maintenance (RPM). Manufacturers simultaneously face risks with respect to pricing and sales quantity, with the former from intrabrand price competition and the latter from demand fluctuations. Practicing minimum RPM is analogous to acquiring an option in that the price downside risk is controlled. Intrabrand price competition intensifies manufacturers' incentives to impose RPM because of the rising value of the option. Although price risks are favorable to RPM, risks vis-à-vis sales quantity are not. Thus, the incentives to impose RPM are greater as intrabrand price competition increases and sales quantity fluctuations decrease. In addition, as the retail price and sales quantity of products are positively correlated, manufacturers have greater incentives to impose RPM.

Key words: resale rice maintenance, real options

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I. INTRODUCTION

The motivation behind minimum resale price maintenance (RPM) has been a long-lasting puzzle that has been explained by many scholars using various models. Although every argument is applicable to a number of uses of RPM, there may be a common reason behind manufacturers. Manufacturers have used RPM in many markets, including those for beer, automobiles, medicines, cosmetics, home electrical appliances, and many more. Some of these markets are apparently competitive. Not every manufacturer can use RPM as a means to increase profit, but each of them can use RPM as a means to satisfy the need to reduce risk.

Why would a manufacturer want to impose RPM? The traditional explanation of RPM is that it prevents retailers from free riding in providing services (Telser, 1960). One line of justifications is the service theories represented by Mathewson and Winter (1983, 1984), Marvel and McCafferty (1984). RPM enables the retailers to capture the demand generated by the service and thus provides incentive for retailers to invest in service. Deneckere et al. (1996, 1997) note that RPM may be used to respond optimally to demand uncertainty. Chen (1999) indicate that explicit or implicit in these arguments is the belief that RPM is used because, from the point of view of the manufacturer, there would otherwise be “too much” price competition among retailers. In fact, manufacturers face price risk and sales quantity risk simultaneously; the former from intrabrand price competition and the later from demand fluctuations. Imposing minimum RPM is analogous to acquiring an option because the price downside risk has being controlled.

Real options approach is a tool that recognizes the risk factors faced by manufacturers and helps us understand how they react to these factors. There have been research try to explain social phenomena by incorporation of options analyses. Real options approach provides guidance that future decision possibilities and contingencies can affect manufacturers’ decision significantly. This approach also provides a better method of taking account of uncertainty than traditional methods. Brach (2003, p.1) points out, “The key advantage and value of real option analysis is to integrate managerial flexibility into the valuation process and thereby assist in making the best decisions.” In this paper, real options approach allows us to examine why a manufacturers would want to impose RPM from risk perspectives. As Brach (2003, p.11) notes, real options analysis will also assist in identifying how a given risk can be limited, and how an alternative “Plan B” should be designed to effectively hedge risk and mitigate losses. The value of RPM is the same as that of the put option, which is the conditional expectation of price below minimum resale price.

We construct a real options model that assumes manufacturers face price risk from intrabrand price competition and sales quantity risk from demand fluctuations. This model shows not only that these two sources of risk have great influence on RPM, but the correlation between price and sales quantity also has significant impact on RPM.

II. LITERATURE REVIEW

The traditional explanation of RPM provided by Telser (1960) is that a special service argument implies that in the absence of RPM, consumers prefer to purchase brands from those retailers who provide fewer services but sell these brands at lower prices. Full-service retailers will then have provided costly service without the compensating revenue from the sale of these brands. Their natural reaction will be to reduce service level. But if service is really a necessary part of buying the brand, this in turn will lead to a reduction in demand. Marvel and McCafferty (1984) state that RPM has been common in grocery, drug, and apparel markets - markets in which tangible services provided by dealers are difficult to identify. They show that RPM will be adopted when a manufacturer wishes to purchase quality certification from reputable retailers. Raising the retail price will lower demand through the direct price effects, but will raise demand by inducing higher quality retailers to enter the market. As a result, the adoption of RPM will lead to higher sales.

