Should National Brand Manufacturers Produce Private Labels?
Should National Brand Manufacturers Produce Private Labels?

Abstract

Should national brand manufacturers produce private labels? Anecdotal evidence shows that this is a common question for managers in different industries and countries. This paper examines this question, focusing especially on the effects of producing private labels on manufacturers’ profits when their provision may affect both the consumers’ perception of the quality of the private label and the national brand manufacturer’s costs. The analysis allows for different degrees of competition in the retail market, and for linear and non-linear pricing. We show that national brand manufacturer’ gains from producing private labels are increasing with the concentration of the retail market. The results presented in this paper may help managers to identify key variables that may affect the profitability of producing private labels.

Key words: Private labels, Strategic Interaction, Manufacturer Profits.
1. Introduction

Private labels are a growing market in different countries around the world\(^1\). They have more than 20% of market share in countries such as the Netherlands, Spain, Germany, Belgium, France and United Kingdom, while in France the penetration of private labels in product categories such as Groceries, Cleaning products, Tobacco, Dairy, Meats and Delicatessen is also largely above 20% (Berges-Sennou et al. 2004). Moreover, the Private Label Manufacturers’ Association (PLMA) reports in its 2003 Private Label Yearbook that store brands now account for one in five items sold every day in U.S. Supermarkets, Drug Stores and Mass Merchandisers. The PLMA also points out that in the past five years, annual sales of private label products in supermarkets has increased 18.4%, while the sale of national brand products in those distribution channels has increased 11% in the same period.

On the account of the growing importance of private labels, national brand manufacturers in many industries are asking themselves whether or not they should supply them. According to US executives\(^2\), there are several U.S. manufacturers of national brands currently producing private labels for retailers and attempting to increase their involvement in this segment. Quelch and Harding (1996) report that more than 50% of U.S. manufacturers of branded consumer packaged goods make private label goods as well.

The main objective of this paper is to evaluate the advisability of producing private labels by a national brand manufacturer (NBM). This analysis is interesting since the production of private labels may have costs and benefits to a NBM. One such benefit is to obtain operational synergies through the use of some indivisible resources with idle capacity. A potential cost is the loss of negotiation power with retailers in the national brand due to the production of a private label that may be perceived as having better quality than a private label manufactured by independent firms. When consumers lack the time, opportunity, or

---

\(^1\) According to the Private Label Manufacturers’ Association (PLMA), private label products encompass all merchandise sold under a retailer’s name. That brand can be the retailer’s own name or a name created exclusively for that retailer.

\(^2\) For example, Dave Price of ProSource, quote from “Competition leads to growth of private labels”. Sema News, December, 2003.
ability to inspect alternatives at the point of sale, they rely on any available evidence of quality to help them make a purchase decision. As such, they may perceive the private label produced by the branded manufacturer as a closer substitute to the national brand, for instance, for reputational effects.

We analyze the advisability of producing private labels by a national brand manufacturer for different degrees of retail market concentration. Berges-Sennou et al. (2004) provide empirical evidence of a positive correlation between the concentration of retail market and the market share of private labels. As the gain in operational efficiency and the effects of a change in private label quality on manufacturer’s profits may depend on the concentration of the retail market (e.g. through the quantity sold of each product), it is important to assess the effect of this concentration on the NBM’s incentives to produce private labels.

The main body of research regarding private labels has been confined to the analysis of the retailers’ incentives to market them (Mills, 1995; Raju, Sethurman and Dhar, 1995; Putsis, 1997; Cotterill, Putsis and Dhar, 2000; Scott-Morton and Zettelmeyer, 2004); the determinants of variation in private label penetration across product categories (Sethuraman, 1992; Hoch and Banerjie, 1993); and the determinants of the characteristics of private labels (Bontems et al., 1999; Sayman et al., 2002). However, the determinants of the supply of private labels by NBMs have received limited attention in the literature. This lack of analysis is surprising given the importance of this issue to NBMs’ managers.

In an interesting and pioneer article, Quelch and Harding (1996) recommend that companies with well known brands should not produce private labels because the cost of cannibalizing the national brand is generally larger that the contribution of the private label to the company’s financial results. However, these authors do not derive their conclusions from a formal model.