There is a common implication behind special service and quality certification arguments: in practice, retail price and sales quantity may not move in opposite directions. The special service argument states that the reduction in retail price does not always lead to increasing demand quantities because of the decline in service level, which is a necessary part of buying these brands. On the other hand, quality certification states that raising retail price may increase demand quantities in order to attract higher quality retailers. Both special service and quality certification are characteristics of conspicuous goods that retail price and sales quantity move in the same direction rather than in opposite directions. From the risk perspective, price downside risks in the cases that retail price and sales quantity demonstrate positively correlated become viciously detrimental to manufacturers, because discounts in retail price will accompany a decline in sales quantity. RPM will be extremely necessary in these cases.

Deneckere et al. (1997) consider demand uncertainty in their model. The model states that risk-neutral retailers are saddled with excess inventories in the low-demand state but make up for this with positive profits in the high demand state. Minimum RPM benefits the manufacturer because it guarantees holding adequate inventories in low demand states. That study uses Nintendo as an example, suggesting that Nintendo tried to protect retail prices in order to promote adequate inventory holding.1 Flath and Nariu (2000) state the desire of Nintendo to impose RPM may have been to preserve sales revenue in low-demand states. Minimum price stipulations merely to curb price discounting in low demand states are more likely to be profitable if low demand is less likely. Implicit in this model is the assumption that demand uncertainty does not certainly encourage RPM. The major contribution of these models is to bridge the relationship between uncertainty and RPM. However, neither of these models simultaneously consider price risk and demand quantity risk, nor do these models consider the correlation between these two sources of risk.

In our paper, we construct a model in which the manufacturer faces price risk and sales quantity risk simultaneously. Price risk comes from intrabrand price competition, and

[1] See Sheff (1994) for a detail discussion for Nintendo’s experience.

the objective of RPM is to recoup the price-setting right from retailers in order to eliminate the price downside risk. In addition, we assume that the production capacity can always satisfy market demand. Manufacturers face the sale quantity risk from consumer’s demand variation. As Telser (1960, pp.87) notes:

“Any manufacturer who can sell as much of the product to retailers as he pleases without affecting its price at manufacturing level is manifestly foolish if he attempts to force resale price maintenance on retailers.”

Imposing RPM requires costs including constructing a monitoring mechanism, and any other investments that convince retailers that the payoff is worth the investment. Although previous models assume the cost of RPM is zero, RPM is undeniably a costly process in reality. As Flath and Nariu (2000, pp.399) note:

“But to enforce minimum price stipulations, the manufacturer must monitor the actual details of transactions that the parties involved might wish to conceal.”

After considering the cost of RPM, our model shows that the intrabrand price competition increases the manufacturer’s incentive to RPM. Because imposing RPM is just like acquiring a put option, which is intended to eliminate price downside risk, and the value of put option increases with rising price variance. Using data from Japan, Chen (1997) shows that manufacturers are encouraged to impose RPM to stabilize retail prices. Chen (2004) demonstrates that RPM reduces intrabrand price competition by impacting the effects of advertising. Moreover, Chen and Chen (2006) apply options concepts into RPM from the manufacturers’ perspective.

Although price risk favors RPM, sales quantity risk does not favor RPM. Before adopting RPM, a manufacturer has the flexibility to wait; this flexibility has value that increases with growing sales quantity risk, and persuades the manufacturer to wait longer to impose RPM, until the circumstances become more promising. On the other hand, as the correlation between retail price and demand quantity becomes positive, the incentive to impose RPM increases rapidly, because a fall in the retail price be accompanied by a reduction in the sales quantity. Considering different sources of uncertainty, this model presents a framework of RPM behavior types, and explains why different products have different RPM levels.

III. RESEARCH MODEL

When consumers' demands for assortment and variety are high, putting manufacturers' brands into the hands of a retailer is usually superior to selling direct. But manufacturer and retailer are independent economic entities, with each channel member seeking its own profit, not others. The manufacturer set its brands' price at the optimum level, whereas retailers are not priced to optimize for the individual brand, but rather for the store as a whole. Retailers thus have strong incentive to engage into intrabrand price competition in order to draw store traffic. With the growing power of retailers, the fluctuations on retail price from intrabrand price competition will have backward results in fluctuation on factory price. Manufacturers thus need to bear extra operating risk.

Black and Scholes (1973) and Merton (1973) showed how to value a financial option whose payoff is contingent on the value of the underlying asset. Brennan and Schwartz (1985) and McDonald and Siegel (1985) were the first to actually apply these insights to investment valuation, which is now known as real options analysis. Brach (2003, p.9) has pointed out, "The Black Scholes formula, which is used to price financial options, many indeed not be the right formula to price many real options. Several of the basic assumptions and constraints that come along with the Black Scholes equation simply do not hold in the real world . . . This, however, does not imply that the use of real options analysis is impractical or incorrect."

Imposing minimum RPM is analogous to purchasing a put option to reduce the downside risk of retail price, as a result, leads to a stable factory price. So the value of minimum RPM is the same as a put option whose value is the conditional expectation of price below minimum resale price. The option valuation method we use in this article follows the framework of Dixit and Pindyck (1994).

We assume retail price P and sales quantity Q follow geometric Brownian motions and the uncertainty in these two variables to be correlated:

$$dP = (\mu_P - \delta_P)Pdt + \sigma_P P dW_P \tag{1}$$

$$dQ = (\mu_Q - \delta_Q)Qdt + \sigma_Q Q dW_Q \tag{2}$$

where

$$E(dW_P dW_Q) = \rho\, dt\ , \quad |\rho| < 1 \tag{3}$$

where dW_P, dW_Q are increments of Wiener processes with coefficient of correlation ρ, and μ denotes the risk-adjust return, δ denotes the rate-of–return shortfall, σ denotes the variance parameter, given μ, δ, σ>0, and the subscripts P and Q correspond to retail price and sales quantity processes, respectively. We also assume for convenience that the uncertainty over future value of $P \times Q$ is spanned by the capital market.[2]

We denote intensity of the intrabrand price competition by σ_P, means the intrabrand price competition will increase the variance of price movements.[3] The reason that we assume the retail price fluctuates stochastically is, without RPM, the retail price is set by retailers autonomously. We further assume that manufacturer's sales quantities are equal to demand quantities since there is no limitation on manufacturer's capacity, and denote intensity of sales quantity fluctuation by σ_Q. In addition, $\rho > 0$ means the retail price and sales quantity move in the same direction as time passes; and on the contrary, they move opposite directions with $\rho < 0$. In this model, the manufacturer's revenue $P \times Q$ has two underlying variables that both fluctuate stochastically.

We assume that the retailer charges every unit sold in its store a fixed percentage of retail prices; the amount is $(1-\eta)P$, as the manufacturer receives η P per unit, given $0 < \eta < 1$. Without RPM, the manufacturer's revenue swings as the P fluctuates. This assumption is not unrealistic in the modern channels that the retailers have growing power due to their close contacts with consumers. As intrabrand competition increases the volatility of retail price, manufacturers have strong incentive to impose minimum RPM on

[3] See Dixit and Pindyck (1994), Chapter 4, for a more detailed discussion.

[3] As Albion (1983, 131) notes: "Those brands that are good loss leaders…with individual stores alternating those promoted through constant daily and weekly specials."

their brands. We denote the value of RPM (the value of a put option) per unit by $H(\eta P)$, and the minimum resale price that the manufacturer wants to set by $\overline{P}$. Following standard arguments, $H(\eta P)$ must satisfy the differential equation:

$$\frac{1}{2}H''(\eta \mathrm{P})\sigma_{\mathrm{P}}^2\eta^2 P^2 + (r-\delta_{\mathrm{P}})H'(\eta \mathrm{P})\eta \mathrm{P} - rH(\eta \mathrm{P}) = 0 \tag{4}$$

where $r > 0$ denote the risk-free rate.