The recommendations by Quelch and Harding are somewhat challenged by anecdotal observation of real life situations. For example, the U.S. Company Granatelli Motor Sports manufactures a large variety of performance products such as valve covers, mass air...
sensors and computer tuners, for the automotive aftermarket. Some Granatelli products are
top sellers in their markets. A few years ago, Granatelli began producing private labels in
some of its branded categories for companies such as “Summit Racing”. These private label
products have been so successful that Granatelli Motor Sport has set up a private label
division and is actively seeking this type of business. Another example comes from the
French dairy sector, where all large firms such as Besnier, Bongrain, Nestle and Sodia Al,
produce both branded and private label products. Some medium and small dairy
manufacturers (e.g., Senoble) have been specializing in the production of private labels
even while continuing to produce their own brands. In a different food industry, Heinz
supplies private labels in different categories but not in its more important product:
ketchup.

Berges-Sennou et al (2004) argue that when deciding its production, the trade-off for a
retailer is between gains in efficiency and share in rents. On the one hand, if the NBM also
manufactures the private label, it may obtain gains in efficiencies and, then, it may be in a
position to offer a private label product of better quality at the same cost, or a product of
similar quality at a lower cost, than the competitive fringe. On the other hand, if the NBM
also produces the private label, the retailer entrusts both goods to the same producer,
thereby affecting each party’s negotiation power.

This article is organized as follows. In the next section, the model is presented. In section 3
we find the equilibrium and describe the main results. Finally, a summary is offered in
section 4.

2. The model

2.1 Demand Structure

Consumers buy at the most one unit of the good, which may be either the national brand or
the private label. The utility (net of cost) derived by a consumer for buying the national
brand is \( \theta - p_n \), while the utility (net of cost) derived by consuming the private label is \( \delta \theta - \)
where $\theta$ is a consumer-specific taste parameter. Utility is zero if neither good is bought. We assume that there is a continuum of consumers with $\theta$ uniformly distributed on $[0, 1]$ and density equal to 1. $\delta$ indicates the degree of substitutability of the private label for the national brand or, equivalently, $\delta$ is an index of the quality of the private label. As such, as $\delta$ raises, the private label becomes a better substitute for the national brand. We assume that $\delta \in (0, 1)$ and, thus, that consumers prefer, at the same price, the national brand. The consumer chooses the option that provides the highest level of utility.

This preference structure implies that consumers prefer, at the same price, a national brand to a private label owing to perceived differences in quality between both products (Hoch and Banerji, 1993). Since consumers have different values of $\theta$, the vertical structure has a degree of market power. With this preference structure, consumers who buy the national brand are those for whom condition (1) is satisfied:

$$\theta - p_n \geq \delta \theta - p_s \quad \text{or} \quad \theta \geq \frac{p_n - p_s}{1 - \delta} \quad (1)$$

In addition to condition (1), consumers who buy the national brand are those for whom $\theta - p_n$ is greater than 0. On the other hand, consumers who buy the private label are those for whom condition (2) is satisfied:

$$\delta \theta - p_s \geq 0 \quad \text{or} \quad \theta \geq \frac{p_s}{\delta} \quad (2)$$

From (1) and (2) it follows that the private label is sold whenever:

$$\frac{p_n - p_s}{1 - \delta} > \frac{p_s}{\delta}$$

As the national brand will be sold only when $P_n < 1$, both products are sold when $P_s < \delta P_n$ and $P_n < 1$. If $P_s \geq \delta P_n$ and $P_n < 1$, the price of the private label relative to the price of the
national brand would be so high that no consumer would buy the private label. Since $\theta \leq 1$, the demand for each product, when both goods are sold, is given by (3) and (4) below:

\[
q_n = \int_{\frac{p_n - p_s}{1-\delta}}^{1} \partial \theta = 1 - \frac{p_n - p_s}{(1-\delta)} \quad (3)
\]

\[
q_s = \int_{\frac{p_s}{\delta}}^{\frac{p_n - p_s}{1-\delta}} \partial \theta = \frac{p_n - p_s}{(1-\delta)} \cdot \frac{p_s}{\delta} \quad (4)
\]

Equations (3) and (4) show that the demand for each product is decreasing in its own price and increasing in the price of the substitute good. Notice that when both products are sold, consumers who buy the national brand are those with higher values of $\theta$. We restrict ourselves to those prices and quantities that are nonnegative\(^3\).