In addition, $H(\eta P)$ must satisfy the following boundary conditions:

$$H(\eta P) = \eta(\overline{P} - P) \tag{5}$$

$$\mathrm{H}'(\eta \mathrm{P}) = -1 \tag{6}$$

The solution takes the form:

$$H(\eta P) = G(\eta P)^{\beta_1} \tag{7}$$

where

$$G = -(\eta\overline{P})^{1-\beta_1}\beta_1^{-\beta_1}(\beta_1 - 1)^{\beta_1 - 1} \tag{8}$$

$$\beta_1 = 1/2 - (r-\delta_P)/\sigma_P^2 - \sqrt{\left[(r-\delta_P)/\sigma_P^2 - 1/2\right]^2 + 2r/\sigma_P^2} \tag{9}$$

The total value of minimum RPM in this period is $R = H(\eta P)Q$, and the expected present value is $R/\delta_R = H(\eta P)Q/\delta_R$, where δ_R denotes the rate-of-return shortfall of R.

To impose and maintain RPM, manufacturers need to spend an enormous amount on constructing a monitoring system to control the behavior of downstream members. We denote the cost of RPM by I in the rest of this article.

Before imposing minimum RPM, manufacturers have the flexibility to wait. This flexibility to wait is similar to a wait option, as denoted by $F(R)$, that gives manufacturers the right, but not the obligation, to choose when to pay an exercise price I and in return receive R/δ_R. We can determine a unique threshold R^* such that it is optimal to impose RPM. $R > R^*$ implies that when $R/\delta_R \geq F(R) + I$, the manufacturers will then impose RPM. If $R < R^*$, manufacturers will keep $F(R)$ and have no incentive to impose RPM. It is noteworthy that a higher R^* means less incentive for manufacturers to impose RPM. Following standard arguments, $F(R)$ must satisfy the differential equation:

$$\frac{1}{2}F''(R)R^2(\sigma_H^2+\sigma_Q^2+2\rho\sigma_Q\sigma_H)+(r-\delta_R)F'(R)R-rF(R)=0 \tag{10}$$

In addition, $F(R)$ must satisfy the following boundary conditions:

$$F(R)=R/\delta_R-I \tag{11}$$

$$F'(R)=1/\delta_R \tag{12}$$

The solution takes the form:

$$F(R)=KR^{\beta_2} \tag{13}$$

By substituting (13) into (11) and (12) and rearranging, the solution of RPM threshold is

$$R^*=I\delta_R\beta_2/(\beta_2-1) \tag{14}$$

where

$$\sigma_H=\beta_1\sigma_P \tag{15}$$

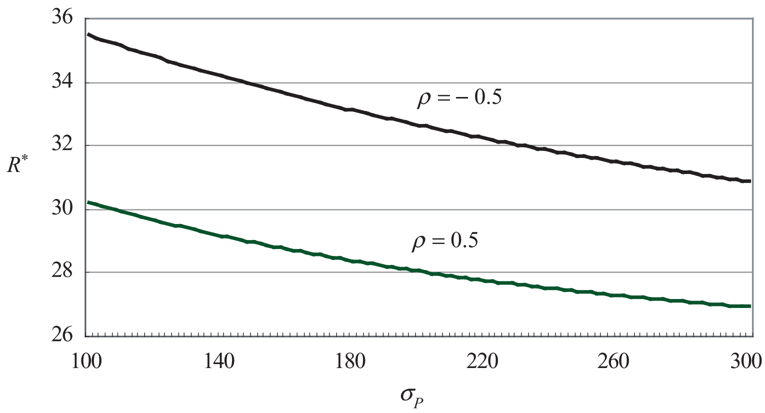
$$\delta_R=\delta_Q-r-\rho\sigma_H\sigma_Q \tag{16}$$

$$\beta_2=\frac{1}{2}-\frac{r-\delta_R}{\sigma_H^2+\sigma_Q^2+2\rho\sigma_H\sigma_Q}+\sqrt{\left[\frac{r-\delta_R}{\sigma_H^2+\sigma_Q^2+2\rho\sigma_H\sigma_Q}-\frac{1}{2}\right]^2+\frac{2r}{\sigma_H^2+\sigma_Q^2+2\rho\sigma_H\sigma_Q}} \tag{17}$$

R^* given in (14) represents the critical value at which it is optimal to impose RPM. We use comparative statics to show how R^* depends on the value of underlying parameters. If the change of one particular parameter causes lower R^*, it means this change encourages RPM; and the opposite means this change discourages RPM if R^* become higher.

Figure 1 demonstrates that with more intrabrand price competition, the manufacturer has more incentive to adopt RPM because of lower threshold R^*. The economical sense is, since imposing RPM is analogous to acquiring a put option that is designed to eliminate price downside risk, as intrabrand price competition intensifies, RPM becomes more valuable and more attractive to manufacturers. This result can explain why RPM is often imposed on branded, advertised products. Because these products have high consumer salience, they easily become the object of intrabrand price competition among retailers due to their superior abilities to draw store traffic (Albion, 1983).

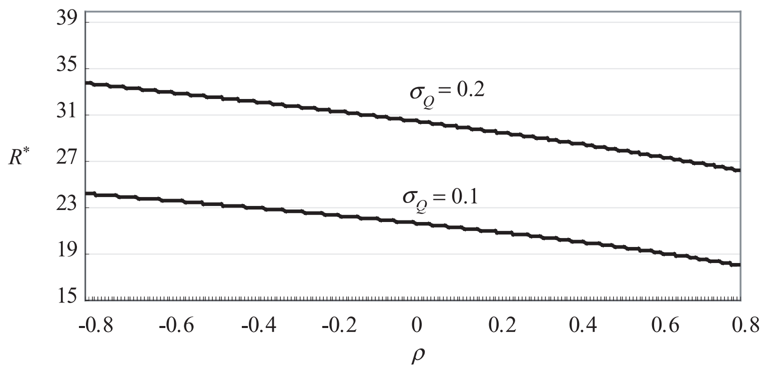
In dynamic circumstances, the retail price and sales quantity do not necessarily move in opposite direction, so the sign of ρ could be either positive or negative. When $\rho > 0$, the manufacturer's incentive to adopt minimum RPM will be much greater than in the condition of $\rho < 0$, because decline in the retail price will also accompany with the decline in the sales quantity, implying greater uncertainty over the revenue of manufacturers. Figure 1 shows threshold of RPM for a brand whose $\rho = 0.5$ is lower than that $\rho = -0.5$, indicating that it is much easier for manufactures to adopt RPM when retail price and sales quantity demonstrate a positive correlation. For example, brands that need quality certification have more need for RPM because a decline in retail price will lower demand because of losing high-quality dealers. This also explains why almost all conspicuous goods, like jewelry and cosmetics, also require RPM; otherwise manufacturers would bear brutal revenue risk as retail prices fluctuate.



(Parameter value: $r = 0.02,\ \eta = 0.8,\ \delta_P = 0.02,\ \delta_Q = 0.04,\ I = 500,\ \sigma_Q = 0.2$)

Fig. 1 The effect of intrabrand price competition, and correlation between price and sales quantity on RPM.

Figure 2 shows that the brands with negative correlation ρ and high σ_Q do not have a high requirement for RPM due to higher R^* than those with positive ρ and low σ_Q. As σ_Q increases, the opportunity that the benefit of RPM can justify I diminishes; the wait option $F(R)$ owned by manufacturers' become valuable, so the threshold is increasing, or otherwise the manufacturers cannot compensate for $F(R)$ and I. Although high σ_P favors minimum RPM, high σ_Q does not favor minimum RPM. The economic sense behind this is that: while σ_P raises the expected present value of minimum RPM, thus increases the incentive to adopt RPM; the σ_Q raises the value of wait option, thus reduces the incentive to adopt minimum RPM.[4] Figure 1 and Figure 2 demonstrate that different sources of uncertainty affect manufacturers' RPM decisions divergently.



(Parameter value: $r = 0.02,\ \eta = 0.8,\ \delta_P = 0.02,\ \delta_Q = 0.04,\ I = 500,\ \sigma_Q = 0.2$)

Fig. 2 The effect of sales quantity fluctuation, and correlation between price and sales quantity on RPM

Coughlan et al. (2001, pp.186) state the reason why uncertainty is unfavorable to vertical integrate:

"To justify the overhead of the vertically integrating, the business must be very promising, and yet, the nature of uncertainty is such that it is difficult to tell how promising the business really is. This conundrum can be solved by avoiding it altogether."