2.2 Other Assumptions

In our framework, there are three types of agents: the NBM, retailers, and independent firms that may produce private labels. The NBM produces and sells a national brand ($n$). The independent firms may only produce and sell a private label, which may also be manufactured by the NBM. Both goods are made available to consumers through common retailers. We explore the question of whether by foreclosing sales from independent private label manufacturers, the NBM makes more profits than it would have made selling only its branded product.

Due to differentiation efforts in special design, packaging, advertisement and brand reputation, the producer of the national brand has market power on it. The supply of private labels by independent manufacturers is supposed to be competitive and then, a retailer procures a store brand produced by any of these manufacturers at a price equal to its marginal cost of production. Retailers sell the national brand and the private label to

---

\(^3\) To analyze the more interesting case in which both goods are offered by retailers, we restrict the analysis to parameter values such as $\delta > 2c$. 
consumers at $P_n$ and $P_s$ respectively. The marginal costs ($c$) of the national brand and the private label provided by independent manufacturers are identical. Thus, the only cost differences between both goods are the fixed and sunk costs incurred by the NBM to help in their differentiation efforts. The only cost to retailers is the wholesale price of each product.

The NBM may have a lower marginal cost in the production of the private label because of its ownership of some indivisible factor that, after being used in the production of the national brand, is available at a lower cost for the production of the private label. We assume that the NBM obtains this synergy only by producing private labels and not by producing more of the national brand. One possible reason for this assumption is that the NBM does not want to produce more than a certain amount of the national brand to avoid lower prices or a worse service on it.

Specifically, we assume that the NBM’s marginal production cost of the private label is ($c-\beta$), where $\beta \in [0, c]$ is an indicator of the degree of economies of scale. The NBM’s wholesale prices of the national brand and the private label are $w_n$ and $w_s$, respectively. However, on account of its cost advantage, the NBM can set $w_s \leq c$ and foreclose independent private label manufacturers without incurring a loss on its private label sales. But the lower $w_s$ is set, the more sales of the national brand are diverted, and the lower are the NBM’s profits on its combined sales. As such, we assume that the NBM’s goal is to use its private label cost advantage to minimize national brand diversion (Mills, 1999) charging $w_s = c - \epsilon$. Given that $\epsilon$ is negligible, we assume $w_s = c$ for the computations that follow.

Furthermore, the private label produced by the NBM may be perceived as being of better quality than the good produced by independent manufacturers, either because consumers learn that the private label is produced by the NBM (e.g. because the retailer asked the NBM to announce it in the packaging), or because high minimum quality standards set by a NBM that wants to maintain its brand’s equity and customer goodwill. This difference in quality may entitle the NBM to additional market power.
Specifically, we assume that the private label produced by the NBM is perceived as having quality $\delta_1$, with $1 > \delta_1 \geq \delta$. $\delta_1$ can be thought as $(\delta + d)$ with $d \in [0, 1 - \delta]$ showing the distance between the perceived quality of the private label manufactured by the NBM and the independent firms. Since by introducing private labels a NBM may bring about, simultaneously, cost advantages and a cannibalization of sales and margins on its branded product, we analyze the relative importance of each of those factors.

The decision sequence of the game is as follows: In the first stage, the NBM decides whether to produce the private label or not, and sets the wholesale prices anticipating the retailers’ second stage reaction. In the second stage, each retailer sets the quantity demanded of the national brand and the private label. Based on the prices of both goods, consumers decide which item, if any, to purchase. As the NBM knows the retailers’ reaction functions, the resulting equilibrium is sub game perfect. Since two part tariffs are widely used on retailers – manufacturers relationships, we also analyze the case where the NBM may charge a two-part tariff maintaining the same decision sequence.

3. Equilibrium

In this section, we compare the NBM’s profits with and without the production of the private label. We separate the analysis in two cases. In the first case, we assume that the NBM produces the private label only for one retailer, while in the second case we assume that the NBM produces the private label for the $t$ retailers. The first case is applicable to a situation in which the private label is store specific, for example because the retailer asks for exclusivity on its production or because of special requirements that increase substantially the marginal costs of producing private labels for other retailers, while the second case is more appropriate when the NBM produces common private labels for different retailers at the same marginal cost.

Case 1: The NBM produces the private label for one retailer
The NBM produces the Private Label

In this section, we analyze the NBM’s incentives to produce a private label of quality $\delta_1$ for a varying degree of retail competition. To introduce competition at the retail level, we assume the existence of $t$ retailers that compete \textit{a la} Cournot. To find equilibrium, we solved the game backwards, starting with the retailer’s decision. A retailer $i$ that sells a national brand and a private label chooses $q_{n,i}$ and $q_{s,i}$ so as to maximize (6):

$$
\pi^F = (1 - q_{n,j} - \sum_{j \neq i} q_{n,j} - \delta q_{s,i} - \delta \sum_{j \neq i} q_{s,j} - w_n)q_{n,i} + (\delta q_{s,i} - \delta \sum_{j \neq i} q_{s,j} - \delta q_{n,j} - \delta \sum_{j \neq i} q_{n,j} - w_s)q_{s,j}
$$

(6)

Where $w_n$ and $w_s$ are the wholesale prices of the national brand and the private label, and $q_{n,i}$ and $q_{s,i}$ are the quantities of each product sold by retailer $i$. From the FOC of (6), and solving for $q_{n,i}$ and $q_{s,i}$, we obtain:

$$
q_{n,i} = \frac{1 - \delta_1 - w_n + w_s}{(1 + t)(1 - \delta_1)}
$$

$$
q_{s,i} = \frac{\delta_1 w_n - w_s}{\delta_1(1 + t)(1 - \delta_1)}
$$

The NBM’s problem involves the selection of the wholesale prices considering the retailer’s reaction functions. Hence, the NBM maximizes in equation (7):

$$
\pi^a = (w_n - c)Q_n + (w_s - (c - \beta))Q_s
$$

(7)

Replacing $Q_n$ by $tq_{n,i}$; $Q_s$ by $q_{s,i}$; and $w_s$ by $c$; the NBM’s profits are given by expression (8):

$$
\pi^{asl} = (w_n - c)\left(\frac{1 - \delta_1 - w_n + c}{(1 + t)(1 - \delta_1)}\right) + (c - (c - \beta))\left(\frac{\delta_1 w_n - c}{\delta_1(1 + t)(1 - \delta_1)}\right)
$$

(8)
From the FOC of (8), we obtain the equilibrium wholesale price of the national brand (equation 9):

\[
w^*_n = \frac{2c - \delta_1 + 1}{2} = \frac{2c - \delta - d + 1}{2}
\]  

(9)

Replacing \( w^*_n \) in \( q_{n,i} \) and \( q_{s,i} \) we obtain \( q_{n,j}^* = 1/(2(t+1)) \) and \( q_{s,j}^* = (\delta - 2c)/(2(1+t)) \). In (9) we observe that as the (positive) difference in quality between the private label produced by the NBM and by independent manufacturers increases, the wholesale price of the national brand decreases \( \partial w^*/\partial d < 0 \). Replacing \( w^*_n \) on the profit function, we obtain the NBM’s profits by producing the national brand and a private label of quality \( \delta_1 \) (equation 10):

\[
\pi = \frac{t(1-\delta_1)}{4(t+1)} + \frac{\beta(\delta_1 - 2c)}{2\delta_1(1+t)}
\]  

(10)

The NBM does not produce the Private Label

When the NBM does not produce the private label, a retailer \( i \) may buy a private label of quality \( \delta \) from independent competitive manufacturers at a price \( c \), maximizing in equation (11):

\[
\pi = (1 - q_{n,j} - \sum_{j \neq i} q_{n,j} - \delta q_{s,i} - \delta \sum_{j \neq i} q_{s,j} - w^*_n)q_{n,j} + (\delta - \delta q_{s,j} - \delta \sum_{j \neq i} q_{s,j} - \delta \sum_{j \neq i} q_{n,j} - c)q_{s,j}
\]  

(11)

From the FOCs of equation (11), we obtain:

\[
q_{n,j} = \frac{1 - \delta - w^*_n + c}{(1+t)(1-\delta)}
\]

\[
q_{s,j} = \frac{\delta w^*_n - c}{\delta(1+t)(1-\delta)}
\]
On the other hand, a NBM that does not produce the private label maximizes in equation (12), anticipating the retailer’s reaction function:

\[ \pi^m = (w_n - c)Q_n \]  

(12)

From the FOC of (12), and replacing \( Q_n \) by \( tq_{n,i} \) we obtain \( w^* = (1-\delta+2c)/2 \). Replacing \( w^* \) in \( q_{n,i} \) and \( q_{s,i} \) we obtain the NBM’s profits:

\[ \pi^m = \frac{t(1-\delta)}{4(t+1)} \]  