And the RPM, just like vertical integrate, has overhead, such as undertaking, monitoring and maintaining costs that need to be justified. In the absence of stable sales quantity, the manufacturer does not have enough confidence to justify the costs of RPM, and he may find that the cost of imposing RPM, I, is higher than the net benefit (denoted by $R/\delta_R - F(R)$). For example, RPM on men's underwear is more common and stricter

[4] It also means that the incentive to wait longer increases.

than that on fashion apparel since the sales quantities of men's underwear are more stable than fashion apparel. If one product can not generate stable sales streams, the manufacturer prefers to let retailers decide retail price, rather than pay the costs to stipulate resale price maintenance.

IV. IMPLICATIONS FOR PUBLIC POLICY

We phrased the central concern of the public policy makers as, "Why would a manufacturer want to impose RPM?" We have argued that an important element in answering these questions- how a given risk can be limited, and how RPM should be designed to effectively hedge risk and mitigate losses. Manufacturers face price risk and quantity risk simultaneously; they can use RPM as a means to satisfy the need to reduce risk. Therefore, the profit of manufacturer arises only if the price downside risk has being controlled.

We explain how different sources of risks affect the incentive of RPM by showing the response of RPM's threshold to the changes of risk parameters. Imposing RPM is analogous to acquiring an option because the price downside risk has being controlled. As intrabrand price competition become more intense, the manufacturer's incentive to impose RPM increases because of rising value of options. On the contrary, the sales quantity risk decreases the incentive of RPM because it makes the possibility that the benefits of RPM exceed the costs of RPM become uncertain. As the coefficient of correlation between price and sales quantity is closer to positive, the manufacturer has more incentive to impose RPM.

RPM has been seen as an anticompetitive measure by many scholars, but RPM still exists in many competitive markets, such as food, apparel, furniture. In fact, manufacturers simultaneously take risk and profit factors into account when they make marketing strategies. This research indicates that the risk factors need to be considered in any antitrust policymaking. On the other hand, if the correlation between price and sales quantity (such as a conspicuous good) demonstrates positive, the manufacturers thus need to impose RPM because the decline of retail price will accompany the decline of sales quantity. Without RPM, the negative externality of intrabrand price competition will bring extra risk to the manufacturers. After all, if manufactures cannot control the risks from their downstream members, their profits from marketing strategies will be bound with uncertainty.

These results have important implications for marketing managers, public policy makers. Marketing managers need to coordinate their price risk and sales quantity risk to increase their profits. The relationships between price risk, sales quantity risk and RPM need to be considered in any antitrust policymaking.

V. CONCLUSIONS

RPM has been adopted in different markets, although not all manufacturers in these markets can use minimum RPM to increase profits. Thus, analyzing RPM from the risk perspectives may be more appropriate than from the profit perspectives. Manufacturers in the market simultaneously face price risk and sales quantity risk; the former from intrabrand price competition and the later from demand fluctuations. Imposing RPM is equivalent to acquiring a put option. As intrabrand price competition become more intense, the manufacturer’s incentive to impose RPM increases because of rising value of put options. Although the price risk is favorable to RPM, the sales quantity risk is not favorable to RPM. The fluctuation of sales quantity makes manufacturers less confident about whether the cost of RPM can be justified. On the other hand, as the price and sales quantity are positively correlated, the manufacturers’ incentives for RPM become even greater, because intrabrand price competition significantly will amplify the revenue risk.

For business managers, the decision of whether or not to adopt RPM should depend on each brand’s risk characteristics that demonstrate in practice. Business managers should evaluate the demand of risk-reduction for each brand to determine whether the benefits can justify the costs. The results in this study also need to be considered into any antitrust policies, since imposition of RPM may be more appropriate to be thought as a risk-aversion behavior rather than a monopoly-profit-making behavior. The prohibition on RPM in some circumstances could bring extra operating risk to manufacturers, not only the profits decreasing.