(13)

**Difference in NBM’s Profits by Producing the Private Label**

Expression (14) shows the difference in NBM’s profits by selling both products as compared to its profits when it only sells the national brand (\( \Delta \pi^m \)). Proposition 1 is based on expressions (14) and (15):

\[ \Delta \pi^m = \pi^{m=1} - \pi^m = \frac{\beta(\delta_1 - 2c)}{2\delta_1 (1+t)} + \frac{t(\delta - \delta_1)}{4(t+1)} \]  

(14)

**Proposition 1**: For any level of retail market concentration: a) The difference in NBM’s profits by producing a private label can be positive, negative or zero, depending on the relative effects of the economies of scale obtained by producing it and on the difference in the quality of the private label produced by the NBM. b) The difference in NBM’s profits by producing the private label are increasing with the economies of scale and with the difference between the perceived quality of the private label produced by it and by independent manufacturers.

Part (a) of proposition (1) comes from the signs of the right hand side’s (RHS) terms of (14). Since \( (\delta_1 - 2c) > 0 \), the first term of the RHS is positive as long as the NBM enjoys some economies of scale from the production of the private label, while the second term of
that side is negative as long as the perceived quality of the private label produced by the NBM is higher than the perceived quality of the private labels produced by independent manufacturers. Replacing $\delta_1$ by $\delta + d$ we obtain equation 15:

$$\Delta\pi^m = \pi^m_{1} - \pi^m = \frac{2d\beta + 2d\delta - td - td^2 - 4c\beta}{4(t+1)(d + \delta)} \quad (15)$$

Part (b) of proposition 1 comes from $\partial \Delta\pi^m / \partial \beta > 0$ and from $\partial \Delta\pi^m / \partial d < 0$. From proposition 1, we derive Lemma 1:

**Lemma 1**: For any level of retail market concentration: (a) when the unique effect of producing a private label by a NBM is to improve its quality, the NBM should not produce it. (b) When the unique effect of producing a private label by a NBM is to obtain economies of scale, the NBM should produce it.

Part (a) of Lemma 1 comes from equation (15), where it can be seen that with $\beta = 0$ and $d > 0$, the change in NBM’s profits ($\Delta\pi^{md}$) is given by:

$$\Delta\pi^{md} = \frac{-td}{4(t+1)} < 0$$

$\Delta\pi^{md}$ is negative because as the perceived quality of the private label produced by the NBM improves, the wholesale price of the national brand goes down (equation 9). Notice also that as $d$ is larger, $\Delta\pi^{md}$ becomes more negative, showing a larger cannibalization on the national brand’s margin. Part (b) of Lemma 1 can be derived observing in (15) that with $\beta > 0$ and $d = 0$, the difference in NBM’s profits ($\Delta\pi^{me}$) is given by:

$$\Delta\pi^{me} = \frac{\beta(\delta - 2c)}{2(t+1)\delta}$$
Since $\Delta \pi^{mc}$ is positive, the NBM should produce private labels when its unique effect is to take advantage of economies of scale. The explanation for this result is that with $d = 0$, the NBM obtains a positive margin on the private label ($\beta$) without cannibalizing the national brand’s margin.

**Effect of private label market share on NBM's incentives to produce private labels**

NBM’s incentives to produce private labels may also depend on the national brand’s market share. Defining $MS = Qs/(Qs + Qp)$ as the private label market share of category unit sales, we obtain $MS = (\delta - 2c)/2(\delta - c)$. As $\partial MS/\partial \delta = c/(\delta - c)^2 > 0$, Thus, private labels that are strong substitutes for national brands account for larger market shares in their categories.

From equation (14) we obtain $\partial \Delta \pi^{mc}/\partial \delta > 0$. This result shows that as the private label produced by independent manufacturers becomes a closer substitute of the national brand, and thus it has a larger market share, the NBM should be more motivated to produce it. Two reasons explained this result. Firstly, as the market share of the private label becomes larger, any cost advantage brought about by economies of scale attain more importance. Secondly, in our model a larger private label category market share implies a lower national brand’s category market share and unit sales, decreasing the relative importance of the cannibalization on the national brand’s margin. From these results we obtain proposition 2:

**Proposition 2**: The NBM’s incentives to produce a private label are increasing in its category market share.

**Effect of retail market concentration on NMB’s incentives to produce private labels**

Proposition 3 summarizes the effect of market concentration on its incentives to produce private labels:
Proposition 3: a) The difference in NBM’s profits by producing a private label is increasing with the concentration of the retail market. b) The NBM’s gains by producing private labels, when its unique effect is to take advantage of economies of scale, are increasing with the concentration of the retail market. c) The NBM’s losses by producing a private label, when its unique effect is to increase the quality of the private label available to consumers, are decreasing with the concentration of the retail market.

Part (a) of proposition 3 comes from \( \frac{\partial \Delta \pi^m}{\partial t} < 0 \), while part (b) comes from \( \frac{\partial \Delta \pi^{me}}{\partial t} < 0 \) and part (c) from \( \frac{\partial \Delta \pi^{md}}{\partial t} < 0 \).

A general conclusion from proposition 3 is that it is more convenient to produce private labels as the retail market is more concentrated. There are at least two related reasons for this result. First, when the retail market becomes more concentrated, the quantity sold to an individual retailer increases and thus, the total NBM’s cost advantage is larger. Second, as the retail market is more concentrated, the total quantity of the national brand traded in the market is lower (standard Cournot result) and then, the NBM’s losses by charging a lower national brand’s wholesale price are reduced. Thus, as the concentration of the retail market increases, the reason that motivates the production of a private label by a NBM (cost synergies) is reinforced, while the reason that limits its production (national brand’s price cannibalization) is minimized. From equation (15), we also derive Lemma 2:

Lemma 2: The NBM will be indifferent about producing a private label when:

\[
\beta = \frac{d(t+d+\delta)}{2(d+\delta-2c)}
\]

Lemma 2 is derived solving for \( \beta \) in equation (15). By naming \( \frac{d(t+d+\delta)}{2(d+\delta-2c)} = Z \), then a NBM should produce private labels as long as \( \beta > Z \). As an example, if \( c \) is normalized to zero, the NBM should produce a private label as long as \( \beta > \frac{dt}{2} \). Figure 1 graphs the function \( \beta = \frac{dt}{2} \) for different levels of retail market concentration. Figure 1 shows that it is convenient to produce private labels at any point to the left of the line and that, therefore,
the space available to produce them is larger as the concentration of the retail market increases. This result agrees with the conclusions presented in proposition 2.

**Figure 1**

![Indifference curves](image)

**Case 2: The National Brand Manufacturer produces a private label for t retailers**

In this section, we assume that the NBM may produce the private label for t retailers. In this case, each retailer maximizes in equation (6), as in the previous section. However, a NBM that also produces the private label maximizes in equation (17), where the difference between equations (8) and (17) is that in the latter $Q_s = t^*q_{s,i}$.

$$\pi_{at} = (w_n - c)\left(1 - \frac{\delta_1 - w_n + c}{1 + t(1 - \delta_1)}t + (c - (c - \beta))(\frac{\delta_1 w_n - c}{\delta_1 (1 + t)(1 - \delta_1)}t)\right) \quad (17)$$

From the FOC of (17), and replacing $\delta_1$ by $\delta + d$, we obtain the NBM’s profits when it produces the national brand and a private label of quality $\delta + d$:

$$\pi_{at} = t(1 - (\delta + d)) + \frac{t\beta (\delta + d - 2c)}{4(t + 1)} + \frac{t\beta (\delta + d - 2c)}{2(\delta + d) + 2t(\delta + d)} \quad (18)$$
When the NBM does not produce the private label, it obtains the same profits shown in (13). Thus, the difference in profits for a NBM by producing a private label when it sells it to \( t \) retailers is given by:

\[
\Delta \pi^{m2} = \pi^{m1} - \pi^m = \frac{t(2d\beta + 2\beta d\delta - d\delta - d^2 - 4\epsilon \beta)}{4(t+1)(d + \delta)}
\]  

As in the previous case, equation (25) can take any sign depending on the relative effects of the economies of scale and the quality improvement of the private label produced by the NBM. Expression (26) shows the difference in NBM’s profits by producing private labels when it sells it to \( t \) retailers \textit{vis a vis} when it sells it to one retailer. Since \( \Delta \pi^{m1} > \Delta \pi^m \) for any \( t > 1 \), the NBM would prefer to sell the private label to \( t \) retailers (\( \Delta \pi^{m1} = \Delta \pi^m \) only for \( t = 1 \)). This result is explained, basically, by the larger synergies that can be obtained by selling the private label to more retailers. Proposition (4) is derived from expression (25):

\[
\Delta \pi^{m1} - \Delta \pi^m = \frac{(1-t)(c - d - \delta)\beta}{2(t+1)(\delta + d)}
\]  

**Proposition 4:** a) The NBM’s gains by producing the private label, when its unique effect is to take advantage of economies of scale, are decreasing with the concentration of the retail market, while the NBM’s losses when its unique effect is to improve the quality of the private label are decreasing with the concentration of the retail market.