參考文獻

Albion, M. S. (1983), *Advertising's Hidden Effects: Manufacturers' Advertising and Retail Pricing*, MA: Auburn House Publishing.

Black, F., and M. Scholes (1973), "The Pricing of Options and Corporate Liabilities," *Journal of Political Economy*, 81: 637-659.

Brach, Marion A. (2003), *Real Options in Practice*, John Wiley & Sons, Inc., Hoboken, NJ.

Brennan, M. J., and E. S. Schwartz (1985), "Evaluating Natural Resource Investment," *Journal of Business*, 58: 135-157.

Coughlan, A. T., E. Anderson, L. W. Stern and A. I. EL-Ansary (2001), *Marketing Channels*, NJ: Prentice Hall, Inc.

Chen, Miao-Ling (1997), *Vertical Restraint and Advertising Effects*, Tokyo: Hakuto-Shobo Publishing Company.

Chen, Miao-Ling (2004), "The Effects of Advertising on Retail Price Competition under Vertical Restraint-A Japanese Case", *Journal of Business Research*, 57(3): 277-283.

Chen, Miao-Ling and Chen, Guan-Ru (2006), "The Effects of Advertising on Resale Price Maintenance," *Applied Economics, accepted*.

Chen, Y. (1999), "Oligopoly Price Discrimination and Resale Price Maintenance," *Rand Journal of Economics*, 30: 441-455.

Deneckere, R.; H. P. Marvel and J. Peck (1996), "Demand uncertainty, inventories, and resale price maintenance," *Quarterly Journal of Economics*, 111(3): 885-913.

Deneckere, R., H. P. Marvel and J. Peck (1997), "Demand Uncertainty and Price Maintenance: Markdowns as Destructive Competition," *American Economic Review*, 87(4): 619-641.

Dixit, A. and R. S. Pindyck (1994), *Investment under Uncertainty*, Princeton, NJ: Princeton University Press.

Flath, D. and T. Nariu (2000), "Demand Uncertainty and Resale Price Maintenance," *Contemporary Economic Policy*, 18(4): 397-403.

Marvel, H. P. and S. McCafferty (1984), “Resale Price Maintenance and Quality Certification,” *Rand Journal of Economics*, 15(3): 346-359.

Mathewson, G. F. and R. A. Winter (1983), “The Incentive for Presale Price Maintenance under Imperfect Information,” *Economic Inquir*y, 21(3): 337-348.

Mathewson, G. F. and R. A. Winter (1984), “An Economic Theory of Vertical Restraints,” *Rand Journal of Economics*, 15(1): 27-38.

McDonald, R., and D. R. Siegel (1985), “Investment and the Valuation of Firms When There is an Option to Shut Down,” *International Economic Review*, 26: 331-349.

Merton, R. C. (1973), “The Theory of Rational Option Pricing,” *Bell Journal of Economics and Management Science,* 4: 141-183.

Sheff, D. (1994), *Game over: How Nintendo Conquered the World,* New York: Vintage.

Telser, L. G. (1960), “Why Should Manufacturers Want Fair Trade?” , *Journal of Law and Economics*, 3: 86-105.

從風險觀點探討零售價格維持之誘因：運用實質選擇權分析

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中文摘要

本研究運用實質選擇權分析，由風險觀點分析製造商實施零售價格維持之誘因。製造商面對價格與銷售數量之風險，前者來自品牌內價格競爭，而後者來自需求之波動。因為價格之下方風險已經被控制，所以實施最低零售價格維持相當於取得一項選擇權。當品牌內價格競爭較為激烈時，由於選擇權之價值增加，導致製造商實施零售價格維持之誘因上升。雖然價格之風險導致製造商較容易實施零售價格維持，而銷售量之風險卻導致製造商較不容易實施零售價格維持。因此當面對品牌內價格競爭上升與銷售量波動之下降時，製造商實施零售價格維持之誘因即隨之上升。另一方面，當產品之零售價格與銷售數量呈現正相關時，製造商有較高之誘因以實施零售價格維持。

關鍵詞：零售價格維持、實質選擇權

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