To explain part (a) of proposition (4) we first derive equation (27) that shows the difference in NBM’s profits by producing the private label when the NBM enjoys cost advantages from economies of scale and there are no differences in the perceived quality of the private label (\( \beta > 0, d = 0 \)). Notice that contrary to the result obtained when the NBM sold its private label to one retailer, in this case \( \partial \Delta \pi^{m2}/\partial t > 0 \). This result shows that the NBM’s gain by selling private labels is larger as the market is less concentrated and is explained by the higher total quantity traded in a Cournot setting when there is an increase in the number of firms.
Two part tariffs

In the previous section, we analyzed the case where the NBM charges linear wholesale prices. However, a common pricing scheme in the relationship between NBMs and retailers involves the charging of non linear prices. One of such non linear pricing schemes is a two-part tariff \((f, w)\) where \(f\) is a fixed payment from the retailer to the NBM and \(w\) is the linear unitary wholesale price. In what follows, we analyze the NBM’s incentives to produce private labels when it can apply a two-part tariff. To simplify the presentation, in this section we assume \(t = 1\) and \(c = 0\).

The maximum fixed payment that a retailer will be willing to pay by carrying the NBM’s products equals the incremental profits obtained by selling them. By carrying the national brand and the private label produced by the NBM, the retailer will market a private label of quality \(\delta_1\) and the national brand, while if it does not carry them, it will sell a private label of quality \(\delta\). Assuming that when charging a two part tariff, the linear wholesale prices charged by the NBM are equivalent to the marginal costs of production of each good \((c\) and \((c - \beta)\))\(^4\), the retailer profits by selling both goods are given by (28):

\[
\pi' = (p_n - c)q_n + (p_s - (c - \beta))q_s \tag{28}
\]

From the first order condition of (28) we obtain

\[
p_n = 1/2; \quad p_s = (\delta_1 - \beta)/2; \quad q_n = (1 - \delta_1 - \beta)/(1 - \delta_2); \quad q_s = \beta / 2(\delta_1 - \delta_2^2). \tag{29}
\]

Replacing these results in (28) we obtain the retailer’s profits (expression 29):

\[
\Delta \pi_{m2}^{(n)} = \frac{\beta t (\delta - 2c)}{2(t + 1)\delta} > 0 \tag{27}
\]

\(^4\) To charge the marginal price is not necessarily the optimal linear price with a two-part tariff scheme when the same company sells two substitute products. However, it is generally a good approximation of it.
\[ \pi' = \frac{(\delta_i - \delta_i^2 + \beta^2)}{4(\delta_i)(1-\delta_i)} \]  \hspace{1cm} (29) 

On the other hand, by selling a private label of quality \( \delta \) supplied by independent manufacturers we obtain: \( q_s = \frac{1}{2} \), \( p_s = \frac{\delta}{2} \) and retailer’s profits \( \pi' = \frac{\delta}{4} \). Thus, the maximum fixed payment that can be charged by a NBM that supplies both goods at their marginal cost is given by \( f \) in expression (29):

\[ f = \frac{(\delta_i - \delta_i^2 + \beta^2)}{4(\delta_i)(1-\delta_i)} - \frac{\delta}{4} = \frac{(d + \delta - 2d\delta - d^2 + \beta^2 - \delta^2)}{4(\delta + d)(1-d)} - \frac{\delta}{4} > 0 \]  \hspace{1cm} (29) 

The NBM may also choose not to produce the private label. In this case, to assure that the retailer will charge a national brand’s price to consumers such that the profit of the vertical structure is maximized, the national brand wholesale price is set at its marginal cost \( c \). However, since the marginal cost of the private label provided by the independent manufacturers and the national brand are assumed to be identical, profits of the vertical structure are maximized when the retailer sells only the national brand. In this case, the retailer’s price, quantity and profits are \( q_n = \frac{1}{2} \), \( p_n = \frac{1}{2} \) and \( \pi_r = \frac{1}{4} \).

Since by rejecting the offer of the NBM the retailer may always sell a private label of quality \( \delta \), the maximum fixed payment than can be charged by the NBM to the retailer is given by \( f_i \) in expression (30). From this expression we derive proposition (5):

\[ f_i = \frac{1}{4} - \frac{\delta}{4} = \frac{1-\delta}{4} \]  \hspace{1cm} (30)

**Proposition (5):** If charging a two part tariff, the NBM should prefer producing both the national brand and the private label.
Proposition (5) is obtained from expression (31) which is the difference between expressions (29) and (30). Expression (31) shows the difference in the fixed fee that can be charged by the NBM when it offers both goods to the retailer:

\[ f - f_1 = \frac{\beta^2}{4(\delta + d)(1-\delta - d)} \]  

(31)

Since \( f > f_1 \); if charging a two-part tariff, the NBM should prefer to produce both goods. A two part tariff favors the production of both goods since by selling a private label of better quality there is no negative effect on the national brand’s wholesale price (its unit price equals its marginal cost). Thus, the NBM appropriated for itself the additional profits.

Next, we compare the profits obtained by the NBM by charging a two-part tariff and a linear price assuming it produces both goods. As it can be seen, the NBM’s profits are larger by charging a two-part tariff.

\[ \Delta = \frac{(\delta_1 - \delta_1^2 + \beta^2)}{4(\delta_1)(1-\delta_1)} - \frac{\delta}{4} - \left( \frac{1-\delta_1}{8} + \frac{\beta}{4} \right) > 0 \]

To implement an optimal two-part tariff, the NBM must have complete information about the consumer demand and the perceived quality of the private label produced by independent manufacturers. As the uncertainty regarding those variables increases, the NBM would be at an informational disadvantage, and a two-part tariff will be less profitable for it.

4. Summary

The results presented in this paper shed some light as to why some NBM may want to produce private labels and others not. Two important reasons are idle capacity and the

---

5 Given that in any of both cases we assume that the NBM charges its marginal cost for each product, its profits will be given by the fixed fee.
consumers’ perceived quality of the private label. As the NBM’s idle capacity is larger and
the change in perceived quality is lower, it is relatively more convenient for a NBM to
produce private labels. We also show that when the NBM does not enjoy cost advantages
from the production of a private label, the cannibalization effect dominates and then, NBMs
should avoid producing private labels.

Thus, by producing a private label of better quality, a leading NBM may avoid the threat
posed by private labels produced by other manufacturers and by secondary national brand
competitors. This conclusion is more important as the retailer’s shelf space becomes more
scarce.

National brand manufacturers are facing increasing competition from other branded
manufacturers and from private labels. Moreover, the concentration of the retail market in a
number of countries has increased the bargaining power of retailers against branded
manufacturers. In this scenario, national brand manufacturers need higher efficiencies to
compete successfully. The production of private labels may be a way to increase
efficiencies, mainly if there is space to take advantage of economies of scale by producing
both goods.

NBMs should be more enthusiastic about producing private labels when independent
manufacturers may produce a good whose perceived quality is closer to that of the national
brand for at least two reasons: i) the market share of the national brand goes down,
reducing the cannibalization effect on the national brand’s wholesale price; ii) the quantity
sold of the private label rises, increasing the positive effect due to economies of scale.
Moreover, when it is relatively easy to imitate a national brand, it may be relatively more
convenient for the NBM to produce a private label to preempt the introduction of a
competitor to the branded market.

From the results presented in this article we may speculate that a likely reason to produce
private labels by a NBM that does not have cost advantages is to preempt the entry of
independent manufacturers to its branded market. This preemption is more valuable when it
is more likely that private label producers represent a threat to the national brand, for example owing to a steeper learning curve, scarcity of retailer’s shelf space, or insufficient strength of the national brand.

Since there is evidence of a positive correlation between retail market concentration and private label market share, the results presented in this paper reinforce the evidence that retailers’ incentives to market private labels are increasing with the concentration of the retail market. In this article, we also show that the national brand manufacturer’s incentives to produce private labels are increasing with the concentration of the retail market when the NBM sells its private label to one retailer, while the opposite result is true when the NBM sells its private label simultaneously to different retailers.
Bibliography


